Digital Agenda Framework 2017

ACCELERATE TO THE DIGITAL STATE

LIST OF ABBREVIATIONS

BPO	Business Process Outsourcing
C2C	Connect-to-Compete
CICT	Commission on Information and Communications Technology
CIO	Chief Information Officers
CPO	Creative Process Outsourcing
DBT	Direct Benefit Transfer
DOST	Department of Science and Technology
e-NAM	Electronic National Agriculture Market
FAO	Food and Agriculture Organization
FMCG	Fast Moving Consumer Goods
G2G	Government-to-Government
G2B	Government-to-Business
G2C	Government-to-Citizen
GDP	Gross Domestic Product
GNI	Gross National Income
GSMA	GSM Association
HDI	Human Development Index
IBPAP	Information Technology and Business Process Association of the Philippines
ICT	Information Communication Technology
IoT	Internet of Things
IT	Information Technology
ITB	Information Technology Board
ITU	International Telecommunication Union
JAM	Jan Dhan-Aadhaar-Mobile
KPO	Knowledge Process Outsourcing
MDEC	Malaysia Digital Economy Corporation
MDG	Millennium Development Goal
MeitY	Ministry of Electronics & IT
MFS	Mobile Financial Services
MoC	Ministry of Commerce
MoF	Ministry of Finance
MoENT	Ministry of Federal Education and Professional Training
MoIT	Ministry of Information Technology
MOSTI	Ministry of Science, Technology & Innovation
MB	Monetary Board
MSC	Multimedia Super Corridor
MSMEs	Micro, Small, and Medium Enterprises
NCTA	National Cable and Telecommunications Association
NDRC	National Development and Reform Commission
NETP	National Educational Technology Plan
NFIS	National Financial Inclusion Strategy
NRI	Networked Readiness Index
OECD	Organization for Economic Co-operation and Development
OTT	Over the Top Services
PDS	Philippines Digital Strategy
PEMRA	Pakistan Electronic Media Regulatory Authority
PEZA	Philippine Economic Zone Authority
PITB	Punjab Information Technology Board
PTA	Pakistan Telecommunications Authority
PwC	PricewaterhouseCoopers
R&D	Research and Development
SBP	State Bank of Pakistan
SDG	Sustainable Development Goal
SECP	Securities & Exchange Commission of Pakistan
TUENA	Turkish National Information Infrastructure Plan
VC	Virtual Currency
USF	Universal Service Fund
WEF	World Economic Forum

CONTENTS

EXECUTIVE SUMMARY

Digitalization - a revolution in itself, is redefining the way people live, interact, transact and develop as one world. The impact of digital change is rapid and far reaching. Never have individuals, businesses and nations been so dependent on technology, as they are today. Digital is taking center stage in our day-to-day dealings, demanding countries to make digitalization a top priority in their national development agendas.

The case for digitalization needs no winning arguments. Nations becoming increasingly digital have experienced growth and productivity in their economies and businesses, leading to more jobs, higher levels of innovation, and better quality of life. Digitalization has positively impacted every area and industry - from better access and connectivity opportunities to more convenience and ease in services, from information dissemination to knowledge sharing, from creating efficiencies in health and education to improving service delivery in commerce and agriculture sectors. **Customer Obsessed approach to deliver** e-Citizen services, **Innovation** in business models, **Collaborative** partnerships across sectors and industries, **Entrepreneurs** with exciting ventures – are all thriving examples of people and societies truly embracing the digital way today.

In order to realize digitalization, countries' development plans need to have a focused, government-owned national digital agenda, backed with a progressive strategy and concrete plan. While several countries around the world have already started, and in some cases made significant progress in, their digital journeys, Pakistan is only just starting to develop a policy framework around a digital strategy.

This paper is an effort to contribute to the Digital Pakistan agenda by suggesting a framework focused on **policy making, digital services growth and enabling a digital ecosystem**. The document begins by defining a digital economy and establishing the actual need for digitalization in emerging economies such as Pakistan. Using other global countries as comparative benchmarks, the paper also looks at the numerous benefits - economic, social, and governmental - that economies experience when countries digitalize. In addition to giving a detailed account of Pakistan's standing in global digital rankings, the document also highlights the multi-faceted challenges, early initiatives and interplay of various enablers in Pakistan's digital ecosystem. The conclusion presents a calculated set of recommendations, with a designed action plan and detailed roles, responsibilities and guidelines. The recommendations made are based on the foundation laid by the existing policy regime in the country. This paper duly acknowledges existing efforts made by designated ministries, regulatory bodies, and public and private sector firms in driving the digital agenda forward.

Digital change is real and so are the opportunities. The benefits of going digital encourage governments to embark on a coordinated, collaborative journey of digitalization, hand-in-hand with all stakeholders. From policy making to implementation, from public ownership to private sector commitment, from building infrastructure to enhancing skills and from growing individually to working together across industries – this will enable digital growth and expansion in Pakistan. With the government's growing efforts, digital change has taken its roots in Pakistan, yet there are many areas that, with further attention, can help build a sustainable and strong Digital Pakistan.

1. Introduction

1.1 The Purpose

Accelerate to the Digital State is an aspirational effort to assist the digitalization journey of Pakistan. The report is positioned to propel forward the agenda for digital policy formulation and implementation in the country, in collaboration with key stakeholders of the digital ecosystem. It is a humble contribution from the private sector towards the big endeavor of building a Digital Pakistan.

1.2 The Methodology

This document is built on several brainstorming sessions, extensive research, and key analysis to develop a proposal for the Digital Agenda Framework. Key questions related to digitalization and its use, benefits, challenges as well as different countries' approaches and practices, highlighted the need for a thorough research exercise.

Primary research, through various stakeholder surveys using unstructured interviews, was conducted, seeking the input of industry thought leaders and policy makers. The stakeholders consulted were categorized as follows: Government (federal, provincial, and sector-specific ministries), Advocacy Groups & Multi-lateral Organizations, Private Sector Companies, and Research & Academic Institutions. Some informal insights were also gathered through industry leaders as well as former and current policy makers. Secondary research consisted of newspapers, reports, online publications, statistic databases and global indices.

Analysis was based on two levels – international context and local context. Within the international context, each country's digital journey, digital policies & frameworks, and key initiatives were analyzed to extract key learnings. Within the local context, national and provincial level digital policies were analyzed, alongside a sectoral analysis of four sectors. For each sector, the paper analyzes the sector's existing policy regime, relevant stakeholders and current digital initiatives.

The ideas, research and analysis have helped propose a guideline for the digital agenda framework. Key challenges, opportunities and recommendations were identified for establishing a roadmap towards a Digital Pakistan.

Brainstorming
Key Questions

Research
Primary, Secondary

Analysis
International Context
National Context

Digital Agenda Framework
Key Challenges
Key Opportunities
Recommendations

Figure 1: The Methodology

1.2.1 Research Limitations

While this report aims to be the first of its kind, defining digitalization in Pakistan at a holistic level, there are few limitations in its research scope.

The paper is primarily based on secondary research with limited input from primary research. The main source of research is the internet including federal/provincial sites and portals as well as global digital-related and country specific reports. The information available on such public forums varies from country-to-country and sector-to-sector so there could be minor disparities while compiling the report.

Undertaking several digital initiatives, every country in this analysis has seen an improvement on various digital indices over the years. However, to highlight the impacts of digitalization, only two or three initiatives have been selected for each country. The report is not establishing direct correlation of the stated initiatives or programs to the overall digital progress in the country. Realizing that digital progress is an outcome of several factors, this report addresses the progress and initiatives as a possible contribution to the digital growth but not as the only reasons for it. As for the local context, only high level sectoral analysis has been conducted to set the baseline, with a detailed analysis on the sectors to be addressed in the subsequent versions of this document.

1.2.2 Scope and Way Forward

The paper serves as a high-level policy analysis of existing documents and current federal and sectoral initiatives for a digital framework for Pakistan. Other countries are also reviewed under their respective digital policy frameworks, visions, strategies, and initiatives. This paper is the first volume in a series of policy framework research papers. The next volume will take a closer look into Pakistan's sector-level policy initiatives and challenges, providing a deeper understanding of digitalization requirements for each sector.

1.3 Structure of the Document

The report begins by introducing the reader to digitalization and other associated concepts including **digital societies, digital divide,** and **digital revolution**. Later, it explains the benefits of digitalization, followed by the pitfalls of digital divide for different countries. The continuing section highlights the economic, social, and governance benefits which economies of the world have reaped through digitalization.

Digitalization, and its various benefits, can be measured through different international indicators with the report focusing on selected indicators **- World Economic Forum (WEF)'s Network Readiness Index (NRI), International Telecommunication Union (ITU)'s ICT Development Index, International Telecommunication Union (ITU)'s Access to Internet, Tufts University's Digital Evolution Index,** and **GSM Association (GSMA)'s Digital Development Index**. Using the indicators, the subsequent section conducts a comparative country analysis to assess and learn from the digital journeys of the Philippines, Russia, China, India, Turkey, Malaysia, and the USA.

The section following the comparative country analysis, maps Pakistan's digital journey in the context of its existing policy landscape and the relevant international indicators. A dive into different pertinent sectors - including Education, Health, Commerce, and Agriculture - provides a review of sector-specific initiatives and key stakeholders involved. Key challenges for Pakistan are addressed, followed by a comparative analysis of current policies and planning programs. The report concludes with a recommendations section which synthesizes the learnings from local as well as international contexts so as to present a workable roadmap for expediting Pakistan's journey towards digitalization.

ABOUT DIGITALIZATION

2. About Digitalization

2.1 What is Digitalization?

"The First Industrial Revolution used steam power to mechanize production. The Second used electric power to create mass production. The Third used electronics and information technology to automate production. Now a Fourth Industrial Revolution is building on the Third. It is characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres."

- Professor Klaus Schwab, Founder and Executive Chairman, World Economic Forum (WEF)1

The terms digital economy, digitalization, and digitization have been used interchangeably to describe the movement of the world's economies towards the Fourth Industrial Revolution. PricewaterhouseCoopers (PwC), in Maximizing the Impact of Digitization, describes digitization as the **"mass adoption of smart and connected ICT by consumers, businesses, and governments,"**[2] whereas Gartner describes digitalization as **"the use of digital technologies to change a business model and provide new revenue and value-producing opportunities."**[3]

All definitions recognize the growing importance of digital technologies for individuals, corporations, and countries. Today, the emergence of a digital economy has become a catalyst for change across every industry and country in the world. Technological advances in fields such as Artificial Intelligence, 3-D Printing, the Internet of Things, and Robotics, all have the potential to revolutionize operations with the ability to transform entire systems of production, management, and governance in private, public and development sectors.

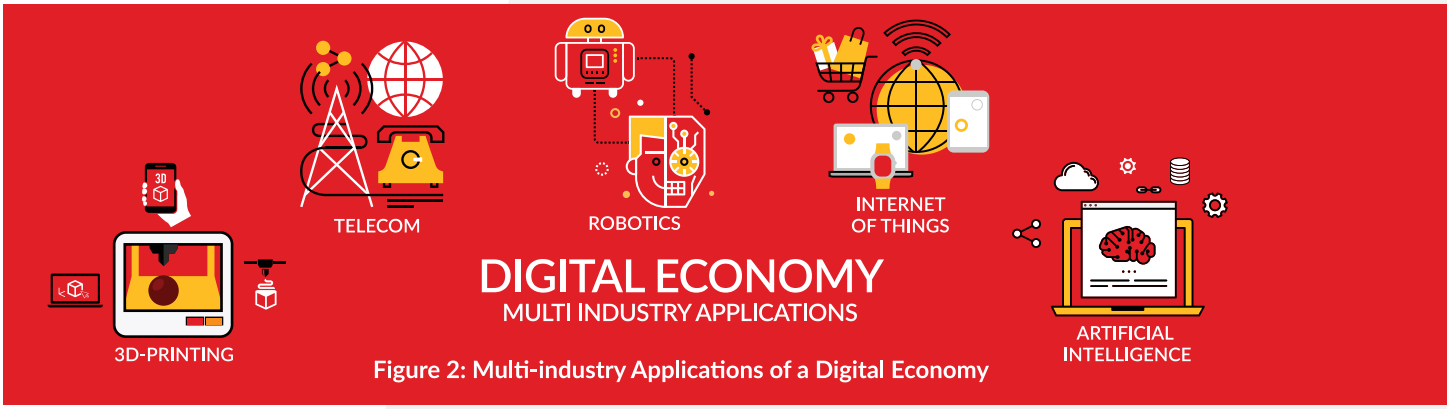

Figure 2: Multi-industry Applications of a Digital Economy

2.2 Benefits of Digitalization

Digitalization is of paramount importance especially for emerging economies. Nations that fail to digitalize fast enough face the threat of a digital divide and an unsustainable economy. The efficient use of digital technologies is a key driver for economic advancement, societal well-being, and government effectiveness. A key reason behind these multi-faceted benefits is the connectivity that digital brings - connecting people, government and business in real time. Rural and urban disparities decrease, allowing for connectivity and hence mass-level benefits for people nationwide. Silos in remote areas are broken down, allowing for greater communication, accessibility and ultimately more opportunities for more people.

Data suggests that between 2015 and 2016, internet users grew by 10%.[4] In 2017, global internet users totaled 3.77 billion – a 50% penetration rate.[5] Digitalization has allowed for the expansion of social media – a key method of communication.[6] Active social media users have increased by 21% in 2016 from 2015. With 2.80 billion global social media users in 2017, equaling 37% penetration, social media usage is expected to increase.[7]

Nations that reach advanced levels of digitalization experience significant benefits in their economies, their societies, and the functioning of their public sectors.

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[1]Klaus Schwab, "The Fourth Industrial Revolution: what it means, how to respond," Work Economic Forum, Retrieved May 2, 2017: https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond

[2]Karim Sabbagh, Bahjat El-Darwiche, Roman Friedrich, and Milind Singh, "Maximizing the impact of digitization," PricewaterhouseCoopers, Strategy&, 2012

[3]"Digitalization: Gartner IT Glossary," Gartner IT Glossary, Retrieved May 3, 2017, from: http://www.gartner.com/it-glossary/digitalization/

[4]Simon Kemp, "Digital in 2017: Global Overview," We Are Social, Last modified 24th January 2017, Retrieved from https://wearesocial.com/special-reports/digital-in-2017-global-overview

[5]Ibid.

[6]Ibid.

[7]Ibid.

2.2.1 Economic Impact

Increasing Economic Growth – The economic impact of digitalization can be identified by several variables, most notably growth in per capita GDP, innovation and ultimately job creation. Studies show that as nations digitalize, they improve their per capita GDP. Analysis by Accenture and Oxford Economics (2015) shows that digital technologies can be harnessed to unlock faster economic growth, adding as much as US $1.36 trillion to the GDP of the world's top 10 economies by 2020.[8] PwC highlighted that an increase of 10% in a country's digitization index reduces a nation's unemployment rate by 0.84% – and from 2009 to 2010, digitization added an estimated 19 million jobs to the global economy, up from the estimated 18 million jobs added from 2007 to 2008.[9] The World Bank Group's Development report stated that in developing countries, the ICT sector accounts for only on average about 1% of the workforce. However, in OECD countries, the ICT sector accounts for 3-5% of the employment rate.[10]

Enhancing Innovation – PwC analysis established a correlation between a country's digital development and innovation by highlighting that a 10-point increase in a country's digitization score leads to a 6-point increase in the country's Global Innovation Index.[11] With access to digital platforms for research, development, marketing, sales, and distribution, companies can continuously improve the quality, speed, or profitability of their products. Such digital platforms also allow for the emergence of more competitors. With growing transparency, consumer engagement, and new patterns of consumer behavior, companies and competitors are forced to innovate and adapt the way they design, market, and deliver products and services.

Case in Point: The UK

With a strong e-Commerce sector involving online retailing, sales of Internet-related devices, IT and telecommunications investments, and internet-related government spending, the UK's digital economy has the largest proportion of GDP among G-20 countries.[12] In 2014, the economic contribution of the digital economy in terms of Gross Value Added was £118 billion, 7% of UK's total.[13] Digitalization also has a significant impact on job creation.

2.2.2 Social Impact

Improving Quality of Life – Using the Gallup Wellbeing Thriving Index and the Organization for Economic Co-operation and Development's (OECD) Better Life Index which measures quality of life, PwC found that digitalization significantly boosts societal well-being in a developed economy. Their analysis revealed that a 10-point increase in the digitization score results in an increase of approximately 1.3 points in the OECD Better Life Index.[14] While developed nations continue to reap the benefits of digitalization, developing nations also experience enormous benefits in the form of better access to basic services such as health, education and living standards, as measured by the UNDP's Human Development Index (HDI). A 10-point increase in the digitization score increases HDI by approximately 0.13 points.[15]

Attaining Sustainable Development Goals (SDGs) – Utilizing digital technologies can also help nations to achieve their Sustainable Development Goals (SDGs) as identified by the UN. Firstly, ICTs are able to diffuse at a remarkable speed allowing these technologies to become more accessible. Research reported by Columbia University indicates that mobile phones, computers, the internet, and social media have been the fastest technologies to be adopted by communities.[16] Furthermore, ICTs also reduce costs of deploying new services, making it possible for nations to deliver quality services to masses across different sectors, and meeting national SDGs.

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[8]"Digital Density Index: Guiding digital transformation." Accenture, Retrieved May 5, 2017 from: https://www.accenture.com/us-en/insight-digital-density-index-guiding-digital-transformation (2015)
[9]Karim Sabbagh, Bahjat El-Darwiche, Roman Friedrich, and Milind Singh, "Maximizing the impact of digitization," PricewaterhouseCoopers, Strategy&, 2012
[10]World Development Report 2016: Digital Dividends," World Bank Group, Retrieved May 5th, 2017, http://www.worldbank.org/en/publication/wdr2016
[11]Karim Sabbagh, Bahjat El-Darwiche, Roman Friedrich, and Milind Singh, "Maximizing the impact of digitization," PricewaterhouseCoopers, Strategy&, 2012
[12]"Digital Economy Concept, Trends and Visions: Towards a Future-Proof Strategy," Discussion Paper from the World Bank Group, Last accessed April 17th 2017, http://pubdocs.worldbank.org/en/513361482271099284/Digital-Economy-Russia-Discussion-paper-2016-12-20-eng.pdf
[13]Ibid.
[14]World Development Report 2016: Digital Dividends," World Bank Group, Retrieved May 5th, 2017, http://www.worldbank.org/en/publication/wdr2016
[15]Ibid.
[16]"How Information and Communications Technology can Accelerate Action on the Sustainable Development Goals: ICTs & SDGs," Ericsson & The Earth Institute at Columbia, Retrieved May 6, 2017: https://www.ericsson.com/en/news/2016/5/ericsson-and-earth-institute-ict-accelerates-action-on-sustainable-development-goals

2.2.3 Impact on Government

Improving Transparency – PwC's analysis demonstrated that greater digitalization also enables a society to become more transparent, increasing public participation and government's ability to broadcast information. A 10-point increase in digitization saw an increase in the Transparency International Index by approximately 1.2 points.[17] Digital technologies lead to more active political participation by giving the population more insight into government policies and functions.

Enabling e-Governance – e-Government services and basic government services, such as public education, are more effective when using digital channels. An increase of 10 points in digitization led to an improvement in the effectiveness of e-Government, proving that higher digitalization contributes to more efficient delivery of e-Government services.[18]

Case in Point: e-Governance

Many governments have taken steps towards implementing digital technologies in their nations. In Uzbekistan, the government launched two programs to advance digital development in the country: the "ICT Infrastructure Development Program 2015-2019" (9 projects) and the "e-Government Development Program 2013–2020" (28 projects).[19] Within the e-Government program, Uzbekistan launched 265 online services and 600 government agencies, implemented user feedback on service quality and e-Participation, increased transparency in public service delivery, set-up a call-center, and established "One-Stop-Shops" in 194 districts.[20] In March 2015, Uzbekistan also launched an Open Data Portal, where the government uploaded 709 datasets on 15 subject areas with 63 data providers and 267k downloads.[21] Similarly, the Ministry of Communications and Information Technologies (MCIT) of Afghanistan has also developed a road map for activities under its e-Governance program. By the end of 2018, almost 70% of services would be available electronically.[22]

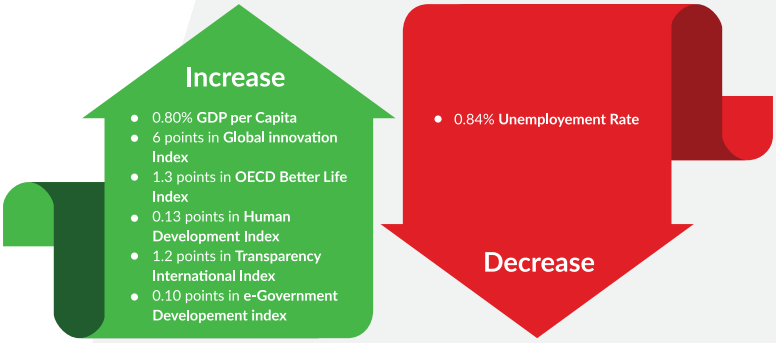


Figure 3: Impact of 10%/10 Point increase in Digitalization (Source: PricewaterhouseCoopers - 2012)

2.3 The Digital Divide

A digital divide is a technological gap in terms of access to, and usage of, ICT. It is also defined as **"the social stratification due to unequal ability to access, adapt and create knowledge via use of information and communication technologies."**[23] Countries that fail to digitalize may face this digital divide while those that digitalize can reap the economic, social, and governmental benefits.

A digital society, free from the digital divide, is an aggregate of people where citizens can seamlessly interact – for work, entertainment, communication – through digital channels with the help of connected devices and interoperable services. Such a society enables people to access multiple public and private services, including but not limited to education, health, financial services, utilities and citizen services, transport, commerce, and agriculture, using digital technologies anytime and anywhere.

[17] Karim Sabbagh, Bahjat El-Darwiche, Roman Friedrich, and Milind Singh, "Maximizing the impact of digitization," PricewaterhouseCoopers, Strategy&, 2012
[18] Ibid.
[19] "Reaping the Benefits of Digital Technology in Central Asia," The World Bank, Accessed on May 7th, 2017, http://www.worldbank.org/en/news/feature/2016/03/15/reaping-the-benefits-of-digital-technology-in-central-asia
[20] Ibid.
[21] Ibid.
[22] Ibid.
[23] "Smart policies to close the digital divide: Best practices from around the world," Economist Intelligence Unit, Accessed on May 7th, 2017, http://unpan1.un.org/intradoc/groups/public/documents/un-dpadm/unpan049753.pdf

MEASURING
DIGITALIZATION
THE GLOBAL CRITERIA

3. Measuring Digitalization – The Global Criteria

Multiple international indicators are available to assess the extent and impact of digitalization. Different indices measure digitalization differently - some on mass adoption of technology services, some on infrastructure availability and reach while others merely on connectivity. The goal is to establish parameters to evaluate key enablers for digitalization which often includes calculations regarding a country's conducive environment (political, regulatory, business & innovation centric), capabilities for adoption (infrastructure, skills and affordability), and active usage (individual, business and government).

The five indices used to measure digitalization in this report are **World Economic Forum (WEF)'s Network Readiness Index (NRI), International Telecommunication Union (ITU)'s ICT Development Index, International Telecommunication Union (ITU)'s Access to Internet, Tufts University's Digital Evolution Index,** and **GSM Association (GSMA)'s Digital Development Index**. In order to track the digital journey of each country, rankings from the years 2012 through 2016 were collected where available.

3.1 WEF's Networked Readiness Index (NRI)[24]

World Economic Forum's Networked Readiness Index (NRI) measures how well an economy is using information and communications technologies to boost competitiveness and well-being. A country's networked readiness depends on whether it has the necessary drivers for digital technologies to meet their potential, and on whether these technologies actually have an impact on the economy and society.

The Index comprises of four sub-indices namely a) environment for ICTs, b) readiness of a society to use ICTs, c) actual usage by all main stakeholders, and d) impact that ICTs generate in economy and society. The first three (Environment, Readiness, and Usage) serve as drivers that establish the conditions for the fourth sub-index, ICT Impact.

a. **Environment sub-index** gauges the support provided by a country's political, regulatory, business and innovation environment to incorporate and utilize ICT within the country.

b. **Readiness sub-index** measures the degree to which a society is prepared for digital change, which includes a country's skills, affordability, and existing ICT infrastructure and digital context.

c. **Usage sub-index** assesses the effort required of the main social agents, i.e. individuals, business and governments, to increase their capacity to use ICT, and measures their use of digital in their day-to day activities with other agents.

d. **Impact sub-index** measures the extent to which economic and social impacts of ICT can boost competitiveness and wellbeing, and build a technology-savvy economy and society.

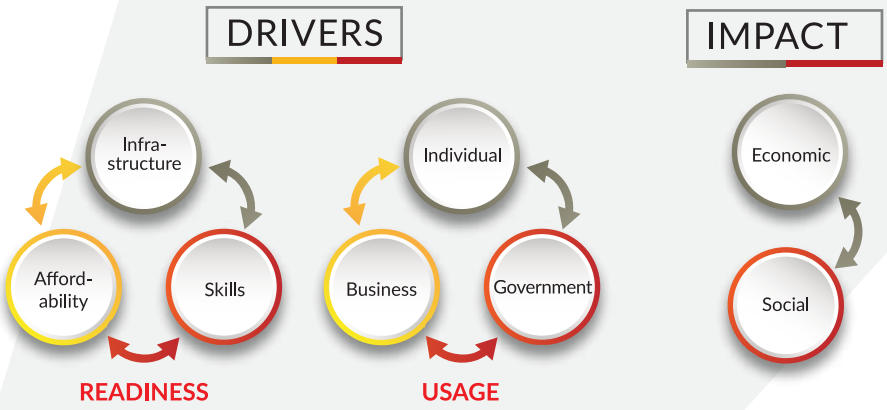


Figure 4: Networked Readiness Index (Source: World Economic Forum)

[24]"World Economic Forum: Networked Readiness Index," World Economic Forum, Retrieved May 5th, 2017: http://reports.weforum.org/global-information-technology-report-2015/networked-readiness-framework

3.2 ITU's ICT Development Index (IDI)[25]

The ICT Development Index ranks ICT performance within and across countries along 11 ICT indicators. These indicators are grouped in three clusters: access, use, and skills. The access sub-index (40% weight in ranking) captures ICT readiness and uses five indicators to measure infrastructure and access to ICT technologies. The use sub-index (40% weight in ranking) captures ICT intensity and includes three indicators measuring ICT usage and intensity of usage. The skills sub-index (20% weight in ranking) captures ICT capability or skills and uses three indicators to assess the education and literacy level of the population.

3.3 ITU's Access to Internet[26]

The International Telecommunication Union (ITU), with a comprehensive list of statistics from 2001 to 2015, has compiled various countries' data related to ICTs. Access to Internet is one of the measures recorded by ITU. Since internet is a basic component of connectivity which ensures the journey of an economy towards digital, it is critical to know the percentage of a country's population that has access to internet.

