

# 2019 DIGITAL NEPAL FRAMEWORK

## Unlocking Nepal's Growth Potential



Government of Nepal  
Ministry of Communication  
and Information Technology

FROST & SULLIVAN

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## Abbreviations

ABPS	Any Branch Payment System
ADB	Asian Development Bank
ADS	Agriculture Development Strategy
AMI	Advanced Metering Infrastructure
AMR	Automatic Meter Reading
APF	Armed Police Force
ASEAN	Association of South East Asian Nations
BAU	Business As Usual
BPO	Business Process Outsourcing
CBS	Central Bureau of Statistics
CDC	Curriculum Development Centre
CEHRD	Centre for Education and Human Resources Development
CSR	Corporate Social Responsibility
CTEVT	Council for Technical Education and Vocational Training
DFID	Department for International Development
DFTQC	Department of Food Technology and Quality Control
DoA	Department of Agriculture
DoE	Department of Education
DoED	Department of Electricity Development
DoHS	Department of Health Services
DoI	Department of Irrigation
DOI	Department of Immigration
DoIT	Department of Information Technology
DoLIA	Department of Land Information and Archive
DoLMA	Department of Land Management and Archive
DoLRM	Department of Land Reform and Management
DoMG	Department of Mines and Geology
DoR	Department of Road
DoT	Department of Tourism
DoTM	Department of Transport Management
DoUDPBC	Department of Urban Development and Building Construction
DWSS	Department of Water Supply and Sewerage

EDCD	Epidemiology and Disease Control Division
EHR	Electronic Health Records
EMIS	Education Management Information System
ETFC	Electricity Tariff Fixation Commission
EVI	Economic Vulnerability Index
FAO	Food and Agriculture Organization
FDI	Foreign Direct Investment
FEMD	Foreign Exchange Management Department
FSPs	Financial Services Providers
FTTH	Fiber-To-The-Home
GDP	Gross Domestic Product
GIS	Geographic Information System
GNI	Gross National Income
GoN	Government of Nepal
GPS	Global Positioning System
HAI	Human Assets Index
HFR	Health Facility Registration
HIM	Health Information Management
HuRIS	Human Resource Information System
IBN	Investment Board Nepal
ICIMOD	International Centre for Integrated Mountain Development
ICT	Information and Communications Technology
IFC	International Finance Corporation
IoT	Internet of Things
IPPs	Independent Power Producers
ISPs	Internet Service Providers
ITU	International Telecommunication Union
KOIKA	Korea International Cooperation Agency
LDC	Least Developed Country
LMIS	Logistics Management Information System
MICS	Multiple Indicator Cluster Surveys
MIS	Management Information System
MoALD	Ministry of Agriculture and Livestock Development

MoCIT	Ministry of Communication and Information Technology
MoCTCA	Ministry of Culture, Tourism and Civil Aviation
MoD	Ministry of Defense
MoEST	Ministry of Education, Science and Technology
MoEWRI	Ministry of Energy, Water Resources and Irrigation
MoF	Ministry of Finance
MoFA	Ministry of Foreign Affairs
MoFAGA	Ministry of Federal Affairs and General Administration
MoFE	Ministry of Forests and Environment
MoICS	Ministry of Industry, Commerce and Supplies
MoHA	Ministry of Home Affairs
MoHP	Ministry of Health and Population
MoLCPA	Ministry of Land Management, Cooperatives and Poverty Alleviation
MoPIT	Ministry of Physical Infrastructure and Transport
MoUD	Ministry of Urban Development
MoWS	Ministry of Water Supply
MoWCS	Ministry of Women, Children and Senior Citizen
MuAN	Municipal Association of Nepal
NARC	Nepal Agricultural Research Council
NAST	Nepal Academy of Science and Technology
NDCL	Nepal Doorsanchar Company Limited
NEA	Nepal Electricity Authority
NGIC	National Geographic Information Centre
NGOs	Non-Governmental Organizations
NHMS	National Health Management System
NITC	Nepal Information Technology Centre
NP	Nepal Police
npIX	Internet Exchange Nepal
NRB	Nepal Rastra Bank
NSP	Network Service Provider
NTA	Nepal Telecommunications Authority
NTB	Nepal Tourism Board
NTGA	National Transmission Grid Company

NTIS	Nepal Trade Integration Strategy
NUDS	Nepal Urban Development Strategy
OCC	Office of Controller of Certificate
OLE	Open Learning Exchange
OPMCM	Office of the Prime Minister and Council of Ministers
PKI	Public Key Infrastructure
PPP	Public-Private Partnership
RTDF	Rural Telecommunication Development Fund
SAARC	South Asian Association for <i>Regional</i> Cooperation
SDGs	Sustainable Development Goals
SPV	Special Purpose Vehicle
SSDP	School Sector Development Program
TAAN	Trekking Agencies Association Nepal
TEVT	Technical Education and Vocational Training
TIA	Tribhuvan International Airport
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
VSAT	Very Small Aperture Terminal
WECS	Water and Energy Commission Secretariat
WFP	World Food Program
WHO	World Health Organization
WTTC	World Travel and Tourism Council

## Executive Summary



### Background

Bordering two of the world's fastest-growing economies – India and China – Nepal has eight of the world's highest mountains, an abundance of natural resources, and multidimensional cultural heritage attracting tourists globally. Despite having these enticing features, Nepal has not been able to tap its growth potential due to prolonged political uncertainty.

That stated, Nepal has made significant progress on reforms with the adoption of a new Constitution in 2015, transitioning from a unitary to federal state, and election of a stable government. The new government's priorities are centered on development and targeted initiatives to realize its goal of attaining developing nation status by 2022, and middle-income country status by 2030.

The Prime Minister of Nepal, Khadga Prasad Oli, has outlined his vision of “Prosperous Nepal, Happy Nepal” with broad objectives to address some of the basic challenges facing the country. Key focus areas include:

- Building capabilities to grow the country's tourism sector
- Focusing on rapid build-out of infrastructure – water, transportation, and energy
- Ending absolute poverty, illiteracy, and unemployment
- Providing health insurance and free health care for every citizen
- Accelerating post-earthquake reconstruction efforts
- Curbing the flow of young talent leaving the country
- Increasing farming productivity

### Digital Journey

Nepal has enjoyed incredible success in digital adoption compared to its neighbors, with mobile penetration exceeding 100% and Internet penetration reaching 63%. According to the NTA, there was an addition of 2.25 million new Internet users in 2017 alone, translating into approximately 250 new Internet users every hour.

Nepal is expected to lead Internet penetration by 2025 in comparison to major economies such as China and India, given its growth trend over the next few years. The growing popularity of social media is a crucial driver for Internet adoption in Nepal, coming second only to Bhutan in South Asia in social media penetration. As at January 2018, Nepal has nearly 9.3 million Facebook users. Entertainment and video sharing are other popular use cases with more than 6.4 million registered users on YouTube.

### What is Digital Nepal?

The early success with Internet and mobile provide the impetus for Nepal to leverage the potential of digital technologies to drive accelerated growth.

The Digital Nepal Framework is a blueprint that provides a roadmap to how digital initiatives can:

- Contribute to economic growth
- Find innovative ways to solve major challenges facing society in a shorter period with fewer resources
- Identify opportunities for Nepal to participate in the global economy

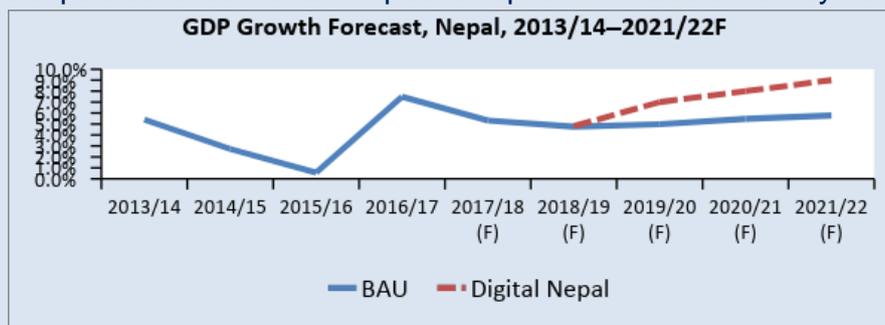
The digital initiatives have been selected based on:

- Alignment with the vision of Prosperous Nepal, Happy Nepali
- Demonstrated success in other similar developing markets
- Ability to execute in the local environment

The Digital Nepal Framework encompasses:

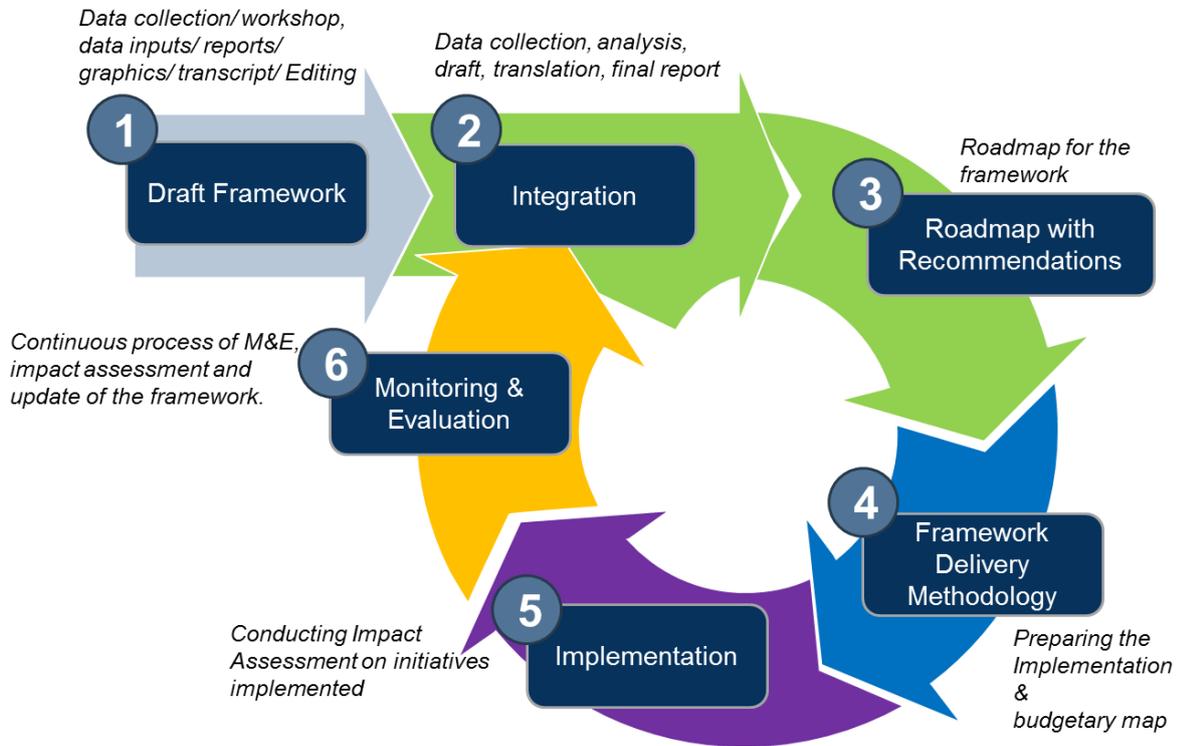
- One Nation
- Eight Sectors
- 80 Digital Initiatives

The Digital Nepal program is designed to enable Nepal to harness its growth potential by leveraging disruptive technologies and driving socioeconomic growth. The program is expected to deliver an impact of up to NPR 800 billion by 2022



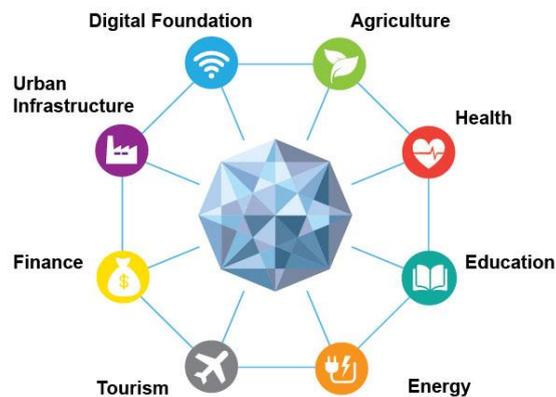
## Methodology

Digital Nepal program is designed with six steps strategic methodology. The methodology gives the path from development of Digital Nepal framework document, implementation and continuous engagement of stakeholder to implement the vision of integrating ICT into Nepal’s development.



## Eight Sectors and Eighty Digital Initiatives

Under the Digital Nepal framework, eight sectors – digital foundation, agriculture, health, education, energy, tourism, finance and urban infrastructure – have been identified based on close engagement with stakeholders.



Eighty digital initiatives are identified which aims to propel socioeconomic growth in Nepal by addressing crucial challenges while unlocking the growth potential in each of the eight key sectors. All identified 80

digital initiatives are discussed with all concerned stakeholders in workshops and feedback process setup by MoCIT.

Digital Foundation	Agriculture
1) Establish the Internet as an essential service 2) Improve spectrum availability, management and optimization 3) Take the lead in 5G networks deployment 4) National Optical Fiber Network 5) High-speed internet connectivity for efficient delivery of Public services 6) Special economic zones for ICT sector 7) Government of Nepal App 8) Use of Government Enterprise Architecture (GEA) 9) Paperless government to promote collaboration 10) Public Wi-Fi Hotspots 11) National Cyber Security Center 12) Provincial Data Center Establishment 13) National Language Computational Resource Pack 14) National Biometric ID Card 15) Digital Signature 16) Digital Innovation and Co-creation Hub 17) Digital Skill Development Initiative 18) Government eLearning Platform 19) ICT in Education	20) eHaat Bazaar 21) Precision Agriculture 22) Agriculture Tools Sharing 23) Digital Disbursement for MSP & Subsidies 24) Digitization of Land Records 25) Smart Irrigation Project 26) Smart Livestock and Wildlife Management 27) Televet Medical Center Establishment 28) Agriculture Input and Output Product Quality Tracking System 29) Education and training programs for farmers 30) State of the Art Knowledge Centers and Government Agriculture Centers
Health	Education
31) National Digital Healthcare Program 32) Next-Generation Digital Healthcare Facilities 33) Electronic Health Records 2.0 34) Mobile Health Units 35) e-Maternal Care 36) Drones for delivery of emergency medical supplies 37) Centralized Telemedicine Center	38) Smart Classrooms 39) OLE Nepal 2.0 40) Online Learning Platform 41) Rent-a-Laptop Program 42) EMIS 2.0 43) Centralized Admission System 44) Biometric Attendance Systems and CCTV Cameras 45) Mobile learning centers in rural areas
Energy	Tourism
46) Smart Metering 47) GIS Smart Grid Project 48) Pan-Nepal roll-out of NEA- Any Branch Payment System (ABPS) 49) NEA Official Mobile App 2.0 50) Smart Building / Energy Management Project 51) NEA Field Force Automation Solutions 52) NEA Customer Service Portal 53) NEA e-Learning Platform 54) Contract Management Information System	55) Welcome Nepal Website and Mobile App 2.0 56) Electronic Visas and Immigration Process Improvement 57) Multilingual Helpline 58) Augmented and Virtual Reality Tours 59) Electronic Tour Guides 60) Omnichannel Marketing 61) Tourist Security Infrastructure

Finance	Urban Infrastructure
62) National Payment Gateway 63) Credit Ratings (Individual/ Corporate Accounts) 64) Information Management System for Nepali Migrants 65) Mobile Wallet Services 66) Encourage digital payments in Nepal 67) Development of single window for business & industry promotion 68) Development and promotion of ecommerce and ITeS ecosystem 69) Digital Payments Campaign	70) Water ATMs 71) Smart metering for water 72) Intelligent Waste Management 73) Automated Waste Sorting 74) Municipality Mobile Application 75) Connected Public Transport/ Public Transport Mobile App 76) Intelligent Traffic Management 77) Intelligent Parking Lot Management 78) Intelligent Toll Booths 79) National Disaster Management System 80) Disaster Management Training

### Digital Nepal Enablers

The success of the Digital Nepal Framework will require a high degree of emphasis on implementation. The Government of Nepal needs to focus on the following priority areas to create an enabling environment for the success of Digital Nepal initiatives:

Technology and Infrastructure	Entrepreneurship/PPP	Talent and Skills Development
<p><b>Digital connectivity needs to be a key priority.</b> Possible actions include:</p> <ul style="list-style-type: none"> <li>• Make Internet access a fundamental right for every citizen</li> <li>• Improve the availability of spectrum to the operators to enhance service coverage and quality</li> <li>• Take leadership in driving 5G adoption in South Asia</li> <li>• Establish a nationwide fiber network</li> </ul>	<p><b>Encourage private sector participation.</b> Possible actions include:</p> <ul style="list-style-type: none"> <li>• Digitally streamline PPP application system to mobilize private investment</li> <li>• Tax holidays and incentives for investment in Digital Nepal program</li> <li>• Startup accelerator program to build a strong ecosystem for nurturing innovation and entrepreneurship</li> </ul>	<p><b>Improve digital education.</b> Possible actions include:</p> <ul style="list-style-type: none"> <li>• Compulsory IT education in schools and colleges</li> <li>• Increase the education system's capacity to impart advanced ICT education</li> <li>• ICT literacy programs for rural communities and underprivileged Nepalese</li> <li>• Ongoing communication and celebration of digital stories of success</li> </ul>
<p><b>Facilitate the development of a robust financial ecosystem.</b> Possible actions include:</p> <ul style="list-style-type: none"> <li>• Encourage digital payments</li> <li>• Attract investments in fintech by encouraging the growth of startups and telecom companies to offer services to drive financial inclusion</li> </ul>	<p><b>Encourage foreign direct investment in priority areas.</b> Possible actions include:</p> <ul style="list-style-type: none"> <li>• Fast-track FDI applications for Digital Nepal initiatives</li> <li>• 100% FDI and easier repatriation of funds for Digital Nepal initiatives</li> </ul>	<p><b>Making public servants digitally-ready will be essential.</b> Possible actions include</p> <ul style="list-style-type: none"> <li>• Digital skills training for public sector employees</li> </ul>

## Nepal in Context

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### **Background**

Bordering two of the world's fastest-growing economies – India and China – Nepal has eight of the world's highest mountains, an abundance of natural resources (mainly fresh water), and multidimensional cultural heritage attracting tourists globally. Despite these enticing features, Nepal has not been able to tap into its growth potential due to prolonged political uncertainty, trade disruptions, and natural disasters (such as the twin earthquakes in 2015 and floods in 2017). Political instability had become a part of life for Nepali citizens, with the country changing its government up to 20 times since the introduction of democracy in 1990.<sup>1</sup>

That stated, Nepal has made significant progress on reforms with the adoption of a new Constitution in 2015, transitioning from a unitary to federal state, and election of a stable government.