3.4 Tufts University's Digital Evolution Index (DEI)[27]

The Digital Evolution Index analyzes the state and pace of digital evolution across 60 countries. The current state of digital evolution is determined by the interplay of four drivers – supply conditions, demand conditions, institutional environment, and innovation & change – across 170 indicators. The pace of digital evolution over time is measured by the growth of a country's digital evolution score between 2008 – 2015. Countries are mapped onto four distinct trajectory zones which are used to identify the countries' digital competiveness as well as trust in digital economies:

a. Break Out Countries score low in their current state of digitalization but are evolving rapidly

b. Watch Out Countries face significant challenges with their low state of digitalization and experience low momentum

c. Stand Out Countries are highly digitally advanced and exhibit high momentum

d. Stall Out Countries enjoy a high state of digital advancement but exhibit slowing momentum

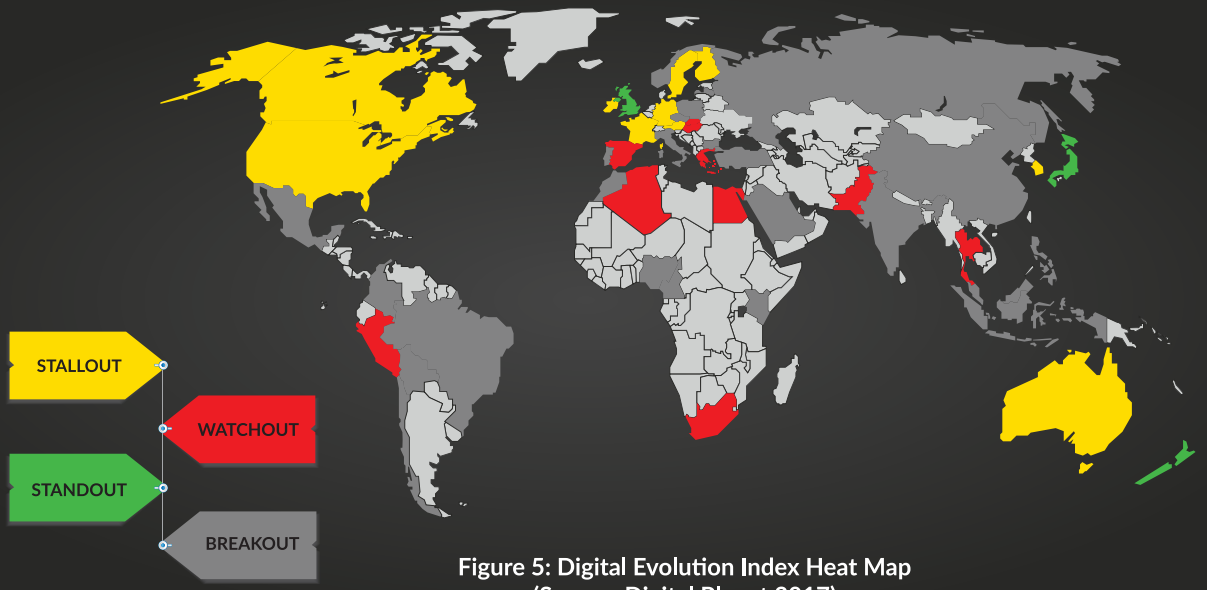


Figure 5: Digital Evolution Index Heat Map
(Source: Digital Planet 2017)

[25]"The ICT Development Index (IDI): conceptual framework and methodology," International Telecommunication Union, Retrieved May 5th, 2017: http://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis2016/methodology.aspx

[26]"International Telecommunication Union: Facts & Figures 2017," International Telecommunication Union, Retrieved May 5th, 2017: http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx

[27]"Bhaskar Chakravorti and Ravi Shankar Chaturvedi, "Digital Planet 2017 How Competitiveness and Trust In Digital Economies Vary Across The World", The Fletcher School, Tufts University July 2017, Retrieved on August 1st, 2017: https://sites.tufts.edu/digitalplanet/files/2017/05/Digital_Planet_2017_FINAL.pdf

3.5 GSMA's Digital Development Index[28]

GSM Association's Digital Development Index provides a comparative view of the current state of digitization across seven different countries and regions of the world. The level of digitalization is dependent on the connectivity and advancement of citizens on four components (digital citizenship, digital lifestyle, digital commerce, and connectivity).

Digital Citizenship Delivery of public services over digital channels

Digital Lifestyle Consumption of local content and solutions through smartphones

Digital Commerce Delivery of goods/services through digital channels and access to global marketplaces

Connectivity Ensuring reliable and continuous access to the internet

Assessing these four areas, making up the GSMA Digital Development Index, can determine a society's progress in digitalization and, therefore, any improvement in these areas allows for further advancement on the digital front.

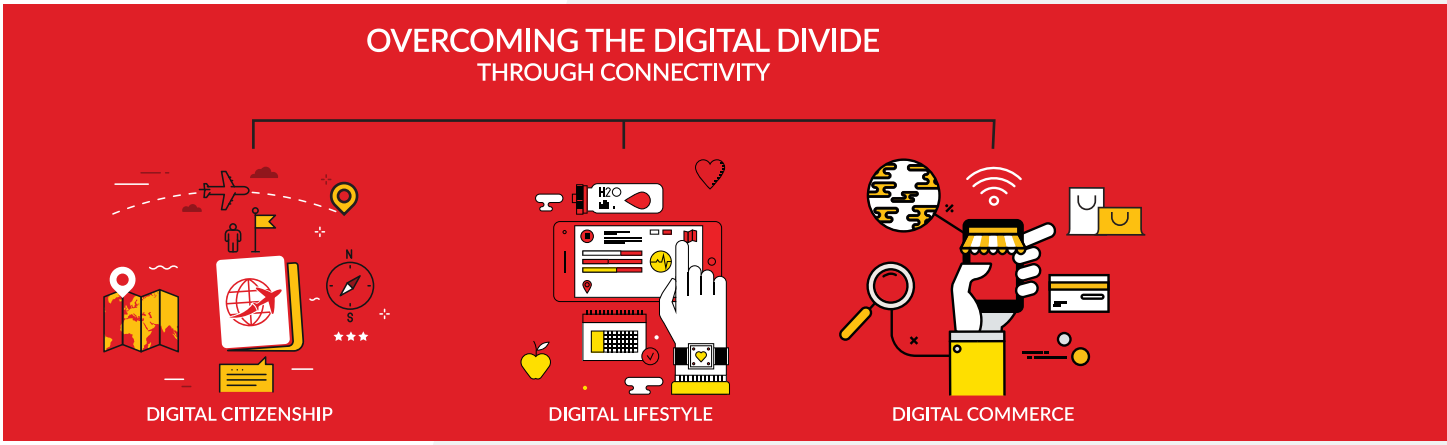


Figure 6: GSMA's Digital Developement Index (Source: GSMA)

The countries being reviewed under this index are categorized as:

Emerging Digitization is highlighted as spurring socio-economic development, improving social and financial inclusion, and increasing citizens' engagement with the government.

Transitional Digitization is focused on providing customized services for improved engagement between citizens and institutions, catering to urbanization by delivering advanced lifestyle services, and leveraging interoperability across networks irrespective of the sector.

Advanced Digitization is concentrated on developing interoperable digital technologies between sectors, improving citizen experience through provision of public services, utilizing smart technologies like IoT, and creating a more holistic and coordinated approach for a digital society.

Index	Description	Parameters
WEF's Networked Readiness Index (2012 - 2016)	Measures effectiveness of an economy in utilizing ICTs to boost competitiveness and well-being	Environment, Readiness, Usage, Impact
ITU's ICT Development Index (2012 - 2016)	Monitors and compares developments in ICT between countries and over time	Access, Use, Skills
ITU's Access to Internet (2012 - 2016)	Assesses extent of connectivity through access to internet	Percentage of individuals using the internet
Tufts' Digital Evolution Index (2017)	Analyzes the state and pace of digital evolution	Supply Conditions, Demand Conditions, Institutional Environment, and Innovation & Change
GSMA's Digital Development Index (2015)	Studies the level of connectivity and advancement of citizens in a country	Digital Citizenship, Digital Lifestyle, Digital Commerce, and Connectivity

Table 1: International Indicators for Digitalization

[28]"Building Digital Societies in Asia, GSMA, June 2015 and Advancing Digital Societies in Asia," GSMA, April 2016, https://www.gsmaintelligence.com/research/?file=bd5b3cf1d0533f9c9641039ba6966864&download


COMPARATIVE
COUNTRY
ANALYSIS

4. Comparative Country Analysis

Around the globe countries have embraced the digital way and therefore are continuously reaping digital benefits. It is imperative to understand where Pakistan stands, in terms of digitalization readiness, as per world renowned indexes. By studying different countries, Pakistan can learn what matters, what works and how to move ahead on its digital journey. This section will address these areas and will conclude on the key learnings from the global case studies.

WEF's Networked Readiness Index, known for its comprehensive and all-encompassing ranking methodology, was used to select the most relevant countries for the comparative country analysis. A total of 139 countries were placed into four quartiles based on their respective rankings on the NRI. Seven countries were subsequently chosen. Two countries – the **USA** and **Malaysia** – were selected from the first quartile (countries ranking from 1-35), three countries – **Russia, Turkey,** and **China** – were selected from the second quartile (countries ranking from 36-71), and two countries – the **Philippines** and **India** – were selected from the third quartile (countries ranking from 72-106). With a ranking of 110, **Pakistan** ranks in the fourth quartile. These specific countries were chosen based on their state and scope of digitalization, population and demographic relevance to Pakistan.

The seven countries reviewed for international best practices have each invested in different digital strategies and key initiatives, allowing them to transform into digital economies. While some initiatives have been benchmarked as successes, others highlight areas and challenges that should be addressed

	Philippines	Russia	China	India	Turkey	Malaysia	USA	Pakistan
IDI Rank (ITU 2016)	107	43	81	138	70	12	15	146
IDI Value (ITU 2016)	4.28	6.95	5.19	2.69	5.69	6.22	8.17	2.33
IDI Value (ITU 2012)	3.34	6.95	4.18	2.21	4 .69	6.22	8.17	1.83
NRI Rank/139 (WEF 2016)	77	41	59	91	48	31	5	110
NRI Score/7 (WEF 2016)	3.6	4	4.1	3.9	4.1	4.8	5.6	3.4
NRI Score/7 (WEF 2012)	3.6	4	4.1	3.9	4.1	4.8	5.6	3.9
Access to Internet(ITU 2016)	55.50%	76.41%	53.20%	29.55%	58.35%	78.79%	76.18%	15.51%
Access to Internet(ITU 2012)	36.24%	63.80%	42.30%	12.56%	45.13%	65.80%	74.70%	9.96%
Digital Development Index (GSMA 2015)	-	-	-	-	-	-	-	Emerging
DEI (Tufts 2017)	Break Out	Break Out	Break Out	Break Out	Break Out	Break Out	Stall Out	Watch Out

Table 2: Comparative Analysis of Selected Countries based on Different Indices (Source: WEF, ITU, Tufts, GSMA)

Note: The ranking of the countries varies based on the index used, as different indices consist of different indicators. The indices also give different weightage to its sub-indices. Each index's data source for its numbers and indicators also varies. Currently, only seven countries have been ranked on GSMA's Digital Development Index. This includes Japan, Singapore, Australia, Thailand, Indonesia, Bangladesh, and Pakistan.

The selected countries' digital context and transformation has been analyzed and summarized below. Each country case study begins with a **country profile** highlighting the country's digital standing. The **digital journey** of the country presents a brief history of the country's digital agenda, followed by an analysis of the **digital strategy** and **key initiatives** that the country has followed. Each country case concludes with **key learnings** – **positive and/or negative -** that Pakistan can consider on its path to becoming digital.

4.1 Philippines

Philippines' Digital Journey

With start-up tech firms around the region drawing billions of dollars in Foreign Direct Investment (FDI), the Philippines is positioned to be a frontrunner in the race to go digital.

In the Philippines, the Department of Information and Communications Technology (DICT), formerly called the Commission on Information and Communications Technology (CICT), is the primary policymaking, planning, coordinating, implementing, regulating, and administrative entity that promotes, develops, and regulates integrated information and communications technology systems.

The CICT began its focus on digitalization in 2006 with the launch of the Five-Year Strategy for the ICT Road Map. The ICT Road Map covered five major areas – 1) ensuring universal access to ICT, 2) developing human capital, 3) e-Governance, 4) business development, and 5) pursuing a legal and policy ecosystem for the ICT sector. The map further identified desired targets, strategies and actions required to achieve an information society.[29]

	NRI Rank / 139 (2016)	NRI Score / 7 (2016)	NRI Score / 7 (2012)	IDI Rank /175 (ITU 2016)	IDI Rank /157 (ITU 2012)	Access to Internet (ITU 2016)	Access to Internet (ITU 2012)	DEI (Tufts 2017)	Income Level	Population in millions (CIA 2016)	Literacy Rate (UNESCO 2016)	GDP at PPP (WEF 2016)
Philippines	77	4	3.6	107	101	55.50%	36.24%	Break Out	Lower Middle	103	95.60%	US $7,254

Digital Policies & Frameworks: Philippine Digital Strategy

Building on this ICT Road Map, the next notable focus on digitalization came through the creation of the **Philippine Digital Strategy (PDS)** 2011-2016, which was aligned with the Philippines Development Plan (PDP) 2011-2016.[30]

The PDS had four strategic areas focused on creating an enabling environment for country development and people empowerment.

Transparent Government & Efficient Services' Delivery

The PDS set the development of **e-Government** as a priority. Through implementation of systems, it prioritized the integration and interoperability of ICT infrastructure and services by improving existing government structures and institutions as well as upgrading the ICT skills of the entire bureaucracy for greater G2G, G2B, and G2C interaction.

[29]"The Philippine Digital Strategy Transformation 2.0: Digitally Empowered Nation," DICT Department of Information & Communications Technology, 2011
[30]Ibid.

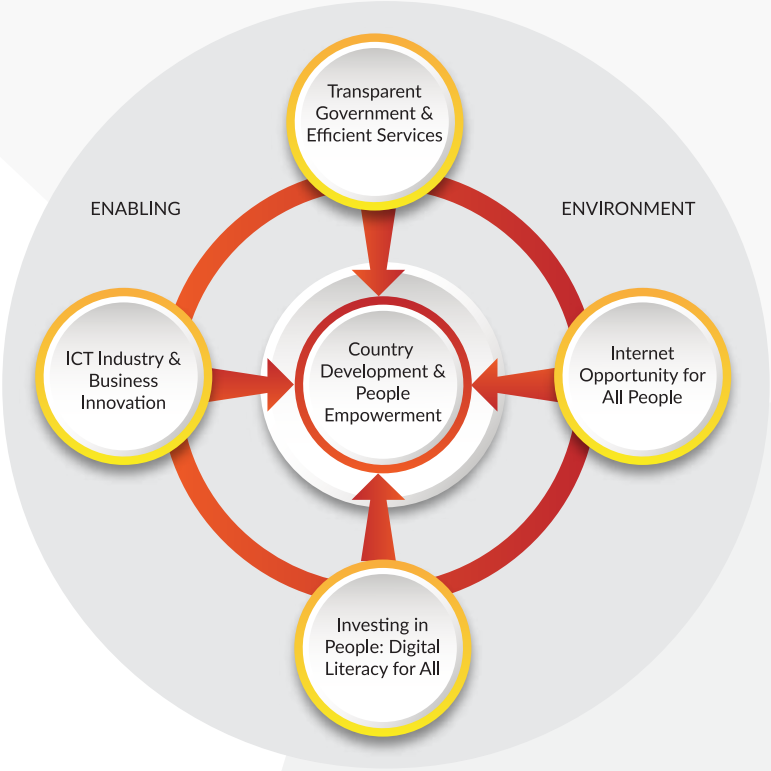


Figure 7: The Philippine Digital Strategy 2011-2016 (Source: DICT)

Internet Opportunity for All

The PDS emphasized private sector's role in developing a **broadband policy** to accelerate the expansion and service provision of broadband. With such development of public-private partnerships, internet would reach previously unserved areas and customers. Furthermore, the PDS stressed digital inclusion through **capacity building** – especially in schools – and content and applications development by both local players and stakeholders.

ICT Industry and Business Innovation

Focus on the continued growth of the **IT/Business Process Outsourcing (BPO) industry** was the third element of PDS. The aim was to branch outside of the metro cities and into underdeveloped regions, ensuring investment and job opportunities in other regions in the country. The strategy also provided a mechanism to enable micro, small, and medium size enterprises (mSMEs) by developing their capacity to use the Internet as a market expansion tool. Through **public-private partnerships,** investments in research and development, and business incubation facilities were encouraged.

Investing in People: Digital Literacy for All

The PDS aimed to address the needs of the formal sectors as well as the marginalized communities in the Philippines. Innovative approaches were taken to ensure the digital inclusion of all sectors of the population, including support for disabled people. Special focus was placed on content development and delivery of **ICT trainings.** Broadband Internet access and integration of ICT in curriculum across all levels of the education system were prioritized to ensure a skilled workforce along with a sustained leadership, particularly in the Business Process Outsourcing (BPO)/Knowledge Process Outsourcing (KPO)/Creative Process Outsourcing (CPO) sectors.

Key Initiatives

Business Process Outsourcing (BPO)

The growth in the Philippines' BPO sector has been driven by multiple factors including low labor costs; a highly skilled and educated workforce; competitive infrastructure; and in particular, government tax incentives. The Government has been active in attracting BPO investment through tax incentives favored by the Philippines Economic Zone Authority (PEZA). PEZA incentives include a special 5% tax on gross income earned, exemption from the payment of import duties and taxes on imported machinery, equipment and raw materials, a 50% deduction on training expenses, and permanent resident status for foreign investors who make an initial investment of US $150,000 or more.[31]

As a result, the Philippines' BPO sector outperformed the world's BPO industry performance, with an average growth of around 9–12% over BPO industry growth of around 5–7% between 2004 and 2014.[32] In 2011, the Information Technology and Business Process Association of the Philippines (IBPAP) along with the Philippines' Department of Science and Technology (DOST) created a 2011-2016 road map stating that the BPO industry would earn US $25 billion in revenues (7.3 per cent of GDP) by 2016 while employing 1.3 million people.[33] By 2014, total revenue in the Philippine BPO industry was US $18.4 billion – 6 per cent of GDP – employing 1.03 million people.[34]

Beyond Access

Beyond Access, an international non-profit organization, began its operations in 2013 with the aim to transform libraries into community information hubs. These hubs mobilize communities by equipping them with digital skills, community literacy, and digital services. Beyond Access has facilitated public-private partnerships between universities such as the University of the Philippines Open University, private corporations such as Intel Philippines, and government agencies such as the Department of Science and Technology (DOST).[35] Such partnerships support the Philippines in achieving the goal of "Investing in People: Digital Literacy for All" as stated in the Philippines Digital Strategy.

In 2015, 25 of the public libraries that worked with Beyond Access reported[36] that –

- 14,500 people participated in digital skills training
- 16,500 people had access to e-Government services
- Nearly 2,000 people accessed workforce development services

Philippines' Regulatory Framework for Digital Currency Exchanges

The Central Bank of Philippines issued a regulatory framework for the exchange of digital currencies in the country. The proposal received approval from the nation's Monetary Board (MB), a policymaking government body related to financial matters, and was put in effect as of 21st February, 2017. This came after the MB recognized the rapid growth of Virtual Currency (VC)-based payments and remittance transactions that are estimated at around US $5 to $6 million per month in the country.[37]

[31]Lorenza Errighi, Sameer Khatiwada and Charles Bodwell, "Business process outsourcing in the Philippines: Challenges for decent work", ILO Asia - Pacific Working Paper Series, December 2016
[32]Ibid.
[33]Ibid.
[34]Ibid.
[35]"Maximizing Digital Access in the Philippines," Beyond Access, August 2013 to June 2017
[36]Ibid.
[37]"Central bank of Philippines issues regulatory framework for digital currency exchanges," Econotimes Digital Currency Revolution, Last Modified February 8th, 2017, http://www.econotimes.com/Central-bank-of-Philippines-issues-regulatory-framework-for-digital-currency-exchanges-528759

The framework primarily focuses on facilitating conversion and exchange from virtual currencies to flat currency and vice versa. The regulation hopes to create a healthy environment for digital exchanges and also ensures its proper and regulated usage to prevent crimes such as tax evasion and money laundering. Its primary aim is to address potential risks that may arise from virtual currencies and also provide a system which encourages technological innovation in turn improving the financial system of the country. Identifying the growing usage of digital currencies in the nation, these guidelines and policies were implemented with the intention of protecting the financial system and consumers. The Central Bank of Philippines also claims that bitcoin usage is rising in the country, growing to 5–6 million a month compared to 2–3 million last year (2016).[38]

Key Learnings

1. Create a Digital Strategy

By establishing the Philippines Digital Strategy, the country defined a course of action with roles and responsibilities for different agencies which was owned by all instrumentalities of government, both national and local. Adoption of the PDS has seen an overall improvement in the Philippines' Networked Readiness Index. From 2012 to 2016, the Philippines saw an increase in its overall score from 3.6 to 4.0 while its overall ranking jumped from 86/142 to 77/139.[39]

2. Enhance Public-Private Partnerships (PPPs)

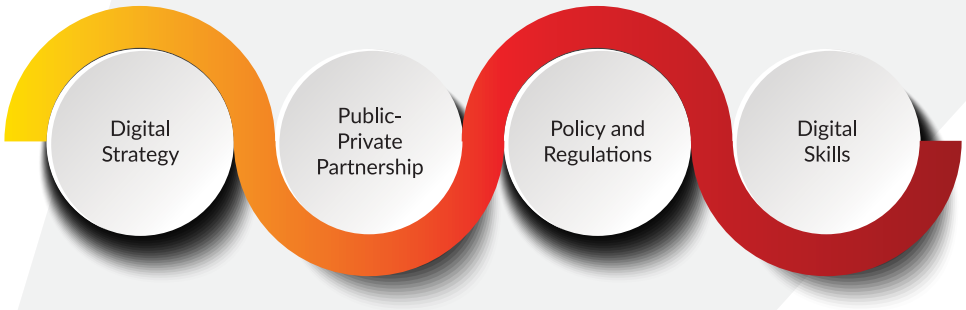
The Philippines utilizes PPPs for a majority of their digital programs and views it as an essential component to implement programs in e-Governance, broadband deployment, and ICT training. The roles of the private sector, civil society, and the government were deemed pivotal in developing ICT in the country.

3. Reform Policy and Regulations

New legislation in Philippines meant reorganizing the executive branch and elevating the role of ICT development to a dedicated department. Philippines has seen significant improvements in the effectiveness of law-making bodies and in the efficiency of the legal framework used to settle disputes and modify regulations. Over the last five years, total tax rates placed upon businesses have decreased as have the number of days to start a business, making it easier to do business in the Philippines. Better legal conditions for business coupled with an increased tertiary education enrollment rate (28.2% in 2009 to 35.8% in 2014),[40] contribute to a more conducive, attractive environment for foreign direct investments (FDIs), BPOs and SMEs.

4. Invest in Digital Skills

The Philippines' greatest strength continues to be its skills development. Since 2012, the quality of education systems – math and science in particular – coupled with an increase in secondary education enrollment have led to a highly literate population. With higher literacy rates, along with an increasing percentage of internet users, the Philippines has experienced an improvement in its individual usage, improving digital literacy and empowering a digital workforce.



[38]Iris Gonzales, "BSP regulates bitcoin usage," The Philippine Star, Last modified 20th January 2017, https://www.pressreader.com/philippines/the-philippine-star/20170130/282059096722670

[39]"Networked Readiness Index – Philippines," World Economic Forum, Retrieved May 25th, 2017 http://reports.weforum.org/global-information-technology-report-2016/economies/#economy=PHL

[40]Ibid.

4.2 Russia

Russia's Digital Journey

President Vladimir Putin set Russia on its digital journey in early 2017 when the Ministry of Telecom and Mass Communications submitted the **Digital Economy of the Russian Federation** plan. According to the digital plan, by 2025, Russia is set to achieve a number of indicators that can significantly improve the quality of life.[41] Several new initiatives aim to tackle Russia's existing obstacles and create enablers ranging from improved regulations to infrastructure to affordability.

While the document does not mention the source of funding, the Minister of Communications promised to create a fund for the development of digital economy. Sources suggest a Universal Service Fund (USF) was collated from a portion of revenue submitted by telecom operators.[42]

	NRI Rank / 139 (2016)	NRI Score / 7 (2016)	NRI Score / 7 (2012)	IDI Rank /175 (ITU 2016)	IDI Rank /157 (ITU 2012)	Access to Internet (ITU 2016)	Access to Internet (ITU 2012)	DEI (Tufts 2017)	Income Level	Population in millions (CIA 2016)	Literacy Rate (UNESCO 2016)	GDP at PPP (WEF 2016)
Russia	41	4.5	4	43	42	76.41%	63.80%	Break Out	Lower Middle	1446.3	99.70%	US $25,410

Digital Policies & Frameworks: Digital Economy of the Russian Federation

The Digital Economy Plan describes eight development areas: **regulation, information infrastructure, research and development, personnel and education, information security, governance, smart cities, and digital health.**

A major target that the plan identifies is providing **access to internet** across Russia with 5G network to be deployed in cities by 2025, available to 300,000 inhabitants. In remote villages, the plan is to provide high-speed Internet by satellite or drone technology. In addition to access, the plan also states that affordability will be improved. By 2020, the federal government intends to reduce the cost of Internet 10 times to 0.1% of average income.[43]

Furthermore, Russia aims to **update existing legal regulations** allowing the country to overcome any hindrances in the adoption and integration of technologies such as big data and internet of things by businesses and individuals. Similarly, improving **research and development** is another key goal as the Ministry plans to create around 10 digital platforms, 15 technology parks, and 20 research centers by 2025.[44]

Digitizing 90% of government records[45] is another noteworthy initiative – although one that will face internal rife due to the mass prevalence of paper records over electronic ones. Digital signatures and common digital spaces will be created by 2025 with e-Services reaching 80% of the population.

Russia also aims to create **smart cities** by automating 100% of public transportation by 2025 with the use of unmanned public transport, integrated with city traffic systems.[46] According to the document, by 2025, Russia will create a digital health ecosystem ensuring the availability of medical care and increasing the use of human and information resources in the provision of medical services.

[41] "The digital economy of Russia: the cities – drones, villages, fast Internet", FreeNews English, Accessed June 2017, http://freenews-en.tk/2017/05/06/the-digital-economy-of-russia-the-cities-drones-villages-fast-internet/
[42] Ibid.
[43] Ibid.
[44] Ibid.
[45] Ibid.
[46] Ibid.

With mass digitalization, **cybersecurity** has been prioritized, with Russia aiming to reach 10th place by 2020 and 8th place by 2025 on the International Telecommunication Union's (ITU's) index. The plan also indicates that by 2020, the share of traffic going through foreign servers will reduce from 600% to 5%.[47]

Key Initiatives

e-Governance & e-Services

e-Governance has been one of Russia's national policy priorities for almost a decade beginning with Russia's Information Society Development Strategy 2008. The launch of gosuslugi.ru, a centralized e-Government website, was the single window platform for users to access services offered by different ministries.[48] At its initial launch, the metric used to measure the success of the website was simply the number of services available online. Inter-agency collaborations were later added which allowed for more online e-Services, ranging from education to healthcare to business registration.