- The country's first-ever Local level elections for state assemblies and the Federal Parliament in 2017 marked a crucial and decisive move toward federalism and political stability.
- The new Constitution aims to turn around the economic and political situation, ensure double-digit economic growth over the next 10 years,<sup>2</sup> create an inclusive, pluralistic democracy, and mixed-market economy.
- One of the key goals of the government is to graduate from its Least Developed Country (LDC) status by 2022 to become a middle-income economy by 2030.<sup>3</sup> As such, the government has implemented several long-run policies and programs centered on the UN's Sustainable Development Goals (SDGs).

### **Macroeconomic Environment**

Nepal registered a steady GDP growth of 5% from 2010–2015. However, the massive earthquake of April 2015 significantly impacted the country's economic development and GDP growth in FY 2015/16, dropping to 0.6%.

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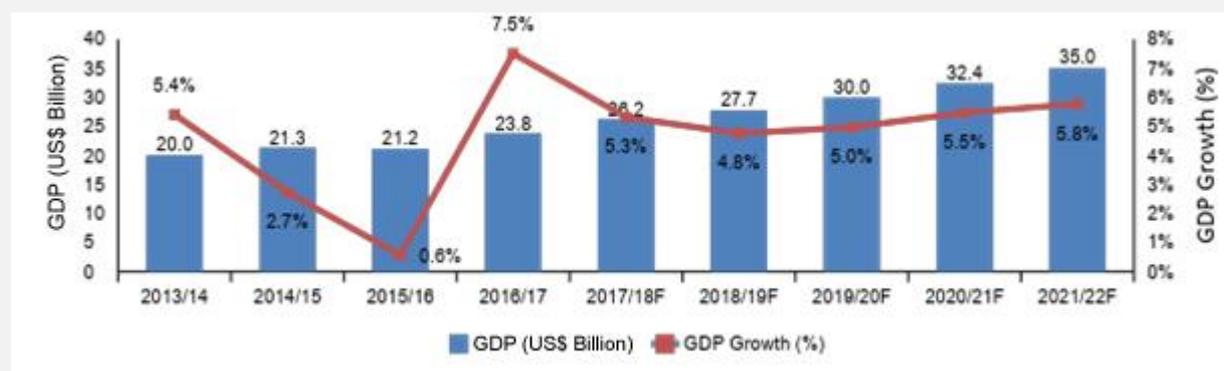
<sup>1</sup> UNESCO

<sup>2</sup> Constitution of Nepal, 2015

<sup>3</sup> Envisioning Nepal 2030/ National Planning Commission, 2017

- In 2016–2017, growth picked up significantly to 7.5%, driven by a good harvest, significant foreign aid, normalization of trade activities, and improved electricity supply management. In 2017, Nepal was ranked the third fastest growing economy in the world in terms of GDP growth.<sup>4</sup>
- Moving forward, growth is likely to normalize to pre-earthquake levels at approximately 5.3%, sustained by increased spending in infrastructure reconstruction and development. However, this could be offset by a slowdown in remittance inflow due to a decline in the number of outgoing migrants.

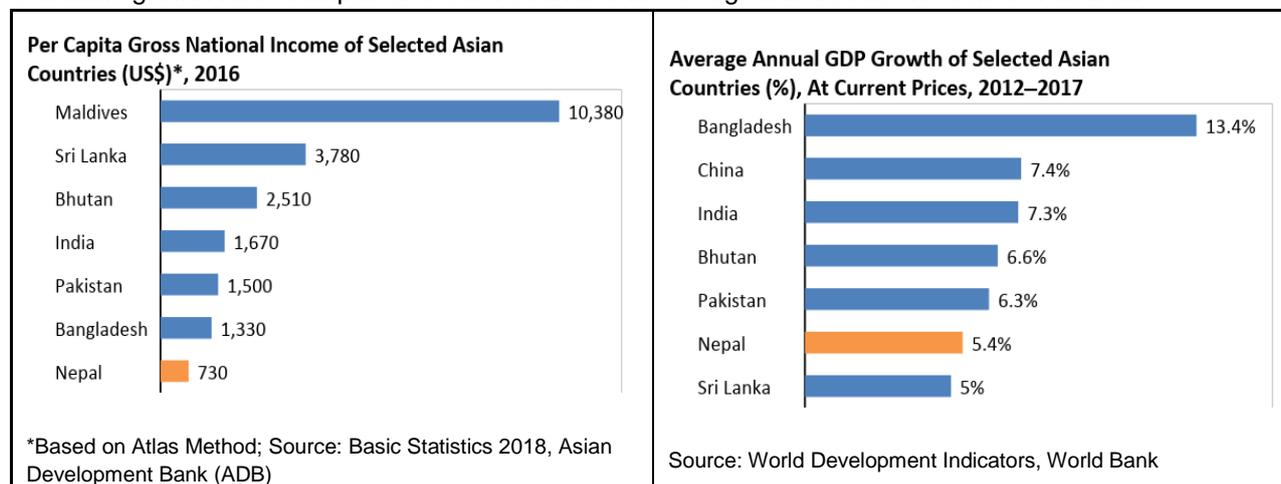
**GDP (US\$ billion) and GDP Growth (%), at Constant Prices, Nepal, 2013/14–2021/22F**



Note: F indicates forecasts

Source: Nepal's Macro Environment and Key Industry Prospects, 2017–2022

Nepal is considered one of the least developed countries in the world with low per capita income. Its low economic growth rates compared to other countries in the region is a cause for concern as well.



<sup>4</sup> World Economic Forum

### Criteria for Graduation from LDC Category

The graduation threshold for any two of the following three graduation criteria must be met over two consecutive triennial reviews for graduation from LDC status:

Graduation Criteria		Nepal Progress vs. Criteria
Per capita income	GNI per capita >US\$ 1,242 (three-year average)	US\$ 753 (avg. 2015–2017)*
Human assets	Human Assets Index (HAI) >66	68.7 (2015)
Economic vulnerability	Economic Vulnerability Index (EVI) <32	26.2 (2015)

Source: UN Committee for Development Policy; \*GNI per capita, Atlas method (current US\$)

While Nepal’s Gross National Income (GNI) per capita is well below the threshold for graduation out of the LDC category, the country’s significant progress in human asset- and economic vulnerability-related KPIs have made it eligible for graduation from LDC.

However, Nepal has decided not to rely on the non-income criteria framed by the United Nations to graduate from the LDC category, fearing that such a transition would reduce the flow of foreign aid and deprive the country of other international support measures.

The expected economic growth rate of 5%–6% is unlikely to help Nepal to achieve its objectives of:

- Meeting income criteria for graduation from the LDC category by 2022
- Becoming a middle-income country by 2030

To realize its aspiration to become a middle-income country by 2030, Nepal will require substantial infrastructure development alongside a consistent growth rate of 8% to 10% annually.

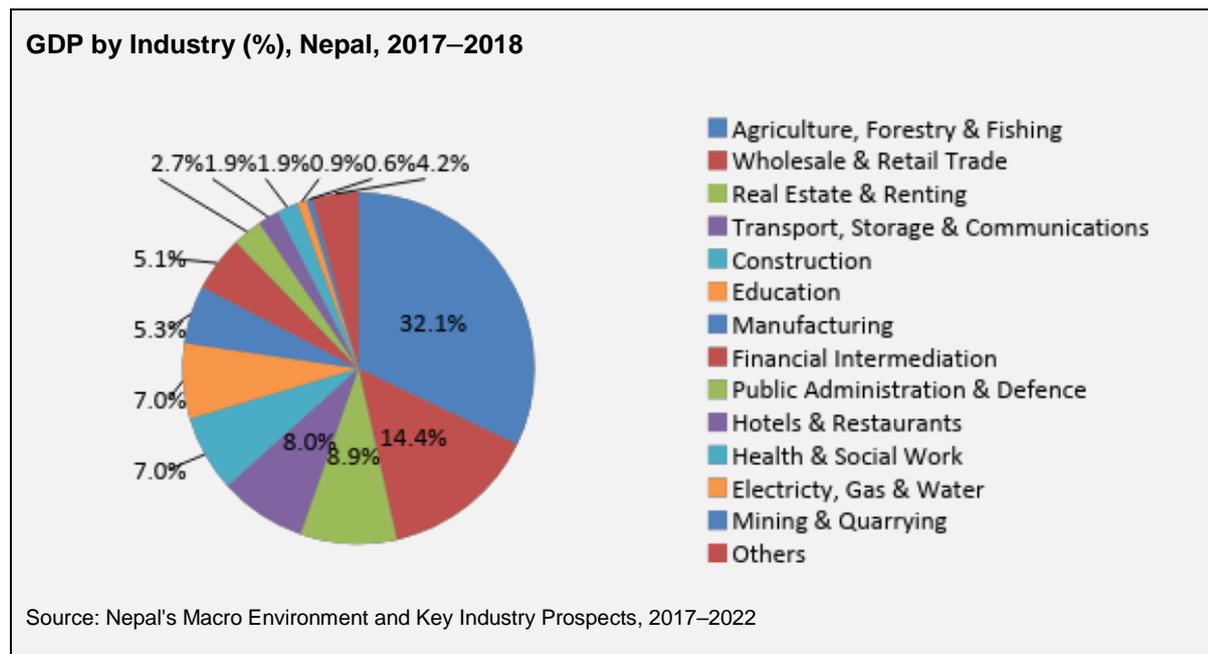
***Maintaining a GDP growth rate of 8% to 10% will require broad-based growth spanning infrastructure development, supporting policies, fiscal reforms, and greater foreign participation***

Agriculture remains the mainstay of the Nepali economy, accounting for the largest share of total value-add at ~32.1%.

- Future growth is projected to be led by the reconstruction of damaged irrigation facilities and sufficient agricultural supplies. However, unseasonal rainfall in August 2017 that resulted in severe flooding and landslides, and affected paddy production has created significant food shortages which may slowdown sector growth.

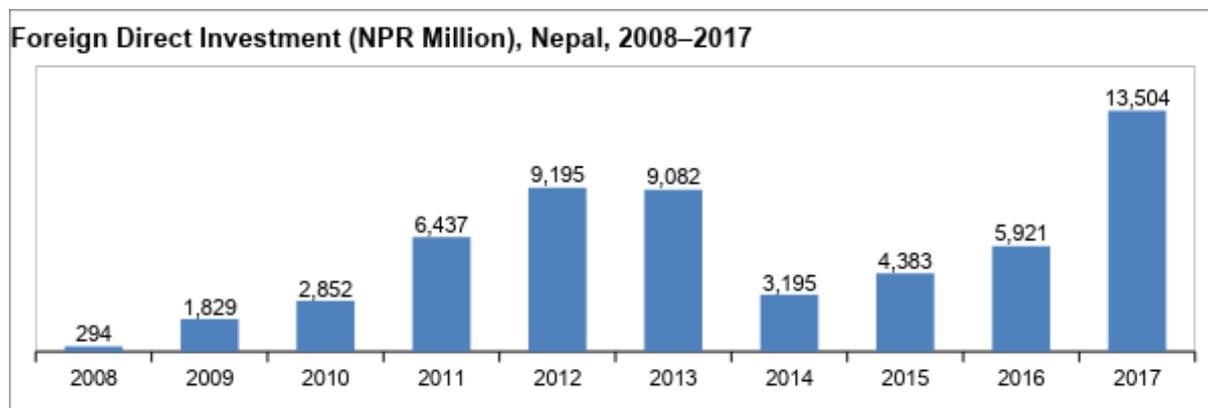
Trade, transport, and construction are other sectors experiencing strong momentum in Nepal.

- Wholesale and retail trade and transport sectors have picked up with the normalization of trade activities and are expected to grow further in the import-driven economy.
- Construction sector growth in 2017–2018 is expected to be boosted by continued momentum in post-earthquake reconstruction and large infrastructure projects.



**Foreign Direct Investment**

The Government of Nepal has taken several steps in recent years to encourage foreign direct investment (FDI) in the country. It issued the new Foreign Investment and One-Window Policy 2015, replacing the Foreign Investment and One-Window Policy 1992, and organized the Nepal Investment Summit 2017 with the objective of attracting FDI.



Source: Nepal Rastra Bank

As a result of these efforts, FDI in Nepal grew by an astounding 128% to reach NPR 13.5 billion in 2017.<sup>5</sup> However, Nepal has not been able to harness the full potential of FDI investments with net FDI contribution at only 0.8% of GDP.<sup>6</sup> To optimize FDI investments, the Government of Nepal should continue its efforts to attract foreign investors to bridge funding gaps in targeted sectors, and enable technology transfer and sharing of best practices from other economies.

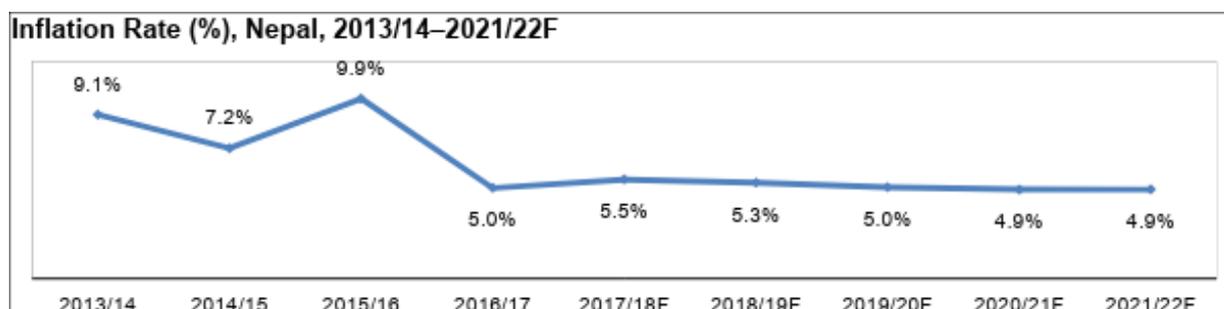
<sup>5</sup> Nepal Rastra Bank

<sup>6</sup> World Bank

### **Inflation Rate**

Following significant volatility in the past five years, the inflation rate in Nepal had stabilized, reaching a 13-year low in 2017, aided by declining food prices and moderation in the cost of non-food items. In 2018, the inflation rate reported a marginal spike due to a sharp rise in vegetable prices; going forward, it is forecast to remain at 5%.

In recent months, strong trade linkages with India have resulted in Nepal’s inflation trend mimicking that of India.



Source: Nepal's Macro Environment and Key Industry Prospects, 2017–2022

### **Population**

High population growth in Nepal has long been regarded as one of the critical challenges inhibiting economic growth. The country’s population almost doubled between 1960 and 1990. However, the expansion of mass education, rising economic opportunities, urbanization, growth in female labor force participation, and delayed marriages are leading to declines in fertility rates and slowing population growth.

#### **Population Growth Rate, Nepal, 2013/14–2021/22F**

	2013/14	2014/15	2015/16	2016/17	2017/18 F	2018/19 F	2019/20 F	2020/21 F	2021/22 F
Population (Million)	28.11	28.43	28.85	29.15	29.51	29.87	30.22	30.55	30.91
Annual population growth (%)	1.1%	1.1%	1.5%	1.0%	1.2%	1.2%	1.2%	1.1%	1.2%

Source: Nepal's Macro Environment and Key Industry Prospects, 2017–2022

### **Poverty**

With almost 18.2% (Source: 15<sup>th</sup> Annual Development Program) of the population living below the national poverty line, 50% of the population earning below ~US \$3 per day, and a per capita income below international and regional standards, Nepal is considered among the poorest nations in South Asia, trailing only Bangladesh. This is primarily due to socioeconomic conditions where almost 80% of Nepal’s population lives in rural areas, have large families, very small landholdings, and lack access to primary healthcare, education, safe drinking water, sanitation, and other necessities.

The earthquake in 2015 that caused widespread devastation coupled with high dependence on agriculture and geographical issues such as rugged terrain, lack of rainfall, and poor soil quality has further

exacerbated the situation. Huge disparities and inequalities continue to exist between regions and underprivileged social groups.

Despite the dismal situation, Nepal has gained significant ground in alleviating poverty in the past five years, primarily due to high amounts of remittances from Nepalese who have migrated overseas; Nepal has among the highest foreign remittances in the world at US\$6.6 billion, equivalent to 31.3% of the country's GDP in 2016.<sup>7</sup>

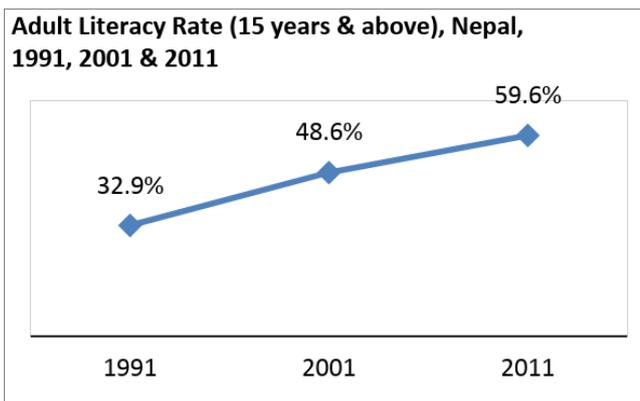
### Poverty Statistics, Nepal

Metrics	1995/96	2003/04	2010/11
Population living below international poverty line (US\$1.90 a day)	61.9%	46.1%	15.0%
Population living below international poverty line (US\$3.10 a day)	86.6%	75.5%	50.8%
Population living below national poverty line	41.8%	30.9%	25.2%

Source: World Bank; Nepal Central Bureau of Statistics

### Literacy Rate

Nepal has made remarkable progress in improving its education system, increasing net primary school enrolment rates from 68.0% to 94.7% from 1991–2017.<sup>8</sup> Government efforts such as the School Sector Development Program (SSDP) and ICT implementation through Open Learning Exchange (OLE) Nepal and Open IDEO programs have closed the gender and age gaps in education considerably – one in five elderly people are able to read and write.



However, with an adult literacy rate of ~59.6%,

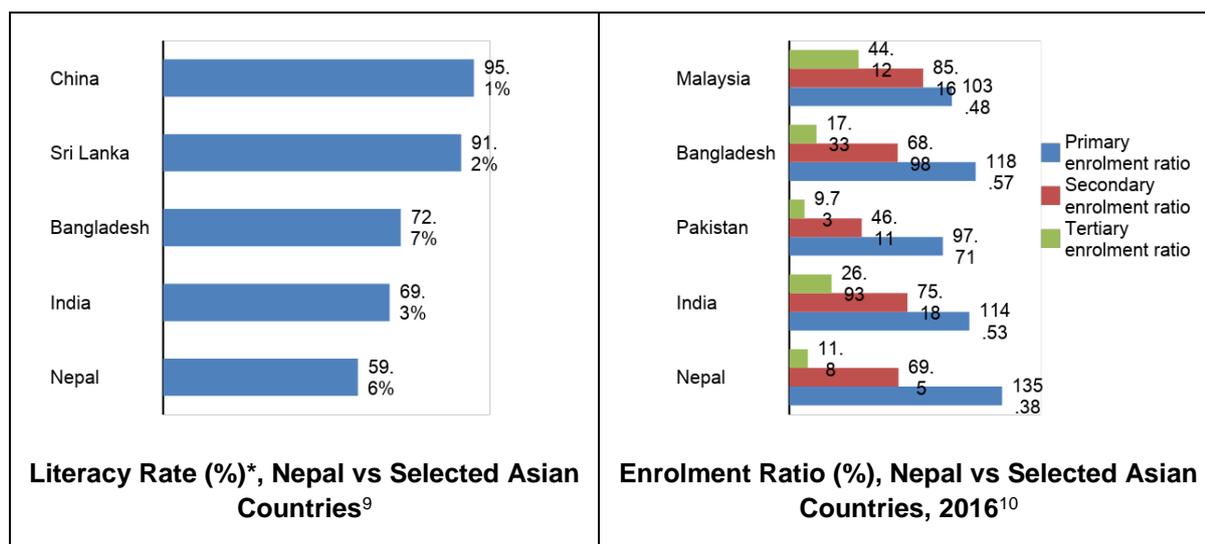
Nepal continues to rank the lowest among key South Asian countries, as the majority of youth still struggle to

Source: World Bank

gain access to education, particularly at the secondary and tertiary levels. To overcome this, the government needs to devise better incentives and monitoring mechanisms to ensure the efficient implementation of its various programs.

<sup>7</sup> Pew Research Center and World Bank, 2017

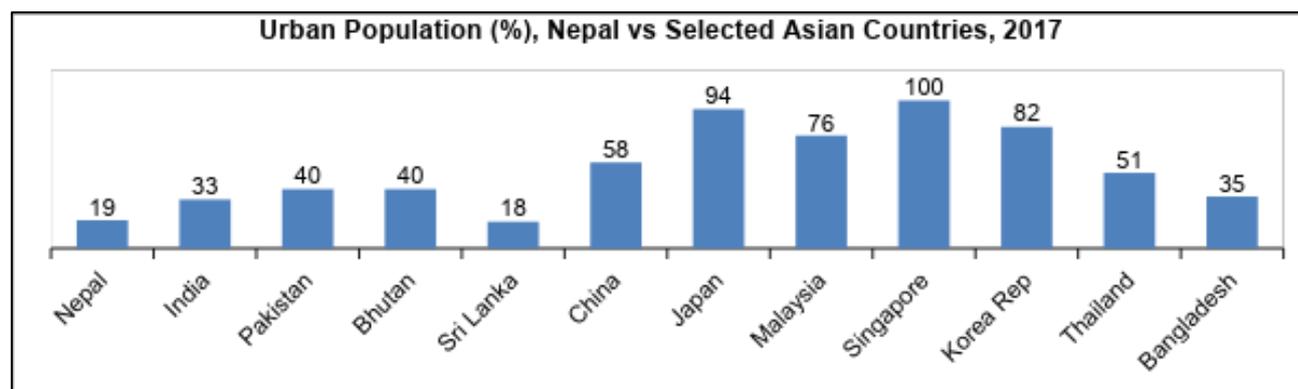
<sup>8</sup> UNESCO



\*Latest available census data in the country

### High Rural Population

Despite rapid urbanization in recent years, Nepal remains one of the least urbanized countries in the world. The World Bank estimates that only one-fifth of the Nepali population lives in urban areas, while more than 80% of the population resides in rural areas.



Source: World Bank

Most infrastructure and socioeconomic development in Nepal are centered in a few large cities, while people in remote rural areas continue to struggle with poor infrastructure and limited access to basic services such as healthcare, education, and financial services. As a result, Nepal trails its South Asian peers in economic growth and SDGs with high poverty and low adult literacy rates. Nepal needs to adopt a holistic approach to investing in its socioeconomic growth aspirations. It is important for the Government of Nepal to focus on extending the reach of its services and development agenda to rural areas to drive inclusive growth and achieve its vision of “**Prosperous Nepal, Happy Nepali**”.

<sup>9</sup> Data for the Sustainable Development Goals by Country, UNESCO Institute for Statistics

<sup>10</sup> Data for the Sustainable Development Goals by Country, UNESCO Institute for Statistics

## State of Digital Adoption in Nepal



### Policy and Regulatory Foundation for Digital Nepal

A number of policy and regulatory frameworks governing the ICT sector provide a basic foundation for the Digital Nepal framework. For example, the National ICT Policy introduced in 2015 seeks to enhance the vision of transforming Nepali society into knowledge and information based society by harnessing rapid advances in the ICT sector. Similarly, the National Broadband Policy announced in 2016 puts forth a framework for stimulating broadband access and availability across the country. Among others, policy emphasis that has been placed on effectively leveraging Universal Service Access Funds as a means of bridging digital divide will provide a strong mechanism for expanding broadband access to communities beyond urban areas if implemented effectively.

While effective implementation of these policy instruments can substantially complement Digital Nepal Program, it will be important to understand the role of a holistic policy regime that transcends ICT domain. For example, there could be a need to revisit investment and trade policies to secure large scale private sector participation in various sectors within the digital economy such as (ecommerce, sharing economy and IT enabled services). Similarly, it will be important to carry out broad based policy gap analysis so as to ensure that Digital Nepal Program is grounded on sound policy frameworks.

In addition to a number of policy and regulatory frameworks including the National ICT Policy, National Broadband Policy and Electronic Transaction Act, the government has also developed the Government Enterprise Architecture (GEA) and Nepal e-Governance Interoperability Framework (NeGIF) which mark some of the foundational initiatives for enabling roll-out of citizen centric digital services and systems that are interoperable and provide a framework for seamless integration. These frameworks do have applicability beyond the realm of centralized roll-out of digitally enabled government services and could easily be adapted to provincial and Local level settings reflecting new political reality of the federal system of governance. In addition, the Government Websites Design/Development and Management Guidelines published in 2068 could also help ensure standardization in the way contents for public consumption are presented by government agencies.

The Digital Nepal initiative must assess and evaluate these frameworks and the supporting government endorsed guidelines concerning automation and digitalization of government services and suggest improvements if necessary.

#### Policy and Regulatory framework

National ICT Policy, 2015

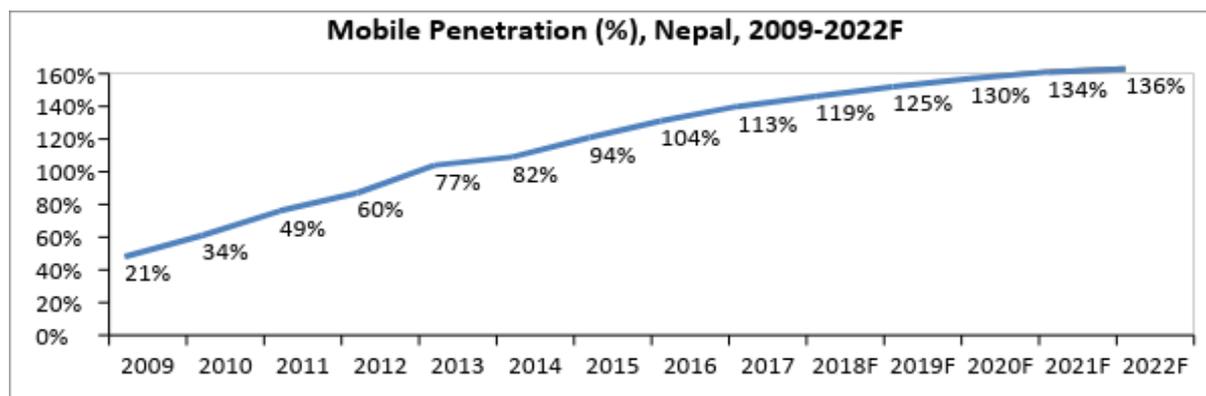
National Broadband Policy, 2015

Electronic Transaction Act, 2067

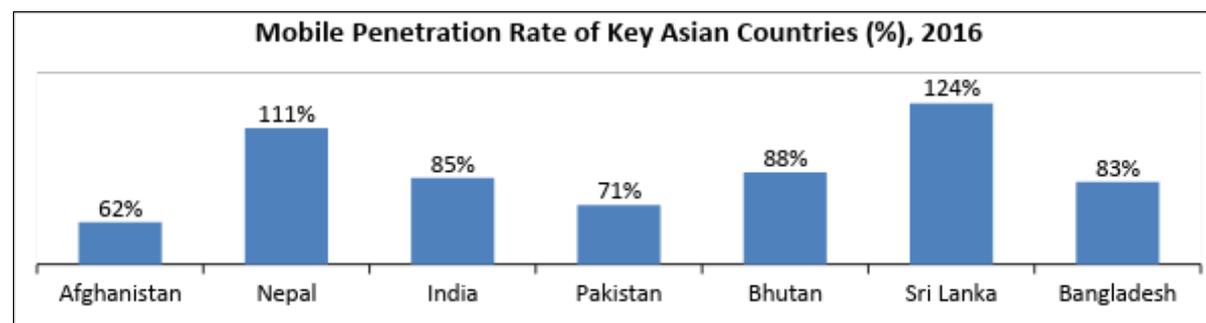
**Mobile-first Economy**

In the past, the expansion of telecommunication infrastructure in Nepal was restricted due to multiple challenges including difficult topography, adverse economic conditions, and political instability. In the past decade, however, the country has seen notable improvements in the telecommunication landscape driven by investments from leading mobile network operators Telecom and Ncell.

Like many other Asian countries, the mobile services industry in Nepal has recorded remarkable growth in the past four to five years. Mobile penetration increased exponentially to 113% in 2017 from 21% in 2009,<sup>11</sup> with the robust growth expected to sustain in the next five years.



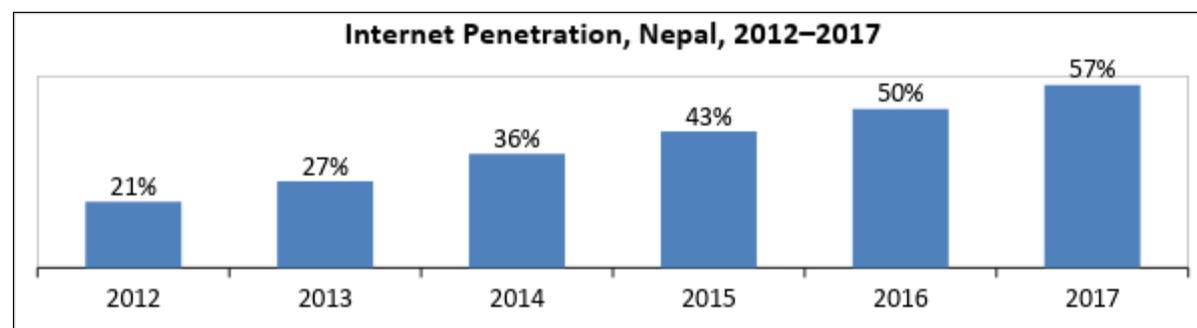
Source: Nepal Telecommunications Authority



Source: World Bank

**Internet Penetration**

Nepalese increasingly realize the benefits of the Internet, with the penetration rate rising at 6%–9% rate annually in the past five years.

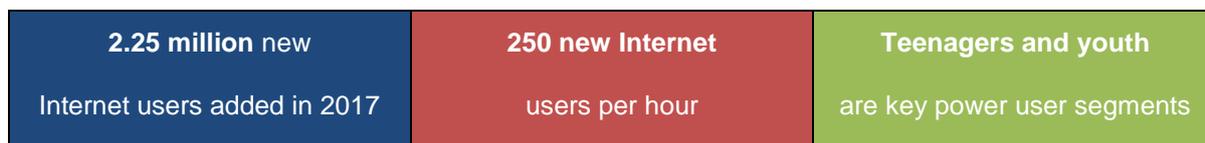


Source: Nepal Telecom Authority; World Bank

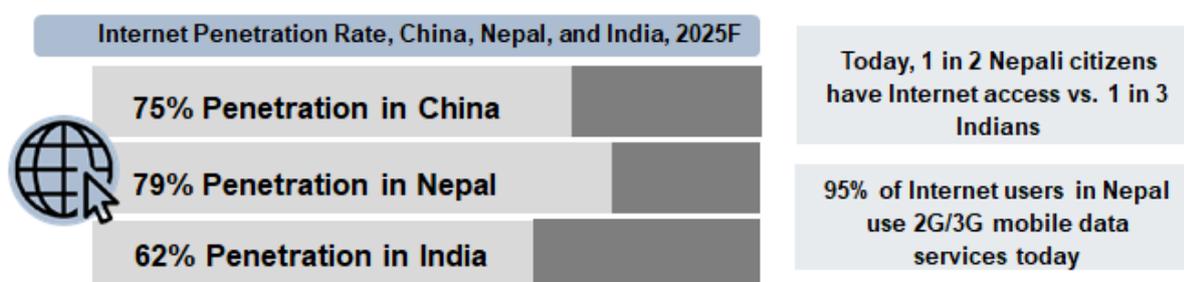
<sup>11</sup> Nepal Telecommunications Authority

According to the Nepal Telecommunications Authority, 2.25 million new users were connected to the Internet in 2017, translating into approximately 250 new Internet users every hour. Rapid penetration of Internet in Nepal is being driven by:

- Increasing popularity of social media (e.g., Facebook, Twitter, and Instagram) and online communication platforms (e.g., WhatsApp and IMO)
- Growing mobile connections and smartphone penetration
- Increasing use cases in areas such as entertainment (e.g., YouTube), music streaming, and e-commerce



With the surge in mobile Internet usage, Nepal is expected to surpass the mobile Internet penetration rate of countries such as India and China.



Source: International Telecommunication Union (ITU)

Mobile operators in Nepal are increasing investments in infrastructure to meet the growing demand for data services. Leading mobile operators are focusing on rolling out 4G services since its launch in early 2017, with 60% of cities in Nepal projected to receive access in the next to two to three years.

4G Telecom Providers	4G Network and Coverage	Investment 2017–2018
<b>Nepal Telecom</b> 50% share in Nepalese mobile market in 2018	Launched: Jan 1, 2017 Current Coverage 2 Cities (Kathmandu, Lalitpur, Bhatapur and Pokhara)	ZTE, Huawei and Mavenir to invest US\$15.36 million, US\$38 million and US\$21 million respectively to provide LTE core network service to Nepal Telecom
<b>NCELL</b> 46% share in Nepalese mobile market in 2018	Launched: Jun 1, 2017 Current Coverage: 21 Cities Aims to provide 4G services in 40 cities by 2018	Investment of more than US\$460 million for the technology transfer and infrastructure.
<b>Smart Telecom</b> 4% share in Nepalese mobile market in 2018	Lunched: Nov 1, 2017 Coverage: 4 cities (Kathmandu, Lalitpur, Bhatapur and Pokhara)  4G Customers: 39, 155 (June 2018)	US\$110 million investment (80% investment through FDI from Kazakhstan)

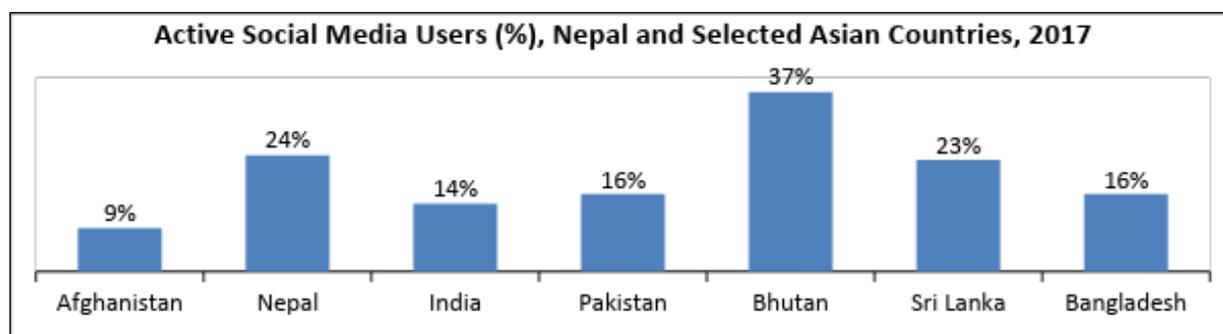
Source: Nepal Telecommunications Authority

Compared to the mobile broadband industry, Nepal's fixed-line sector is considerably underdeveloped. Fixed broadband services are largely confined to larger cities with some ISPs beginning to offer fiber connections to homes.

The Government of Nepal is initiating steps to expand Internet connectivity as part of its vision of a digital society that connects 90% of the population to broadband services by 2020.<sup>12</sup> In May 2018, Nepal Telecommunications Authority selected Subisu, a privately-owned Nepali company focusing on cable TV and cable Internet, to build Fiber-To-The-Home (FTTH) network in eight districts in Province 2 of Nepal.

### **Social Media**

The growing popularity of social media is the key driver for Internet adoption in Nepal, making the country second only to Bhutan in South Asia in social media penetration.



Source: Hootsuite, 2017

As at January 2018, Nepal has nearly 9.3 million Facebook users.<sup>13</sup> Entertainment and video sharing are other popular use cases with more than 6.4 million registered users on YouTube.<sup>14</sup>

Expanding social media use is catalyzing the growth of digital marketing in Nepal. Website development, social media marketing, content management, web design, and e-mail marketing have become one of the fastest modes of disseminating information.

### **E-commerce Set to Flourish**

As at May 2017, there are more than 56,286 registered websites in Nepal, including 40,000 commercial websites.<sup>15</sup> Many businesses and organizations leverage digital marketing to enhance their online presence and promote their business globally.

The growth of e-commerce in Nepal is inhibited due to the lack of a supporting ecosystem such as limited digital payment options. However, this is changing with the emergence of fintech start-ups such as eSewa and Khalti which are expected to disrupt the payments landscape.