Utilizing digital technology to improve government transparency, the **Open Government (OG)** Initiative was launched in 2012 to build the ministerial openness ranking which measured how federal agencies perform in terms of information disclosure.[49] Although the agencies vary greatly in terms of the amount and quality of disclosed information, OG has led most agencies to appoint a responsible official (usually at a Deputy Head position) to work towards openness.

In addition to openness, the federal agencies adopted many practices for e-Government development.[50] For example, the city of Moscow was the first federal entity to launch an **e-Voting platform** called Active Citizen in 2013 which now has over one million users, allowing people to participate in the decision-making process in civic matters, such as setting speed limits on local roads, and naming a new metro station.[51] Although assessing e-Governance is extremely difficult in Russia, ICT Ministry estimates about 35% (2015) of the country's population is already using e-Services.[52] With an approximate 60% internet penetration level, this means that over half of Russian internet users utilized the government's electronic services in 2015.[53]

e-Education: The "Computers for Students" project

In 2006, Russia invested in modernizing its school system, doubling the number of computers available in its classrooms with a partnership between Intel and the charitable foundation Volnoe Delo called the "Computers for Students" project. The project is now the longest running e-Learning project in Russia, aiming to donate 1 million notebooks nationwide and establish a 1:1 e-Learning environment in primary schools.[54] Each student in the 240 participating schools received a notebook and is expected to work on the machine during lessons.[55] A wireless card ensures internet access, while students who do not own a desktop are allowed to take the school notebook home. During its first year, the Computers for Students project delivered over 52,000 personal computers to school children and 1,608 to primary school teachers. In addition to equipment procurement, the Volnoe Delo Foundation has trained 192 IT teachers.[56]

Russia's Law on e-Signatures

Russia's Law on Digital and Electronic Signatures ensures that a digital signature on digital documents has the same legal value as a traditional paper signature. Due to the increasing amounts of digital transactions and paperless information being exchanged, this law was created in 2011 to legally recognize electronic signatures

[47]Ibid.
[48]Alexey Dolinskiy, "E-governing Russia," Digital Russia, Accessed June 2017, http://article.digital-russia.com/e-governing/
[49]Ibid.
[50]Ibid.
[51]"Going mobile in Moscow: city digitisation the Russian way," Alex Scroxton, Last modified 11 April 2017, http://www.computerweekly.com/news/450416621/Going-mobile-in-Moscow-city-digitisation-the-Russian-way
[52]Alexey Dolinskiy, "E-governing Russia," Digital Russia, Accessed June 2017, http://article.digital-russia.com/e-governing/
[53]Ibid.
[54]"Education Transformation in Russia 1:1 eLearning programs help students develop 21st century skills," Intel, 2009, https://www.intel.com/content/dam/doc/case-study/learning-series-education-transformation-study.pdf
[55]Ibid.
[56]Ibid.

on documents.[57] These digital signatures can be presented in court as admissible evidence. The law covers consumer and commercial agreements as well as short-term real estate documents such as lease agreements, purchase and sales contracts, and other related documentation for residential and commercial real estate. It is a major step forward in ensuring true paperless workplaces and accommodating new technologies and concepts such as electronic documents and distant work places.[58] The law is helping the government reach its 2025 targets as outlined in the 2017 Digital Economy of the Russian Federation plan, including digitizing 90% of government records and creating common digital work spaces by 2025.[59]

Key Learnings

1. Continued Focus on e-Governance

Russia's e-Government rankings are generally favorable. Russia has a high ranking in UN's e-Government Development Index (between 0.5 and 0.75, with Russia's at 0.73 in 2014, 0.51 in 2010).[60] At the federal level, three institutions have listed improving overall e-Governance as their key policy priority.

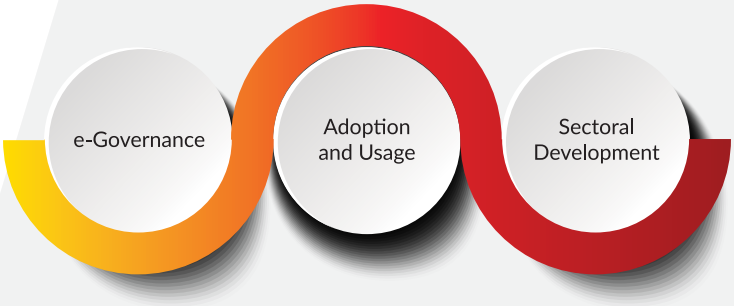
2. Improve Capabilities for Adoption and Usage

Early reforms in Russia's telecommunications sector enabled faster, more accessible, and more affordable Internet connectivity for both people and firms across the country. Furthermore, as mobile and fixed Internet tariffs are very low and continue to drop (10th place overall on affordability), individual usage continues to rise.[61]

However, World Economic Forum data suggests that ICT infrastructure is not keeping up with the demand of the population as internet bandwidth per user is falling in Russia. Digital skills must be further developed to fuel sustainable growth and increase the use of digital payment systems. Public-Private Partnerships in e-Education have already contributed to improving digital skills in the nation.

3. Need for Sectoral Development

Russia's failure to invest and develop its e-Commerce and mobile financial services arena attributes to its low GDP contribution. While business usage rates are high (more than 60% of firms in Russia have a website and more than 90% utilize email – one of the highest rates in the Europe and Central Asia region),[62] a World Bank report suggests that e-Commerce activities constitute just 1.4% of Russia's Gross Domestic Product (GDP), compared to 3% in Western Europe and the United States, and 5% in China.[63] The overall low level of e-Commerce activity is further hampered by a weak digital payment system – just one person out of every five has a credit or debit card, and only 37% of Russian firms use Internet banking.[64]



[57]"Federal Law of The Russian Federation of April 6, 2011 No. 63-FZ - About the digital signature," CIS-Legislation, Last accessed on August 6th, 2017, http://cis-legislation.com/document.fwx?rgn=32989
[58]Ibid.
[59]"The digital economy of Russia: the cities – drones, villages, fast Internet", FreeNews English, Accessed June 2017, http://freenews-en.tk/2017/05/06/the-digital-economy-of-russia-the-cities-drones-villages-fast-internet/
[60]"UN E-Government Knowledge DataBase – Data Center," Department of Economic and Social Affairs, Accessed on July 15th, 2017, https://publicadministration.un.org/egovkb/Data-Center
[61]"Networked Readiness Index – Russian Federation," World Economic Forum, Accessed on May 25th, 2017: http://reports.weforum.org/global-information-technology-report-2016/economies/#economy=RUS
[62] "Russia Can Gain More from a Digital Transformation," The World Bank, Accessed on June 23rd 2017, http://www.worldbank.org/en/news/press-release/2017/05/18/russia-can-gain-more-from-a-digital-transformation-says-world-bank
[63]Ibid.
[64]Ibid.

4.3 China

China's Digital Journey

Over the last couple of decades, China has developed exponentially with digital reforms that have led to a growing middle-class population, an increase in modernization and communication with the outside world, ultimately leading to rapid internet penetration. Unlike a majority of Western nations, this penetration has been fueled by smartphones rather than desktop computers. By the end of 2015, China accounted for around a fifth of the global internet population with 688 million Internet users, out of which 620 million were mobile Internet users.[65]

This has heavily influenced the way in which consumers in China access the web. In 2015, over 413 million people shopped online, generating US $623 billion in online retail transactions, accounting for 12.9% of China's total retail transactions.[66] e-Services too have made strides with over 152 million internet users utilizing digital health services to make doctors' appointments, seek medical advice, and exercise with internet or mobile apps.[67] As the demand for new digital technologies, products, and user experiences continues to grow, Chinese companies continue to innovate their products, services, and business models.

In the next five years, Beijing wants to push China's digital developments to the next level, closing the urban-rural digital divide. Digital development has become increasingly important for China's countryside and is visible through the rise of China's so-called "Taobao villages" phenomenon – referring to rural villages that profit from local e-Commerce businesses.[68] With the 13th Five-Year Plan all set with measurable goals and milestones, China is poised to not only become an "Innovation Nation" by 2020, but an "International Innovation Leader" by 2030 and a "Powerhouse for Innovation" by 2050.

	NRI Rank / 139 (2016)	NRI Score / 7 (2016)	NRI Score / 7 (2012)	IDI Rank /175 (ITU 2016)	IDI Rank /157 (ITU 2012)	Access to Internet (ITU 2016)	Access to Internet (ITU 2012)	DEI (Tufts 2017)	Income Level	Population in millions (CIA 2016)	Literacy Rate (UNESCO 2016)	GDP at PPP (WEF 2016)
China	59	4.2	4.1	81	66	53.20%	42.30%	Break Out	Upper Middle	1374.6	94.60%	US $14,107

Digital Policies & Frameworks: 13th Five-Year Plan (FYP)

The 13th Five-Year Plan, released in March 2016, outlines a series of plans based around five key themes – **innovation**, coordinated development, green growth, openness, and inclusive growth. **Innovation**, a core component of digitalization, is the cornerstone of the plan. The primary goals are threefold: 1) moving the Chinese manufacturing up in the value-added chain, 2) re-establishing China as a center for innovation and technology, and 3) ensuring productivity.[69]

Initially drafted by the National Development and Reform Commission (NDRC), the 13th FYP was created through the collaborative effort of multiple ministries and agencies.[70] The actual implementation of the 13th FYP's key digitalization initiatives was the responsibility of the Ministry of Industry and Information Technology (MIIT).[71] While the plan establishes the Chinese government's key objectives and broad policy strategies for the next five years, ministries and provincial governments are responsible for drafting subordinate plans—tailored to each province and specific sectors of the economy.

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[65] "More Than Half of China's Population is Online — And Most Use Smartphones," The Wall Street Journal, Last modified January 2016, https://blogs.wsj.com/chinarealtime/2016/01/26/more-than-half-of-chinas-population-is-online-and-most-use-smartphones/

[66] "Digital China 2020: An action plan for Chinese enterprises," Accenture, Accessed May 2017, https://www.accenture.com/us-en/insight-digital-china-2020

[67] Ibid.

[68] "Taobao Villages: How Ecommerce Helps China's Rural Economy," Sampi, Last modified June 2015, http://sampi.co/taobao-villages-china-rural-ecommerce/#ixzz4jxbdMSyB

[69] Ibid.

[70] "Perfecting China, Inc. - The Drafting Process," Center For Strategic & International Studies, Accessed July 2017, http://fiveyearplan.csis.org/drafting-process/

[71] Katherine Koleski, "The 13th Five Year Plan," The U.S.-China Economic Security Economic and Security Review Commission, 2017

Three key digital targets noted in the 13th FYP include:

- Increasing R&D spending
- Raising quality and quantity of Chinese patents
- Enhancing human capital

The 13th Five Year Science and Technology Innovation Plan, implemented by MIIT, supplements these three targets with nine additional targets (see Table 3). Other targets mention innovation capability that is internet penetration (fixed & mobile) and the contribution of science and technology to economic growth. Increasing internet penetration and utilizing innovation to foster intelligent manufacturing in emerging industries aligns with the government's focus on optimizing different sectors as mentioned in the "Made in China 2025" and "Internet Plus (+)" plans.

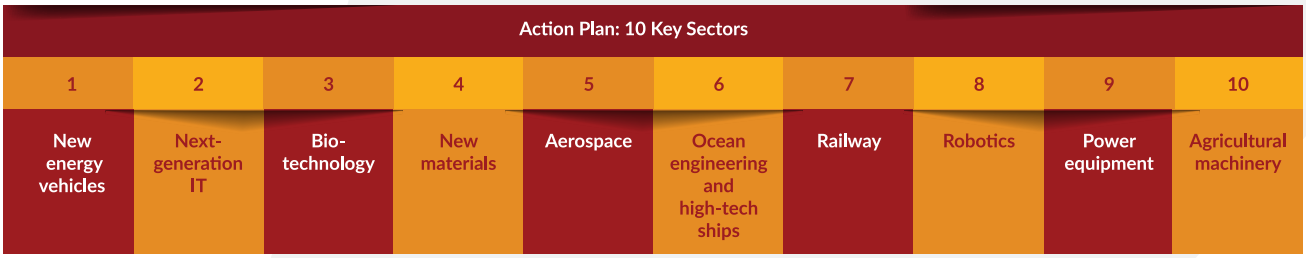
Key Initiatives

Made in China 2025

Through use of digital technologies and platforms, Made in China 2025 focuses on enhancing manufacturing efficiency and value of different industries.[72] The Action Plan focuses on 12 targets with deadlines in 2020 and 2025 and concentrates on enhancing China's innovation, productivity, quality, digitalization, and efficiency in 10 key sectors. A think tank under the State Council, released the Made in China 2025 Key Area Technology Roadmap that outlines local-level targets for these sectors.[73]

The Chinese government supports the initiative with significant state funding, creating three separate funds to finance the program's implementation. This includes a US $20 billion National Integrated Circuit Fund, $3 billion Advanced Manufacturing Fund, and $6 billion Emerging Industries Investment Fund.[74] China Development Bank has also pledged to provide $44.8 billion (RMB 300 billion). Besides the federal government's budget, local governments have also signed up to provide financial support.[75] For example, 21 cities and 5 provinces have pledged $6 billion (RMB 40 billion) in subsidies for robotics.[76]

Under Made in China 2025, China will ultimately substitute all its imported technology and products with local technology by building domestic firms up to a globally competitive standard of production. Since the initiation of the Made in China 2025 plan, nearly 30% of large-scale Chinese factories have completed digitalization of their production lines.[77] Their productivity could be improved by as much as 20%, costs of production reduced by 20%, and emissions footprint slashed by another 10%, according to the Hainan Reform and Development Institute.[78]



[72] Ibid.
[73] Ibid.
[74] Ibid.
[75] Ibid.
[76] Ibid.
[77] Peter Cai, "Internet+: China's grand plan to harness the internet," The Australian, Last modified June 25th 2015, http://www.theaustralian.com.au/business/business-spectator/internet-chinas-grand-plan-to-harness-the-internet/news-story/506204d3ccdb763a31868e65f95a1fb1
[78] Ibid.

Internet Plus (+)

To capitalize on China's huge online consumer market and optimize manufacturing, finance, healthcare, and government, the Internet Plus plan aims to build up the country's domestic mobile Internet, cloud computing, big data, and the Internet of Things sector firms, and create global competitors by assisting domestic firms' expansion abroad.

A core requirement for this initiative is to provide widespread access to broadband internet. The 13th FYP aims to raise the fixed broadband household penetration ratio from 40% in 2015 to 70% in 2020 and the mobile broadband subscriber penetration ratio from 57% in 2015 to 85% by 2020.[79] In January 2017, NDRC announced that China would invest US $179.1 billion (RMB 1.2 trillion) between 2016 and 2018 to improve broadband and mobile networks, leading to the construction of more than 56,000 miles of high-speed fiber optic cables and 2 million 4G base stations.[80]

Target	2015	2020
Global Innovation ranking	18	15
Contribution of science and technological advances in economic growth	55.3%	60%
R&D as share of GDP	2.1%	2.5%
Number of R&D personnel per 10,000 people employed per year	44.5	60
Revenue of high-technology enterprises	22.2 trillion RMB	3.4 trillion RMB
Share of value-added knowledge intensive services industries to GDP	15.6%	20%
R&D Intensity	0.9	1.1
Global ranking for the number of citations in international science and technology papers	4	2
Patents filed under the Patent Cooporation Treaty per 10,000 patents	3.05	6.1
Patents filed per 10,000 people	6.3	12
National technical contract turnover	983.5 billion RMB	2 trillion RMB
Population of the total population possessing scientific degrees	6.2%	10%

Table 3: The 13th Five-Year Science and Technology Innovation Plan Targets
(Source: U.S.-China Economic Security Economic and Security Review Commission)

China's National Health and Family Planning Commission Regulation on Big Data in Health Sector

China is in its final stages of developing and launching a regulatory framework for Big Data Analytics in its health sector. This one-of-a-kind policy was formulated in response to the State Council's guideline to promote and regulate usage of Big Data in health care. The policy focuses on providing rules and regulations on how data will be collected, stored, and used. It also outlines basic rules on data ownership and privacy.

The guideline will further play an important role in building a new economic pillar for China involving big data. The state aims, by the end of 2020, to establish and continuously improve the inter-connectivity of Public Health Information Platforms and National Medicine Purchasing Business Platforms.[81] Reports say that by 2020, China will have the world's largest health data pool, covering more than 1.4 million people,[82] further highlighting the importance and benefits of launching a comprehensive policy framework.

[79]Katherine Koleski, "The 13th Five Year Plan," The U.S.-China Economic Security Economic and Security Review Commission, 2017
[80]Ibid.
[81]"China to grow big on e-healthcare data," Hogan Lovells, August 2016, http://f.datasrvr.com/fr1/116/27996/Alert_20160817_China_to_grow_big_on_e-healthcare_data.pdf
[82]Shan Juan, "Big data a boon for healthcare," Last modified 28th June 2016, http://usa.chinadaily.com.cn/china/2016-06/28/content_25879560.htm

Key Learnings

1. Continue Focus on Adoption and Usage

While adoption and usage by individuals has increased, particularly in terms of mobile broadband subscriptions, which nearly doubled in one year from 21.4 to 41.8 per 100 population, business usage is limited.[83] Therefore under the 13th FYP, China places developing the manufacturing sector as a key initiative as only about 60% of Chinese companies use industrial automation software over assembly lines.[84] One study reports that there are 282 industrial robots to 10,000 factory workers in Germany, as opposed to just 14 in China.[85] Hence, Chinese businesses will need to embrace digital technologies and spur innovative processes to become an innovation-driven, high-income economy.

2. Engage in Public-Private Partnerships

The Chinese government has engaged in partnerships with the private sector in order to provide e-Services and e-Governance. Last year, Alibaba's Alipay and Sina Weibo launched a new 'online city services platform', where paying traffic fines, handling immigration issues, or scheduling marriage registration could be arranged from citizens' mobile phones or computers.[86] With the rise in e-Government initiatives, PPPs with companies will also strengthen.

3. Strengthen Business and Innovation Environment

The business environment remains one of the key bottlenecks (ranking 104th on the NRI) in China. According to WEF data, China maintains high taxation on businesses at 67.8% and has lengthy and complex processes to set up new businesses (ranking 121st and 120th respectively), discouraging new and more competitive firms from entering the market. Patenting activity is also still relatively low compared with that of advanced economies. The Chinese government needs to build the necessary institutional capital for innovation by strengthening its legal regimes for intellectual property protection and supporting universities that promote entrepreneurship. Moreover, the government needs to shift from playing an active role in the market to "a mere referee", making room for the Chinese private sector to operate and spur genuine innovation and entrepreneurship.

4.4 India

India's Digital Journey

India has taken several steps to become a more digitally-enabled country. In 1984, Prime Minister Rajiv Gandhi prioritized the development of ICTs in India by computerizing the public sector, setting up a National Task Force, and improving the National e-Governance Program. Today, under current Prime Minister Modi's leadership, the Digital India Initiative sets forward three broad visions, nine pillars, and several initiatives for digitalizing India's economy.[87]

[83]"Networked Readiness Index – China," World Economic Forum, Accessed on May 25th, 2017: http://reports.weforum.org/global-information-technology-report-2016/economies/#economy=CHN
[84]Xin En Lee, "Made in China 2025: A New Era for Chinese Manufacturing," CKGSB Knowledge, Last modified September 2nd, 2015, http://knowledge.ckgsb.edu.cn/2015/09/02/technology/made-in-china-2025-a-new-era-for-chinese-manufacturing/
[85]Ibid.
[86]Manya Koetse, "Hu Angang: Digital is Key in China's 13th Five-Year Plan," What's on Weibo, Last modified July 5th, 2016, http://www.whatsonweibo.com/huangangfiveyearplan/
[87]"E-governance and Digital India Empowering Indian Citizens Through Technology," Deloitte, September 2015

In 1999, the Ministry of Information Technology and Communication was established by bringing together three IT-related departments. By 2016, one department emerged as a full-fledged Ministry of Electronics and Information Technology.[88] Implemented by the new Ministry, the Digital India program has launched several initiatives but success for a majority of them has yet to be fully realized.

	NRI Rank / 139 (2016)	NRI Score / 7 (2016)	NRI Score / 7 (2012)	IDI Rank /175 (ITU 2016)	IDI Rank /157 (ITU 2012)	Access to Internet (ITU 2016)	Access to Internet (ITU 2012)	DEI (Tufts 2017)	Income Level	Population in millions (CIA 2016)	Literacy Rate (UNESCO 2016)	GDP at PPP (WEF 2016)
India	91	3.8	3.9	138	121	29.55%	12.56%	Break Out	Lower Middle	1,267	74.04%	US $ 6,161,62

Digital Policies & Frameworks: Digital India

With three core focuses, **Digital India** is a program aimed at transforming the country through leveraging information and communication technologies in every sphere of economy and society:[89]

Digital Infrastructure as a Utility to Every Citizen

Digital India aims to provide connectivity to the Indian masses through increasing fixed-line broadband and mobile connectivity or Wi-Fi hotspots. Furthermore, every citizen will be given a cradle-to-grave digital identity that can be linked with a mobile number and a bank account to enable digital banking. A safe and secure cyberspace would be provided, allowing shareable private cloud space on public cloud servers.

Governance & Services on Demand

The initiative also plans to integrate the services of multiple government departments and make them available in real time on online and mobile platforms. By utilizing digital technologies, the initiative would allow cashless and electronic financial transactions with citizens' claims and entitlements available on cloud, making it easier to do business in India.

Digital Empowerment of Citizens

By making digital resources universally accessible in all local languages, the final component of Digital India promises to promote the development of digital literacy amongst the masses. These resources, along with other government services, would allow for a collaborative digital platform so citizens can engage in participative governance.

The three visions are in turn supported by nine pillars: Broadband Highway, Universal Access to Mobile, Public Internet Access Program (PIAP), e-Governance, e-Kranti, Information for All, Electronics Manufacturing, IT for Jobs, and Early Harvest Programs.

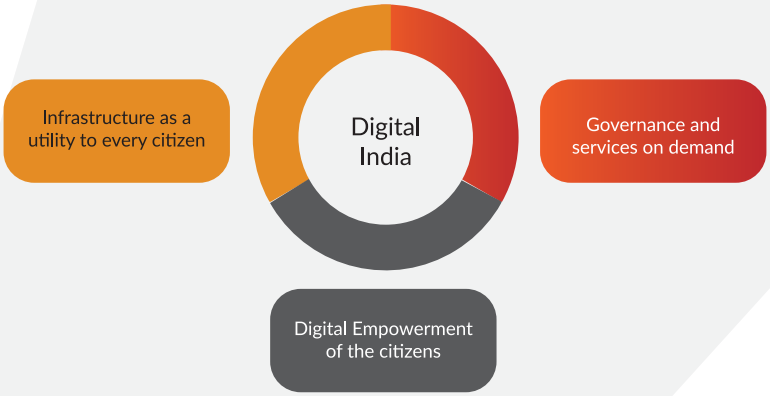


Figure 8: Digital India (Source: Deloitte)

[88]Aman Sharma, "DeITY becomes a new ministry, leg-up for Ravi Shankar Prasad," The Economic Times, Last modified July 19, 2016, http://economictimes.indiatimes.com/news/economy/policy/deity-becomes-a-new-ministry-leg-up-for-ravi-shankar-prasad/articleshow/53285683.cms.
[89]"E-governance and Digital India Empowering Indian Citizens Through Technology," Deloitte, September 2015

Digital India Governance Framework

The Government of India launched a governance structure for Digital India consisting of a Monitoring Committee on Digital India, Digital India Advisory Group and an Apex Committee.[90]

The **Monitoring Committee on Digital India** under the Chairpersonship of Prime Minister constitutes representatives from relevant Ministries (Electronics & IT, Finance, Communications, Health, Planning, Human Resource Development, and Rural Development) to provide leadership, prescribe deliverables and milestones, and periodically monitor the implementation of the Digital India Program. The **Digital India Advisory Group** solicits views of external stakeholders, advising the Monitoring Committee on policy issues and strategic interventions necessary for accelerating the implementation of Digital India across central and state government ministries/departments. Lastly, the **Apex Committee** oversees the Digital India program, providing policy and strategic direction for its implementation and resolution of inter-ministerial issues.

Moreover, the executing body, the **Ministry of Electronics & IT** (MeitY), announced **Chief Information Officers** (CIO) for at least 10 key ministries so that various e-Governance projects could be designed, developed, and implemented faster. At the state level, Digital India's institutional mechanism consists of a **State Committee on Digital India** headed by the Chief Minister, with the central ministries/departments and state governments in charge of implementing various projects.

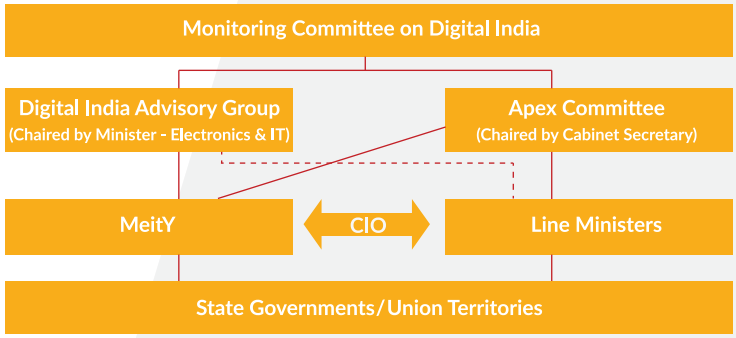


Figure 9: Digital India Governance Framework (Source: NeGD)

Key Initiatives

JAM Trinity (Jan Dhan-Aadhaar-Mobile)

Aadhaar is a biometrically verified 12-digit unique identity number issued by the Unique Identification Authority of India (UIDAI) to each resident. While Aadhaar was launched in 2009, UIDAI, the statutory authority for monitoring it, was established in July 2016.[91] The JAM Trinity aims to deliver Jan-Dhan Yojana - that is affordable access to financial services such as banking, remittance, credit, insurance, and pension – to Aadhaar holders via phones. In addition to serving financial inclusion needs, the government mainly the Ministry of Finance, also plans to offer various subsidy schemes for the poor through JAM Trinity.[92]

Aadhaar helps in direct biometric identification of disadvantaged citizens, while Jan Dhan bank accounts and mobile phones allow direct transfer of funds into citizens' accounts. Since its launch in August 2014, 300 million people utilize JAM Trinity.[93] Furthermore, it is projected to create 1.2 billion bank accounts, when linked with 900 million mobile phones and about 1 billion Aadhaar numbers.[94] People can also use JAM Trinity to avail subsidies on cooking gas. About INR Rs. 170 billion cooking gas subsidies have been availed (as per Ministry of Finance estimates for first quarter of 2016).[95] The Parliament has also approved a bill extending Direct Benefit Transfer (DBT) to food, kerosene, and fertilizers, allowing JAM Trinity to play a key role in distributing subsidies.

[90] "Digital India Programme Management," NeGD, Accessed on July 2017, http://negd.gov.in/digital-india-programme-management
[91] "UIDAI And Aadhaar – What And Why?" Studycopter, Last modified October 10th, 2016, http://studycopter.com/feed/uidai-and-aadhaar-what-and-why/
[92] "Aadhar: Inclusive by Design A Look at India's National Identity Programme and its Role in the JAM Trinity," GSMA, Accessed July 2017
[93] "World Bank International Video Conference on Digital Economy foundations," Youtube, Published on February 02, 2017, Accessed June 12, 2017, https://www.youtube.com/watch?v=Unq0lQbxJQI&list=WL&index=5
[94] Asit Ranjan Mishra, "India has started linking Jan Dhan scheme, Aadhaar and mobile numbers: Arun Jaitley," Livemint, Last modified April 2nd, 2016, Retrieved on July 26th, 2017: http://www.livemint.com/Politics/PRmaclHkzL6fGJEUIVLo3H/India-has-started-linking-Jan-Dhan-scheme-Aadhaar-and-mobil.html
[95] Ibid.

While India is able to cut out all the intermediaries and inefficiencies from the system, leading to long-term cost savings for the government, JAM Trinity has its own set of challenges. Reliable mobile and data connectivity in remote rural areas may not be available to effectively deliver DBT benefits directly to the people. Limited financial literacy and knowledge on account management, few bank branches, and weak bank infrastructure are also major challenges. Cybersecurity also seems to be a major issue as earlier this year personal details of over one million Aadhaar subscribers were leaked online.[96]

Electronic National Agriculture Market (e-NAM)

e-NAM is an e-Trading platform which gives India's farmers and consumers a single window service allowing them to record commodity arrivals and prices, buy and sell trade offers, and respond to trade offers. Starting off with 25 commodities, at present, 69 commodities are traded on the platform from 18 different states.[97] Over 417 markets have incorporated e-NAM, generating a trade of 5.9 million tons. Since its inception in 2016, over 3.95 million farmers, 88,000 traders and 44,000 commission agents have registered.[98]

Launched by the Ministry of Agriculture & Farmers' Welfare, e-NAM benefits many stakeholders. Farmers and traders are able to sell their products nationwide, hence increasing their access to the market. Bulk buyers, processors and exporters enjoy a reduction in costs through direct trading. Consumers benefit with the availability of better quality produce at more reasonable prices. e-NAM ultimately benefits the system through reduced costs (fewer licensing and transaction costs), streamlined procedures, and promotion of transparency in integrated markets. However, the e-NAM platform has a handful of challenges. To adopt e-NAM, states must reform existing laws and regulations but many states resist change and technology adoption. Moreover, poor broadband penetration and digital infrastructure in rural India, as well as lack of internet literacy amongst farmers, are major setbacks.

Key Learnings

1. Establish Ownership and Structure

Prime Minister Modi endorsed Digital India with his speech, "I Dream of a Digital India…,"[99] legitimizing the basis of this initiative, garnering public support and providing a clear strategy. Moreover, the governance structure for Digital India set an ultimate scheme for accountability. The efficient division of roles and responsibilities meant that initiatives could be implemented in a more streamlined and transparent way. While the Digital India governance structure has been established, there are several ongoing changes and issues amongst the ministries and departments that need to be dealt with.

2. Develop Infrastructure

India's key bottlenecks to widespread ICT adoption remains its lack of infrastructure (114th in the NRI 2016), especially in remote rural areas. Digital infrastructure (especially fiber networks) needs to develop quicker as only 15 out of 100 households have access to the Internet and only 5.5 for every 100 people have mobile broadband subscriptions.[100] Existing government infrastructure, such as post office and service centers, ought to be leveraged for provision of digital services at remote locations.

3. Increase Digital Literacy and Usage

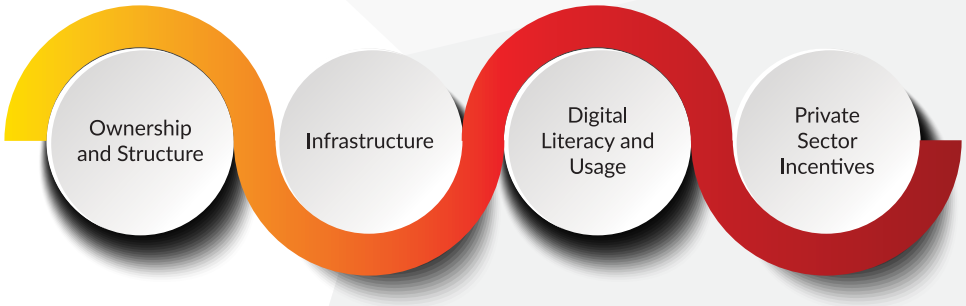
Due to illiteracy and lack of user awareness, India is not fully utilizing e-NAM & JAM services (101st in skills and 120th in usage according to the NRI). With a third of its population illiterate and 10% digital literacy, India needs

[96]"In A Shocking Breach, Aadhaar Details Of A Million Pensioners Leaked In Jharkhand," The Huffington Post, Last modified 23rd April, 2017, http://www.huffingtonpost.in/2017/04/22/in-a-shocking-breach-aadhaar-details-of-a-million-pensioners-le_a_22051319/
[97]"18 states join electronic agricultural trading portal: Government," Business Standard, Last modified April 12th, 2017, http://www.business-standard.com/article/news-ians/18-states-join-electronic-agricultural-trading-portal-government-117041201561_1.html
[98]Ibid.
[99]"Narendra Modi: My dream of Digital India," YouTube, Published on September 17th, 2016, https://www.youtube.com/watch?v=dtr0IR6z2Q4
[100]"Networked Readiness Index – India," World Economic Forum, Accessed on April 23rd, 2017, http://reports.weforum.org/global-information-technology-report-2016/economies/#economy=IND

to provide institutional trainings in schools, colleges and universities, and accelerate partnerships with global technology leaders.[101] The government must also promote and communicate the value-added benefits of technology to citizens, especially benefits such as financial inclusion and increase in the standard of living.

4. Provide Private Sector Incentives

Private sector players should be incentivized to develop infrastructure, provide services and promote digital literacy as part of the Digital India program. India's political and regulatory (78th in NRI) and business and innovation (110th in NRI) environment, with high taxes and bureaucratic red-tapism, creates an unfavorable environment for the private sector. To increase adoption of digital technology, start-ups should also be involved to create and customize applications based on local needs.



4.5 Turkey

Turkey's Digital Journey

Turkey began developing ICT policies and strategies with the Turkish National Information Infrastructure Plan – TUENA (1999). TUENA was followed by several other national plans and programs including the e-Turkey Initiative Action Plan (2000), e-Transformation Turkey Project and Short-term Action Plan (2003-2004, 2005), and the Information Society Strategy & Action Plan (2006-2010). While TUENA and e-Turkey Initiative Action Plan were not implemented, other strategies and action plans were executed by the Ministry of Development.[102] Adopting a centralized approach, the High Planning Council chaired by the Prime Minister recently approved a subsequent **Information Society Strategy and Action Plan** for years 2015-2018.

With a stable NRI ranking at 48th place, half of its population under the age of 30 (largest youth population in Europe) and growing internet penetration and business opportunities, Turkey's digital plans have led to mass digital benefits. Currently, Turkey has over 75 million mobile subscribers[103] and 50% smart phone penetration,[104] with almost 60% of its population having internet access.[105] Moreover, Turkey's conducive business environment has also attracted many international market leaders including Microsoft, Intel, Hewlett-Packard as well as others who see Turkey as a regional hub for doing business.[106]

	NRI Rank / 139 (2016)	NRI Score / 7 (2016)	NRI Score / 7 (2012)	IDI Rank /175 (ITU 2016)	IDI Rank /157 (ITU 2012)	Access to Internet (ITU 2016)	Access to Internet (ITU 2012)	DEI (Tufts 2017)	Income Level	Population in millions (CIA 2016)	Literacy Rate (UNESCO 2016)	GDP at PPP (WEF 2016)
Turkey	48	4.4	4.1	70	68	58.35%	45.13%	Break Out	Lower Middle	103	95.60%	US $ 7,254

[101] "Digital India Unlocking the Trillion Dollar Opportunity," Deloitte, November 2016
[102] "2015-2018, Information Society Strategy and Action Plan," Republic of Turkey, Ministry of Development, March 2015, http://www.bilgitoplumu.gov.tr/en/wp-content/uploads/2016/03/Information_Society_Strategy_and_Action_Plan_2015-2018.pdf
[103] "Turkey Telecom Sector," Turk Telekom, Accessed on June 6th, 2017, http://www.ttyatirimciiliskileri.com.tr/en-us/turk-telekom-group/investing-in-turk-telekom/pages/turkey-telecom-sector.aspx
[104] "Internet Usage Up in Turkey, Thanks in Part to Smartphones: Smartphones are the most common internet access device in the country," eMarketer, Last modified September 9th 2016, https://www.emarketer.com/Article/Internet-Usage-Up-Turkey-Thanks-Part-Smartphones/1014458
[105] "International Telecommunication Union: Facts & Figures 2017," International Telecommunication Union, Retrieved May 5th, 2017: http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx
[106] "Multinationals pick Turkey for managing regional markets," Invest in Turkey – Investment Support and Promotion Agency of Turkey, News, Last modified 2nd February, 2013, http://www.invest.gov.tr/en-US/infocenter/news/Pages/13.02.13-turkey-regional-management-center-for-multinationals.aspx

Digital Policies & Frameworks: Turkey Digital Strategy 2015-2018

Turkey's digital strategy is strongly linked with its overall national 2023 Transformation Agenda. The Information Society Strategy and Action Plan 2015-2018 serves to achieve Turkey's 2023 goals of growth and employment.

Figure 10: National Plans and Programs for Information Society Policies

The plan has 26 institutions, 72 actions and 30 performance indicators under 8 pillars.[107] The Ministry of Development is tasked with preparing information society policies, objectives and strategies. The Department of Communications within the Ministry of Transport, Maritime Affairs, and Communications is in-charge of coordination and supervision of the Information Society Strategy.

2015-2018 Action Plan Pillars

1) Information Technologies Sector
2) Broadband Infrastructure and Competition
3) Qualified Human Resources and Employment
4) Diffusion of ICT into the Society
5) Information Security and User Trust
6) ICT-Supported Innovative Solutions
7) Internet Entrepreneurship and e-Commerce
8) User-Centric and Effective Public Services

Key Initiatives

e-Devlet: Turkey's e-Government Strategy 2016-19

With increasing public expenditure on ICT, in line with the Action Plan, the Turkish government has been a key driver in ICT development. By February 2016, 216 public institutions provided 1,411 e-Services to 26,546,787 registered users of the e-Government gateway (portal) "https://www.turkiye.gov.tr/" - the single contact point for many public institutions' e-Services.[108] Furthermore, the National Judicial Information System now allows litigation processes to be conducted online using e-Signatures.[109] Citizens can benefit from a broader scope of services by using e-Signatures directly on e-Government applications and banks.

The e-Devlet project plans to make Turkey an information society by providing easy and online access to public services. The service offers citizens the possibility to obtain official documents or to pay taxes, duties or fines online among other benefits:

- **Justice** Criminal record check and online tracking feature
- **Traffic & Vehicles** Payment of traffic fines for vehicles, automatic payment of motorway, bridges and tunnel use
- **Insurance** Verification of information and expiry dates of current health, earthquake, traffic, and life insurance policies
- **Property** Verification of real estate registered under a person's name

[107]"2015-2018, Information Society Strategy and Action Plan," Republic of Turkey, Ministry of Development, March 2015, http://www.bilgitoplumu.gov.tr/en/wp-content/uploads/2016/03/Information_Society_Strategy_and_Action_Plan_2015-2018.pdf
[108]"eGovernment in Turkey," European Commission, February 2016, Edition 13.0, https://joinup.ec.europa.eu/sites/default/files/ckeditor_files/files/eGovernment%20in%20Turkey%20-%20February%202016%20-%20Edition%2013_00_v3_00.pdf
[109]Ibid

- **Public Registry** Obtaining document of residence address, change of address
- **Tax Office** Payment and declaration of tax online
- **Health** Book appointments with public hospitals and dental clinics and receive health records through e-Nabız (e-Pulse)

e-Education

Turkey is engaged in one of the world's largest educational technology projects as it aims to distribute tablet computers to every student from grade 5 to 12 and interactive whiteboards in every classroom.[110] In 2011-2012, the Ministry of Education launched the FATIH project in 17 cities and 52 schools with the goal of realizing IT-supported education and providing information technologies to classrooms.[111]

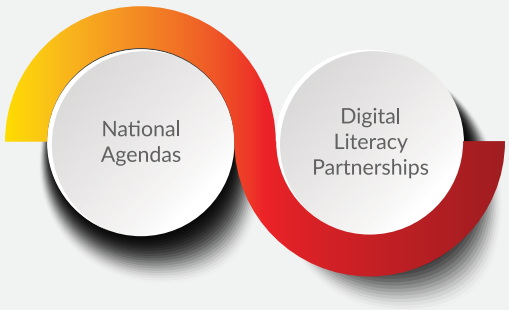
Key Learnings

1. Link ICT with National Agendas

Turkey's ICT strategy is strongly linked with its overall National Transformation Agenda 2023, indicating that Turkey's government realizes that digitalization has significant impacts on the economic and social transformation of the country. More specifically, e-Government in Turkey is a major driver in stimulating ICT demand and usage, signaling that Turkey must continue to invest in its e-Services and e-Government gateway (portal) to become more digital.

2. Collaborate on Digital Literacy

Public-Private Partnerships towards digital literacy is the key to rapid digitalization with the FATIH project serving as a successful example. Global software giants, such as Microsoft, Google, Intel, Apple, and many others have already shown interest in participating in the project. Revising education policies has led to increased adoption of ICT methods in primary and secondary education systems. Digital literacy will improve the public's digital skills, in turn increasing digital use by individuals.



[110]Michael Trucano, "Observing Turkey's ambitious FATIH initiative to provide all students with tablets and connect all classrooms," The World Bank, Last modified 18th December, 2013, http://blogs.worldbank.org/edutech/observing-turkeys-ambitious-fatih-initiative-provide-all-students-tablets-and-connect-all-classrooms
[111]Ibid.

4.6 Malaysia

Malaysia's Digital Journey

The Malaysia Digital Economy Corporation (MDEC), an agency under the Ministry of Science, Technology & Innovation (MOSTI), was created in 1996 to develop, coordinate, and promote Malaysia's digital economy and ICT industry.[112] MDEC strategically advises the Malaysian government on legislation, policies and standards for ICT and multimedia operations.

In 2012, MDEC broadened its role and unveiled **Digital Malaysia** as a transformational program that would drive Malaysia towards a developed digital economy by 2020.

With the government's continuous support and dedication to the digital agenda, Malaysia is ahead of other countries in terms of adopting latest technologies. Malaysia's NRI position has been stable in the last few years with the country moving from 32nd to 31st position in 2016. With the uptake of mobile broadband (60% of the population), individual usage is growing with Malaysia accelerating to 47th rank on individual usage (up by 10 spots). The agile business sector (26th for business usage) is using ICTs to its advantage by interacting with consumers online, and re-optimizing business models and organizational structures.[113]

	NRI Rank / 139 (2016)	NRI Score / 7 (2016)	NRI Score / 7 (2012)	IDI Rank /175 (ITU 2016)	IDI Rank /157 (ITU 2012)	Access to Internet (ITU 2016)	Access to Internet (ITU 2012)	DEI (Tufts 2017)	Income Level	Population in millions (CIA 2016)	Literacy Rate (UNESCO 2016)	GDP at PPP (WEF 2016)
Malaysia	31	4.9	4.8	12	61	78.79%	65.80%	Break Out	Lower Middle	31	94%	US $ 26,000

Digital Policies & Frameworks: Digital Malaysia 2020

Digital Malaysia 2020 outlines a three-pronged strategy, i.e. 1) move Malaysia from being supply to demand focused, 2) shift behaviors from consumption to production centric, and 3) evolve from a low knowledge-skilled to high knowledge-skilled society. Eight projects were identified under Digital Malaysia to achieve the following goals by 2020: create 160,000 high value jobs, contribute 17% to GNI (Gross National Income) and additional 1% to GDP by SMEs, increase digital income by RM 7,000 per annum for 350,000 citizens, rank Top 10 in the IMD World competitiveness scoreboard (from #16 in 2011) and Top 20 in the Digital Economy Rankings of Economist Intelligence Unit (from #36 in 2011).[114] Since its launch in July 2012, the initial eight projects cumulatively contributed US$ 87.8 million (RM 288 million) in Gross National Income (GNI) and created 3,335 high-value jobs.[115]

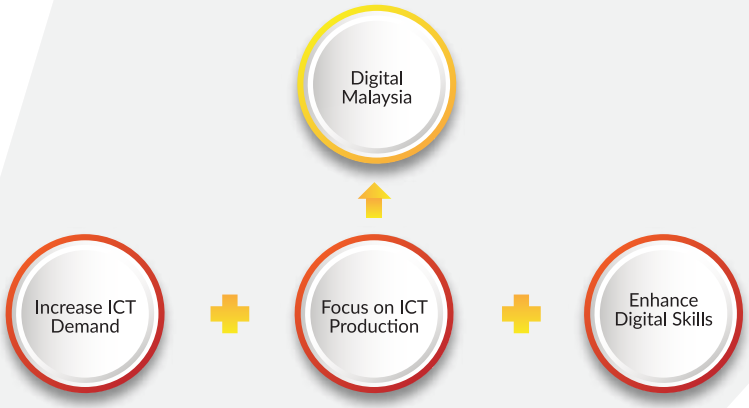


Figure 11: Malaysia's Three-pronged Digital Strategy (Source: MDEC)

[112] "Championing Malaysia's Digital Economy", MDEC, Accessed on May 25th, 2017: https://mdec.my/about-mdec/corporate-profile
[113] "Networked Readiness Index – Malaysia," World Economic Forum, Accessed on April 23rd, 2017, http://reports.weforum.org/global-information-technology-report-2016/economies/#economy=MYS
[114] "Digital Malaysia: Progress Report 2012," MDEC, Accessed on June 15th, 2017, file:///C:/Users/minah.ali/Downloads/Digital_Malaysia_Report_MDeC.pdf
[115] A. Asohan, "Digital Malaysia details out ... finally!" Digital News Asia, July 5th, 2012, https://www.digitalnewsasia.com/digital_economy/digital-malaysia-details-out-finally

Key Initiatives

Multimedia Super Corridor (MSC) Malaysia

MSC Malaysia is Malaysia's national ICT project intended to attract world-class technology companies while grooming the local ICT industry. Today, the MSC Malaysia has reached to 42 other locations across the country, serving as host to 3,800+ companies from more than 40 countries.[116] This led to additional employment for 150,000 high-income knowledge workers, out of which 85% were Malaysians.[117]

Malaysia e-Government Strategy

ICT is increasingly being adopted by Malaysia's public sector. Malaysia's overall position in the NRI was 31 in 2016 with Malaysia being in the top 10 countries of the world for most tech-savvy governments, proving the government's efficiency in promoting ICT and providing online services to the population.[118] Malaysia has created a new digital government strategy aimed at transforming public service delivery by 2020 through a number of e-Government projects:[119]

- **e-Services** Enables citizens and businesses to conduct transactions through a one-stop service window, accessible 24 hours and 7 days a week.
- **e-Procurement** Allows government to conduct procurement activities and suppliers' registration online via desktops, enabling quicker procurement transactions processing.
- **Generic Office Environment** Provides access to e-mail, schedules and documents, and assigns tasks online, improving government transparency and decision-making time
- **Electronic Labor Exchange** Establishes a one-stop center for labor market information and systematic matching of job seekers to job vacancies
- **e-Syariah (sharia)** Provides efficient and quality management of cases, speeding up the judicial process
- **e-Land** Improves the efficiency and effectiveness of land administration

Malaysia Digital Hub

In 2017, MDEC launched another initiative called the Malaysia Digital Hub. This government initiative supports technology and digital co-working spaces for startups and communities, granting them an opportunity to connect to ASEAN and the global digital ecosystem.[120] The Hub gives start-ups ready access to high-speed broadband and fiber optic connectivity, funding and facilitation opportunities, workforce-ready ecosystem, and a holistic, convenient and technologically-driven work environment. While marketed to all tech startups, Malaysia Digital Hub attracts four categories – growing startups, global technology companies, accelerators, and talent builders and investors. To further enrich the work spaces, MDEC has collaborated with the following strategic partners – Microsoft, Next Academy, Maybank, and Y Academy with Kejora – to deploy programmers who would help the startups to grow further.[121]

Key Learnings

1. Elevate Digitalization on the National Agenda

Digital Malaysia is one of the pillars of the overall Malaysian Transformation Agenda 2020. Malaysia has successfully developed clear and comprehensive linkages between the Malaysian Transformation and the Digital Malaysia agenda. The country's digital strategy has been successful because of the clear vision, sound roadmap, measurable goals, stakeholder ownership and robust monitoring mechanism outlined. This level of commitment has made digitalization a national priority in Malaysia for years to come.

[116]"Attracting Investors, Globalising Local Tech Champions," MSC Malaysia, MDEC, Accessed on July 14th 2017, https://www.mdec.my/msc-malaysia
[117]Ibid.
[118]Keith Breene, "The 10 countries best prepared for the new digital economy," World Economic Forum, Last modified 6th July 2016, https://www.weforum.org/agenda/2016/07/countries-best-prepared-for-the-new-digital-economy/
[119]Salmah Khairuddin, "Electronic Government In Malaysia," Malaysian Administrative Modernisation And Management Planning Unit (MAMPU), Prime Minister's Department, Malaysia, Accessed on July 27th, 2017, file:///C:/Users/minah.ali/Downloads/Malaysia-CIO_JAPAN_version_2.pdf
[120]"MDEC Introduced Malaysia Digital Hub™ And Malaysia Tech Entrepreneur Programme To Drive The Growth Of Digital Economy," MDEC, 19th April, 2017, https://www.mdec.my/news/mdec-introduced-malaysia-digital-hub%E2%84%A2-and-malaysia-tech-entrepreneur-programme-to-drive-the-growth-of-digital-economy
[121]Ibid.

2. Digitalize through Public-Private Partnerships

With Malaysia ranking 6th on the WEF e-Governance and citizen centric services index, Public-Private Partnerships have proven successful in effective and rapid digitalization of services. With the Digital Hub initiative, the government is working closely with global multinationals such as Microsoft, providing a supportive and nurturing platform for the private sector.

4.7 United States of America

The United States' Digital Journey

The Federal Communications Commission released the National Broadband Plan in 2010, defining a roadmap with initiatives to stimulate economic growth, spur job creation and boost America's capabilities in education, health care, homeland security and more.[122] Aiming to deliver better digital services to its citizens, the US Administration launched a comprehensive Digital Government Strategy in 2012 to be led in a highly decentralized fashion by the individual states.[123]

While there is digital progress in the US, different sectors are on different stages of digitalization. The McKinsey Global Institute Industry Digitization Index assesses sectoral digitalization across the economy through 3 parameters - digital assets, digital usage, and digital workers - and 27 indicators. According to these indicators, some sectors in the US are far more digitized than others (see Figure 12).

Overall, the United States sees an improvement in its rankings from 9th (2012) to 5th (2016) place on the WEF NRI, and ranks 3rd for its extremely favorable business and innovation environment.[124] As a result, United States has one of the most responsive and digitized business sectors globally. The public sector is using digital technologies effectively to deliver services to citizens, ranking 4th on the Government Online Service Index and 9th on the e-Participation Index. According to the WEF NRI, the United States has very low broadband prices with the cheapest package being US $16 per month.[125]

	NRI Rank / 139 (2016)	NRI Score / 7 (2016)	NRI Score / 7 (2012)	IDI Rank /175 (ITU 2016)	IDI Rank /157 (ITU 2012)	Access to Internet (ITU 2016)	Access to Internet (ITU 2012)	DEI (Tufts 2017)	Income Level	Population in millions (CIA 2016)	Literacy Rate (UNESCO 2016)	GDP at PPP (WEF 2016)
United States	5	5.8	5.6	15	14	76.18%	74.18%	Stall Out	High Income	321.6	99%	US $ 55,805

[122]"Digital Government Strategy," U.S Department of State, Accessed on July 15th, 2017, https://www.state.gov/digitalstrategy/
[123]James Manyika, Sree Ramaswamy, Somesh Khanna, Hugo Sarrazin, Gary Pinkus, Guru Sethupathy, and Andrew Yaffe, "Digital America: A Tale Of The Haves and Have-Mores," McKinsey Global Institute, December 2015, http://www.mckinsey.com/industries/high-tech/our-insights/digital-america-a-tale-of-the-haves-and-have-mores
[124]"Country and Regional Trends from the NRI," World Economic Forum, Global Information Technology Report 2016, Accessed on May 25th, 2017, http://reports.weforum.org/global-information-technology-report-2016/country-and-regional-trends-from-the-nri/
[125]James Manyika, Sree Ramaswamy, Somesh Khanna, Hugo Sarrazin, Gary Pinkus, Guru Sethupathy, and Andrew Yaffe, "Digital America: A Tale Of The Haves and Have-Mores," McKinsey Global Institute, December 2015, http://www.mckinsey.com/industries/high-tech/our-insights/digital-america-a-tale-of-the-haves-and-have-mores

As digitalization continues to expand in various sectors and industries, the United States has a major opportunity to boost productivity growth. According to McKinsey, looking at just three big areas of potential—online talent platforms, big data analytics, and the Internet of Things— estimates suggest that digitization could add US $2.2 trillion to annual GDP by 2025.[126]

Figure 12: US Sectors based on Levels of Digitalization (Source: McKinsey)

Key Initiatives

e-Government

In 2012, the U.S Administration launched a comprehensive Digital Government Strategy aimed at delivering better digital services to its citizens. President Obama issued a presidential memorandum on building a 21st century digital government in which the president directed each major federal agency in the United States to make two key services, that American citizens depended on, available on mobile devices within the next 12 months.[127]

United States Digital Service

The U.S. Digital Service is a White House startup, founded by the President in 2014, which uses technology and innovations to deliver better services to the American people.[128] In support of these goals, U.S Digital Service recruits top technologists for term-limited hours of duty with the Federal government. Digitizing immigration, education, refugee admissions, healthcare applications, and student loans are some of the many projects implemented.

e-Health

The U.S government has invested significantly in the e-Health sector to improve quality of healthcare delivery in North America. According to findings released from the 5th Annual Makovsky/Kelton "Pulse of Online Health" Survey conducted in January 2015, it is expected that almost two-thirds (66%) of Americans would use a mobile app to manage health-related issues in few years from now.[129]

e-Education

The United States, realizing the importance of ICT in education, is taking concrete steps to expand online and distance learning. The National Educational Technology Plan (NETP) entitled "Transforming American Education: Learning Powered by Technology" was developed in 2010.[130] It emphasized and defined e-Education goals to ensure that students were connected to educational opportunities and content on the internet.

[126]Ibid.
[127]"Presidential Memorandum -- Building a 21st Century Digital Government," The White House, Office of the Press Secretary, Last modified May 23rd, 2012, https://obamawhitehouse.archives.gov/the-press-office/2012/05/23/presidential-memorandum-building-21st-century-digital-government
[128]"The U.S. Digital Service - Building a more awesome government through technology," Executive Office of the President, Last accessed, June 6th, 2017, https://www.usds.gov/
[129]Sunnie Southern, "News: Desire to Use HealthApps - Pulse of Online Health Survey," LinkedIn, Last modified February 25th 2017, https://www.linkedin.com/pulse/news-desire-use-health-apps-pulse-online-survey-sunnie-southernmin
[130]Jennifer Fritschi and Mary Ann Wolf, "Turning On Mobile Learning - Illustrative Initiatives And Policy Implications In North America," United Nations Educational, Scientific and Cultural Organization (UNESCO) Working Paper Series on Mobile Learning, 2012

Several US-based organizations directly support the development and implementation of mobile learning programs. The Connect-to-Compete (C2C) partnership, which is a joint effort by the National Cable and Telecommunications Association (NCTA), cable providers, and non-profit organizations, promotes e-Education by providing low-cost broadband service to millions of K–12 students who do not have access at home.[131] Several states reference mobile technologies in their educational technology plans that span several years into the future, validating an increased interest in mobile learning at the state level.