## **Digital to Unlock Potential for Nepal**

Digital adoption in Nepal is higher than ever with near-universal mobile adoption and almost 60% Internet penetration. While Nepalese are adopting Internet-based services at a rapid pace, case studies for adoption in the public sector and enterprises are scarce. Nepal lacks a support ecosystem such as digital

<sup>12</sup> Nepal's ICT Development and Broadband Policy, 2015

<sup>13</sup> Hootsuite

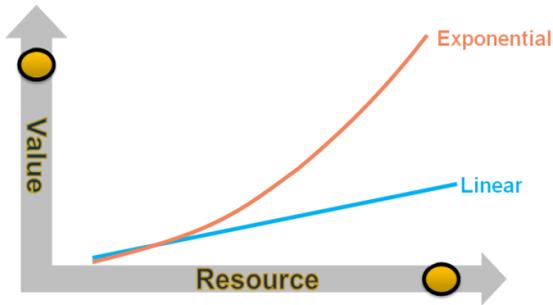
<sup>14</sup> Social Blade

<sup>15</sup> Nepal Country Commercial Guide, Export.gov

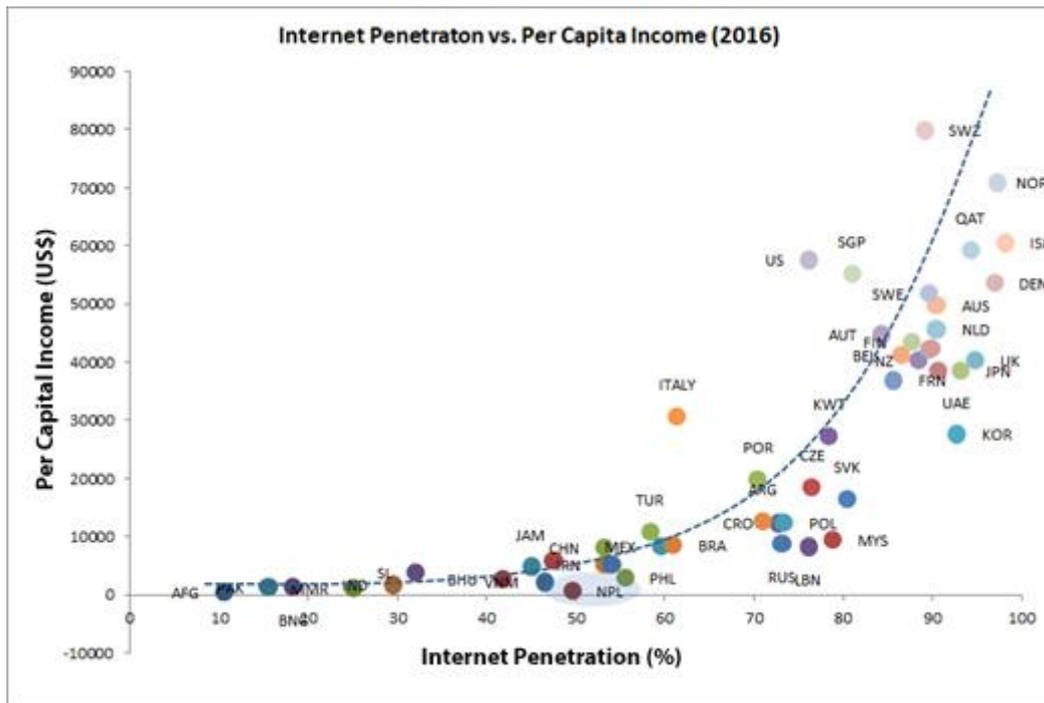
payments and online banking which are critical for the development of a digital society. As a result, Nepali society has not been able to reap the full benefits of the ongoing digital revolution.

Emerging business models and disruptive technologies such as artificial intelligence (AI), robotics, and the Internet of things (IoT) are transforming the way work is done. These digital technologies are allowing governments and enterprises globally to unlock the potential to achieve exponential growth.

**Digital as a Catalyst for Exponential Accelerated Growth**



There are strong linkages between digital adoption and GDP growth. According to a World Bank report, every 10% increase in Internet penetration in a country results in incremental economic growth of 1.3%.<sup>16</sup> The impact is more pronounced once the penetration reaches critical mass.

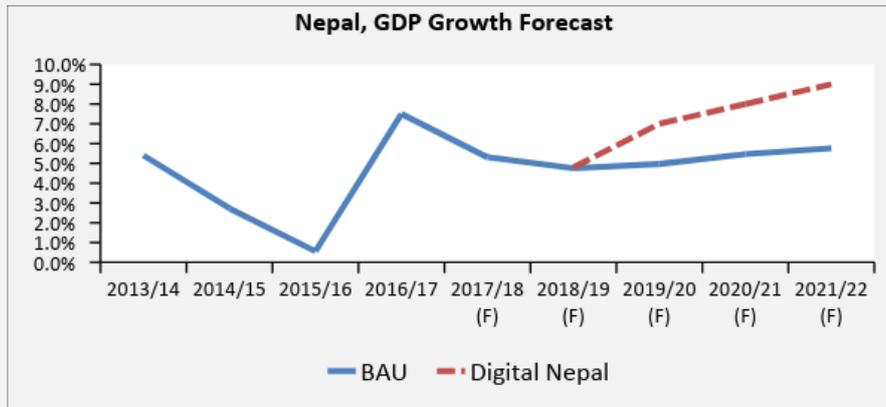


Source: World Bank; International Telecommunication Union (ITU); Nepal Telecommunications Authority

Nepal needs to expand at a significantly higher rate (8%–10%) than current projections (~5%) to have a realistic chance of meeting the income criteria for elevation from the LDC category by 2022 and becoming a middle-income country by 2030. Disruptive digital technologies have the potential to enable Nepal to fast-track its socioeconomic growth. The Digital Nepal framework intends to guide Nepal in identifying critical digital initiatives that can allow it to meet its growth potential.

<sup>16</sup> Exploring the Relationship Between Broadband and Economic Growth, World Bank, 2016

By leveraging disruptive technologies to drive socioeconomic growth, the Digital Nepal program will allow Nepal to unlock its growth potential and become a developing country by 2022 and a middle-income nation by 2030.



**Some of the digital initiatives undertaken by the Government of Nepal**

**Digital Foundation**

**Digital Signature**

*Stakeholders:* MoCIT, OCC

**Optical Fiber Networking**

*Stakeholders:* MoCIT, NTA, Telecom Companies

**Different types of Internet technology (VSAT)**

*Stakeholders:* MoCIT, NTA

**Virtual Private Network (VPN) Connections**

*Stakeholders:* MoCIT, NDCL

**Nepal Vital Registration**

*Stakeholders:* MoFAGA, MoHA

*Supported by:* World Bank

**Cyber security and Data Center**

*Stakeholders:* MoHA, MoCIT, NITC, NP

*Supported by:* KOICA

**Supply, delivery, installation & testing microwave radio for mid hill**

*Stakeholders:* MoCIT, NTC

**Agriculture**

**Call centers for supporting farmers (Kisan Call Centers)**

*Stakeholders:* MoFAGA, MoCIT NITC, NTA

**Mobile apps: Support Farmers on plant health and other agriculture related news and alerts**

*Stakeholders:* MoALD, MoCIT, NITC

**Agriculture Atlas of Nepal**

*Stakeholders:* MoALD, ICIMOD

*Supported by:* ICIMOD

**Pilot Program of Climate Resilience: Agriculture Management Information System**

*Stakeholders:* World Bank, MoALD

**Land Usage Monitoring and Analysis**

*Stakeholders:* MoALD, MoLCPA

**Use of GIS and remote sensing along with the use of ICT**

*Stakeholders:* MoALD, MoLCPA

**Land use zoning maps based on soil quality and crop suitability**

*Stakeholders:* MoALD and MoLCPA

**National Geographic Information Infrastructure**

*Stakeholders:* MoLCPA, Survey Department

**Management information system of tea and coffee sub-sector of Nepal**

*Stakeholders:* National Tea and Coffee Development Board

*Supported by:* European Union

<p><b>Digital training method to framers for pesticides analysis</b>  <i>Stakeholders:</i> MoALD</p>
<p><b>Mobile application on tomato and kausi kheti (house terrace farming)</b>  <i>Stakeholders:</i> Vegetable Crops Development Centre, MoALD  <i>Supported by:</i> ICT in Agriculture Nepal, UNDP</p>
<p><b>NARC Krishi application launched by Nepal Agriculture Research Council</b>  <i>Stakeholders:</i> MoALD</p>
<p><b>Proper price tracking system</b>  <i>Stakeholders:</i> MoALD, NDCL</p>
<p><b>Food and Safety (Pesticide Tracking)</b>  <i>Stakeholders:</i> MoALD, DFTQC</p>
<p><b>Online Seedling Order System</b>  <i>Stakeholders:</i> Vegetable Crops Development Centre</p>
<p><b>Land Record Information Management System (LRIMS)</b>  <i>Stakeholders:</i> MoLCPA, DoLMA  <i>Supported by:</i> GoN, ADB</p>
<p><b>National Geoportal</b>  <i>Stakeholders:</i> MoLCPA, MoFE, DoR, DoMG</p>
<p><b>Bhumi Sushaasan Application</b>  <i>Stakeholders:</i> MoLCPA</p>
<p><b>Digitization of Land Parcels</b>  <i>Stakeholders:</i> DoLIA</p>
<p><b>Scanning of Field book and Plot Register</b>  <i>Stakeholders:</i> DoLIA</p>
<p><b>Application for calculation registration fee and capital gains tax</b>  <i>Stakeholders:</i> DoLIA</p>
<p><b>Spatial Application Extension Software</b>  <i>Stakeholders:</i> DoLIA</p>
<p><b>Parcel Editor software</b>  <i>Stakeholders:</i> Cadastral survey division, Survey department</p>
<p><b>Health</b></p>
<p><b>E-Childcare</b>  <i>Stakeholders:</i> MoHP</p>
<p><b>ELMI's- Electronic Logistics Management Information System</b>  <i>Stakeholders:</i> DoHS</p>
<p><b>HMIS-Health Management Information System</b>  <i>Stakeholders:</i> DoHS</p>
<p><b>Early Warning and Reporting System</b>  <i>Stakeholders:</i> Epidemiology and Disease Control Division</p>
<p><b>Health Infrastructure Information System</b>  <i>Stakeholders:</i> DoHS</p>

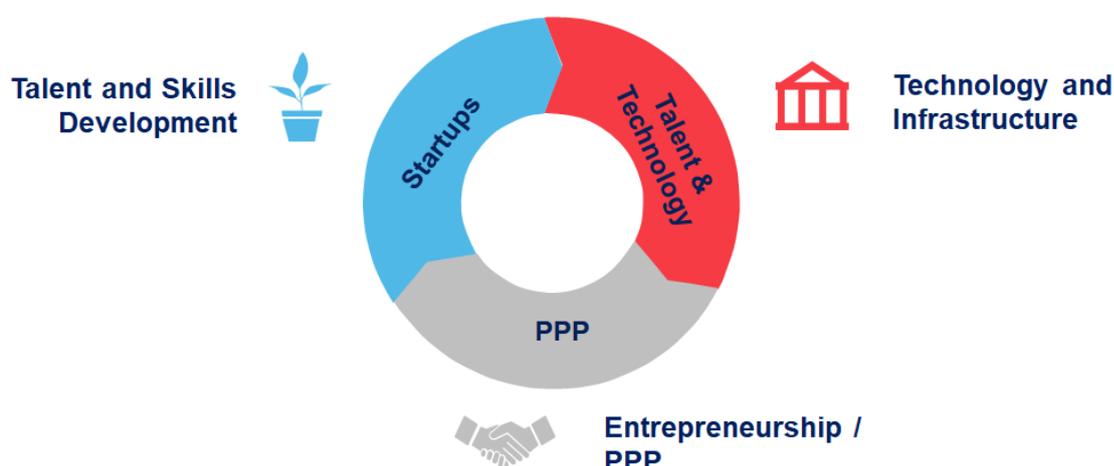
<p><b>DHIS2 Tracker</b> Stakeholders: DoHS</p>
<p><b>SMS Messaging</b> Stakeholders: National Health Education Information Communication Centre</p>
<p><b>Mobile Health</b> Stakeholders: MoHP, Family welfare division</p>
<p><b>MDIS-Malaria and Disease Information System</b> Stakeholders: Epidemiology and disease control division created by EKbana</p>
<p><b>Telemedicine</b> Stakeholders: Patan Hospital</p>
<p><b>Education</b></p>
<p><b>GPS Mapping is in practice since 2070–2071</b> Stakeholders: MoEST</p>
<p><b>Energy</b></p>
<p><b>Energy Consumption pricing (Smart Pricing according to usage of the electricity)</b> Stakeholders: NEA, ETFC</p>
<p><b>Smart Licensing</b> Stakeholders: NEA</p>
<p><b>GIS Smart Grid</b> Stakeholders: NEA, NTGA</p>
<p><b>Tourism</b></p>
<p><b>Reliable Tourism Information System</b> Stakeholders: MoCTCA, Tourism Board Nepal</p>
<p><b>TIMs Card Chip (Trekker’s Information Management system)</b> Stakeholders: MoCTCA, Tourism Board Nepal, TAAN</p>
<p><b>Finance</b></p>
<p><b>National Payment Gateway</b> Stakeholders: MoF, MoCIT, NITC, NRB</p>
<p><b>Secure Payment System (Reduce cost of financial transfer/ withdrawal from any ATM's should be free of cost).</b> Stakeholders: MoF, NRB</p>
<p><b>Digital Payment system (NePS)</b> Stakeholders: Commercial and development banks</p>
<p><b>Digital Security – Public Key Infrastructure, National Level Biometrics ID, Digital Signature</b> Stakeholders: MoHA, MoF, NRB</p>
<p><b>Securities Data Management System</b> Stakeholders: MoF, SEBON</p>

<b>Mero Share (CDSC Nepal)</b> Stakeholders: SEBON
<b>Urban Infrastructure</b>
<b>CCTV surveillance for road traffic monitoring</b> <i>Stakeholders:</i> MoPIT, MoUD, NP
<b>Second phase: Smart card in public transport, first phase mandatory tickets in public transport</b> <i>Stakeholders:</i> MoPIT, MoUD
<b>Socio-Economic Atlas</b> <i>Stakeholders:</i> MoLCPA
<b>Electronic - Building Permit System</b> Supported by: DFID

## Digital Nepal Enablers



The Government of Nepal needs to focus on the following priority areas to create an enabling environment for the success of Digital Nepal initiatives:



### Technology and Infrastructure

A robust ICT infrastructure and supporting ecosystem is the backbone of the Digital Nepal program. The Government of Nepal needs to undertake initiatives for driving digital adoption and facilitating the establishment of a reliable ICT infrastructure through PPPs.

#### Digital Connectivity Needs to be a Key Priority

Digital connectivity in Nepal has improved considerably in the past few years due to the rapid adoption of mobile Internet. However, it continues to lag behind its neighbors and developed economies in the overall development of the ICT sector.

As a result, strengthening digital connectivity needs to be a key priority for the Government of Nepal. In coordination with MoCIT and in consultation with other concerned stakeholders following actions are identified to improve digital connectivity:

- Make Internet access a fundamental right for every citizen
- Improve availability of spectrum to operators to enhance service coverage and quality

- Take leadership in driving 5G adoption in South Asia
- Establish a nationwide fiber network

### **Facilitate Development of a Robust Financial Ecosystem**

Digital payments and financial transactions conducted through smartphones and mobile devices are now a vital cog in modern financial infrastructure. A strong digital finance ecosystem can facilitate the evolution of new business models and digital start-ups, generating new job opportunities and enabling faster economic growth. Digital financial services also have the potential to encourage financial inclusion by allowing previously unbanked population access to these services.

Nepal has an underdeveloped financial ecosystem with low penetration of digital financial services. As a result, facilitating the development of a robust financial ecosystem needs to be a priority of the government. Possible actions in this direction include:

- Promoting digital payments
- Attracting investments in fintech by encouraging the growth of start-ups and telecom companies that offer services to drive financial inclusion

### **Entrepreneurship/PPP**

The Digital Nepal program would require significant investments, which the government alone cannot provide. Public-private partnerships and foreign investments need to play a major role in Digital Nepal by bringing technological expertise and capital infusion for sustainability and scalability of the program.

The government should initiate necessary policy interventions to encourage private sector participation in the Digital Nepal program. It could consider taking the following steps to improve the ease of doing business in priority areas:

### **Private Sector Participation**

Possible actions include:

- Rolling out a digitally streamlined PPP application system for mobilizing private investment in Digital Nepal
- Offering tax holidays for investments in critical areas (e.g., companies focusing on Smart Health in remote rural areas can be given a three-year tax holiday)
- Providing a startup accelerator program to build a strong ecosystem for nurturing innovation and entrepreneurship in tackling key challenges and generating large-scale job opportunities

### **Foreign Investments**

Foreign investment can help Nepal leverage skills and insights from similar initiatives undertaken by foreign investors in other parts of the world. Possible actions to attract foreign investments include:

- Fast-tracking FDI applications for Digital Nepal initiatives through a single window system
- Increasing FDI limits and easier repatriation of funds (e.g., 100% FDI for Digital Nepal initiatives)

### **Talent and Skills Development**

Digital Nepal program aims to open up opportunities for socioeconomic growth by addressing challenges in various sectors and enabling Nepal to enter an era of high economic growth. Investment in enhancing the digital skills of the Nepalese is critical to reap the real benefits of the Digital Nepal program. Possible actions include:

- Investing in digital education
- Training public servants in digital skills

### **Improve Digital Education**

The Government of Nepal should consider the following efforts to enhance the digital skills of the Nepalese:

- Compulsory IT education for schools and colleges
- Geospatial/GIS education for schools and colleges
- Systematically strengthen Nepal's education system's capacity to impart advanced ICT education
- ICT literacy programs aimed at combating digital exclusion in rural communities and underprivileged Nepalese

### **Digital Skills Training of Public Servants**

Making public servants digitally ready is essential to the success of the Digital Nepal program. The government should ensure the establishment of IT training teams in all government agencies to impart digital training for its staff. It can also consider leveraging the proposed National eLearning Platform to train its employees on new systems and technologies introduced in their respective departments.