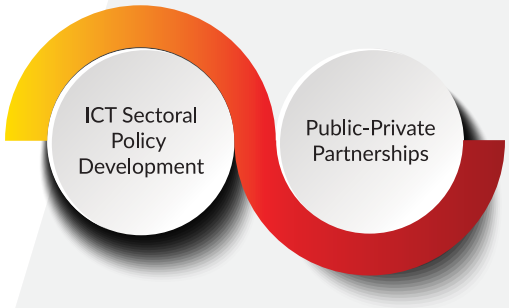
Key Learnings

1. Continue ICT Sectoral Policy Development

ICT policies have a critical role to play in different sectors of the economy, as reflected in United States' ICT policies for health and education sectors. Successful implementation of these e-Government services is further facilitated by tailoring programs to local level (state/country) requirements. Real potential of digitalization on economy can be realized only after achieving digitalization for all sectors in all states.

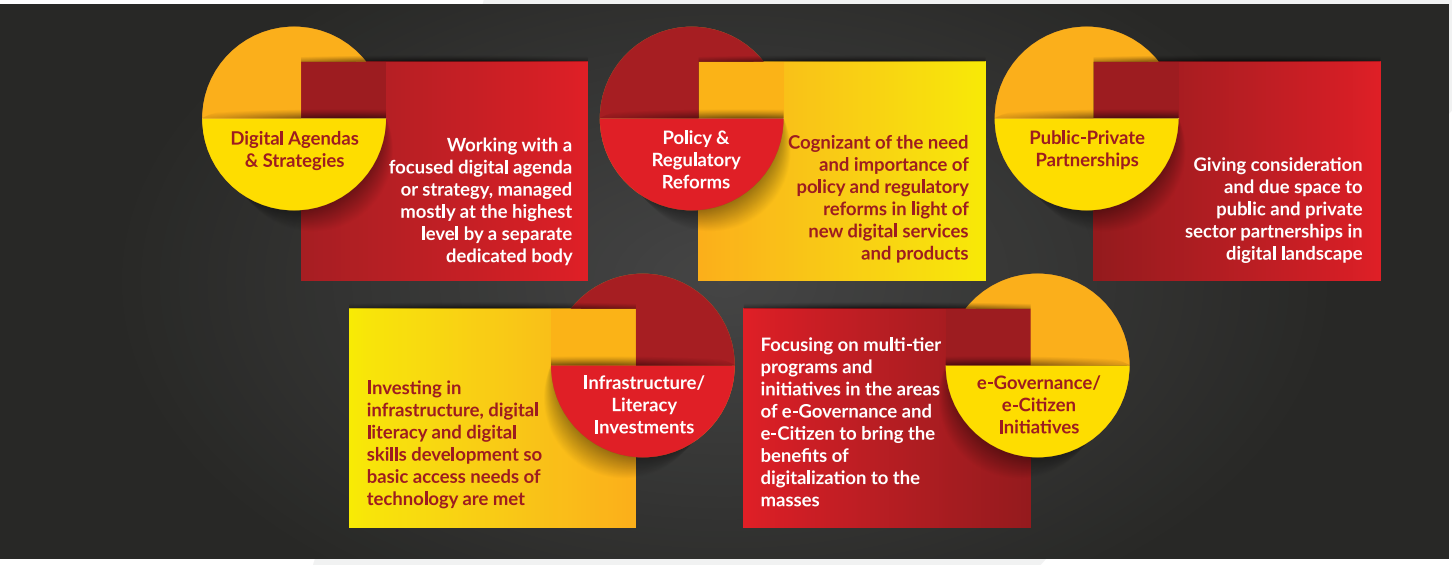
2. Demand for Digital Skill Sets

While already delivering basic education through ICT methods, the US government has another growing opportunity that is to give specific digital skills training to professionals and workers. There is high demand, and wages, for digital-skilled employees in the United States.



4.8 Key Takeaways from Comparative Country Analysis

A cross-country analysis of the selected seven countries outlines their digital journey, highlighting similar initiatives, learnings and challenges. Some common drivers for digitalization that emerge out of this analysis are mentioned below:



[131] Ibid.

PAKISTAN **GOING** DIGITAL

5. Pakistan Going Digital

5.1 Digital Journey

The Government of Pakistan has taken significant steps to bridge the digital divide in the country. Some of the major initiatives have been in the area of creating an enabling infrastructure that can provide high-speed broadband to the masses. Three separate Next Generation Mobile Spectrum Auctions (NGMSA), providing high-speed 3G/4G connectivity access throughout the country, have led to an overall increase in the broadband subscription from 2.7 million in 2013 to an impressive 44.6 million in 2017.[132] Furthermore, there have been some good examples of successful public-private partnerships, aimed at promoting entrepreneurship and job creation. One such example is the National Incubation Center project, a platform which nurtures tech startups and supports a culture of innovation and entrepreneurship.

	NRI Rank / 139 (2016)	NRI Score / 7 (2016)	NRI Score / 7 (2012)	IDI Rank /175 (ITU 2016)	IDI Rank /157 (ITU 2012)	Access to Internet (ITU 2016)	Access to Internet (ITU 2012)	DEI (Tufts 2017)	Digital Development Index (GSMA 2015)	Income Level	Population in millions (CIA 2016)	Literacy Rate (UNESCO 2016)	GDP at PPP (WEF 2016)
Pakistan	110	3.4	3.4	146	132	15.51%	9.96%	Watch Out	Emerging	Lower Middle	202	60%	US $ 5,000.01

The current need gap in the policy and regulatory environment in ICTs has been recognized by stakeholders, both locally and globally. The private sector is poised to play a big role in technological advancement of the country. Notable policymaking efforts include the Telecom Policy 2015 and the most recent draft of Digital Pakistan Policy 2017.

The Ministry of Information Technology (MoIT) is the federal body responsible for the creation and implementation of all ICT-related initiatives. The country's focus on digitalization is increasing with albeit few but successful public-private partnerships leading to improved digital and financial inclusion of the masses, accelerating the socio-economic development of the country.

Furthermore, the impact and reach of digital services is heavily dependent on their connectivity to the masses. In Pakistan, cellular penetration was at approximately 90 million unique subscribers by mid-2016 (47% of the total population). By 2020, around 90% of Pakistan's population is projected to have access to 3G networks and around 80% could enjoy 4G services.[133]

Pakistan's current standing on different international indicators points to unique challenges and opportunities on its path to digitalization. According to **WEF's Networked Readiness Index,**[134] Pakistan currently ranks 110th out of 139 countries. In all four sub-indices (**environment, readiness, usage,** and **impact**) evaluated by the NRI, Pakistan is in the lowest quartile. Within the environment sub-index, Pakistan ranks 115th for its political and regulatory environment and 98th for its business and innovation environment. The low ranking on the environment sub-index can be attributed to Pakistan's underdeveloped ICT laws, inefficient legal framework, and low venture capital availability, to name a few. For example, Pakistan ranks at 128th and 125th when it comes to the number of procedures and time it takes to enforce a contract.[135] As for the readiness sub-index, while Pakistan is one of the most affordable countries in the world with low tariffs and high competition in the cellular and internet industry, lower levels of technology usage can be attributed to Pakistan's poor infrastructure and low literacy of citizens. Hence, in the usage sub-index, the country ranks in the bottom 30 (out of 139 countries) on every measure of cellular or internet usage with only 15.51%[136] of the population using the internet. This combined with urban-rural disparities in infrastructure helps explain why Pakistan ranks in the lowest quartile for the usage sub-index, which focuses on economic and social impact.

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[132]Pakistan Telecommunication Authority, Telecom Indicators, Retrieved on August 18, 2017 from: http://www.pta.gov.pk/index.php?Itemid=599
[133]Jan Stryjak and Henry James, "Country Overview: Pakistan – A Digital Future", GSM Association, 2016
[134]"Networked Readiness Index – Pakistan," World Economic Forum, Accessed on April 23rd, 2017, http://reports.weforum.org/global-information-technology-report-2016/economies/#economy=PAK
[135]Ibid.
[136]"International Telecommunication Union: Facts & Figures 2017," International Telecommunication Union, Retrieved May 5th, 2017: http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx

ITU's ICT Development Index further provides evidence and support to WEF's NRI findings in Pakistan. Ranking 146th out of 175 countries, Pakistan once again scores low in all three sub-indices - **access, use,** and **skills** – of the IDI.[137] **ITU's Access to Internet**[138] shows that in 2001, 1.32% of Pakistan's population had access to internet, ahead of its contemporaries in the subcontinent - Bangladesh (0.13%) and India (0.66%) - but behind other Asian nations that are working towards digitalization such as the Philippines (2.52%) and China (2.64%). By 2016, Pakistan had made strides in improving internet penetration rate, with 15.51% of the population having access to internet. However, contemporaries like India (29.55%), the Philippines (55.5%), and China (53.2%) had increased access at an exponential rate in this time frame. While internet penetration continues to improve in Pakistan, a huge contribution to that access will come from high-speed internet (especially in the wake of 3G/4G services' proliferation since 2014).

Pakistan is also listed under the "Watch Out" category on **Tufts University's Digital Evolution Index.**[139]A low state of digitalization coupled with a slow rate of change in digitalization, Pakistan faces significant challenges when it comes to digitalizing and falls behind contemporaries such as India, Philippines, and Russia which are categorized as "Break Out" countries. Other countries such as China, Turkey and Malaysia score higher in their state of digitalization and are moving towards the "Stand Out" category – where countries are both highly digitally advanced and exhibit high momentum for digitalization.

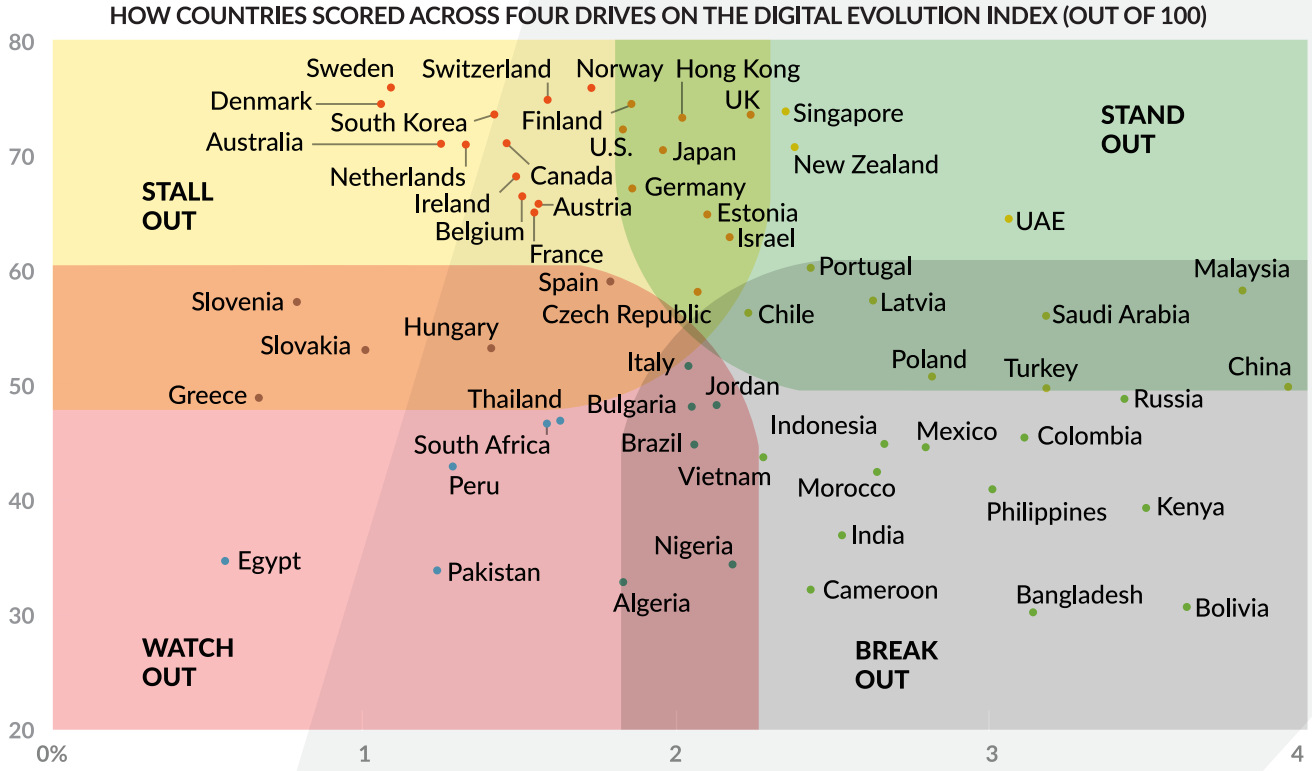

Figure 13: Digital Evolution Index (Source: Tufts, Fletcher School)

GSMA's Digital Development Index[140] recognizes Pakistan's efforts, listing it as an emerging digital society in 2016. As explained in section 3.5, countries belonging to this category are at a budding stage of digitalization, with primary emphasis on socio-economic development and social inclusion. Delivering health, education, and financial services through improvements in infrastructure, affordability, and logistics is the primary goal. Pakistan must focus more on building an enabling environment to spur digital growth and reach advanced stages of digitalization.

[137]"The ICT Development Index (IDI): conceptual framework and methodology," International Telecommunication Union, Retrieved May 5th, 2017: http://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis2016/methodology.aspx

[138]"International Telecommunication Union: Facts & Figures 2017," International Telecommunication Union, Retrieved May 5th, 2017: http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx

[139]Bhaskar Chakravorti and Ravi Shankar Chaturvedi, "Digital Planet 2017 How Competitiveness And Trust In Digital Economies Vary Across The World", The Fletcher School, Tufts University July 2017, Retrieved on August 1st, 2017: https://sites.tufts.edu/digitalplanet/files/2017/05/Digital_Planet_2017_FINAL.pdf

[140]Jan Stryjak and Henry James, "Country Overview: Pakistan – A Digital Future", GSM Association, 2016

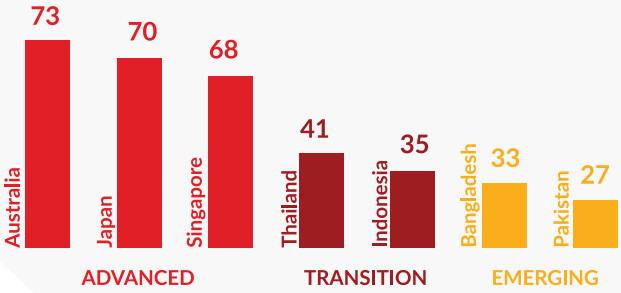

Figure 14: Digital Development Index in Asia (Source: GSMA)

5.2 Digital Policies and Frameworks

Digitalization in Pakistan is receiving due focus from national level planning and policymaking bodies. Current policies and frameworks have the right intentions and goals towards moving on the digital path. The section below summarizes current policy efforts under a **multi-tiered approach**, towards reviewing national, provincial, and sectoral level policies and frameworks.

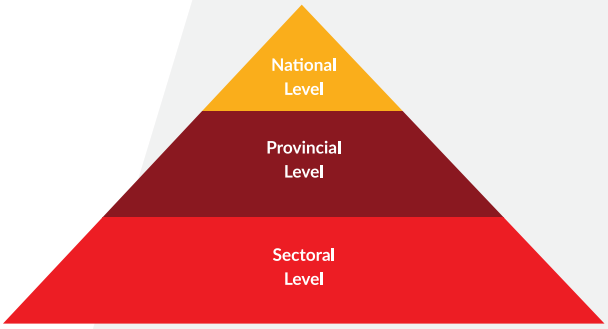

Figure 15: Multi-tiered Approach for Policy Review

5.2.1 National Level Policies

Digital Pakistan Policy Draft 2017

In 2017, the Ministry of Information Technology (MoIT), responsible for directing and regulating efforts to launch information technology and telecommunications initiatives in the country,[141] introduced the Digital Pakistan Policy Draft 2017 document. The policy document[142] underpins the need for a digital agenda and establishes the importance of digitalization as a strategic enabler. The draft highlights the current barriers and challenges for the IT sector in Pakistan along with four key priority areas - Sector Digitalization, IT Sector Sustainability, Cross-sector Collaboration, and Entrepreneurship and Innovation – and fourteen policy goals (see Figure 15). It also clearly pinpoints the prioritized areas for accelerated digitalization including e-Governance, e-Agriculture, e-Justice, e-Health, e-Energy, and e-Commerce.

The policy document identifies the need to bring internet to the masses and further bridge the digital and literacy divide. Lack of awareness, literacy, access and R&D in the ICT sector have been identified as key challenges in realizing digitalization opportunities. Furthermore, technology parks, incentives for software and hardware industries, entrepreneurship through technology incubators and provision of venture capital funds have been underlined as initiatives for the digital enablement of the country. The document demands a digital platform for public and private sector to deliver citizen-centric services. It also stresses eliminating legal and administrative barriers for data exchange for citizen services, providing cloud-based citizen services and data center cluster and integrating government databases.

The policy draft advocates that relevant federal ministries, divisions and departments create their own guidelines and lead the implementation of policy strategies that fall within their domain. Provinces are then encouraged to identify their own projects and create their own implementation plans. While a Roles and Responsibilities Matrix

[141] "Ministry of Information Technology Introduction", Ministry of Information Technology, Government of Pakistan, Retrieved on August 16, 2017 from: http://www.moitt.gov.pk/frmDetails.aspx?opt=basic&id=1
[142] "Digital Pakistan Policy 2017", Ministry of Information Technology, Government of Pakistan, 2017, Retrieved on June 20, 2017 from: moit.gov.pk/policies/DPP-2017v5.pdf

Figure 16: Digital Pakistan Policy Draft Areas and Goals (Source: MoIT)

has been created, an 'Action Plan' detailing the time frame and outputs is planned for the next phase. The draft policy still needs to be approved for implementation.

Pakistan 2025 One Nation - One Vision

Pakistan 2025 One Nation - One Vision,[143] drafted and implemented by the Planning Commission, serves as the country's overarching national vision for its economic and social transformation, setting goals for Pakistan to become one of the top 25 economies of the world by 2025 and one of the top 10 economies by 2047.

The seven pillars of the Pakistan Vision 2025 are People First, Inclusive Growth, Governance, Security (Water, Energy, Food), Entrepreneurship, Knowledge Economy, and Regional Connectivity. These pillars have strong linkages with the United Nations' SDGs (Sustainable Development Goals) and MDGs (Millennium Development Goals). The document emphasizes that shared vision, political stability and continuity of policies, peace and security, rule of law, and social justice are key enablers to build a conducive environment for the implementation of the aforementioned pillars.

Digital technologies have the potential to enable the government to achieve its Vision 2015 objectives. The document identifies priority areas and targets that must be addressed. For example, it specifies the need for every school, college and university to be digitalized and computerized by 2025. Providing a growing population with access to essential health, education and energy services, agriculture sector growth, a responsible and accountable government and public sector, jobs through an entrepreneurial private sector, and an environment where people can live with dignity, are all areas where digitalization can play a pivotal role.

5.2.2 Provincial Level Policies

Currently, the provincial government of Punjab has presented the Punjab IT Policy 2016 draft, while the provincial government of Khyber Pakhtunkhwa is in the process of drafting its KP's Digital Strategy.

Punjab Information Technology Board (PITB) introduced the Punjab IT Policy in 2016 to focus on six core principles (education, employment, entrepreneurship, engagement, empowerment, and economy) to guide the policy formulation for the following key areas: Industry, Education, Health, Governance, Citizens, and Startups and MSMEs.[144] Endorsed by the Chief Minister of Punjab, the draft also highlights ten broad policy goals with subsequent objectives and policy commitments as outlined below:

[143] "Pakistan 2025: One Nation – One Vision" (2014), Planning Commission, Ministry of Planning, Development & Reform, Retrieved on April 3, 2017 from: fics.seecs.edu.pk/Vision/Vision-2025/Pakistan-Vision-2025.pdf

1) Reducing digital divide
2) Making Punjab an IT R&D and innovation hub
3) Creating entrepreneurial frameworks
4) Enabling environment for IT technologies
5) Making Punjab a preferred destination for local and international investments
6) Increasing financial inclusion and promoting e-Commerce
7) Using ICTs for enhancing citizen capabilities
8) Promoting a knowledge-based economy
9) Increasing employment opportunities through ICTs
10) Utilizing ICTs to promote governance

The policy draft appears aligned with the federal government's Vision 2025. It sets targets for commitments to bridge the digital divide across gender, region, and economic classes by recognizing internet as a basic right for all citizens and bringing the offline population online. This, in turn, is expected to decrease the connectivity disparity between urban, sub-urban, and rural parts of the province, eliminate discrimination in ICT education and training with respect to gender, incentivize private sector to upgrade connectivity in backward areas, ensure affordability, digitalize public sector, and raise digital awareness among the public.

The draft also mentions establishing a SMART ICT-driven government for a more efficient, transparent, and green governance model along with the utilization of public-private partnerships (PPPs) as a model to achieve various policy commitments. It also identifies the need to create a safe and enabling regulatory environment to prepare for the challenges posed by digitalization, such as net neutrality, censorship, and data security. Special attention is given to the role of ICT in creating smart cities.

Similarly in its upcoming Digital Strategy, the **Khyber Pakhtunkhwa Information Technology Board (KPITB)**, focuses on four pillars: Economy (increasing economic opportunities through digitization), Skills (improving education quality and ICT skills), Access (ensuring affordable connectivity, digital inclusion), and Governance (improving government processes, service delivery, citizen centric services).[145] The Board identifies ICTs as key for job creation, connectivity, empowerment, and inclusive economic growth in KP. Moreover, the KP Digital Strategy makes the strategy formulation exercise a "social learning process" with multi-stakeholder engagement and clear demarcation of roles for government and businesses.

5.2.3 Sectoral Level Policies

Pakistan's GDP composition of each sector shows the contribution of agriculture, industry, and services to be at 20.9%, 20.3%, and 58.8% respectively (2015).[146] The growth in the services sector has been on a consistent rise (increase from 4.37% in 2014 to 4.95% in 2015[147]). Digitalizing the services sector can further enhance growth and in turn have a positive impact on the GDP. Taking this into account, three services sectors are selected for the scope of this report – **education, health, commerce** – along with **agriculture**.

Digitalization in the **education** services sector can help reduce the rural-urban literacy gap (urban areas at 74% compared to a 49% for the rural areas),[148] enhancing basic reading and writing skill levels. This is likely to impact both usage and skill parameters that are imperative for digitalization. Education is selected as a priority sector for analysis in this report.

Health is the second sector picked for analysis in this report, by looking at the benefits e-Health can bring to serve the scarcity of quality health services in the country. By offering health services from afar, via digital means, e-Health can help bridge gaps in healthcare access and availability (as per 2015-16 survey, availability of 1 doctor for 997 persons, 1 hospital bed for 1,584 persons, and 1 dentist for 10,658 persons).[149]

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[144] "Punjab IT Policy 2016", Punjab Information Technology Board, 2016, Retrieved on March 21, 2017 from: "www.policy.pitb.gov.pk/system/files/Punjab%20IT%20Policy%202016%20V1.1.pdf
[145] "Digital KP", Government of Khyber Pakhtunkhwa, Retrieved on June 21, 2017 from: http://kpgoestech.com/digitalkp/
[146] "Highlights – Pakistan Economic Survey (2014-15)", Government of Pakistan, Retrieved on July 1, 2017 from: http://www.finance.gov.pk/survey/chapters_15/Highlights.pdf
[147] Ibid.
[148] "Economic Survey of Pakistan (2016-17) – Education", Ministry of Finance, Government of Pakistan, Retrieved on May 11, 2017 from: http://www.finance.gov.pk/survey/chapters_17/10-Education.pdf
[149] "Pakistan Economic Survey (2016-17) – Health", Ministry of Finance, Government of Pakistan, Retrieved on June 13, 2017 from: http://www.finance.gov.pk/survey/chapters_17/11-Health.pdf

e-Commerce in Pakistan, forecasted to generate US $1 billion by 2020,[150] is the third selected sector for analysis. The sector is growing at a remarkable rate and attracting significant investments from outside Pakistan. For example, recent investments by Rocket Internet Group of Companies[151] and the intention of investment shown by Alibaba in the recent MoU signing with the Government of Pakistan[152] are just a few examples showing the promising growth of this sector.

Finally, Pakistan's economy is still largely dependent on **agriculture,** with the sector employing 42% of the labor force.[153] The slow growth of the agriculture sector, 2.7% (2013-14) to 2.9% (2014-15),[154] presents an opportunity to digitally transform this sector. Agriculture is selected as the fourth sector for analysis in this report. A brief account of **e-Governance** is also given as part of this sectoral analysis section.

Figure 17: Selected Sectors for Analysis

Each sector is detailed with a fact sheet – which presents a brief snapshot of the existing landscape and policy regime, stakeholders – highlighting some of the key stakeholders and their role in key policy initiatives, and current e-Initiatives – discussing some digital initiatives in the sector.

The high-level sector analysis in this section looks at the as-is state of four primary sectors – Education, Health, Commerce, and Agriculture. This section does not represent an exhaustive analysis of each sector. Later versions of this framework will discuss each sector in more detail.

NOTE: The 18th Amendment in the Constitution of Pakistan was a significant event that devolved powers to provinces, making certain subjects and issues a provincial concern instead of a federal one. The Amendment, passed in 2010 by the National Assembly of Pakistan, stipulates that provinces would be required by law to establish local government systems.[155] The provinces could also formulate and implement their own sector (which includes but is not limited to education, tourism, food and agriculture, local government and rural development) policies and initiatives. Subsequently, the political, administrative, and financial responsibility and authority was also devolved to provinces' elected representatives.

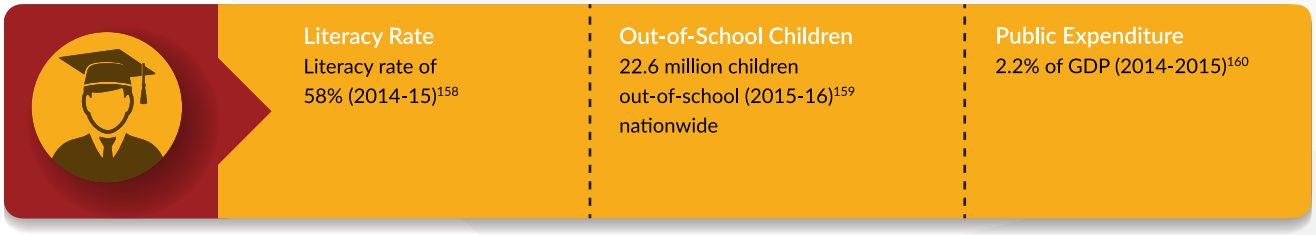
The provincial autonomy, in the wake of the 18th Amendment, led to certain projects being handed over from the MoIT to respective provincial governments.[156] MoIT still leads public sector development projects such as "Computerization of Prime Minister's Secretariat" and "Technology Parks Development Project at Islamabad".[157] Provincial governments like Punjab and Khyber Pakhtunkhwa have established autonomous Information Technology Boards, responsible for implementing digital solutions and modernizing government services' delivery across their provinces. Governments of Baluchistan and Sindh have the Department of Science and Information Technology and Information Technology Department, respectively. These provincial-level organizations are responsible for initiating and launching digital projects across their provinces.

[150] "E-Commerce potential in Pakistan Economy", Pakistan Observer, Retrieved on June 18, 2017 from: http://pakobserver.net/e-commerce-potential-in-pakistan-economy/
[151] "Our Network of Companies", Asia Pacific Internet Group, Retrieved on August 25, 2017 from: http://www.asiapacificinternetgroup.com/portfolio
[152] "Chinese tech giant Alibaba Group set to enter Pakistan; signs first MoU", Dawn, Retrieved on August 25, 2017 from: https://www.dawn.com/news/1333495
[153] "Pakistan Economic Survey (2015-2016) – Agriculture", Finance Division, Government of Pakistan, Retrieved on July 26, 2017 from: http://www.finance.gov.pk/survey/chapters_16/02_Agriculture.pdf
[154] "Pakistan Economic Survey (2014-2015) – Agriculture", Finance Division, Government of Pakistan, Retrieved on July 26, 2017 from: http://www.finance.gov.pk/survey/chapters_15/02_Agricultre.pdf
[155] "Devolution – Provincial Autonomy and the 18th Amendment", Jinnah Institute, 2014, Retrieved on July 1, 2017 from: http://jinnah-institute.org/wp-content/uploads/2015/02/Devolution-Report.pdf
[156] "Hospital management information system (HMIS) at Tertiary Health Care Level at Sheikh Zayed Medical Complex (SZMC), Lahore completed within stipulated time period Minister of State for IT", Ministry of Information Technology, Government of Pakistan, Retrieved on August 16, 2017 from: http://www.moitt.gov.pk/frmDetails.aspx?id=1175&opt=newsevents
[157] "PSDP Projects (2016-17)", Ministry of Information Technology, Government of Pakistan, Retrieved on August 16, 2017 from: http://www.moitt.gov.pk/frmDetails.aspx?opt=misclinks&id=104

5.3 Selected Sectors' Snapshot

5.3.1 Education

Fact Sheet



In Pakistan, public expenditure on the education sector accounts for about 2.2% of GDP and is projected to increase to 4% of GDP by 2018. In 2015-16, Punjab spent about 37.9%, Sindh about 20.3%, Khyber Pakhtunkhwa about 16.9%, and Baluchistan about 6.85% whereas the federal spent 17.9% of the allotted public expenditure.[161] In the same corresponding year, amongst the provinces, Punjab took the lead with a 61% literacy rate, followed by Sindh with 56%, Khyber Pakhtunkhwa with 53%, and Baluchistan with 43%.[162] The disparities amongst rural and urban areas as well as across genders in Pakistan are evident as the literacy rate remains much higher in urban areas (74%) than rural areas (49%), and is also higher for men (81%) than women (66%).[163]

Policy Regime and Stakeholders

In 2010, the Federal Ministry of Education, which is responsible for formulating and coordinating the education policy and curricula, was abolished and its functions were devolved to provinces. This step equipped provinces to form and design their own syllabi and curricula, independent of other provinces.[164] The **Ministry of Federal Education and Professional Training (MoENT)** is responsible for creating nationwide policies to ensure availability of education.[165] It also provides technical and vocational skills to ensure that national and international employment standards are maintained in Pakistan. MoENT's sub-departments include the **National Education Assessment System** which identifies issues and problems with the nation's education system.[166] **National Curriculum Council,** with membership from all provinces, is created to ensure minimum standards in education.[167] Working alongside the provinces, the **Higher Education Commission,**[168] an independent, autonomous, and constitutionally-established institution, is responsible for primary funding, and regulating and accrediting higher education efforts in Pakistan.

Working with these stakeholders, the Federal Government prepared the holistic **National Education Policy 2009**[169] which aims to bridge implementation gaps by outlining reforms and policy actions to be taken at provincial levels. The Federal Ministry of Education and provincial education departments then developed the **National Plan of Action 2013-2016**[170] as a guideline for provinces to achieve MDG targets in Pakistan. In the

[158]"Economic Survey of Pakistan (2014-15) – Education", Ministry of Finance, Government of Pakistan, Retrieved on May 11, 2017 from: http://www.finance.gov.pk/survey/chapters_15/10_Education.pdf
[159]Kashif Abbasi, "22.6m Pakistani children still out of school: report", Dawn, Updated March 9, 2017, https://www.dawn.com/news/1319300
[160]"Economic Survey of Pakistan (2014-15) – Education", Ministry of Finance, Government of Pakistan, Retrieved on May 11, 2017 from: http://www.finance.gov.pk/survey/chapters_15/10_Education.pdf
[161]"Economic Survey of Pakistan (2016-17) – Education", Ministry of Finance, Government of Pakistan, Retrieved on May 11, 2017 from: http://www.finance.gov.pk/survey/chapters_17/10-Education.pdf
[162]Ibid.
[163]Ibid.
[164]"Devolution – Provincial Autonomy and the 18th Amendment", Jinnah Institute, 2014, Retrieved on July 1, 2017 from: http://jinnah-institute.org/wp-content/uploads/2015/02/Devolution-Report.pdf
[165]"Ministry of Federal Education and Professional Training (MoENT)", Ministry of Education, Government of Pakistan, Retrieved on July 21, 2017 from: www.moent.gov.pk/
[166]"About NEAS", National Education Assessment System, Retrieved on July 23, 2017 from: http://www.neas.gov.pk/About%20Neas.html
[167]"Introduction – National Curriculum Council (NCC)", Ministry of Federal Education and Professional Training (MoENT), Retrieved on July 23, 2017 from: http://www.moent.gov.pk/frmDetails.aspx?opt=misclinks&id=22
[168]"About Us", Higher Education Commission, Pakistan, Retrieved on June 8, 2017 from: http://www.hec.gov.pk/english/aboutus/pages/aboutus.aspx
[169]"National Education Policy 2009", Ministry of Education, Government of Pakistan, 2009, Retrieved on June 3, 2017 from: http://unesco.org.pk/education/teachereducation/files/National%20Education%20Policy.pdf
[170]"Pakistan National Plan of Action 2013-2016" ASER Pakistan, Retrieved on April 23, 2017 from: http://aserpakistan.org/document/learning_resources/2014/Pakistan_National_plan_of_action_2013-2016.pdf

federal capital, the **Prime Minister's Education Reform Program (PMERP)**[171] was launched in 2015 to upgrade standards of education and uplift the state of government schools.

Since education is a provincial concern, the **education departments** in all provinces of Pakistan serve as the overseeing body for their respective education plans, ensuring coordination with the federal government. For instance, Government of Khyber Pakhtunkhwa developed the **KP Education Sector Plan 2010-2015,**[172] providing guidelines for an education plan and serving as a monitoring and evaluation tool to assess progress against the MDG targets. The **Baluchistan Education Sector Plan 2013-2018**[173] was prepared as a vehicle to manage the planning, execution, and monitoring & review of education policies and strategies in the province, with a focus on monitoring the implementation plan. The **Sindh Education Sector Plan 2014-2018**[174] was formulated with key policy, strategy and program priorities outlined under four areas of access, quality, governance, and public finance management. The **FATA Education Sector Plan 2015-2020**[175] outlines a strategic and reform-oriented plan focused on infrastructure, governance, capacity building of teachers, IT, and science education, to improve access to quality education in far-flung rural areas. Similarly, the **Punjab School Education Sector Plan 2013-2018**[176] focuses on various service delivery models, emphasizing the need for a strategy towards education quality, access, equity, and governance.

Selected Initiatives for e-Education

PITB initiated **e-Learn Punjab**[177] **-** a project intended to facilitate learners and empower educators throughout the province. e-Learn Punjab, the first government e-Learning initiative in Pakistan, is an official repository of free digitized textbooks, videos, animations, and simulations. Teachers can also contribute to this online educational database by uploading content for students. The initiative aims to provide a diverse curriculum for all students in the province, across rural and urban areas. For the first phase, digitized versions of science subject textbooks for 9th and 10th grades are being made available online, with future phases preloading the same content on laptops and CDs.

A similar online initiative to note is the recently announced partnership between the Information Technology University (ITU) and edX[178] – the nonprofit online learning platform created by Harvard and Massachusetts Institute of Technology (MIT). The partnership aims to develop Pakistan's **first digital university** by offering advanced online courses under faculty supervision.

Smart Monitoring of Schools, another notable scheme, is a school monitoring initiative whereby the Government of Punjab deploys monitoring officers to digitally collect data related to teacher presence, student enrolment and attendance, and availability of facilities during on-spot visits.[179] 1,100 officers make monthly visits to over 52,000 public schools across the province. Data collection through an app reduces data entry time, ensures data accuracy, and allows for real time data availability and visualization. Since August 2014, over 1 million spot visits to public schools have been processed and analyzed through this application. Replication of such digital monitoring programs across cities and provinces can allow for improved delivery of education.

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[171]Zubair Qureshi, "PM education reforms programme yielding results", Pakistan Observer, Retrieved on May 11, 2017 from: http://pakobserver.net/pm-education-reforms-programme-yielding-results/
[172]"Education Sector Plan 2010-2015", Government of Khyber Pakhtunkhwa, Retrieved on April 27, 2017 from: www.kpese.gov.pk/Downloads/Education%20Sector%20Plan.pdf
[173]"Baluchistan Education Sector Plan 2013-2018", Government of Baluchistan, Retrieved on June 7, 2017 from: emis.gob.pk/Uploads/Balochistan%20Education%20Sector%20Plan.pdf
[174]"Sindh Education Sector Plan", Sindh Education and Literacy Department, Retrieved on June 10, 2017 from: www.sindheducation.gov.pk/Contents/Menu/Final%20SESP.pdf
[175]"FATA 2015 – 2020 Education Plan in the Offing", Pakistan Observer, April 8, 2017, Retrieved on June 3, 2017 from: http://www.pressreader.com/pakistan/pakistan-observer/20150408/281595239049209/TextView
[176]"Punjab School Education Sector Plan (2013-2017)", School Education Department, Government of Punjab, Retrieved on May 1, 2017 from: http://aserpakistan.org/document/learning_resources/2014/Sector_Plans/Punjab%20Sector%20Plan%202013-2017.pdf
[177]"elearn Punjab", Punjab Information Technology Board, Retrieved on June 10, 2017 from: elearn.punjab.gov.pk/
[178]"ITU & EDX Signs MOU for Pakistan's First Digital University", Information Technology University, Retrieved on June 11, 2017 from: itu.edu.pk/itu-latest-news/itu-edx-signs-mou-for-pakistans-first-digital-university/
[179]"Smart Monitoring of Schools", Punjab Information Technology Board, Retrieved on June 8, 2017 from: https://www.pitb.gov.pk/sms

5.3.2 Health

Fact Sheet

Public Health Services
1 doctor for 997 persons, 1 hospital bed for 1,584 persons, and 1 dentist for 10,658 persons (2016-2017)[180]

Share in Public Spending
Baluchistan (10%) and KP (18.7%) spend least, Punjab (66.2%) and Sindh (33.4%) spend most[181]

Public Expenditure on Health
0.46% of GDP (2016-2017) - a 9% increase compared to last year; Per capita health spending US $36.2 (below WHO's US $86 benchmark for low income countries)[182]

Government spending on health sector amounts to about 0.46% of GDP.[183] While around 61% (2016) of the total population lives in rural areas,[184] there are only 600 health centers in rural areas across the country.[185] Looking at access to medication, about 1.2 pharmacists are available to every 20,000 people in Pakistan.[186] Medicine prices suffer with large variances between international rates (0.72) and Pakistan's rates (26.2).[187]

Moreover, only 19.3% of pharmacies in the country meet licensing requirements,[188] leading to price distortion and low quality of healthcare.

Policy Regime and Stakeholders

After the devolution of powers, the health mandate was delegated to three levels: federal, inter-provincial, and provincial.[189] **The Ministry of National Health Services, Regulations and Coordination (MNHSRC),**[190] providing federal level ownership after devolution, was formed in 2013 to frame health policies, enforce regulations and conduct health research on a national level. Provision of public health and healthcare services were devolved to the provincial level, with each province establishing its own health department. Many health programs, such as Family Planning, Primary Health Care, and Program on Immunization were also devolved. The World Health Organization (WHO) viewed the devolution of the health sector in Pakistan as a key opportunity whereby provinces can become effective advocates and catalysts for strategic development in health.[191]

The Ministry of National Health Services, Regulations, and Coordination[192] provides efficient, equitable, accessible, and affordable health services, improves national and international coordination in public health, ensures oversight for regulatory bodies in health sector, improves population welfare coordination, and ensures the enforcement of drug laws and regulations. Governments of Sindh, Punjab, and KP have formulated their long-term health sector strategies (2012-2020) to ensure that provinces deliver improved healthcare and cover essential services.[193]

The **Sindh Health Care Commission Act 2013,**[194] enacted by the Government of Sindh, ensures effective delivery of health services to the whole province. Similarly, the **Punjab Health Care Commission Act 2010**[195] aims to improve performance, effectiveness, and provision of quality healthcare services. The Government of KP, in 2015,

[180]"Pakistan Economic Survey (2016-17) – Health", Ministry of Finance, Government of Pakistan, Retrieved on June 13, 2017 from: http://www.finance.gov.pk/survey/chapters_17/11-Health.pdf
[181]Ibid.
[182]Ibid.
[183]"Economic Survey of Pakistan (2016-17) – Health", Ministry of Finance, Government of Pakistan, Retrieved on May 11, 2017 from: http://www.finance.gov.pk/survey/chapters_17/11-Health.pdf
[184]"Rural population (% of total population)", The World Bank, Retrieved on July 21, 2017 from: http://data.worldbank.org/indicator/SP.RUR.TOTL.ZS
[185]"Pakistan", World Health organization (WHO), Retrieved on July 21, 2017 from: http://www.emro.who.int/pak/programmes/primary-a-secoundary-health-care.html?-Secoundary-Health-Care-=
[186]Shehla Zaidi, Maryam Bigdeli, Noureen Aleem, and Arash Rashidian, "Access to Essential Medicines in Pakistan: Policy and Health Systems Research Concerns" PLOS, May 22, 2013, Retrieved on July 23, 2017 from: http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0063515#s3
[187]Ibid.
[188]Ibid.
[189]"Devolution – Provincial Autonomy and the 18th Amendment", Jinnah Institute, 2014, Retrieved on July 1, 2017 from: http://jinnah-institute.org/wp-content/uploads/2015/02/Devolution-Report.pdf
[190]"Vision and Mission", Ministry of National Health Services, Regulations, and Coordination, Retrieved on May 15, 2017 from: www.nhsrc.gov.pk
[191]"Pakistan", World Health Organization (WHO), Retrieved on July 23, 2017 from: http://www.emro.who.int/pak/who-presence-in-pakistan/
[192]"Vision and Mission", Ministry of National Health Services, Regulations, and Coordination, Retrieved on May 15, 2017 from: www.nhsrc.gov.pk
[193]"Economic Survey of Pakistan (2016-17) – Health", Ministry of Finance, Government of Pakistan, Retrieved on May 11, 2017 from:
[194]http://www.finance.gov.pk/survey/chapters_17/11-Health.pdf
[195] "The Punjab Healthcare Commission Act 2010", Punjab Healthcare Commission, Retrieved on April 24, 2017 from: https://www.phc.org.pk/downloads/PHC_Final_Act.pdf

established the **Health Care Commission (HCC),**[196] to regulate private health sector and ensure the provision of quality healthcare services in the public sector through performance audits and hospital service evaluations.

Selected Initiatives for e-Health

Through e-Health, multiple electronic features have been added to existing health infrastructure for easy access to doctors and specialists, access to medicine, and access to medical information for both doctors and patients. The Aga Khan University, an extremely well reputed university-cum-hospital setup, has a **Center for Innovation in Medical Education**[197] which provides access to an e-Health clinic, a digital library, and a digital research unit where e-Health technologies are built and tested. The Center also envisions the "next generation hospital ward", by simulating a futuristic 8-bed virtual ward, with the latest patient monitoring, networking, and teleconferencing facilities. Other ventures like **Ring a Doctor**[198] utilize the cost-effectiveness of web-based and mobile-app-based solutions, and provide patients with access to experts.

The Government of Pakistan has also launched an e-Health service[199] in the form of personal identification cards which stores health histories and patient data securely so that doctors and insurers can have access to consistent patient histories to make informed decisions. Such government initiatives are also coupled with existing health policies, such as the **Prime Minister National Health Program**[200] which provides health facilities to underprivileged citizens of the country. Private sector ventures, like healthonline.pk[201] , are also providing access to medicine through online portals, mobile applications, and basic messaging services.

Another digital initiative called **eVaccs** is a vaccination project that is rolled out by the Government of Punjab, in collaboration with the Federal Ministry of Health.[202] The project automates the whole process of immunization, from ensuring on-the-field vaccinator attendance to increasing geographical coverage of vaccination. The program has been applauded for its impact, reaching out to 2.6 million children so far and increasing overall coverage for low-income rural areas by approximately 160% in almost two years.[203]

Some other notable initiatives include **Procheck**[204] which is a pharma-based web portal providing three-tiered solutions: an anti-counterfeiting application for medicines, a remote plant management solution for third-party manufacturing assistance, and a data analytic tool for sales force activities; **Sehat**[205] which is an online pharmacy and medical store delivering medicines at consumers' doorstep; **DoctHERs,**[206] a digital healthcare platform, which utilizes the community health model to deliver health services in real-time while leveraging online technology; and **Sehat Kahani**[207] which is a social impact initiative (present through both online and brick-and-mortar clinics) towards improving primary health care in communities through health care consultation, awareness and counseling.

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[196]"Health Care Commission (HCC)", Government of Khyber Pakhtunkhwa, Retrieved on May 21, 2017 from: http://health_regulatory_authority.kp.gov.pk/page/welcome_to_khyber_pakhtunkhwa_health_care_commission/page_type/message

[197]"Centre of Innovation in Medical Education", The Agha Khan University, Retrieved on June 11, 2017 from: https://www.aku.edu/cime/Pages/home.aspx"Centre of Innovation in Medical Education", The Agha Khan University, Retrieved on June 11, 2017 from: https://www.aku.edu/cime/Pages/home.aspx

[198]"Ring a Doctor", Retrieved on June 9, 2017 from: https://www.ringadoctor.com/

[199]"e-Cards (Health), NADRA, Retrieved on July 21, 2017 from: https://www.nadra.gov.pk/solutions/secure-document-solutions/e-health-cards/

[200]"Prime Minister National Health Program", Retrieved on June 9, 2017 from: http://www.pmhealthprogram.gov.pk/about-us/

[201]"Health Online", retrieved on June 10, 2017 from: healthonline.pk

[202]"eVaccs", Government of Punjab, Retrieved on July 21, 2017 from: http://open.punjab.gov.pk/evaccs/

[203]Ibid.

[204]"Procheck", Retrieved on August 23, 2017 from: http://procheck.pk/#how

[205]"Sehat", Retrieved on August 23, 2017 from: https://sehat.com.pk/pages/Profile.html

[206]"DoctHERS", Retrieved on Agust23, 2017 from: http://www.docthers.com/index.html

[207]"Sehat Kahani", Retrieved on August 23, 2017 from: http://sehatkahani.com/our-kahani/

5.3.3 Commerce

Fact Sheet

In 2016-17, trade and commerce in Pakistan looked unfavorable as exports declined by 3.06% and imports grew by 18.67%.[211] On the other hand, e-Commerce, the digital/online platform for carrying out transactions, has shown significant promise, as e-Commerce companies boast an average of up to 300% growth per year.[212] However, Pakistan still needs to grow its e-Commerce sector as current e-Commerce transactions account for only 0.1% of total retail sales as compared to 8-9% in the US and 18-20% in China.[213] There is a lack of access to digital payment mechanisms with only 6% of people having mobile branchless banking accounts and only 1.8% of the population receiving government transfers through digital means.[214] In addition, basic banking services are unavailable to masses as more than 100 million Pakistanis do not have access to basic financial institutions. According to 27.5 million of those lacking access, distance to a financial institution is noted as the biggest deterrent.[215]

Policy Regime and Stakeholders

The main stakeholders in commerce include the **Ministry of Commerce** (MoC)[216] which is a federal ministry looking after the national economy by working on trade liberalization and facilitation, improving export competitiveness, and reducing the cost of doing business. The Ministry of Commerce also formulated a **Trade Policy Framework 2015-18** with an extensive list of goals which include increasing annual exports, improving export competitiveness, transitioning from factor-driven to efficiency-driven and innovation-driven economy, and raising share in regional trade.[217] The **Trade Development Authority of Pakistan (TDAP)**, with Ministry of Commerce as its administrative ministry, is responsible for implementing initiatives under the Trade Policy.[218]

Ministry of Finance (MoF)[219]– dealing with subjects pertaining to finance of the federal government and devising the annual budget statement – and **Federal Bureau of Revenue** (FBR)[220]– a federal revenue-collecting entity responsible for formulating and administering fiscal policies, and levying and collecting federal taxes – are also key players in commerce. Although FBR is responsible for collection of federal taxes, the provinces have their own revenue boards which work on tax management and with tax enforcement agencies in their province, resulting in different rates across the nation.[221]

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[208]"Haq, Shahram. "Pakistan's Booming Retail Sector." The Express Tribune. April 27, 2016. Accessed November 13, 2017. https://tribune.com.pk/story/1092296/mall-culture-pakistans-booming-retail-sector/.
[209]"Building Digital Societies in Asia: Making Commerce Smarter", GSMA Report, 2015, Retrieved on April 2, 2017 from: https://www.gsmaintelligence.com/research/?file=868a8ea61c838988eed467a03d12773c&download
[210]Ibid.
[211]"Economic Survey of Pakistan (2016-17) – Trade and Payments", Ministry of Finance, Government of Pakistan, Retrieved on April 2, 2017 from: http://www.finance.gov.pk/survey/chapters_17/08-Trade.pdf
[212]"Primed for Growth: An Analysis of Pakistan's eCommerce Market in 2016", ProPakistani, 2017, Retrieved on July 21, 2017 from: https://propakistani.pk/2017/02/14/primed-growth-analysis-pakistans-ecommerce-market-2016/
[213]Ibid.
[214]"Financial Inclusion in Pakistan", The World Bank, February 8,2016, Retrieved on July 21, 2017 from: http://www.worldbank.org/en/news/infographic/2016/02/08/financial-inclusion-in-pakistan
[215]Ibid.
[216]"About", Ministry of Commerce, Government of Pakistan, Retrieved on June 3, 2017 from: http://www.commerce.gov.pk/?page_id=2690
[217]"Strategic Trade Policy Framework 2015-18", Ministry of Commerce, Government of Pakistan, Retrieved on August 20, 2017 from: http://www.commerce.gov.pk/wp-content/uploads/2016/03/STPF-2015-18-Document.pdf
[218]"About Us", The Trade Development Authority of Pakistan, Retrieved on August 23, 2017 from: http://www.tdap.gov.pk/about.php
[219]"Ministry of Finance", Government of Pakistan, Retrieved on April 5, 2017 from: http://www.finance.gov.pk/
[220]"Introduction to FBR", Federal Bureau of Revenue, Government of Pakistan, Retrieved on April 13, 2017 from: http://www.fbr.gov.pk/Contents/introduction-to-fbr/57
[221]Amin Yusufzai, "Telecom Taxes to be Rationalized, Provinces' Interference on Telecom Taxes Unfair: Anusha" ProPakistani, 2015, Retrieved on July 15, 2017 from: https://propakistani.pk/2015/12/07/telecom-taxes-to-be-rationalized-provinces-interference-on-telecom-taxes-unfair-anusha/

Apart from tax management, the government is also working on policies towards enhancing digital payments. A major component of e-Commerce transactions is the capability to conduct transactions online with the help of digital payments.

The **Electronic Transactions Ordinance 2002**[222] was passed which set a modern legal and regulatory commerce framework for Pakistan. The main objective was to improve overall governance, economy, and services to citizens by transforming paper-based transactions to electronic transactions.

Later, the **State Bank of Pakistan** (SBP) – the central bank of Pakistan - introduced the **Payment Systems and Electronic Fund Transfers Act 2007**[223] which covers all areas related to payment systems, payment instruments, clearing, electronic fund transfers, e-Banking/ATMs, burden of proof, and fines and penalties. SBP is a major stakeholder in the **National Financial Inclusion Strategy (NFIS)**, launched in May 2015, the objective of which is to achieve universal financial inclusion in Pakistan. The strategy hopes to achieve formal financial access for 50% of the adult population by 2020.[224]

Selected Initiatives for e-Commerce

In Pakistan, e-Commerce has emerged as a separate, independent sector from commerce. e-Commerce refers to the transaction of goods and services with the help of any online channel or portal, m-commerce being the same through a mobile phone. Pakistan's e-Commerce market is predominantly a mobile first market, with over 75% of total order volume for a number of e-Commerce startups made through mobile phones.[225] This has been made possible through the availability of affordable smartphones, increase in investments by mobile phone operators, an emphasis on mobile money for digital payments and the proliferation of 3G/4G services. Some promising ventures in e-Commerce are outlined below:

Daraz.pk[226] is an online shopping portal with products ranging from electronics and appliances to fashion, books, and accessories. With initial investments by the German-based group Rocket Internet, the portal now ranks among the top ten most visited websites in Pakistan. It is also the number one ranked among online shopping websites, estimated to earn between US $1-2 million annually through online advertising alone. The scale of growth has led Daraz to partner with Telenor's Easypaisa service, shifting financial transactions from cash-on-delivery to online channels with 33% of Daraz's Black Friday 2015 sales transactions carried out through prepaid online method. In partnership with Standard Chartered Bank, it has also introduced payments on monthly installment basis for credit card holders.

Pakwheels.com[227] is another initiative which speaks volumes about the potential of the e-Commerce industry. The website is a marketplace for buyers and sellers of cars, and a portal for automobile enthusiasts to communicate. The business has an 80% market share of automobiles classified ads, and aims to become a billion-dollar entity by 2020. The website had 25 million unique visitors in 2016, increasing its revenue by 100% in the last three years. The website aims to conduct all its transactions online in the future, which can be aided by policymaking that enables more trust and oversight in online transactions.

Pakistan's e-Commerce market is an emerging one (estimated at US $1 billion by 2020[228]), with potential expansion (reaching over US $600 million by the end of 2017[229]) and growth in various online ventures (other initiatives include Jovago.pk, Food Panda, homeshopping.pk, symbios.pk and shophive.pk).