## Digital Nepal Framework: 1 – 8 – 80

### Vision

- Digital based Social economic prosperity

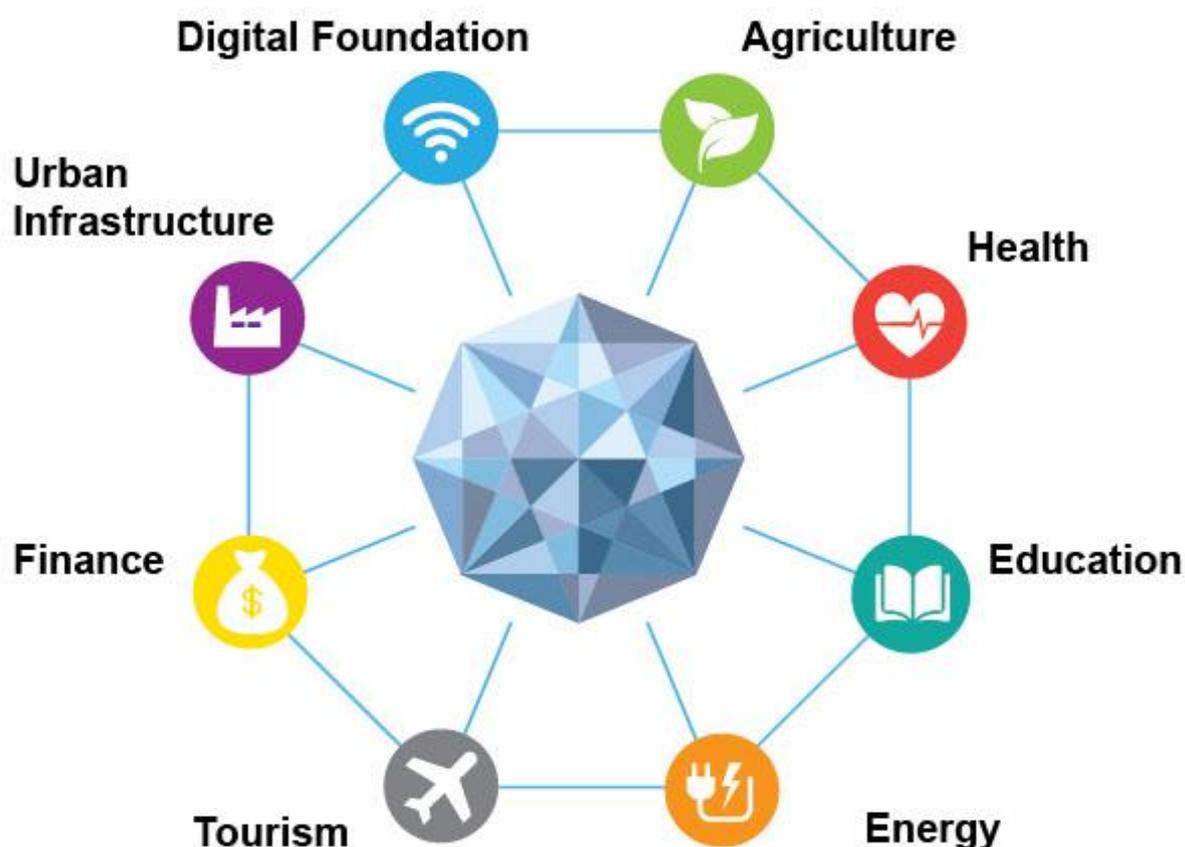
### Mission

- To harness digital technologies as a catalyst to positively transform government, society and economy

### Objectives

- To strengthen the foundation for a knowledge-based society and digital economy
- To provide a framework for action aimed at leveraging digital technologies to achieve Sustainable Development Goals (SDGs)

Under the Digital Nepal framework, eight sectors – digital foundation, agriculture, health, education, energy, tourism, finance and urban infrastructure – have been identified based on close engagement with stakeholders. The framework aims to guide Nepal on its journey toward becoming a digital state.



**Digital Foundation:** Digital foundation is the foundation of the Digital Nepal program. While Internet penetration in Nepal has risen sharply in the past few years, a large section of Nepalese remains digitally uninitiated due to concerns around affordability, access, and digital illiteracy. The program intends to bridge this gap by providing broader access to connectivity using public-private partnerships and government initiatives.

**Agriculture:** Digital Nepal initiatives in the agriculture sector encompass technological solutions aimed at maximizing yield and minimizing agricultural input. The use of agritech solutions is anticipated to boost farm productivity and sustainability to meet growing food consumption, and in turn, increase farmers' incomes.

**Health:** Digital Nepal initiatives in health aim to assist the country in meeting its objectives of providing quality basic healthcare to all citizens. The program intends to leverage digital technologies (e.g., videoconferencing, e-learning, and mobile health) to address issues relating to access, affordability, and quality of healthcare for the Nepalese.

**Education:** Digital Nepal initiatives in education aim to prepare human capital to capture new economic opportunities through the creation of an enhanced teaching and learning environment. This entails the use of digital technologies to support teaching, enrich the learning experience, and improve educational outcomes.

**Energy:** Digital initiatives in the energy sector aim to create a sustainable energy infrastructure to not only reduce costs but also reinforce energy networks. Smart solutions include customer-centric solutions, smart transmissions, and distribution networks, with interconnectivity playing an important role.

**Tourism:** Digital initiatives in the tourism sector seek to promote Nepal globally, attract visitors to the country, and create employment opportunities for the Nepalese. It involves the use of omnichannel marketing solutions, e-commerce, and disruptive technologies such as augmented reality to promote tourism, build human capital skills in the tourism sector, and offer better tourist experiences.

**Finance:** Digital Nepal initiatives in promoting the financial services sector target the sizeable unbanked population by leveraging digital technology and telecoms infrastructure. Given the strong linkages between financial inclusion and economic prosperity, Nepal is poised to benefit considerably from the use of fintech, broadening access to financial services to nearly 55% of the country's unbanked population.

**Urban Infrastructure:** Digital Nepal initiatives in urban infrastructure aim to leverage disruptive technologies to improve the quality of life in Nepal's urban cities by improving essential services, such as water management, solid waste management, public transport, and traffic management.

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Eighty digital initiatives are identified across eight critical sectors to guide Nepal as it embarks on its digital transformation journey. The 80 digital initiatives aims to propel socioeconomic growth in Nepal by addressing crucial challenges while unlocking the growth potential in each of the eight key sectors.

## 1 Country – 8 Sectors – 80 Digital Initiatives

## GDP Impact of US\$8 billion

It is estimated the complete impact of Digital Nepal initiatives to the tune of US\$8 billion (NPR800 billion) upon complete implementation of programs across different sectors. The estimation is arrived on after analysis of following key points-

- **Capital investment in ICT has been a key driver of global growth**

World Bank study indicates that ICT has been a major growth driver across different economies globally during the period of 1995-2014. The impact of ICT in terms of capital infusion has been more profound in developed economies, where it averaged 27%, compares to developing economies averaging 14%. During the same period, it was also observed that developed economies spent close to 10% of capital on labor quality compared to developing economies spending 3% only.<sup>17</sup>

- **Government spending on ICT project roll-out and maintenance**

Capital infusion in form of government funding across different programs which is estimated to be over US\$300 million for a period of 10 years. The capital investment is expected to drive the economic growth with help of telecom market. Potential points of investment are tenders for equipment and infrastructure roll-out, maintenance, skilling and re-skilling and revenue stream. E.g. Nepal has launched a US\$35.5 million worth project to increase broadband connectivity in hilly and rural areas. Similar projects in future can improve direct and indirect employment.<sup>18</sup>

- **E-Governance and Cost Savings**

Government is often the leading ICT beneficiary in a developing or low-income economy. Some of the important areas have been e-governance, revenue streamlining, education and healthcare. Health care alone can help the government save up to 20% with use of telemedicine and remote consultations<sup>19</sup>. E-governance across developing economies such as India has helped government reach remote areas and streamlined processes across every aspect, reducing the cost of delay and inefficiency.

- **Job creation and skill development**

ICT infrastructure and internet-based economy has the potential to boost the Nepal job-market across different verticals. Telecom and e-commerce are already proving to be early job facilitator across different levels. Nepal's e-commerce sector is valued close to US\$30 million, which is experiencing growth at over 40% per annum. Nepal's e-commerce revenue by 2023 is expected to cross US\$192 million annually at current growth rates.<sup>20</sup> Telecom sector is another major employer, which has the potential to growth Nepal's job market in form of skilled workforce requirement for technical work, installation, maintenance. Growth across internet and ICT based verticals will enable a larger IT-BPO sector in Nepal. A shift to service economy has the potential to add another US\$4.0 billion in the fifth year of implementation, with potential cumulative impact of close to US\$10.5 billion across 5-years.

<sup>17</sup> Accelerating Growth, World Development Report 2016

<sup>18</sup> <http://kathmandupost.ekantipur.com/news/2018-10-11/digital-2020.html>

<sup>19</sup> Broadband: A Platform for Progress, Broadband Commission 2011

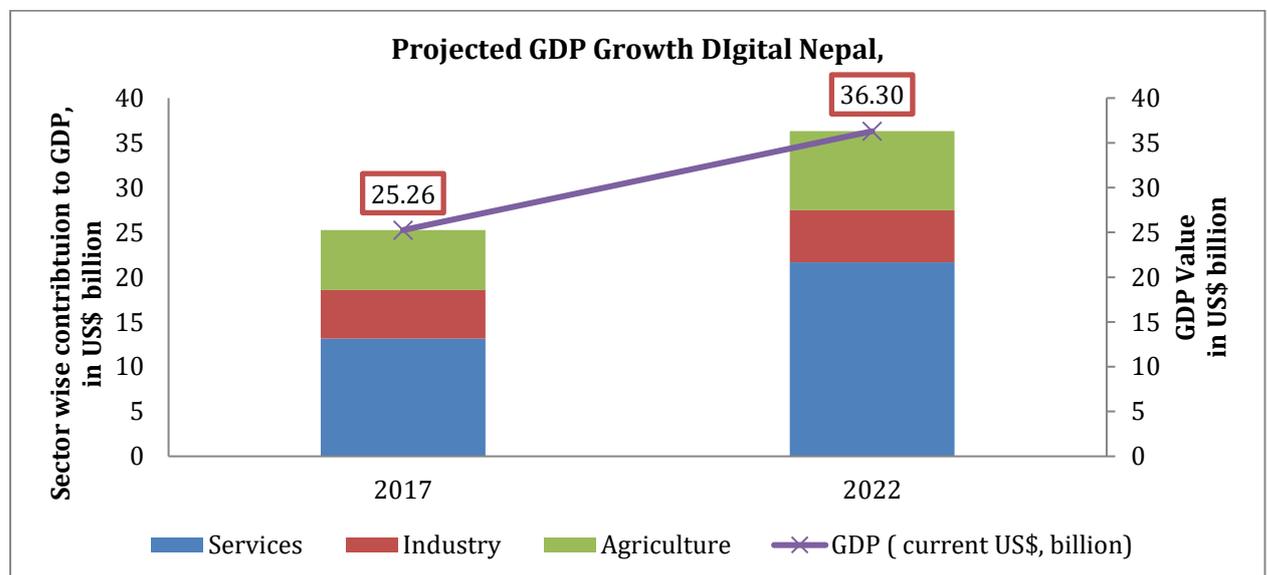
<sup>20</sup> <http://kathmandupost.ekantipur.com/news/2018-04-17/nepals-employment-rate-highest-in-south-asia.html>

- **ICT as Enabler in Agriculture**

Nepal’s agricultural sector can benefit from early stage of ICT adoption in form of inclusive programs and community-based projects. Getting the commodity markets online can help farmers track prices in real-time, enabling better price for yield. Similarly, community centers with internet and media connection can help modern agricultural methods reach rural and hilly areas via tele-conferencing. Using common platforms for selling yield can help reduce distribution costs. There are similar inclusive technologies in place in Africa, India and Bangladesh which have enabled farmers to attain better yields and prices.

- **Capital Deepening**

Major investment and growth in ICT technologies has been observed to lead subsequent increase in workforce efficiency and lower equipment cost, resulting in overall capital savings in in long-run. This results in greater savings for further investment in other business or socio-economic areas.<sup>21</sup>



### Investment for Digital Nepal

Digital Nepal project will require a large-scale investment with an aggressive plan to achieve the desired benefits. World Bank mentions 10% increase in penetration of broadband to have impact of 1.19% on high-income economies and 1.35% on low- and middle-income economies. Similarly, a 10% increase in penetration of mobile devices is expected to have an impact of 0.21% and 0.40% for high-income and low- and middle-income economies respectively. Nepal’s current internet penetration at close to 60% is mostly 2G based, which needs to be replaced with 3G/4G and broadband fixed line connection in order to harness the benefits. Analysis of select economies estimates the required direct investment from Government to be close around US\$350 million over 10 years.<sup>22</sup>

The investment in next 5-years could be on higher proportion to facilitate the rapid build-up of basic infrastructure in form of fiber cables, telecom set-up, skilling and re-skilling, R&D, industry development, inclusion of rural areas into IT network and implementation of e-governance programs. A robust

<sup>21</sup> What is the Impact of ICT on Economic Growth, The Write Pass Journal, December 2012

<sup>22</sup> Frost and Sullivan analysis

infrastructure in short-span of time will also allow Nepal to attract potential FDI sources in different sector early-on. The main focus and responsibility for government would be to expand the infrastructure outside the urban centers, as private players may find it economically unviable due to longer gestation period.

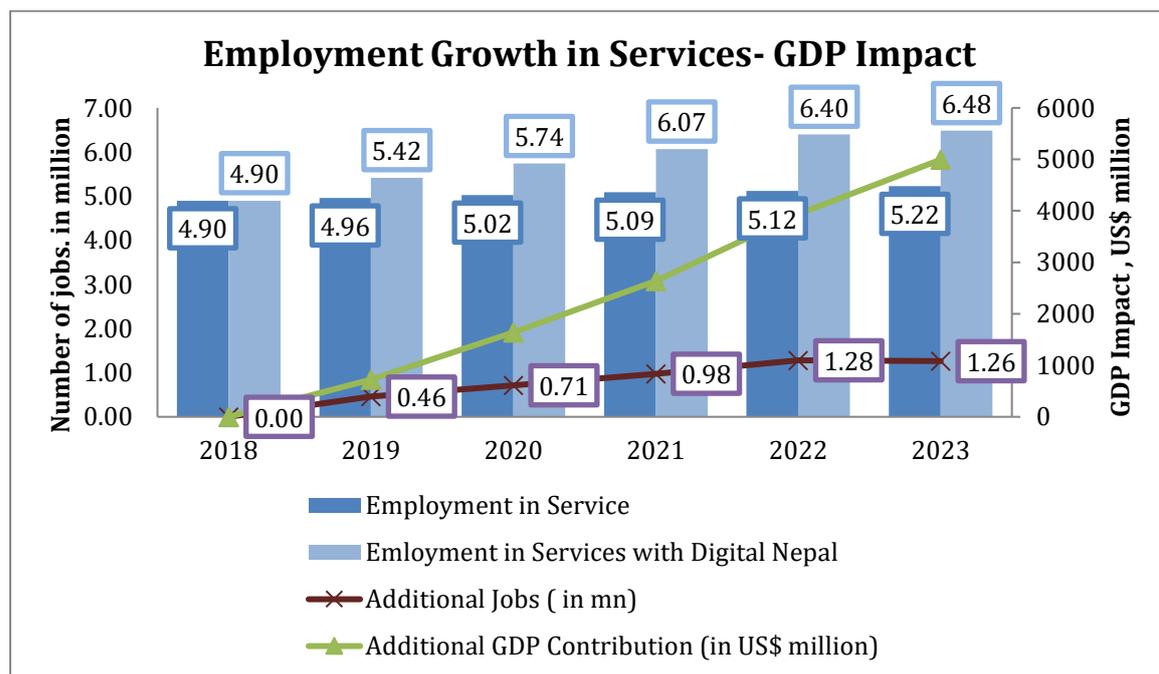
### Digital Nepal and Employment Opportunities

ICT infrastructure and internet-based economy will boost Nepal’s job market across different verticals. Some of the fast-growing verticals directly impacted by ICT in Nepali economy are e-Commerce, telecom, IT-BPO, banking and finance. Digital Nepal project is expected to help grow Nepal’s GDP by 3.2% at the end of initial implementation period.

Telecom and e-commerce are already proving to be early job facilitator across different levels. This is likely to be driven by:

- **Growth of Service sector**

Internet economy can boost the employment opportunities in service sector and hence, increase the GDP contribution per capita labor employed. Countries like India, Malaysia, Vietnam, Philippines have experienced exponential growth with help of service sector. In Nepal, per capita service sector contribution to GDP is more than seven-times compared to agriculture<sup>23</sup>. E-commerce studies in India and China have highlighted that for each direct job created, there are three jobs created in allied and indirect form.<sup>24</sup> Nepal’s service economy can potentially absorb close to 1.3 million additional workforce in 5 years, most of which would be diverted from agriculture.



- **MSMEs leveraging ICT and internet technology**

ICT evolution has been a major factor in equalizing the playing-field for smaller businesses and entrepreneurs. It has substantially lowered the entry-barriers compared to conventional business models, while providing a larger market audience. This

<sup>23</sup> World Bank Data, 2017

<sup>24</sup> Impact of e-commerce on employment in India, Dec 2016, KPMG

- **E-commerce**

Growth in online market sellers is expected to contribute the Nepalese economy in big way. Nepal's e-commerce industry is value at US\$30 million and is expected to grow at more than 41%. The number of online sellers and platforms connecting to e-commerce is growing exponentially. The employment impact for the sector has been estimated to be 1:4, where four indirect jobs are created for each direct job. Increase in online seller base also creates additional 12 jobs in support services as delivery, customer service, warehousing etc.

- **Technology Start-ups and App ecosystem**

Nepal's startup sector is still in infancy and app ecosystem has only started to see growth in past couple of years. With improvement in IT infrastructure, the start-up sector can enable the app ecosystem in Nepal, which is combined with mobile-devices can unlock an entire new segment of employment. The impact on job market has been impressive where for each job in App economy created 2.9 jobs in direct, indirect and induced forms.

- **Evolution of internet and IT-BPO growth**

Nepal's IT space has about 500 companies with most of them with most of them focused on IT and ITES. Tech start-up scene in Nepal has been around for some time but has failed to catch up. The sector has started to grow with more focus from government and boost in the IT infrastructure. IT-BPO can be catalyst to Nepal's tech-based job creation on the lines of neighboring India, Philippines and Vietnam while adding to services sector.

- **Strengthening of innovation Ecosystem**

Internet and ICT are considered as key enablers for innovation and R&D in modern times, helping to bring together isolated wells of disruption. Homegrown innovation ecosystem is the key to attracting foreign investment and also enabling disruptive growth across key sectors as banking, finance, inclusive innovation, agriculture, skill development education, while creating new employment opportunities in process.