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[222] "Electronic Transactions Ordinance 2002", Retrieved on April 13, 2017 from: www.pakistanlaw.com/eto.pdf
[223] "Payment Systems and Electronic Fund Transfers Act 2007", State Bank of Pakistan, Retrieved on April 3, 2017 from: www.sbp.org.pk/psd/2007/EFT_Act_2007.pdf
[224] "National Financial Inclusion Strategy", State Bank of Pakistan, Retrieved on April3, 2017 from: www.sbp.org.pk/press/2015/FM-22-May-2015.pdf
[225] Uzair M. Younus, "A New Frontier", Dawn, March 7, 2017, Retrieved on June 13, 2017 from: https://www.dawn.com/news/1318870
[226] "Daraz PK", Retrieved on July 1, 2017 from: https://www.daraz.pk/
[227] " Article", Pakistan Today, Retrieved on June 10, 2017 from: https://profit.pakistantoday.com.pk/2017/02/20/pakwheels-the-road-to-a-1-billion-valuation/
[228] "E-Commerce potential in Pakistan Economy", Pakistan Observer, Retrieved on June 18, 2017 from: http://pakobserver.net/e-commerce-potential-in-pakistan-economy/
[229] Kanwal Saleem, "Pakistan's E-commerce trade flourishing, reaches over $600m capitalization by 2017", Pakistan & Gulf Economist, February 6, 2017, Retrieved on June 3, 2017 from: http://www.pakistaneconomist.com/2017/02/06/pakistans-e-commerce-trade-flourishing-reaches-600m-capitalization-2017/

5.3.4 Agriculture

Fact Sheet

Agriculture, still a primary contributor to Pakistan's economy, employs about 42.3% of the labor force[234] and utilizes about 47%[235] of the country's land. Replacing outdated harvesting and cultivation techniques with technological solutions and digitalization of the agriculture value chain is critical to the sector's overall growth and development.[236] There is a 40% yield per acre gap between Pakistan and other countries[237] in the same region, leaving a huge margin for improvement. Agriculture grew from 2.7% (2013-14) to 2.9% (2014-15)[238] and is poised to continue doing so.

Policy Regime and Stakeholders

Previously centralized, the agriculture sector was devolved to the provincial level, with provinces being directly responsible for livelihood of around 70% of the population.[239] Provinces are in charge of functions such as agriculture extension, and research and livestock, and have to fulfill targets and goals with their financial and capacity constraints. The **Ministry of Food, Agriculture, and Livestock (MINFAL)** was also abolished, with its functions – research and economic studies on farming agriculture policies - devolved or reallocated to other ministries.[240] The-then government was of the view that sufficient resources, financial support and personnel were available, or provided, in the provinces to perform their new roles (2012).[241] Some of the public sector development program projects were also given to the provinces such as the projects on high efficiency irrigation and crop maximization. In 2012, the **Federal Food Security and Research Division (FFSRD)** was formed which acquired all the federally reallocated functions of the MINFAL[242] and was tasked with food security and research across the country, as well as the export of agriculture items. Similarly, **Pakistan Agricultural Research Council (PARC),**[243] the apex national organization, was established to work with federal and provincial institutions in the country to provide science-based solutions around agriculture. Provinces still have to seek federal approval from entities like PARC for various reasons, indicating a lack of absolute empowerment at the provincial level.[244]

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[230]"The World Fact Book: Pakistan", Central Intelligence Agency (CIA), Retrieved on July 23, 2017 from: https://www.cia.gov/library/publications/the-world-factbook/geos/pk.html
[231]"Pakistan: Rural Population", Trading Economics, Retrieved on July 23, 2017 from: https://tradingeconomics.com/pakistan/rural-population-percent-of-total-population-wb-data.html
[232]Pakistan Economic Survey (2015-2016) – Agriculture", Finance Division, Government of Pakistan, Retrieved on July 26, 2017 from: http://www.finance.gov.pk/survey/chapters_16/02_Agriculture.pdf
[233]Ibid.
[234]Ibid.
[235]Pakistan - Agricultural land (% of land area)", Trading Economics, Retrieved on July 26, 2017 from: https://tradingeconomics.com/pakistan/agricultural-land-percent-of-land-area-wb-data.html
[236]"Pakistan Economic Survey (2015-2016) – Agriculture", Finance Division, Government of Pakistan, Retrieved on July 26, 2017 from: http://www.finance.gov.pk/survey/chapters_16/02_Agriculture.pdf
[239]"Pakistan far behind the world in per acre yield", The Nation, Retrieved on July 21, 2017 from http://nation.com.pk/business/18-Mar-2011/pakistan-far-behind-the-world-in-per-acre-yield
[232]"Pakistan Economic Survey (2014-2015) – Agriculture", Finance Division, Government of Pakistan, Retrieved on July 26, 2017 from: http://www.finance.gov.pk/survey/chapters_15/02_Agricultre.pdf
[233]Ibid.
[234]Ibid.
[235]"Pakistan - Agricultural land (% of land area)", Trading Economics, Retrieved on July 26, 2017 from: https://tradingeconomics.com/pakistan/agricultural-land-percent-of-land-area-wb-data.html
[236]"Pakistan Economic Survey (2015-2016) – Agriculture", Finance Division, Government of Pakistan, Retrieved on July 26, 2017 from: http://www.finance.gov.pk/survey/chapters_16/02_Agriculture.pdf
[237]"Pakistan far behind the world in per acre yield", The Nation, Retrieved on July 21, 2017 from http://nation.com.pk/business/18-Mar-2011/pakistan-far-behind-the-world-in-per-acre-yield
[238]"Pakistan Economic Survey (2014-2015) – Agriculture", Finance Division, Government of Pakistan, Retrieved on July 26, 2017 from: http://www.finance.gov.pk/survey/chapters_15/02_Agricultre.pdf
[239]Tahir Ali Khan, "Devolution of Agriculture: Impact on KP", Retrieved on April 27, 2017 from https://tahirkatlang.wordpress.com/tag/18th-amendment/
[240]Ibid.
[241]Ibid.
[242]Ibid.
[243]"PARC Profile", Pakistan Agricultural Research Council (PARC), Retrieved on April 27, 2017 from http://www.parc.gov.pk/index.php/en/pakistan-agriculture-research-council/parc-profile

Ministry of National Food Security & Research[245] is the federal ministry primarily focused on policy formulation, economic coordination, and planning for food grain and agriculture. It also procures food grains and fertilizers, stabilizes import price of agriculture produce, serves as an international liaison, and conducts economic studies to frame agricultural policies. **National Agriculture Research Center (NARC)**[246] is the largest center of the PARC with their programs serving as a common platform for scientists from different federal, provincial, and academic institutions.

Since agriculture is a devolved concern, the provincial **agriculture departments** also play a crucial role in devising policies and action plans within the province. Policy formulation has been taken up by the Baluchistan and KP provinces but is pending approval.[247] FATA is currently in the process of devising an agriculture policy/action plan, with the help of Food and Agriculture Organization (FAO).[248] Sindh Government has devised a **Food Security Policy** draft which is under consultation with multiple stakeholders and is pending submission.[249] Government of Sindh also requested FAO for assistance with a **Nutrition Sensitive Agriculture Policy/Agriculture Strategy** draft along with designing an Inter-sectoral Nutritional Strategy in 2013. **Punjab Agriculture Policy 2017** draft, released by the Kissan Commission's subcommittee and Punjab Agriculture Commission, aims to make the sector competitive and profitable by focusing on infrastructure research and rural development.[250] The policy also makes a reference to the role of ICTs in the sectoral value chain.

Selected Initiatives for e-Agriculture

Bakhabar Kissan[251] is a free-of-cost service with SMS, interactive voice response (IVR), and mobile app features for farmers, providing them with latest market rates, weather forecast, agricultural advisory, best practice tips, animal husbandry section to buy products, and news related to agriculture and government schemes. There is also a free helpline for access to agri-experts for any crop or livestock-related issue, mainly in rural Punjab and Khyber Pakhtunkhwa.[252]

Similarly, **Zarai Baithak**[253] is an online interactive agricultural information portal which farmers can also access through a number of information centers established in selected villages and equipped with operators. Developed by the Institute of Agri Extension & Rural Development, this project is being implemented at the University of Agriculture, Faisalabad with support from the University's Endowment Funds Secretariat and United States Department of Agriculture (USDA). Department of Agriculture (Punjab) is also a partner of this initiative.

Khushal Zamindar[254] is another free-of-cost service with SMS, IVR, and user-friendly robo-call features for farmers. It provides location-specific weather forecast along with contextual agronomic advisory for relevant crop mix and tips for livestock management. The service is currently available in Punjab, reaching about 36 districts.

Connected Agriculture Punjab Package (CAPP)[255] is a program, initiated by the Government of Punjab with Telenor Pakistan and Tameer Bank as partners, which offers a host of initiatives and services to farmers, such as interest-free loans, subsidies, and access to consultancy and advisory services regarding crops and fertilizers. These services will be provided through a comprehensive digital mobile platform with access through smartphones.

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[244] "Pakistan Agricultural Research Council (PARC)", Retrieved on April 12, 2017 from: www.parc.gov.pk/
[245] "Ministry of National Food Security & Research", Retrieved on April 23, 2017 from: www.mnfsr.gov.pk/
[246] "National Agriculture Research Center (NARC)", Pakistan Agriculture Research Council, Retrieved on April 27, 2017 from: www.parc.gov.pk/index.php/2013-04-11-06-13-50/narc-islamabad
[247] "Country Fact Sheet on Food and Agriculture Policy Trends", Food and Agriculture Organization of the United Nations, August 2016, retrieved on April 24, 2017 from: http://www.fao.org/3/a-i6054e.pdf
[248] "Annual Report2015-16 – Rebuilding Lives in FATA", Rehabilitation and Reconstruction Unit (RRU), Retrieved on April 10,2017 from: https://fata.gov.pk/cp/uploads/downloads/147255457457c555e9858f9.pdf
[249] "Country Fact Sheet on Food and Agriculture Policy Trends", Food and Agriculture Organization of the United Nations, August 2016, retrieved on April 24, 2017 from: http://www.fao.org/3/a-i6054e.pdf
[250] "Punjab's Policy Draft on Farming", Dawn, Updated March 20, 2017, Retrieved on August 20, 2017 from: https://www.dawn.com/news/1321627/punjabs-policy-draft-on-farming
[251] "Services", Bakhabar Kissan, Retrieved on June 8, 2017 from: http://www.bakhaberkissan.com/services.php#iv-he
[252] "Bakhabar Kissan", Jazz, Retrieved on June 8, 2017 from: https://www.jazz.com.pk/prepaid/bakhabar-kissan/#Other-Information
[253] "About Us", Zarai Baithak, Retrieved on June 8, 2017 from: http://www.zaraibaithak.com/pages/about_us
[254] "Telenor Khushal Zamindar", OpenIDEO, Retrieved on June 8, 2017 from: https://challenges.openideo.com/challenge/agricultural-innovation/improve/telenor-khushal-zamindar
[255] "Mobile Agriculture Services Launched in Pakistan", Telenor Group, Retrieved on June 6, 2017 from: https://www.telenor.com/mobile-agriculture-service-launched-in-pakistan/

5.3.5 e-Governance and e-Citizen Services

Pakistan launched a national level initiative, **e-Government Directorate (EGD)**, under the MoIT in 2002. By 2014, the directorate merged with the Pakistan Computer Bureau to create the National IT Board. Since then, 49 projects with a total cost of about PKR 2.6 billion have been developed.[256]

Some provincial governments like Punjab and Khyber Pakhtunkhwa have worked proactively to digitalize various services (PITB launched **Domicile Management System, e-Ticketing for National Highway and Motorway Police**;[257] KP Government initiated processes like e-Recruitment within the government and district e-Services such as issuance of domicile, birth/death certificates[258]). In order to expand their reach, the provincial governments have created both web-based e-Governance services as well as app-based (such as **KP Citizen's Portal App**[259]).

Government of Punjab, through PITB, has digitalized 40% of the government's internal departments, with the intended goal of reaching 100% digitalization of government departments by 2018.[260] PITB has also established **e-Khidmat Centers** which focus on providing seventeen integrated governmental services (which include but are not limited to issuance of birth certificate, character certificate, and traffic fine collection) through a fully automated one window operation for citizens.[261]

Initiatives like FBR's **Taxpayer Facilitation Portal**[262] have allowed citizens to use the portal to avail services like e-Payments of taxes and invoice verifications, contributing to operational efficiencies. Directorate General of Immigration and Passports (DGI&P) also launched an **e-Services portal**[263] which allows citizens to conveniently apply and pay online and receive their passport at home. The online application time averages to a mere 16.5 minutes, ensuring both consumer confidence in citizen services and government accountability of service delivery.

[256] "National IT Board constituted", Dawn, Updated July 19, 2014, Retrieved on July 4, 2017 from: https://www.dawn.com/news/1120174
[257] "Punjab Portal, Citizen Corner", Government of Punjab, Retrieved on June 5, 2017 from: https://www.punjab.gov.pk/get_services
[258] "Citizen Services", Government of Khyber Pakhtunkhwa, Retrieved on June 5, 2017 from: http://kp.gov.pk/page/citizen_1
[259] "KP Citizen's Portal", Retrieved on July 10, 2017 from: http://smart.pmru.gkp.pk/
[260] In-person interview with DG e-Governance, PITB (Conducted in July 2017)
[261] "e-Khidmat Center", Government of Punjab, Retrieved on July 21, 2017 from http://fc.punjab.gov.pk/
[262] "e-FBR portal", Federal Bureau of Revenue, Retrieved on May 5, 2017 from: e.fbr.gov.pk/
[263] "e-Services Portal", Directorate General of Immigration and Passports, Retrieved on May 11, 2017 from: https://onlinemrp.dgip.gov.pk/

5.4 Key Digitalization Challenges for Pakistan

Achieving digitalization in areas of education, health, commerce, agriculture and governance in any country is a demanding task, for both policymakers and implementing bodies. On its path to digitalization, Pakistan is experiencing similar challenges across different priority areas. While efforts are being made both at federal and provincial levels, a profound impact requires collective efforts are implemented under a clear and holistic vision at the national level. An overview of the current challenges Pakistan is facing will help analyze Pakistan's readiness in going digital.

Figure 18: Key Challenges for Pakistan

5.4.1 Policy Making Gaps

Gaps in Policy Framework

The existing policies referred to earlier in the document are good initiatives towards setting the tone for the future course and growth of digital services in Pakistan. While commendable, a majority of these policies do not clearly outline the key stakeholders and their ownership in the overall policy process of driving the policy work forward. The need to emphasize on a monitoring and evaluation model along with a clear action plan to measure progress on the digital front for Pakistan is critical and is currently lacking.

Following the devolution of powers through the 18th Amendment to the Constitution of Pakistan, a governance and implementation model is also critical. Sectors and industries such as energy, agriculture, and education were re-instituted as provincial concerns, further fragmenting the nature of policymaking in the digital realm. Telecommunication remains a federal concern which limits ICT growth and collaboration in various sectors as sectoral agendas are provincially-driven. This, combined with the lack of clear policy guidelines at a provincial level, has led to roadblocks in overall sectoral growth.

It is safe to assume that in the current digital landscape of Pakistan, there is a lack of sustainable, national level, and cross-sectoral digital policy frameworks and supportive regulatory regimes. While the private sector has always played a key role in developing certain sectors and setting in motion the implementation of certain sector-specific regulations (such as Mobile Financial Services/ Branchless Banking), various other sectors such as e-Commerce lack clear formulation and regulations, leading to gaps in policy development and eventual barriers to economic growth. Furthermore, any change in the administration can potentially mean discontinuation of certain policy agendas, hindering implementation of action plans.

Ineffectiveness in the Policy Implementation

Fragmented policy efforts or entirely absent policies is not the only challenge in developing countries like Pakistan; it is also the implementation of existing policies. The existing Digital Policy 2017 draft, highlighting key components that need to become digital, should also provide an action plan for policy implementation and impact realization. The Planning Commission's Vision 2025 highlights the formation of certain units and departments.[264] The Bureau of Infrastructure Development (BID) is established to coordinate and oversee private sector participation in infrastructure development, and the Pakistan Business and Economic Council is to be formulated to ensure equal membership of public and private sector so as to create a high-level forum to determine the direction of the country's economy. There is, however, a lack of visibility and follow-up on the actual implementation of such components of the plan.

Relevant provincial and sectoral government bodies have been slow to drive policies forward perhaps due to administrative and institutional constraints. Even with ongoing policy development and implementation in certain sectors and government levels, Pakistan, without a proper monitoring and evaluation system in place, could fail to track milestones and measure policy impact.

Discrepancies in Policy Ownership and Governance

The implementation of a digital agenda has to transcend beyond the domain or mandate of a specific ministry and has to become a focal area for the whole country, as seen from the international case studies. Currently, only the MoIT has proposed a specific and focused policy on digital agenda, posing limitations on the implementation scope and scale. Several other concerned ministries need to get involved to yield synergistic results. There is a need gap for an overarching governance structure and action plan so that the digital policy can achieve its potential and promised outcomes.

Moreover, since the devolution of powers to the provinces, provincial governments are driving digital initiatives in isolation. The federal and provincial governments, in the wake of the devolution, have not been able to capitalize on the partnership gains through the creation of a holistic and synergistic landscape. The absence of relevant governance structures, stakeholder identification, and subsequent actions plans will continue to be deterrents in aligning federal and provincial policies. This lack of alignment may make it difficult for Pakistan to achieve various social and economic aspirations and become a knowledge-based economy.

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[264] "Pakistan 2025: One Nation – One Vision" (2014), Planning Commission, Ministry of Planning, Development & Reform, Retrieved on April 3, 2017 from: fics.seecs.edu.pk/Vision/Vision-2025/Pakistan-Vision-2025.pdf

5.4.2 Limited Digital Services

Limited Provision of e-Citizen Services

The provision of e-Citizen services in Pakistan are at their initial stages with only a handful of services being provided at provincial and federal levels (such as passport fee collection and online utility bill payments). There is significant room for improvement where governments can scale up digital citizen services. Currently, Pakistan's few e-Citizen initiatives with limited execution could mean missing out on enabling new revenue streams and saving operational costs.

The federal and provincial governments have not yet implemented e-Services that could help improve service availability and usage for the masses, such as those in the form of one-stop-shops. Furthermore, with the limited availability of e-Citizen services, there is little transparency in service delivery, failing to foster consumer confidence in governmental processes.

With mass reach, the Government of Punjab's **e-Khidmat Centers** is a promising one-stop-shop model for key citizen-centric services in Punjab. However, the Centers are not completely digital and require a major physical interface at the Khidmet Center facility to initiate service request and delivery. Currently, eight Khidmat Centers exist around the province and more are expected as per the plan. Khyber Pakhtunkhwa's **Grievance Redressal System (GRS)** is an initiative towards introducing citizen-centric services for complaints, grievances, and suggestions.[265] In its first phase, the system is supposed to address complaints with five departments (Education, Health, Police, Revenue, and Local Government) while the second phase covers all remaining government departments. After a complaint is lodged by a citizen through one of many channels (via phone call, SMS, fax, letter, email), the complaint is acknowledged and further assessed for a follow-up action. The case is forwarded to the concerned provincial department and is closed after clarification. Almost 5,000 complaints have been registered but mostly through phone calls. Other mediums have a lower uptake and so there is significant room to improve the dissemination of these services.[266]

Scarcity of Public-Private Partnerships

Public-Private Partnerships (PPPs) have yielded significant results in the education and agriculture sectors in different provinces. However, their impact on a holistic provincial/national level is yet to be seen. The initiatives often become isolated projects causing replication of effort and resources. For example, most agriculture initiatives used similar electronic means to disseminate agri-related information. These projects are not part of a continuous, long-term agenda or partnership between the government or private sector companies. As mentioned earlier, Planning Commission's commitment through formation of bodies like Bureau of Infrastructure Development (BID) and Government of Punjab's Public Private Partnership (PPP) Cell are examples of some government agencies taking the initiative to proliferate PPPs. However, such efforts are limited by their scope and scale (the BID lacks visibility and few projects are taken up by PPP Cell). Moreover, there is a need for similar PPP efforts at the national level and with other provincial governments. Going digital requires the appropriate technology, investment, and expertise through larger scale collaborations with corporations and multi-lateral organizations.

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[265] "e-complaint/Grievance Redressal System", Government of Khyber Pakhtunkhwa, Retrieved on June 15, 2017 from: http://kp.gov.pk/page/ecomplaintgrievanceredressalsystem

[266] "Grievance Redressal System", Government of Khyber Pakhtunkhwa, Retrieved on July 20, 2017 from: http://complaint.kp.gov.pk/

5.4.3 Environmental Barriers

Impediments in Adoption

The low ICT adoption rate at the individual level is a key metric which, combined with urban-rural disparities in infrastructure, helps explain why technologies have very low business, economic, and social impacts. The launch of 3G/4G technologies in 2014 is a step in the right direction to improve the availability of internet to masses, covering 75% of the country's population (mid-2016).[267] However, more needs to be done to improve digital literacy and basic technological expertise of masses for the long-term.

Having a low literacy rate (60%) and secondary education enrollment rate (41.6%)[268] further contributes to the lack of a digitally-skilled workforce. For example, in agriculture, most small farm-holders are not educated and hence are not equipped to deploy the latest technologies in their farming strategies. Lack of awareness amongst farm-holders limits potential growth in adoption, yields and modern service delivery methods.

The government struggles with the existing digital divide – be it linguistic, cultural, and regional barriers – due to lack of proper investments in improving digital literacy. Insufficient emphasis on developing relevant content and delivering ICT trainings, lack of integration of ICTs in the academic curriculum across all levels of education system, and poor levels of infrastructure investments are other reasons for poor digital and IT literacy. Poor infrastructure, low broadband speeds, and the lack of access to basic ICT hardware especially in rural areas further contributes to the increasing divide between rural and urban regions.

Absence of Advanced Regulatory Frameworks

While the current regulatory framework supports existing industries, there is little focus on updating such frameworks to cater to new digital demands (including updating existing licenses, developing new licenses for new convergence businesses like telco and broadcasting, updating legislation on data privacy and data security), in turn limiting digital growth.

Regulatory frameworks are especially missing for new sectors like e-Commerce, e-Transport (Uber, Careem), other start-ups, and app-based businesses. Due to uncertain and, at times, incomplete public regulatory frameworks, the private sector has taken the lead in terms of ownership of projects. With an increase in mobile internet services, local **entrepreneurs** have dived into launching e-Commerce portals and applications, customizing content and needs to the local consumer. Some successful local e-Commerce portals include Symbios and Shophive.com for general consumer goods, Zameen.com for real estate, and Pakwheels.com for selling cars. Yet, the lack of supportive regulatory frameworks for new business models like Uber and Careem's shared economy model can impede businesses in enhancing scalability and economic opportunities for underserved communities.

The lack of a new futuristic regulatory framework for the digital ecosystem has created a void which will continue to threaten digital growth and consumer protection. Internet of Things (IoT) is considered the next frontier and is set to transform various aspects of consumers' lives. However, Pakistan is just at a nascent stage of exploring IoT and Smart Cities, which further necessitates the need for a broad-ranging IoT policy.[269] With the expected enormous growth of IoT connected devices, emerging security risks must be addressed through a comprehensive regulatory framework. Content and advertising is another area where a comprehensive policy is needed.[270] Pakistan also needs a separate convergence framework for media and telecom, and a clearly defined legal and regulatory framework for online content.[271] Digitalization is going to change the dynamics of various sectors, and therefore, the review of existing policies for ICT inclusion can help propel this change.

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[267] Jan Stryjak and Henry James, "Country Overview: Pakistan – A Digital Future", GSM Association, 2016
[268] "Economic Survey of Pakistan 2014-15: Education", Ministry of Finance, Government of Pakistan, Retrieved on April 14, 2017 from: www.finance.gov.pk/survey/chapters_15/10_Education.pdf
[269] In-house discussion on IoTs and OTTs with subject matter experts (Conducted in July 2017)
[270] Ibid.
[271] Ibid.

Needless to mention that privacy and data protection will arise as a major challenge in the future, again demanding an effective framework. Unsupportive legal frameworks and accountability mechanisms have allowed, in sectors like e-Commerce, fraudulent online activities such as false branding of advertised items, and quality control issues with vendor products, creating a lack of trust in online transactions. Most end-users, hence, prefer to either not buy products online or rely on cash-on-delivery (COD) payments (currently at 95% for all online orders[272]). Missing complaint management systems and consumer protection regulations for the online market further deters consumers from online shopping.

The lack of holistic and supportive regulations within the internal political environment – especially in areas of taxation, consumer rights protection, data security, and competition laws – will prevent improvements in transparency and business environment for digital transactions. The social and economic benefits cannot be realized unless such frameworks are established.

5.5 Key Takeaways

Pakistan's digital journey has gained much attention in the last few years. Federal bodies including the Ministry of Information Technology and the Planning Commission are both taking initiatives, addressing the right areas and building focus for the digital agenda in the country. However, there are still challenging areas Pakistan needs to address both in **policy making and implementation** at the national level. **Ownership of policy** is also less clear at this stage and needs some focus from the authorities. The devolution of powers to provinces along with the lack of **policy alignment** has contributed to disparities in national and provincial agendas.

Although public-private partnerships exist, the **holistic impacts of PPPs** are missing due to absence of consistent, dedicated efforts. Other challenges include fragmented **growth in sectors** and a weaker **regulatory and legal regime** in face of changing digitalization demands. Poor facilities, lack of access, and limited awareness and literacy also contribute to the ineffective **delivery of services** across sectors.

However, all these challenges also present opportunity areas for growth. Some of these opportunity areas in terms of readiness are stated in the next chapter. Furthermore, a concrete set of recommendations for digitalizing Pakistan is shared in the next section, addressing the abovementioned challenges and proposing potential solutions for these issues at the national, sectoral and provincial level.

[272]Monis Rahman, "E-Commerce in Pakistan: The Party Has Started", Retrieved on July 24, 2017 from: https://www.rozee.pk/brecorder/e-commerce/

CONTINUE

5.6 Key Opportunities

5.6.1 Driving Digital Agenda

Since Digital is a multi-faceted, multi-dimensional arena, where several policy areas, ministries and sectors are merging, letting one sector specific body take ownership of Pakistan's diverse portfolio will not help achieve a Digital Pakistan. As seen in country cases, driving the agenda from the top level with clear deliverables has helped countries accelerate their growth in digitalization. A gap exists in Pakistan for this driving seat to be filled.

5.6.2 Digitalizing Key Sectors

Research from other countries indicates that running digital-centric programs across sectors helps boost growth and reduce operating expenses, improving productivity. Pakistan's GDP composition by sector illustrates that the following three sectors contribute significantly to the GDP: Agriculture 20.9%, Industry 20.3% and Services 58.8%.[273] The contribution and growth rate of the services sector is consistently rising compared to both the industrial and agriculture sectors. This brings forth a two- fold opportunity: first is to enhance focus on the service sector and the second is to increase growth in the agriculture and industrial sectors.[274] Digitalizing these sectoral value chains are areas that can positively impact on Pakistan's GDP.

5.6.3 Capitalizing on Digital Technologies

New technologies in digital are rapidly changing the pace and nature of doing business. Capitalizing on these technologies presents a big opportunity for Pakistan towards going digital.

- Internet for All – Almost 23% of Pakistan's population uses broadband internet and almost 10% have access to smartphones (2017). While access to internet in the urban households is about 17.3%, rural areas are severely lagging with a rate of about 1.3%.[275] There is a clear opportunity to increase the access and reach of digital services. As seen in other country examples, Internet for All has been a key driver of digitalization.
- Big Data/Internet of Things (IoT) – In Pakistan more than 96% of the adult population's data is available to NADRA[276] (2012), allowing them to potentially build numerous citizen-centric services and digital products, in turn creating opportunities for existing companies and new business models.

[273]"Pakistan Economic Survey 2014-2015 Highlights," Economic Adviser's Wing, Finance Division, Government of Pakistan, Islamabad, http://www.finance.gov.pk/survey/chapters_15/Highlights.pdf

[274]Ayaz Ahmed and Henna Ahsan, "Contribution of Services Sector in the Economy of Pakistan," Pakistan Institute Of Development Economics Islamabad, Working Papers, 2011:79, http://www.pide.org.pk/pdf/Working%20Paper/WorkingPaper-79.pdf

[275]Siddiqui, Khurram, "87% of Pakistani households own cellphones, only 6.8% have internet connection: survey", The Express Tribune, Last modified on February 03, 2014. Accessed March, 2017, Available at: https://tribune.com.pk/story/666965/87-of-pakistani-households-own-cellphone-only-6-8-have-internet-connection-survey/

Banking institutions have detailed financial records of almost 30 million individuals which can be used to extract financial insights and provide customized solutions for different target markets.[277] Moreover, access and use of data gathered by private entities can also help create a multitude of services for the masses.

- Cloud Computing – According to Oracle, cloud computing is on the rise in Pakistan.[278] It is compatible with modern technology, providing flexibility, simplifying existing systems and processes, and enhancing efficiency. The government can focus on utilizing cloud technology for their citizen-centric services.
- Social Media – There are over 34.4 million active internet users in Pakistan, with over 27 million being active on social media platforms.[279] This is a large population that can be tapped into, to generate digital awareness amongst the masses.

5.6.4 Sharing Digital Dividends

As a result of provincial empowerment, provinces individually are taking commendable initiatives in digitalizing their G2C and G2G interfaces. Opportunities exist to collaborate on these initiatives across provinces and share digital benefits. Successful initiatives in sectors like education, health, and governance in a given province can be replicated across other provinces, thus, reducing the digital divide and creating a more holistic digital experience.

The public and private sectors can also share learnings, skills and dividends in the same way. The public sector can lend its scale and access to the masses, while the private sector can add value by contributing its expertise and footprint to digital projects and initiatives. Recently, private companies have partnered with the federal and the provincial government to promote ICT among people and educational institutions as well as the business community to help bridge the digital divide and promote social inclusion. These partnerships have led to the successful launch of incubation and innovation centers in major cities across Pakistan, which focus on developing technical skills, providing startups with training, and facilitating product testing. Public-Private Partnerships such as these deploy latest technologies in the products churned out by startups, local companies, and the academic community, providing benefits for all involved.

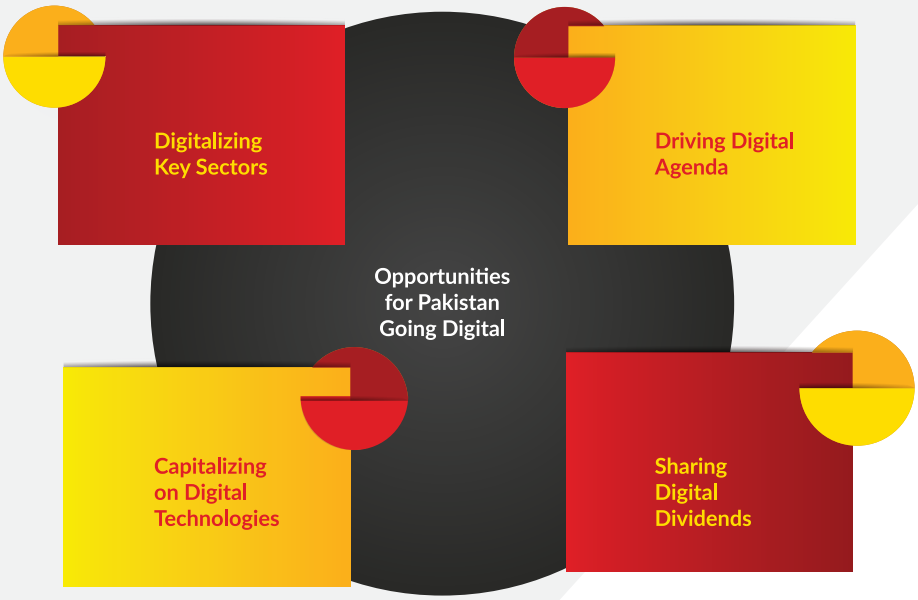

Figure 19: Key Opportunities for Pakistan

[276]"96pc adults registered in Pakistan: NADRA", Dawn, August 8,2012, Retrieved on July 11, 2017 from: https://www.dawn.com/news/743082
[277]"16% of the general public in Pakistan owns and/or uses a bank account," Access to Finance Survey 2015, Gallup Pakistan, April 29th 2016
[278]"Cloud computing on the rise in Pakistan," The International News, Last modified July 31st, 2015, https://www.thenews.com.pk/print/53809-cloud-computing-on-the-rise-in-pakistan
[279]Simon Kemp, "Digital in 2017: Global Overview," We Are Social, Last modified 24th January 2017, Retrieved from https://wearesocial.com/special-reports/digital-in-2017-global-overview

RECOMMENDATIONS FOR **DIGITAL PAKISTAN**

ACCELERATE

6. Recommendations for Digital Pakistan

In view of the analysis in the previous sections, this report is proposing a set of nine recommendations under three well-defined areas of focus: policy making, digital services' growth, and enablement. Each recommendation reviews:

a. **What** is being recommended
b. **Why** it is being recommended (given the current scenario)
c. **How** to initiate implementation
d. **Who** is responsible (identifying relevant stakeholders)
e. **Targets** for implementing recommendations
f. **Risks** related to implementation and non-implementation
g. **Country Examples** for validation

While e- (electronic) and m- (mobile) services have boomed, these alone do not represent the full scope of what digitalization can truly achieve. Hence, this paper suggests using the term d- (digital) to encompass the wide range of services provided through digitalization.

6.1 Recommendations' Summary

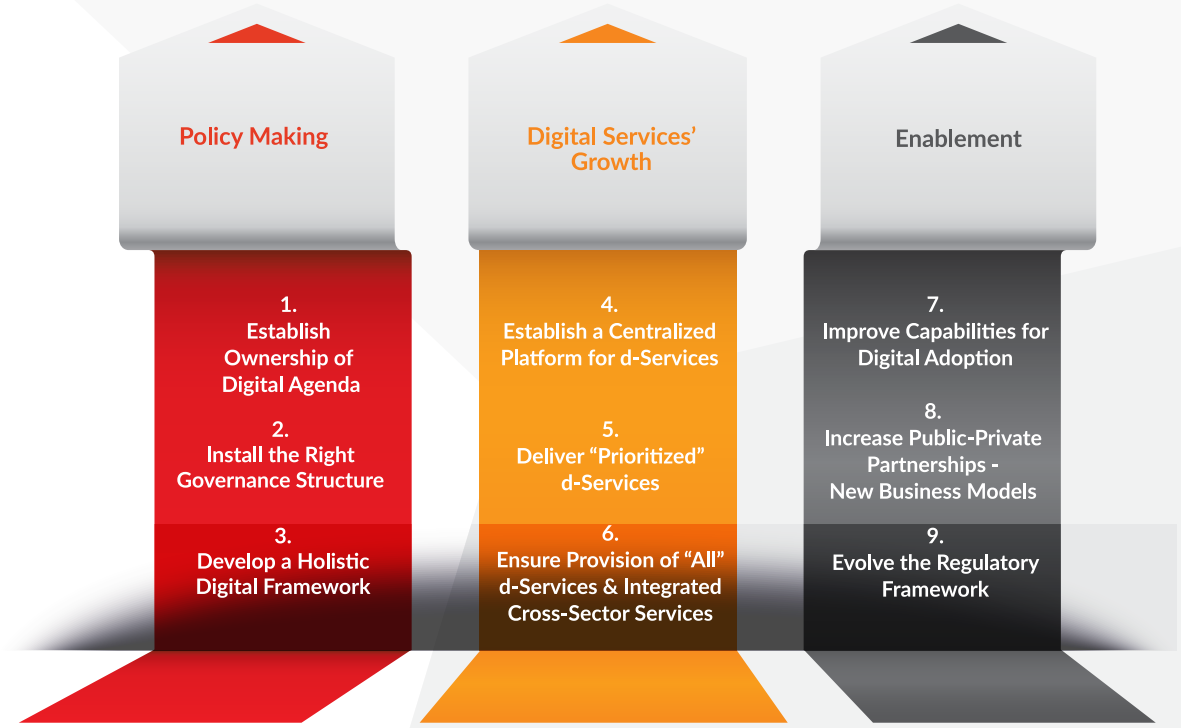

Figure 20: Recommendations for a Digital Pakistan

As stated in section 5 of the report, substantial work is being done by the Ministry of IT and designated provincial Information Technology Boards (ITBs) for ICT growth in the country. The recommendations proposed in this report are built on the policy content of the existing policy work. These recommendations are proposing a collaborative approach to serve as an add-on to the existing policy documents, eventually bringing forward a collective set of goals for digitalizing Pakistan at national and provincial levels, and across the country.

6.2 Recommendations' Profiling

6.2.1 Policy Making

RECOMMENDATIONS

1. Establish Ownership of Digital Agenda

What
- Establish vision and ownership of the digital agenda at the top-most level of the government
- Ensure national and provincial prioritization of the digital agenda as the government's top focus area

Why
- To create a unified, synergistic national direction propelled by the top-most level
- To create a trickle-down effect for provincial governments to prioritize the digital agenda

How
- Onboard and align top leadership at national and provincial levels to move towards one digital vision
- Ensure agreement on establishment of the digital agenda through multi-stakeholder consultative process
- Include digitalization as a priority area in political manifestos

Who
- Public Sector: Prime Minister, Chief Ministers, Heads of Federal Ministries and Provincial Bodies

Target
- Establish digital agenda ownership at the highest level of the government by the end of Q2-2018

2. Install the Right Governance Structure

What
- Develop a governance structure with clear roles and responsibilities at the right level – at both federal and provincial levels

Why
- To allow efficient and effective implementation of the digital agenda
- To establish responsibility, accountability, and transparency of roles
- To improve coordination between different ministries and departments

How
- Drive digital strategy development from top-to-bottom
- Identify key actors at both federal and provincial levels
- Assign a coordinator to facilitate inter-ministry communication for provision of d-Services
- Create an advisory board for the solicitation of input from external stakeholders
- Set up an independent monitoring & evaluation body to assess digital initiatives

Who
- Public Sector: Prime Minister, Chief Ministers, Head of Federal Ministries and Provincial Bodies

Target
- Establish a clear governance structure for the digital agenda ownership by the end of Q3-2018

3. Develop a Holistic Digital Framework

What
- Identify focus areas and formulate policies to accelerate the digitalization process
- Establish guidelines for implementation with measureable targets for priority sectors and related digital technologies

Why
- To create alignment between policy making bodies at federal and provincial levels
- To reduce disparities and ensure alignment amongst different provinces towards the pursuit of digital frameworks

How
- Align with national, provincial, and sectoral policy making bodies to ensure a collaborative approach towards creating a holistic digital agenda framework
- Establish a centralized agenda which delineates targets, goals, timelines and deliverables, sources of funding, roles and responsibilities for stakeholders, clear implementation plans, and monitoring and evaluation guidelines

Who
- Public Sector: Heads of Federal Ministries and Provincial Bodies, Industry Specialists
- Private Sector: Consultants, Subject Matter Experts
- Development Sector: Donor Agencies, Advocacy Groups

Target
- Establish a holistic digital agenda framework which includes SMART targets and accountability mechanisms for all policy pillars by the end of Q4-2018

Implementation Risks

- Possible resistance from ministries, provincial departments, political parties, and sectoral ministries
- Bureaucratic redtapism - delay in alignment and agreement on one vision policy
- Changing political regime and diversion in policy focus
- Lack of funding and resources to impact the implementation of policy targets

Non-implementation Risks

- Failure to reap the benefits of digitalization - economic, social, and governance
- Non-implementation leading to failure in achieving policy vision and mission
- Redundancy in policy recommendations at sectoral and governmental levels
- Disconnect between policy and implementation action plans, causing weak management and execution of programs

Impact & Country Examples

1. Establish Ownership of Digital Agenda

- **Ownership at the Highest Level – India: Modi's Digital India (2014)**
  "I Dream of a Digital India..."[280]
  Visibility at international level (Modi in Silicon Valley)[281]
  Enhanced confidence in foreign investors - Microsoft investing in broadband for 500k villages, Google to enable Wi-Fi at 500 railway stations[282]
- **Russia: Arkady Dvorkovich Deputy Prime Minister of the Russian Federation (2017)**[283]
  National program "Digital Economy" will be developed as ordered by the Russian President this year

2. Install the Right Governance Structure

- **India (2015) –**
  Monitoring Committee on Digital India headed by the PM[284]
  Digital India Advisory Group to solicit external viewpoints
- **Malaysia (1996) –**
  MDeC, an organization under the Ministry of Science, Technology & Innovation (MOSTI) is the lead agency for the Digital Malaysia program[285]

3. Develop a Holistic Digital Framework

- **National Digital Agenda –**
  Philippines – Philippines Digital Strategy 2011 -2016[286]
  Malaysia – Digital Malaysia 2020[287]
  India – Digital India 2015[288]
- **Specific Implementation Plans –**
  Turkey – National e-Government Strategy and Action Plan 2016-2019[289]
  Philippines (2006-2010) – Five-Year Strategy for the Information and Communication Technology (ICT) Road Map[290]

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6.2.2 Digital Services' Growth

RECOMMENDATIONS

4. Establish a Centralized Platform for d-Services

What
- Digitalize internal processes of both federal ministries and provincial bodies
- Create an online platform to deliver d-Services

Why
- To create a seamless ecosystem which can deliver d-Services
- To increase the efficiency, accountability, and transparency of d-Services
- To improve ease and convenience for citizens

How
- Map existing processes and conduct need-gap analysis in the public sector enterprises, government bodies, and ministeries
- Integrate existing databases in the public sector domain
- Initiate the budgeting process to allocate funds for the digitalization process
- Identify and invest in relevant technologies for digitalizing manual processes
- Improve digital literacy amongst public sector employees to ensure sustained adoption
- Establish accountability mechanisms to ensure efficient delivery of d-Services

Who
- Public Sector: Federal Ministries and Provincial Bodies

Target
- Digitalize internal processes for both federal ministries and provincial bodies by the end of Q4-2020
- Develop applications/online portal for priority d-Services by the end of Q4-2020
- Allocate a certain percentage of the budget for digitalization of internal processes by the end of Q4-2019

5. Deliver Prioritized d-Services

What
- Identify sequential delivery of d-Services
- Increase awareness amongst masses to ensure adoption
- Link and align private (Business-to-Government) and public (Government-to-Business, Government-to-Consumers) d-Services

Why
- To improve the ease of access for citizens for d-Services
- To reduce processing time and costs associated with delivering d-Services
- To increase efficiency, accountability, and transparency of government services
- To improve citizens' trust in governmental processes

How
- Identify and set targets for high-impact d-Services
- Increase awareness, access, and literacy of the population

Who
- Public Sector: Federal Ministries and Provincial Bodies
- Private Sector: Technology and Implementation Partners

Target
- Ensure time-bound provision of services:
  Target to make prioritized d-Services available by the end of Q4-2021
- Set incremental targets for outreach to the population:
  Target to have 25% of the population use the online platform by the end of Q4-2022

6. Provide "All" d-Services and Integrated Cross-Sector Services

What
- Intra-sector – Digitalize value chains of key sectors such as agriculture, commerce, health, transport, and education
- Inter-sector – Improve the value chain collaborations between different sectors

Why
- To take the services' provisioning to a higher level of integration
- To reduce the multiple layers in end-to-end service delivery
- To grow and develop sectors with convergence and integration across sectors
- To expand reach into untapped markets and sectoral segments

How
- Digitalize existing operations and bring them to online platforms through integration of value chains
- Improve access, infrastructure, and literacy of the population to operate digital technologies
- Digitize data – Utilize Big Data in cross-sectoral projects
- Utilize Public-Private Partnerships for planning, funding, and implementing programs

Who
- Public Sector: Federal and Provincial Ministries
- Private Sector: Technology and Implementation Partners
- Development Sector: Donor Agencies, Advocacy Groups

Target
- Ensure growth and cost reduction of target industries:
  - Set targets – by the end of Q4-2022
  - Periodic progress reviews – quarterly basis
  - Feedback and improvement – ongoing basis
- Establish a progressive regulatory regime, where required
- Establish a baseline of current levels of production by the end of Q4-2021
- Aim for reducing cost of production by 10% and improve productivity by 15% in identified target industries by the end of Q4-2025

Implementation Risks

- Possible resistance from bureaucracy, government functions, and unions
- Low funding for projects, leading to low prioritization
- Lack of awareness, leading to potential failure in uptake of e-Services
- Limited access, infrastructure, and literacy, creating issues in implementation
- Potential for cyber data theft - subsequent concern related to the absence of data protection mechanisms
- Costly and time-consuming processes for new projects' partnerships

Non-implementation Risks

- Loss of potential revenue streams from new businesses and digitalizing existing services
- Losing out on potential data and information collection
- Ineffective service delivery to the masses
- Lack of digital awareness and mass adoption regarding existing services to continue
- Limited sectoral growth and limited development of under-served communities

Impact & Country Examples

4. Establish a Centralized Platform for d-Services

- **Russia: Open Government and other e-Governance initiatives –** Improves e-Services rankings (0.73 in 2016, 0.51 in 2010 – UN); 35% people using e-Governance services[291]
- **India: JAM Trinity (2014) –** Links IDs with phones to provide financial services; 1.1 billion people[292]

5. Deliver Prioritized d-Services

- **Turkey: e-Devlet Project (2016) –** Provides online access to public services; 1,411 e-Services to 26 million registered users[293]
- **Russia: Open Government Initiative (2012)[294] –** Aimed at improving government transparency and involving a broad expert community in government work; Creation of ministerial openness ranking (which measures how federal agencies perform in terms of information disclosure) has allowed for more openness for information sharing and appointed a designated official to work towards openness

6. Provide "All" d-Services and Integrated Cross-Sector Services

- **Pakistan: Mobile Financial Services (2009) –** 19.9m accounts (2016); Value of transactions (as % of GDP) rose from 0.98 (2011) to 3.5 (2013)[295]
- **India: e-NAM (2016) –** From 25 to 69 commodities listed; 417 markets incorporated; trade of 5.9m tons; over 3.95m farmers, 88k traders, 44k commission agents registered[296]
- **China: 13th Five-Year Plan (2016)–** 30% of large-scale Chinese factories automated; improving productivity by 20%, reducing costs of production by 20%; and reducing emissions by 10%[297]

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6.2.3 Enabling Environment

RECOMMENDATIONS

7. Improve Capabilities for Digital Adoption

What
- Improve readiness by focusing on four key components: infrastructure, access, digital skills, and digital content

Why
- To reduce the existing digital divide
- To enhance adoption of d-Services by citizens

How
- Conduct a need gap analysis to determine underserved regions and communities
- Identify and enable partnerships of relevant stakeholders in the public and private sectors for digital initiatives focused on improving the four key components
- Support relevant federal ministries and provincial bodies to improve on the four key components

Who
- Public Sector: Federal Ministries (such as Education) and Provincial Bodies
- Private Sector: Technology and Implementation Partners

Target
- Infrastructure & Access (by the end of Q4-2019):
  - Review/reduce prices of international and local infrastructure e.g. bandwidth
  - Connect all cities with high-speed fiber – broadband coverage for 90% of the population
  - Push for supportive fiscal policies to reduce tax burden on digital service providers
  - Make devices like smatphones more affordable
- Literacy & Content (by the end of Q4-2019):
  - Introduce mandatory ICT content in the National Education Plan & Provincial Education Plans

8. Increase Public-Private Partnerships (PPP) – New Business Models

What
- Increase collaboration opportunities between the public sector, private sector, and multi-lateral agencies
- Encourage startups by creating a supportive ecosystem

Why
- To realize the full potential of PPPs in terms of scale, revenue, and operational efficiencies
- To use opportunities for innovation and utilization of new technologies
- To increase the level of economic activity through initiatives such as startups and entrepreneurial ventures

How
- Public sector to offer support, scale, funding and subsidies; Private sector to harness skills and expertise
- Select and pursue programs delivering value to government and citizens while creating commercially attractive business opportunities for the private sector
- Update existing regulations, reduce hurdles and streamline processes to encourage PPPs
- Create a conducive, level playing field for both local and international players
- Incentivize corporations and venture capitalists to mentor and invest in startups

Who
- Public Sector: Federal Ministries (such as Finance, IT, and others) and Provincial Bodies
- Private Sector: Technology and Implementation Partners
- Development Sector: Multilateral Agencies, Donor Agencies

Target
- Establish frameworks for PPP in d-Education, d-Health, and d-Agriculture by the end of Q4-2019
- Form a separate Monitoring & Evaluation unit for PPPs by the end of Q2-2019
- Incentivize existing tech companies with better infrastructure access and tax breaks
- Improve industry-academia linkages to support culture of entrepreneurship and innovation
- Increase the number of incubators & accelerators across the country

9. Evolve the Regulatory Framework

What
- Update existing and develop new regulatory frameworks for business models to cater to new digital technologies such as Big Data, Internet of Things, and Cloud Computing
- Review of existing policies for ICT involvement in sectoral value chains
- Create more opportunities at industry-academia level for Research & Development (R&D) to establish a knowledge-based economy

Why
- To provide a regulatory environment that facilitates competition, privacy, and data & consumer protection, without hampering the growth of technological advancements
- To cater for the dependencies of cross sectoral collaborations
- To ensure prioritization of research enabled innovation

How
- Review existing policies and develop regulatory frameworks to reflect changes in the latest technologies and market demand
- Identify relevant stakeholders and ensure multi-stakeholder consultative process for the framework development
- To deploy the learnings from international best practices
- Identify and allocate sufficient amounts of funding for R&D, both in public and private sector enterprises
- Promote R&D for technology amongst educational, private, and public bodies

Who
- Public Sector: Regulatory Authorities (PTA, PEMRA, law-making agencies, SBP), Relevant Ministries (MoF. MoIT, MoC, SECP)
- Development Sector: Advocacy Groups

Target
- Develop regulatory frameworks for new digital technologies by the end of Q4-2019
- Review the need for a framework on telecom and broadcast convergence by the end of Q4-2019
- To ensure a deregulatory approach towards digitalization with only light-touch regulatory intervention, only when required

Implementation Risks

- Internal resistance from bureaucracy and government functions
- Bureaucratic redtapism - delays in alignment and agreement on one vision policy
- Low funding for projects if on low prioritization in the national agenda
- Lack of awareness and literacy, leading to potential failure in generating access
- Failure in enforcing regulatory systems and frameworks by national and provincial players can, inhibiting growth of services
- Costly and time-consuming partnerships' process for new projects

Non-implementation Risks

- Failure to reap the benefits of digitalization – economic, social, and governance
- Continuation of digital divide
- Losing out on potential data and information collection
- Poor regulatory environment for new businesses to continue
- Potential for consumer exploitation with lack of protection, resulting in continued population aversion to adopt new technology
- Loss of potential revenue streams for business partnerships and startups
- Lack of digital awareness and mass adoption to continue
- Limited sectoral growth and limited development of under-served communities

Impact & Country Examples

7. Improve Capabilities for Digital Adoption

- **Turkey: FATIH Project (2011) -** The speed broadband project provides a minimum of 20 megabits to all classrooms[298]
- **Malaysia: High-speed Broadband Project (2017) -** Provides a minimum of 20 megabits all the way to the rural areas by 2020[299]

8. Increase Public-Private Partnerships (PPP)- New Business Models

- **Turkey: FATIH Project (2011)–** Provides various ICT-related business opportunities for investors in software, hardware and in the advisory service industries[300]
- **Malaysia: High-speed Broadband Project (2017) -** A Public-Private Partnership building capacity to provide a minimum of 20 megabits in rural areas by 2020[301]

9. Evolve the Regulatory Framework

- **Philippines: Regulatory Framework for Digital Currency Exchanges (2017) -** Facilitates the conversion and exchange from virtual currencies to flat currency and vice versa[302]
- **Russia: Law on Digital and Electronic Signatures (2011) -** Ensures that a digital signature on digital documents has the same legal value as a traditional paper signature[303]
- **China: National Health and Family Planning Commissions Regulation on Big Data (2020) -** Promotes and regulates usage of big data in healthcare[304]

[298]Michael Trucano, "Observing Turkey's ambitious FATIH initiative to provide all students with tablets and connect all classrooms," The World Bank, Last modified 18th December, 2013, http://blogs.worldbank.org/edutech/observing-turkeys-ambitious-fatih-initiative-provide-all-students-tablets-and-connect-all-classrooms

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[300]Michael Trucano, "Observing Turkey's ambitious FATIH initiative to provide all students with tablets and connect all classrooms," The World Bank, Last modified 18th December, 2013, http://blogs.worldbank.org/edutech/observing-turkeys-ambitious-fatih-initiative-provide-all-students-tablets-and-connect-all-classrooms

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CONCLUSION

PAKISTAN
THE DIGITAL STATE

CONCLUSION

The Digital Framework developed in this document is a small yet comprehensive contribution towards achieving the gigantic mission of digital transformation in Pakistan. This is a humble beginning and sincere effort towards adding value to the digital landscape of the country and to the wider national agenda.

The formation of Digital Pakistan is a big endeavor that no one organization, institution or unit can lead and execute on its own. Digitalization requires participation of all individuals of a society, all institutions and all parties. Every sector of a society, public or private, has a role to play – and every role is significant to the digital agenda.

Digitalizing Pakistan is about enabling an ecosystem with all the elements rightly placed to serve all sectors equally, in a level playing field. This encompasses well-defined policy and plans, commitment to implementation, ownership by the highest authorities, implementation and monitoring of proper programs, and building and updating the regulatory and legal frameworks as per new **Entrepreneurial** demands of digital products and customers.

Digitalization advocates **Collaboration** by engaging industries, ministries and provinces to deliver on a cohesive agenda, collectively.

Digitalization endorses **Partnerships** between competitors, operators, vendors, service providers and customers, by diluting boundaries and developing integrated systems for growth and development.

Digitalization delivers **Growth** and **Innovation** in new business models, new infrastructure and skill development, enhancing efficiencies and speed by innovating businesses and minimizing customer distance.

Digitalization brings **Convenience** for the masses through **Customer Obsessed** e-Citizen services.

Digitalization builds **Trust** between the government and its citizens, by ensuring transparency and accountability.

Digitalization promises **Equal Opportunities** and **Inclusion** for all towards a better future, by bringing access, literacy, reach and skill to the masses, by opening avenues for employment and social prosperity and by creating positive impacts in economic, social and governance sectors. The intention of a national digital agenda is to achieve collective national growth and development.

Digital Pakistan is a vision not a dream; it is a commitment to sustainability, prosperity and growth of a nation. For a developing country such as Pakistan, it is clear that digitalization is the smarter, quicker and more efficient way to achieve economic progress. The private sector should continue to support, contribute and lead the digital agenda, helping build an effective development and implementation plan to help Pakistan **Accelerate to the Digital State**.

Volume 2 elaborates on sectoral level challenges with complete analysis to be published in 2018.

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