- **Industry and Construction**

With increase in telecommunication infrastructure deployment, direct job markets across construction and engineering will see growth. The nature of jobs is expected to be a mix of skilled blue collared jobs and white collar jobs. Additional employment opportunities in field of support activities as logistics and supply would also emerge. Domestic telecom and ICT industry will see job creation in form of maintenance and sales of hardware. Further development of infrastructure can encourage domestic manufacturing

## **Caveat**

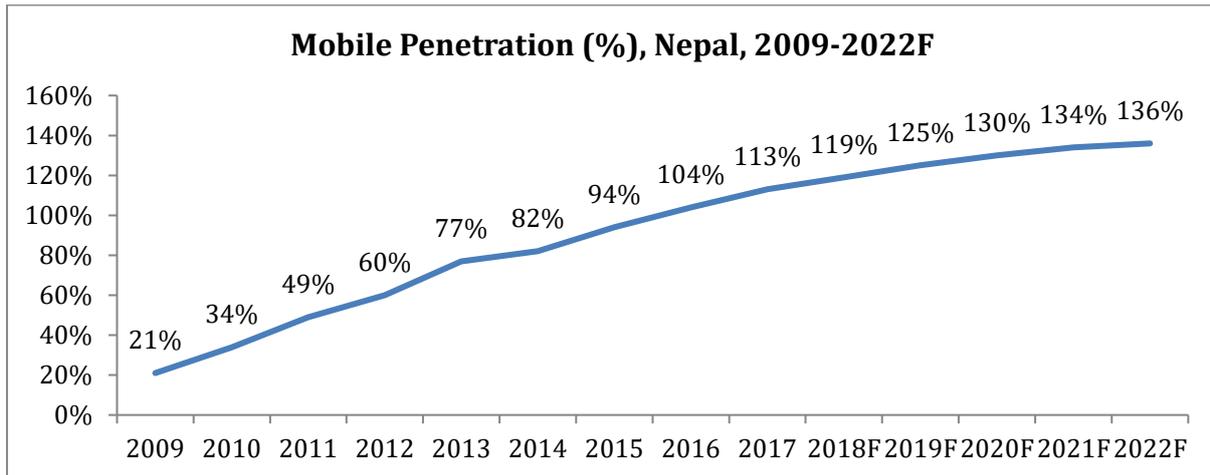
The mentioned growth figures in the report are estimates based in specific assumption on condition of current state of economy, future policy direction, governance efficiency and other independent market factors that can influence economic conditions. The goals are achievable when simultaneous changes can be brought about in governance pattern and decision-making.

Nepal's ICT sector has been a key victim of lack of proper project implantation and slow utilization of project funds. There are also challenges with physical infrastructure in terms of roads and rails, which can prove to be hindrance. With expects simultaneous efforts in the direction of overcoming these challenges to gain optimal benefit out of Digital Nepal project.

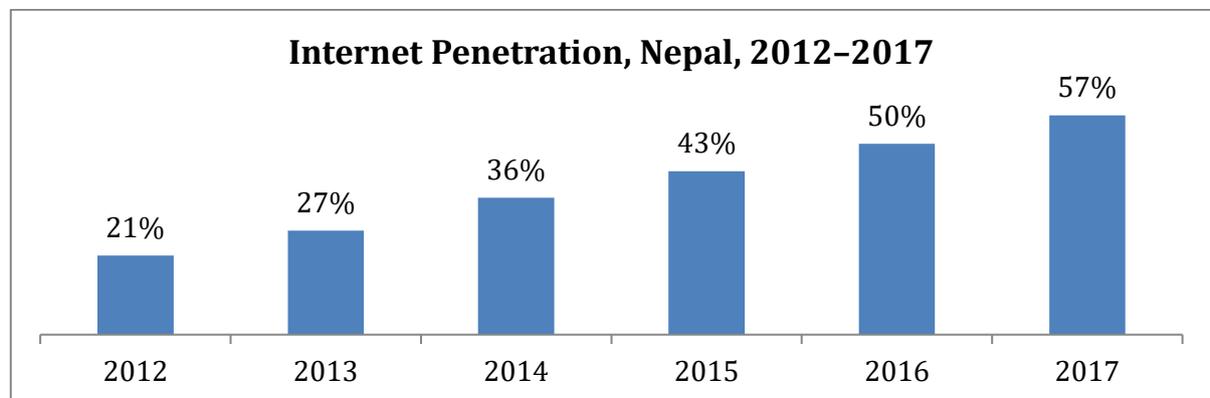
## Appendix

### Current Position of Nepal

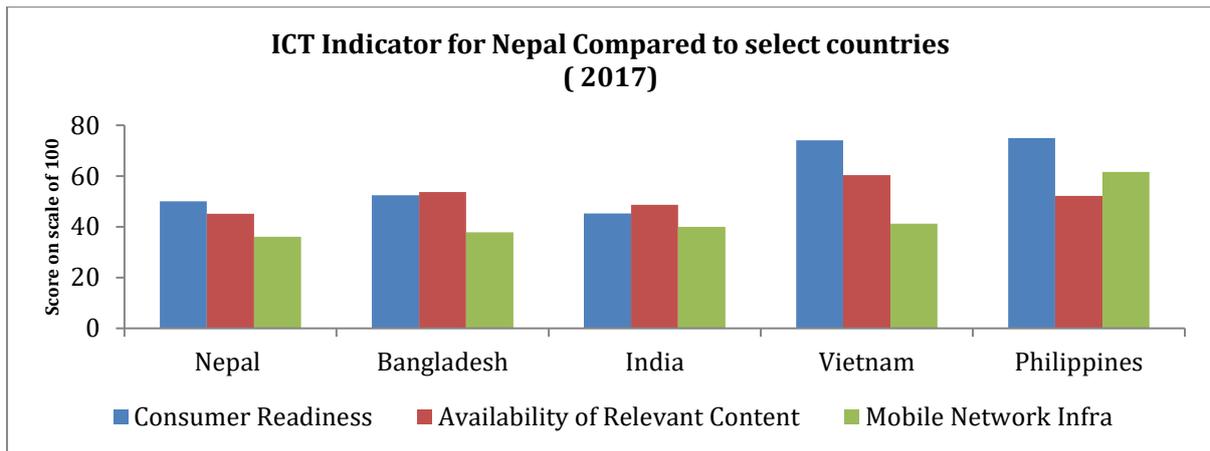
Growing popularity of social media and online communication platforms using smart phones has played important role in rising penetration of internet across Nepal. Internet penetration in Nepal stood at 57% in 2017, higher than South Asian average of 36%. Mobile connectivity in Nepal stood at 125% of the population, which is higher than the regional average of 91%, which includes India at 90% of the population. However less than 1/3<sup>rd</sup> of mobile connections in Nepal are 3G/4G which limits the user usage and experience with mobile internet.



Source: Nepal Telecom Authority



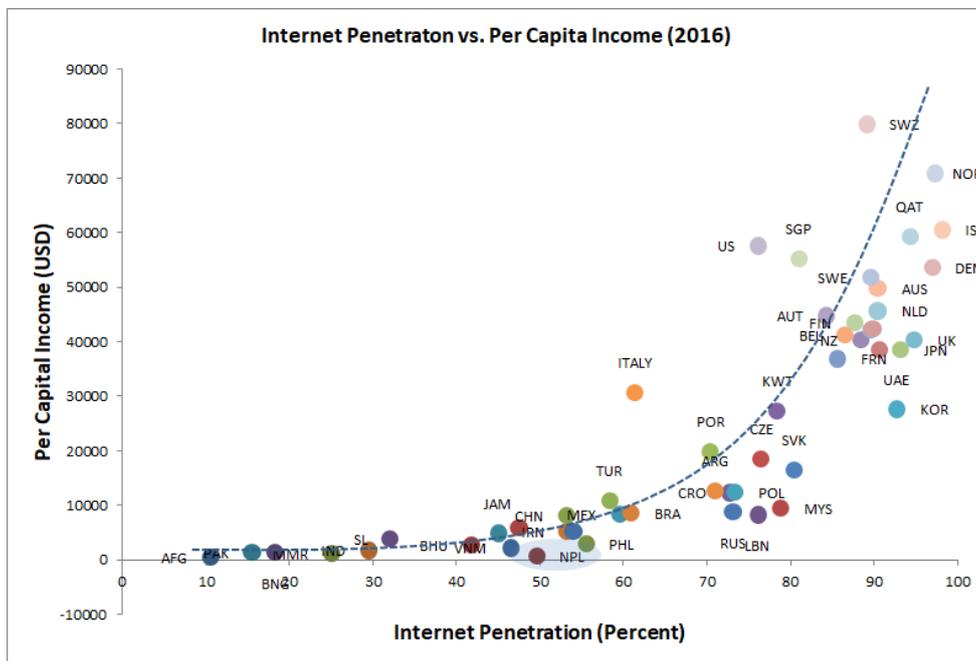
Source: Nepal Telecom Authority; World Bank



Source: We are Social, HootSuite

### Challenges with Nepal

Internet maturity and development of ecosystem has been directly related to general prosperity and per capita income of population. Internet maturity across developed economies was observed to have contributed to an increase in real GDP by US\$500 per capita on an average during 15-year study. The graph below shows the rate of internet penetration vs the per capita income of economies. Here the gap between Nepal's current and potential per capita income can be observed relative to that of China, Philippines and Mexico.



Source: World Bank; International Telecommunication Union (ITU); Nepal Telecom Authority

Though Nepal has as a high internet penetration, per capita income remains low compared to most of its peers. The internet penetration in Nepal is primarily driven by 2G networks, accounting for 2/3<sup>rd</sup> of the connection, while broadband connectivity including mobile and fixed remains below 30%. The broadband services are dominated by mobile broadband which accounts for more than 65% of

broadband connections<sup>25</sup>. The situation highlights lack of developed ICT ecosystem which can provide greater benefits in terms of revenue, job-creation and overall social well-being. Nepal has lacked presence of substantial IT outsourcing or BPO business which thrive on ICT infrastructure and local talent. A key requirement for large scale IT businesses to flourish has been robust underlying IT infrastructure and civic facilities as electric-power supply.

### **ICT and GDP Contribution**

World Bank report titled 'Exploring the relationship between broadband and Economic Growth' in 2016 highlights the direct correlation between different ICT technologies with GDP growth across developing and developed economies. The report infers on the basis of 10 percentage point increase in penetration across different ICT technologies as fixed landline connection, mobile phone, internet (wired, wireless) and broadband connection. The sectorial analysis of each of these vertical revealed a different level of impact on economies GDP growth. Broadband was observed to have the highest impact with 1.19% on high-income economies and 1.35% on low- and middle-income economies, while mobile has lowest impact with 0.21% and 0.40% for high-income and low- and middle-income economies respectively.<sup>26</sup>

ICT development has also been a direct contributor to GDP growth globally. Study conducted for the period of 1995 to 2014, indicated that ICT capital was responsible for about 20% growth across global economies on an average. It contributed the most to developed economies, with average of 27% across 39 countries studied. The average contribution across 91 developing countries was close to 14% for the same period.<sup>27</sup>

The report was based on studies carried out across different countries at different level of economic progress. Whilst broadband was a key growth factor in most of the economies, the report also found that mobile penetration was a key driver as well for some of the lower income economies.

### **Internet Economy**

Internet has increasingly become a major direct contributor to GDP, accounting more than 3.4% across large and developed economies. The impact of internet has also accelerated the economic growth across developed and developing economies. For the period during 2005-09, internet's contribution in select developed economies was 21% and in large developing economies it was 11%. The variation in level of contribution depended on the scale of technology development and overall eco-system maturity.

Matured economies with more balanced systems and platforms in place were able to harness more economic benefits, while the developing economies had few challenges due to gaps, e.g. coverage of population, platforms and adoption, which limited the benefits.

The middle economies as Malaysia, Turkey experienced greater benefits, but not on the same scale as matured economies. Impact of internet has been substantial in terms of creating and replacing jobs. The McKinsey Global SME Survey estimates an average of 2.6 jobs created for every job eliminated. Study on French economy revealed internet to have created 1.2 million jobs where it eliminated 500,000 jobs over 1995 to 2009, with ratio of 2.4 jobs for every job lost.<sup>28</sup>

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<sup>25</sup> <https://www.nepalitelecom.com/2018/04/3g-4g-and-ftth-drives-broadband-penetration-in-nepal.html>

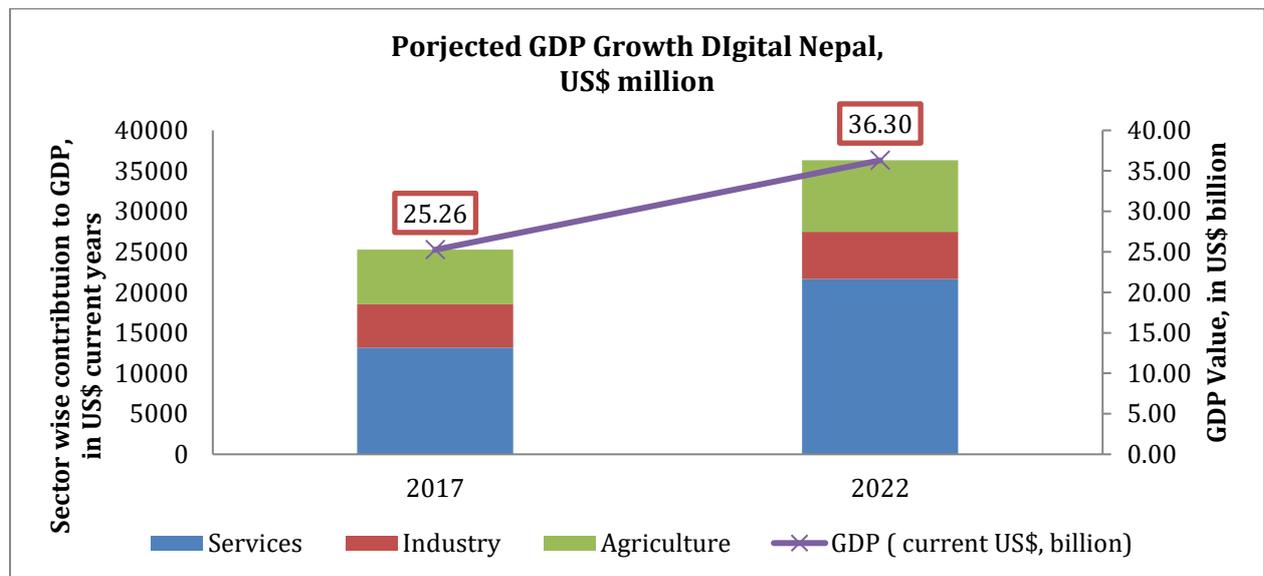
<sup>26</sup> Exploring the Relationship Between Broadband and Economic Growth, WDR 2016, World Bank

<sup>27</sup> Accelerating Growth, World Development Report 2016

<sup>28</sup> The Great Transformer: The impact of Internet on Economic Growth and Prosperity, McKinsey Global Institute, October 2011

**Potential Impact on Nepal**

Growth in ICT can directly impact Nepal’s GDP value in coming years with a paradigm shift in employment across sectors. Internet penetration in Nepal grew during 2014-2017 by 21% of population. However, with slower internet connection more prevalent, the focus is now on upgrading the infrastructure to broadband and 4G levels. Current broadband penetration is close to 30% mostly over 3G/4G mobile connections. Nepal government had targeted 45% coverage across households by broadband by 2018 and all the VDCs<sup>29</sup> under broadband Master Plan 2020. Additional penetration of broadband internet can aid Nepal’s GDP by 2.8-3.3% for each 10% penetration achieved, it is estimated a slower growth in overall internet penetration growth, but expects development of broadband in the existing network areas. Improved broadband coverage can help Nepal realize more than 3% GDP value addition over next 5-years. ICT evolution in India led to 17% increase in internet traffic which during 2015-16 lead to absolute increase in GDP by USD103 billion, whereas increase in mobile of same scale would add have added US\$41.4 billion.<sup>30</sup>



**Okun’s Law**

Okun’s Law explores and defines the relationship between employment and GDP growth. The law based on empirical evidences mentions that every time GDP grows 2% faster than the normal growth rate<sup>31</sup>, 1 percentage point of employment is created. The law also has been applied with GNI, employment rises by 1%, GNI increases by 3%. Research data by different sources also presents a strong co-relation between job creation and GDP of up to 0.7 to 0.82.<sup>323334</sup>

<sup>29</sup> VDC- Village Development Center

<sup>30</sup> Estimating the value of new-generation internet-based applications in India, July 2017, ICRIER-Broadband India Forum

<sup>31</sup> Normal Growth rate- the potential growth rate of economy under current condition without external disruption

<sup>32</sup> <https://www.investopedia.com/articles/economics/12/okuns-law.asp>

<sup>33</sup> <https://marketrealist.com/2015/02/job-creation-gdp-growth-go-hand-hand>

<sup>34</sup> <https://www.enterprise-development.org/what-works-and-why/evidence-framework/link-between-employment-and-economic-growth/>

## Impact on Job Market

Nepal's e-commerce sector is valued close to US\$30 million, which is experiencing growth at over 40% per annum. Nepal's e-commerce revenue by 2023 is expected to cross US\$192 million annually at current growth rates. The industry has proved to have huge impact on job-creation throughout the supply chain across different economies, including large economies as India and China, with more than 2/3<sup>rd</sup> of the jobs in logistics, ware-housing and last-mile delivery. Direct jobs created by the start-up and e-commerce sector grew by CAGR of 50% for 2012-2015 period and is expected to continue the same through to 2021. Nepal's job sector has huge potential to boost from the same, as it has an under developed logistics infrastructure and lacks in last-mile delivery. The seller base for Nepal's online business has been on the growth.

Telecom is another area which has been consistent with positive impact on job creation. The opportunities exist across telecom installation, equipment manufacturing, distribution, maintenance etc. India expects more 20 million jobs in telecom sector by 2025, driven by fiber network plans, BTS installations, WiFi projects, and domestic telecom industry. Nepal as of now imports most of its equipment and has an untapped potential<sup>3536373839</sup>

### Potential Impact of Service Sector in Nepal

As of 2017, Nepal's 70% of the population is employed in agricultural activities and contributes 26.41% of GDP. Services employ 20.1% of workforce while contributing 51.6% of GDP. For 2017, per capita employment in service yielded GDP value addition of US\$8,468.56 in PPP, compared to US\$1,212.05 by agricultural and allied sectors.

The shift from agriculture to services across workforce has been linear and consistent over last few years. Growth in ICT and internet economy can absorb the annual addition of workforce into service economy at increasing rate, creating more value per capita. Every year more than 500,000 youth are entering into Nepal's job market, translating into need of at least 286,900 jobs to sustain the current rate of employment.<sup>40</sup>

It is predicted additional job opportunities created across service sector across different vertical of economy, there is a potential growth of 1 percentage point of workforce working in service sector. In 5 years, the potential impact of workforce employed in service economy reaching 25% of total active workforce is predicted to be more than US\$12 billion. This comes at assumption of decline in total employment in agriculture to 65% from 2017 level of 70%. Further benefits can be realized from Digital payments, App ecosystem, and improvement in agro-value chain, smart logistics, education and development of knowledge economy.

<sup>35</sup> World Bank, Frost and Sullivan Analysis

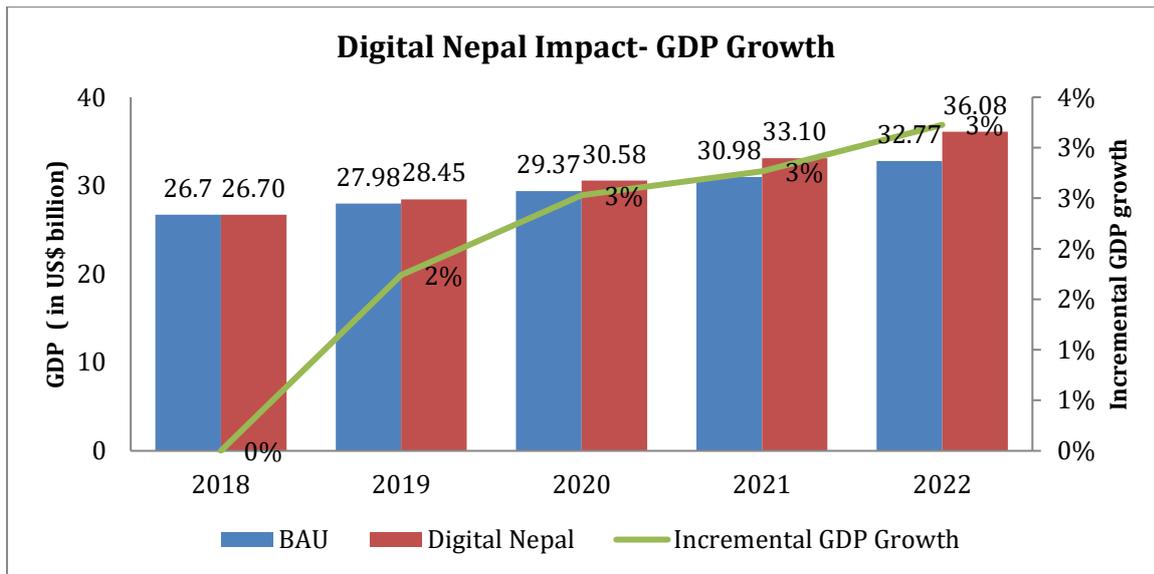
<sup>36</sup> <http://kathmandupost.ekantipur.com/news/2018-04-17/nepals-employment-rate-highest-in-south-asia.html>

<sup>37</sup> <https://www.ibef.org/industry/telecommunications.aspx>

<sup>38</sup> <http://kathmandupost.ekantipur.com/news/2018-10-11/digital-2020.html>

<sup>39</sup> <https://thehimalayantimes.com/business/nationwide-broadband-service-by-2020/>

<sup>40</sup> World Bank



**Impact of ICT in job market across select verticals**

**E-commerce** – Nepal’s e-commerce has been limited to the Capital and key urban centers, while logistics challenges keep it out of rural areas. The e-commerce sector is still in its early stages, with estimates to be US\$25 million in 2017 and is experiencing rapid growth. Growth in e-commerce platforms has the potential to accelerate FMCG, services and other small goods market, resulting in SME growth and employment. Indian e-commerce industry growing at 41% CAGR is expected to add 1.45 million jobs by 2021 which employed only 23,500 in 2012. More than 2/3<sup>rd</sup> of the jobs will be in logistics and warehousing which is available to semi-skilled and skilled workforce.

Growth in seller base will add another 10 million new jobs. It is estimated that one job in e-commerce generates 3 jobs in allied sectors. The most important driving force for Indian e-commerce has been growth in smaller cities and towns, which have emerged as both demand and supply centers.<sup>41</sup>

Daraz Nepal’s major e-commerce website stated that it aims to grow the online sellers from 1200 to 5000 during 2018-19. The indicative job impact has been observed to be of 1:4 ratio, where increase in 1 online seller creates 4 direct jobs and while 12 indirect jobs are created in support services as delivery, customer services, warehousing etc. For a seller count of 5000, the potential impact on job market could be more than 75,000 new jobs across different levels. Boost in e-commerce can drive homegrown IT sector of Nepal, adding additional services jobs to the economy.

**Information and Communication technology (ICT)** - Growth in ICT sector has multi-dimensional benefit for the economy. ICT inclusive of mobile, fixed line and internet is capable of boosting economy across different areas. Growth in ICT coverage and integration across different business sectors can boost in efficiency, bring in network effects and create enhanced logistics. IT-BPO services in Nepal can expand further, which remains an untapped area. Digital platforms for agriculture can boost production, improve supply chain and help farmers connect directly with markets.

**Start-ups and App ecosystem-** Nepal’s IT space has about 500 companies with most of them focused on IT and ITES. Tech start-up scene in Nepal has been around for some time but has failed to catch up. Key challenges being finance, overall customer base and tech readiness of customers. The sector has started to grow with more focus from government and boost in the IT infrastructure. Startups can be catalyst to Nepal’s tech-based job creation on the lines of neighboring India. In 2015, startups in

<sup>41</sup> Impact of e-commerce on employment in India, Dec 2016, KPMG

India attracted close to US\$5 billion in investment, creating 80,000 direct jobs at different skill-levels. Indian app ecosystem contributes more than US\$20 billion in 2015-16 which is expected to rise to US\$270 billion by 2020. The impact on job market has been impressive where for each job in App economy created 2.9 jobs in direct, indirect and induced forms<sup>42</sup>. Nepal is yet to be anywhere near to realizing the full-potential of its app-ecosystem.

### Investment Estimation

Digital India, an accelerated ICT development program with additional budget to the tune of US\$17 billion for the period of 2015-2025 is forecasted to help Indian GDP by 20-30% of additional growth by 2025. The additional value add to GDP is to come from increased revenue, job creation, foreign and domestic investments and gained efficiency across sectors. Indian budget on ICT has been growing increasingly with further projects being added under the Digital India umbrella. The expected impact on GDP has been measured to the tune of US\$500 billion to US\$1 trillion by 2025, achievable by simultaneous development across different verticals impacting growth and usage of ICT. Relative comparison of ICT projects across Southeast Asian economies have also been taken into account while putting in the estimated investment and potential benefits for Nepal.

However, Nepal, still in the early stages of ICT adoption in several services and manufacturing sector and having smaller economy and geographical size would require the budget to be a lot lesser. It is estimated the overall direct government expenditure to be close to the US\$350 million for Nepal to achieve an accelerated growth in different aspects of ICT over a period of 10 years. The estimates have been made by taking into account Nepal's GDP and Purchasing Power Parity.

The investment in next 5-years should be on higher proportion to facilitate the rapid build-up of basic infrastructure in form of fiber cables, telecom set-up, skilling and re-skilling, R&D, industry development etc. Current budget of Nepal in rural and hilly ICT development is US\$105 million, which is expected to be spent on optical fiber and rural internet development. Currently Nepal has assigned US\$35.5 million for laying of optical fiber networks in hilly and rural areas. The biggest challenge for Nepal's ICT infrastructure has been slow rate of expenditure which was 2.6% of total budget till 2015.

### Example/ Case Studies on impact of internet / ICT in some Asian countries –

#### South East Asia

Southeast Asia has emerged as a leading hub of internet fueled growth and has seen rise of ICT based economy. More developed economies as Singapore and Malaysia have been driving the internet-based services. Developing economies as Vietnam and Philippines have emerged as leading destinations in IT outsourcing and BPO industry.

As highlighted by Google Temasek report 2018, the region is expected to see more than **1.7 million full-time with growth in internet economy by 2025**. The number of people employed in high-skilled internet sector will double from 100,000 to 200,000 while creating opportunities in sectors as e-commerce and ride-hailing services along with high-skill jobs, the number of jobs will triple from the jobs created in 2018. The value of internet economy in the region among six major countries has been growing at accelerating rate, doubling from 2015 to 2018 reaching US\$72 million. The size of internet's contribution is expected to be US\$240 million by 2025, which is US\$40 billion more than last year's estimate from Google Temasek.

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<sup>42</sup> Estimating the value of new-generation internet based applications in India, July 2017, ICRIER-Broadband India Forum

The growth is expected to be driven by combined efforts of government policies and infrastructure spend in ICT and supporting areas, along with massive private investment in form of venture and angel funding, R&D and user readiness. The growth across key sectors during 2015-2018 was –

- E-commerce – recorded a growth rate of 62% CAGR
- Online Travel – recorded a growth rate of 15% CAGR
- Online Media – recorded a growth rate of 44% CAGR
- Ride Hailing– recorded a growth rate of 39% CAGR

During the same period contribution to GDP across SEA by internet more than doubled from 1.3% to 2.8%. Among the six major economies, highest contribution was to Vietnam with 4%, while lowest was in Philippines where it contributed 1.6% of GDP.

## Vietnam

Vietnam's internet sector has led the growth in GDP contribution across Southeast Asia with 4%, while it also has one of the highest CAGR of 35% for growth revenue. Vietnam had raised its focus on IT development and started investment in infrastructure along with policy support to encourage global businesses and entrepreneurs to start operations in Vietnam. Since 2000, its IT sector has expanded from close to being absent to more than 14,000 IT companies across hardware, software and digital content. With its expanding IT skilled labor-force, Vietnam became the 2<sup>nd</sup> largest IT partner for Japan in 2015.

In 2015, Vietnam adopted IT Master plan 2020 with aim of boosting the IT sector and accelerating GDP growth. Plan also emphasized on Vietnam coming under top 55 countries of ICT index of ITU.

## Philippines

Philippines experienced the lowest contribution from internet economy to its GDP with 1.6%, and recorded a growth of 30% during 2015-18. Over the last decade Philippines has emerged as an IT outsourcing hub in SEA, with strong growth in BPO sector. In 2015, Manila became the only city to be among top 7 Outsourcing Destinations outside India. In 2015, Manila's BPO sector provided employment to more than 1 million people, while generating revenue over US\$20 billion and expected to be around US\$23 billion for 2016 while employing 1.1 million people. The program during 2011-16 saw US\$1 revenue create half-equivalent wealth.<sup>43</sup> Further under employment, every full-time job created 3.2 indirect jobs.

Philippine Government had been actively engaging in policy and infrastructure development for sustainable long-term growth across IT-BPM industry, while recognizing ICT as a key enabler to achieve the target for sector. BPO was identified as 10 high-potential areas for development in 2011-16 Philippine Development Plan. During the plan government invested heavily in the development of SEZ areas for BPOs and call centers, Creation of regional ICT councils and ICT road map, training programs, along with other fiscal and non-fiscal incentives.<sup>44</sup>

Philippines have followed up the development plans with IT-BPM Roadmap 2022, which aims to leverage the technology advancement and capabilities to enhance the IT-BPM industry and expand its sub-sectors. The plan highlights Animation and Game Development, Contact Center and BPO, Health Information Management, IT & Software, and Global In-house Centers operations. The roadmap is expected to create **1.8 million direct jobs with 7.6 million direct and in-direct jobs across IT-BPM**

<sup>43</sup> <http://boi.gov.ph/wp-content/uploads/2018/02/IT-BPM-2017.pdf>

<sup>44</sup> <https://www.interglobetechnologies.com/blog/philippines-the-new-hub-of-outsourcing/>

and US\$40 billion in revenue. More than 500,000 jobs are expected to be created outside NCR at a CAGR of 11% helping employment opportunities in distant areas..<sup>45</sup>

### Malaysia-

Malaysia had launched HSBB plan in 2008 to expand the capability and reach of its broadband network to enhance business and local infrastructure for improved connectivity using next-generation internet. The project mentioned two categories of connections under the plan-

- High Speed Broadband (HSBB)- for residential household and businesses across select geographic areas, connection speed to be 10-100 Mbps, with final speed for connection in economic centers and businesses being 1Gbps.
- Broadband to General Population (BBGP) - connection for general public with speeds from 256 Kbps-2 Mbps<sup>46</sup>, reaching up to 10 Mbps.

Project was designed to be spread across 10 years and in two-phases. Agreement on investment and implementation was signed between Ministry of Energy, Water and Communication (KTAK) and Telekom Malaysia (TM) under Public-Private Partnership (PPP). The program aimed to provide last mile connectivity using Fibre-to-the-home (FTTH), Ethernet-to-the-Home (ETTH) and Very High Speed Digital Subscriber Line (VDSL2) to homes and businesses across the country.

Investment in the project over 10 years was estimated to be US\$3.23 billion in 2008, of which US\$685 million was to be contributed by Government of Malaysia and US\$2.54 billion was to come from Telekom Malaysia itself.

First phase of the project was rolled out in mid-2008 to 2012, with aim to achieve 50% broadband penetration across households by 2010 and total of 1.3 million households are to be covered by 2012. The economic impact of HSBB and its sub-projects were immediate and visible. **By 2010, HSBB project contributed 1% to GDP and 135,000 new-jobs. The jobs were spread across core-telecom sector, internet and contract under infrastructure lay-out.**

Second-phase of the plan, HSBB 2 was rolled-out in 2015, with a budget of US\$ 885 million<sup>47</sup> distributed across expansion of HSBB network and simultaneously upgrading existing copper-lines (sub-urban broadband) to be HSBB compatible for next 10 years. Contribution of TM was to be total of US\$535 million and that of government to be US\$350 million.<sup>48,49,50</sup>

### Expected Benefits Projected by 2020-

- Total gross national income contribution to be US\$15.1 billion
- Income from potential spill-over effect up to USD2.33 billion from communication content and infrastructure sector.
- In 2020, expected job creation to be 43,162.

Further investment – Malaysian government has launched the National Fiberisation and Connectivity Plan (NFCP) with a budget of US\$ 240 million expects to boost the internet speeds to 30Mbps in 5 – years while lowering the broadband access cost for residents.

<sup>45</sup> <http://itbpm-roadmap2022.ibpap.org/>

<sup>46</sup> minimum internet connection speed for broadband 2008

<sup>47</sup> Conversion rate as of December 2015, 1USD=RM4.30

<sup>48</sup> <http://www.mida.gov.my/home/2937/news/tm-to-invest-rm2.3bil>

<sup>49</sup> International Broadband Initiatives in Malaysia, July 2014, MCMC

<sup>50</sup> HSBB: Malaysia's Drive for High Speed Broadband, Jan 2009, my Convergence, MCMC

## India

In 2011, India's internet contributed 1.6% to GDP (US\$30 billion) which was on the lower side compared to 1.9% GDP contribution that had been observed in many other developing economies. Internet economy contributed 3.2%, 5% and 6% in 2013, 2016 and 2017 respectively to Indian GDP, and is expected to reach 7.5% of the GDP<sup>51,52</sup>. The accelerated growth is expected to come from large scale long-term plans put in place by Indian government to facilitated wider and more robust coverage of broadband and mobile internet across country. The Government of India has increased its focus on digital economy in wake of its assumptions that for a developing economy like India with multitude of opportunities in digital arena, 10% increase in broadband will have a greater effect of 3.3% of GDP<sup>53</sup>. Some of the flagship programs are –

- Digital India – Launched in July 2015, it is an umbrella project under which the Government of India (GoI) has proposed to invest in country's ICT sector across different domains and spheres of governance and daily life. The project aims to propel India into a knowledge economy, with help of digital infrastructure development in form of broadband penetration, e-Governance, modern irrigation, skill development and capacity building to support future digital economy. Some of the key projects are Smart Cities, Bharat Net, Public Wi-Fi hotspots, Universal Access to mobile, Common Services Centers etc. The overall project benefits are to be realized across large gamut of socio-economic fabric of India.
  - Initial estimated of the project put the **cost close to US\$17 billion spread across 10 years** in different cost areas under key Ministries- DeITy and DOT. Implementation of projects under Digital India been calculated to have an impact of USD 500-1000 billion annually by 2025. The key sectors leading it would be banking & finance, health care, agriculture, energy, infrastructure and education. **CMAI association of India projects number of jobs created to be more than 100 million, with 17 million in direct and 85 million indirect.** The improvement in infrastructure is expected to propel India, currently ranked 134, into top 50 nations in ICT development index of ITU.<sup>54,55,56 57</sup>
- National Digital Communications Policy, May 2018- aims to provide fixed broadband fiber connections to 50% of the household and internet coverage to all areas by 2022. The initiative aims to create 4 million additional jobs under digital and communication sectors. The plan also covers important aspect of skill development by targeting 1 million individuals for new-economy skills. The initiative aims to attract increased investments to the tune of US\$100 billion on improved skill-level, enhanced global value chain integration and accelerated progress towards Industry 4.0.
- The Bharat Net project is being implemented in two phases with a total cost of US\$7 billion (INR 45,000 crores)<sup>58</sup>. The project aims to connect 250,000 Indian villages with help of Wi-Fi-hotspots and broadband connections. The completion of project is expected to yield US\$65 billion as contribution to GDP.

<sup>51</sup> <https://media-publications.bcg.com/BCG-TiE-Digital-Volcano-Apr2017.pdf>

<sup>52</sup> <http://dot.gov.in/sites/default/files/EnglishPolicy-NDCP.pdf>

<sup>53</sup> <https://www.financialexpress.com/industry/technology/what-is-bharatnet-project-and-how-it-could-add-whopping-amount-of-rs-4-5-lakh-crore-to-indias-gdp/931358/>

<sup>54,54</sup> <http://www.cmai.asia/digitalindia/pdf/Digital-India-DeITY-Details.pdf>

<sup>55</sup> <https://www.financialexpress.com/economy/digital-india-will-be-a-game-changer/24953/>

<sup>56</sup> <https://www2.deloitte.com/content/dam/Deloitte/in/Documents/technology-media-telecommunications/in-tmt-digital-india-unlock-opportunity-noexp.pdf>

<sup>57</sup> NDCP 2018: The future looks bright, Cellular Operators Association of India (COAI) blog

<sup>58</sup> Exchange rate April 2017- <https://in.investing.com/currencies/usd-inr-historical-data>

## Digital Foundation



Digital foundation sector intends to empower Nepali people to benefit from the on-going digital transformation by focusing on the following three pillars:

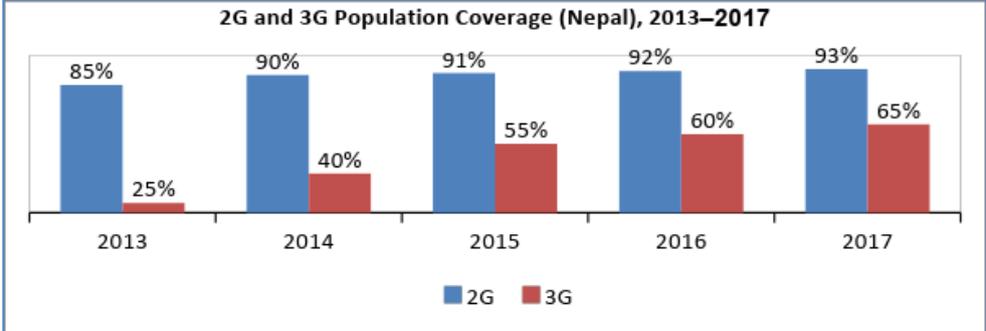
- Digital Connectivity,
- Digital Skills, and
- Digital Governance

Digital Foundation: Empowering Nepalese		
Focus Areas		
Digital Connectivity	Digitally Skills	Digital Governance
<ul style="list-style-type: none"> <li>– Ensuring quality of digital connectivity</li> <li>– Ensuring reliability and quality of digital services</li> </ul>	<ul style="list-style-type: none"> <li>– Creating a digitally-ready society</li> <li>– Job creation</li> </ul>	<ul style="list-style-type: none"> <li>– Transform the way government machinery works</li> <li>– Investing in citizen-facing functions/ technologies</li> </ul>

## Overview of Digital Foundation

<b>Digital Connectivity</b>	Digital connectivity in Nepal has improved considerably in the past five years, with an exponential increase in access to mobile services. Mobile connections and mobile Internet penetration in Nepal almost doubled between 2012 and 2017, with penetration crossing 100%.		
		<b>2012</b>	<b>2017</b>
	<b>Mobile penetration</b>	60%	134% <sup>59</sup>
	<b>Mobile Internet penetration</b>	21%	57%

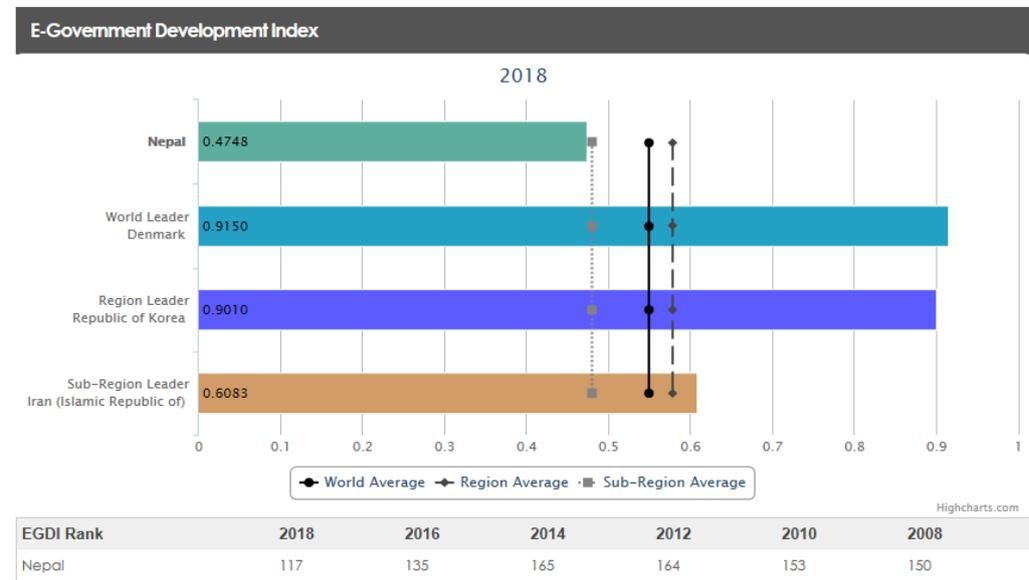
<sup>59</sup> MIS Report (16 December, 2017 – 14 January, 2018), Nepal telecommunications Authority

	<p>Growth in mobile penetration in Nepal has been mostly driven by significant investments made by leading mobile network operators in expanding their network footprints, and increasing affordability of mobile devices and services. Mobile operators have made large investments in their data networks<sup>60</sup>, with 3G network coverage in Nepal increasing from 25% in 2013 to reach 65% in 2017. The top three telecommunications operators in Nepal also launched 4G services in 2017. According to NTA, the number of 4G subscribers in Nepal currently stands at 2,144,887.</p>  <table border="1"> <caption>2G and 3G Population Coverage (Nepal), 2013–2017</caption> <thead> <tr> <th>Year</th> <th>2G Coverage (%)</th> <th>3G Coverage (%)</th> </tr> </thead> <tbody> <tr> <td>2013</td> <td>85%</td> <td>25%</td> </tr> <tr> <td>2014</td> <td>90%</td> <td>40%</td> </tr> <tr> <td>2015</td> <td>91%</td> <td>55%</td> </tr> <tr> <td>2016</td> <td>92%</td> <td>60%</td> </tr> <tr> <td>2017</td> <td>93%</td> <td>65%</td> </tr> </tbody> </table> <p>Source: NTA</p> <p>However, fixedline and fixed broadband networks in Nepal continue to remain underdeveloped with limited coverage outside large cities.</p>	Year	2G Coverage (%)	3G Coverage (%)	2013	85%	25%	2014	90%	40%	2015	91%	55%	2016	92%	60%	2017	93%	65%
Year	2G Coverage (%)	3G Coverage (%)																	
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<p><b>Digital Skills</b></p>	<p><b><u>Digital Literacy</u></b></p> <p>The full potential of the Internet remains untapped with a high level of digital illiteracy among Nepalese, especially for low-income and less educated users. In spite of an increasing role of digital technologies across all spheres, digital education is yet to find its place in Nepali education system with more than 90% of the schools in Nepal not having digital connectivity and ICT devices.<sup>61</sup></p> <p><b><u>ICT Sector</u></b></p> <p>The ICT sector, comprising Internet, telephone, mobile, IT-enabled services (ITeS) and business process outsourcing (BPO), is among the fastest growing in Nepal. The sector has a large role to play in driving socioeconomic growth, as it applies to all sectors and potential to create a large number of jobs. Due to its potential, the Nepal government has taken steps to liberalize the sector by allowing 100% FDI investment in the ITeS and BPO sector, and 80% FDI in the telecommunications sector.</p> <p>Nepali outsourcing companies offer services at reasonable prices compared to other South Asian BPO companies in India, China, and the Philippines. There are more than 6,000 BPO companies in the country of which only 256 are legally registered as at 2017. Nepal offers distinct advantages as a BPO destination due to its lower salaries/cost base and lower employee turnover. However, Nepal has not been able to completely exploit the full potential of the ICT sector.</p>																		
<p><b>Digital Governance</b></p>	<p>Governments are typically one of the largest technology users in a country, and therefore able to promote adoption and industry growth by delivering public services digitally. Promotion of digital governance forms one of the key pillars of Digital Nepal</p>																		

<sup>60</sup> MIS Report, NTA, August 2018

<sup>61</sup> UNESCO, 2014

Program. Digital governance in Nepal can build upon a number of on-going initiatives such as the government PKI, national ID, automation of vital registration of citizens, automation of land registration processes, and election data repository in electronic format, among others. eGovernance and digitalization of public services have emerged as a key priority of the Government of Nepal. Initiating several steps in this direction, Nepal's ranking on the E-Government Development Index improved from 165<sup>th</sup> in 2014 to 117<sup>th</sup> in 2018.



Source: UN

### Challenges in Nepal's Digital Foundation Sector

While Nepal has made great strides in rapidly expanding mobile and Internet connections, a significant section of Nepali society continues to remain digitally uninitiated. Key challenges include:

- **Availability and coverage:** Almost one-third of Nepal's population is not covered by 3G networks while 4G networks cover less than 20% of the population. Fixed broadband networks are limited to large cities
- **Low digital literacy:** Low digital literacy, especially among the rural poor, widening the digital divide
- **Absence of relevant content:** Lack of information in the local language targeting the Nepali-speaking population
- **Limited spectrum availability:** Nepal ranks 148<sup>th</sup> out of 167 countries (score of 39.1 out of 100) on spectrum in GSMA's Mobile Connectivity Index 2017
- **High cost of broadband services**

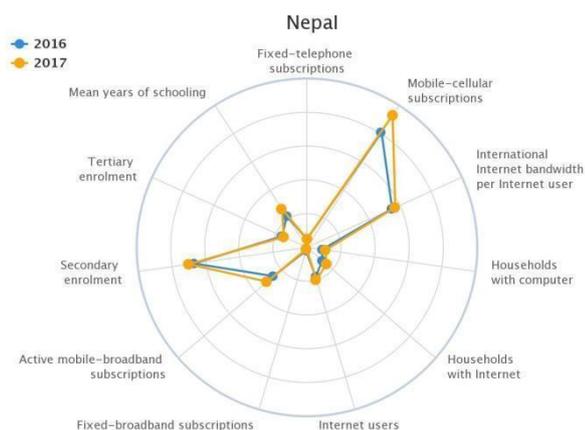
Despite rapid growth in mobile connections, Nepal remains a follower in overall ICT development:

- ITU ranked Nepal 140<sup>th</sup> out of 176 countries in its ICT Development Index (IDI) for 2017
- GSMA ranked Nepal 137<sup>th</sup> out of 167 countries its Mobile Connectivity Index for 2017. GSMA Connectivity Index measures the strength of the enabling environment for connecting offline populations to the mobile Internet

ICT Development Index – Asia-Pacific

	IDI Rank (2017)	Change in Rank	IDI Value	Change in Value
Korea (Rep.)	2	↓ -1	8.85	↑ -0.05
Japan	10	→ 1	8.43	↑ -0.11
Singapore	18	→ 2	8.05	→ -0.2
Malaysia	63	↓ -1	6.38	↑ -0.16
Thailand	78	→ 1	5.67	↓ -0.36
China	80	↑ 3	5.6	↓ -0.43
Sri Lanka	117	↓ -1	3.91	↑ -0.14
Bhutan	121	↓ -2	3.69	↑ -0.11
India	134	↑ 4	3.03	↓ -0.38
<b>Nepal</b>	<b>140</b>	<b>↓ -1</b>	<b>2.88</b>	<b>→ -0.28</b>
Bangladesh	147	↓ -1	2.53	↑ -0.16
Pakistan	148	→ 0	2.42	→ -0.21

ICT Development Index – Nepal (Country Snapshot)



Source: International Telecommunication Union (ITU)

Low rankings in the ICT Development Index and Mobile Connectivity Index indicate the need for considerable investment and focus in connectivity, primarily in connecting the digitally uninitiated population, increasing access and affordability of ICT services, providing digital education, and increasing fixed broadband/fiber network.

Mobile Connectivity Index, 2017	Cluster	Index Score	Ranking
Singapore	Leader	86.55	4
South Korea	Leader	83.37	13
Japan	Leader	80.04	21
China	Advanced	73.98	38
Thailand	Advanced	70.66	48
Malaysia	Advanced	67.97	58
Sri Lanka	Transitioner	55.63	104
India	Transitioner	53.67	109
Bhutan	Transitioner	53.57	110
Bangladesh	Emerging	48.35	118
<b>Nepal</b>	<b>Emerging</b>	<b>39.11</b>	<b>137</b>
Pakistan	Emerging	37.08	143

Source: GSMA

The Government of Nepal considers digital connectivity as an important driver for growth and is taking steps to expand Internet connectivity as part of its vision of a digital society that connects 90% of the

population to broadband services by 2020.<sup>62</sup> Further, the government’s ICT Policy 2015 intends to systematically enhance national ICT readiness. Key priorities of the ICT Policy include:

Digital literacy skills to at least 75% of the population by the end of 2020.	The entire population of Nepal to get <b>access to the Internet</b> by 2020.	Offer <b>online government services</b> to 80% of citizens by 2020.
<b>Universal broadband access</b> to all people on an equitable basis. By 2020, 90% of the population to get access to broadband services.	Develop <b>human resources in ICT</b> and related sectors targeting critical skills areas.	<b>Promote e-Procurement</b> as a means of driving transparency through government procurement processes.

**Digital Foundation Sector: Pain Points, Priorities, and Digital Solutions**

Pain Points	Government of Nepal’s Priorities	Digital technology as an Enabler
<b>Disparate connectivity availability and coverage</b>		
<p>Infrastructure development in urban and rural Nepal</p> <ul style="list-style-type: none"> <li>Just four out of the 77 districts – Kathmandu, Bhaktapur, Lalitpur, and Kaski have the highest ICT penetration while districts in mid-western and far-western regions and mountains in the north have the lowest penetration<sup>63</sup></li> <li>Mobile phone ownership is much higher in urban areas while some rural areas are excluded from mobile or Internet coverage</li> </ul>	<p>The government set up the Rural Telecommunication Development Fund (RTDF) which includes four major projects:</p> <ul style="list-style-type: none"> <li>Building the District Optical Fiber Network program</li> <li>Development of broadband infrastructure in 14 earthquake-affected districts</li> <li>Establishment of the model e-village development committee</li> <li>Extending Internet services to all the community schools and health centers</li> </ul>	<ul style="list-style-type: none"> <li>Incentivize mobile operators to improve footprint in remote areas with low ROI</li> <li>National Fiber/Broadband Network connecting important government establishments, municipalities and agriculture knowledge centers</li> <li>5G for connecting disconnected, remote and rural communities as well as urban communities in Nepal</li> </ul>
<p>Public Internet access</p> <ul style="list-style-type: none"> <li>Availability of public Internet access centers or cyber cafes are extremely limited and concentrated in urban cities. Even among the existing centers, quality of services is substandard with poor Internet speeds and lack of power backup</li> </ul>		

<sup>62</sup> Nepal’s ICT Development and Broadband Policy, 2015

<sup>63</sup> Shailesh Pandey and Nischal Regmi, Changing Connectivities and Renewed Priorities: Status and challenges facing Nepali Internet, January 2018

<p>Coverage of 3G and 4G services</p> <ul style="list-style-type: none"> <li>• Significant sections of Nepalese are not covered by 3G/4G services. Only 30% of mobile connections in Nepal have high-speed Internet (i.e., 3G and 4G)<sup>64</sup></li> </ul>		
<b>Low level of digital literacy</b>		
<ul style="list-style-type: none"> <li>• Low digital literacy and high illiteracy rates in Nepal limit the ability of a large section of society to reap the benefits of digital technologies</li> <li>• Digital illiteracy appears to start at a young age for underprivileged Nepalese as the majority of schools and educational institutions located in rural villages lack basic computers</li> </ul>	<ul style="list-style-type: none"> <li>• ICT policy aims to provide digital literacy skills to 75% of the population</li> <li>• Local and International NGOs (e.g., Code for Nepal, Microsoft Innovation Centre Nepal) provide digital literacy training for rural/ unprivileged Nepalese</li> <li>• The government has launched initiatives like One Laptop per Child and Lab Model (computer sharing mechanism) to develop ICT infrastructure in rural schools</li> <li>• Digital Literacy, Smart School and Digital School Labs in all house of representatives areas</li> </ul>	<ul style="list-style-type: none"> <li>• Compulsory ICT education as part of the national curriculum</li> <li>• Digital Labs and Training Centers in village development committees and municipal offices to impart digital training</li> <li>• Rent-a-Laptop program</li> </ul>
<b>Absence of vernacular content</b>		
<ul style="list-style-type: none"> <li>• Limited mobile applications and phone content in local languages serve as a roadblock for digital adoption since a large proportion of people living in rural areas do not speak or understand English</li> </ul>		<ul style="list-style-type: none"> <li>• Websites and apps with vernacular content are likely to find more acceptance</li> <li>• Improve teaching methodology</li> </ul>
<b>Computer data security</b>		
<ul style="list-style-type: none"> <li>• Growing digital penetration and digitalization trend across industries has increased the risk of cyber-attacks. Nepalese and businesses face growing threats such as ransom ware and data breaches</li> <li>• Data security concerns in the minds of consumers also restrict the growth of e-commerce and start-ups, as many people (especially older generations) are reluctant to share their financial details due to concerns on online fraud</li> </ul>	<p>ICT Policy 2015 intends to:</p> <ul style="list-style-type: none"> <li>• Build an effective legal framework and enforcement capabilities for cybercrime</li> <li>• Raise awareness, educate, and empower people and firms to protect themselves online</li> <li>• Establish a national cyber security cell to prevent, detect, defend, and recover from cyber attacks</li> </ul>	<ul style="list-style-type: none"> <li>• Implement data security and protection standards</li> <li>• Need for a comprehensive data security framework</li> </ul>
<b>Underdeveloped ICT sectors</b>		
<ul style="list-style-type: none"> <li>• The growth of ICT sector in Nepal is underdeveloped due to poor</li> </ul>	<ul style="list-style-type: none"> <li>• IT services and the BPO sector has been identified as one of the</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthening IT infrastructure is critical for</li> </ul>

<sup>64</sup> GSMA Intelligence, Q4 2017, “Digital in 2018 in Southern Asia” report, January 2018; We are Social & Hootsuite

<p>infrastructure, lack of technical talent, and limited foreign investment</p>	<p>12 sectors with the greatest export potential as part of the Nepal Trade Integration Strategy (NTIS) 2016</p> <ul style="list-style-type: none"> <li>• The Government of Nepal Plans and Programs 2017 has identified IT as one of the key drivers of economic growth</li> </ul>	<p>the growth of BPO and ITeS sectors</p> <ul style="list-style-type: none"> <li>• Focus on IT education and training</li> <li>• Hire dedicated IT officers</li> </ul>
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### Promise of Digital Foundation Sector

Internet and mobile connectivity form the backbone of economic growth and employment generation, and create an enabling environment for socioeconomic transformation by improving income levels, empowering underprivileged communities, and bridging the digital divide.

There is a strong link between improvements in digital connectivity and economic growth. Studies find that every 10% increase in broadband penetration results in a 1.3% rise in GDP. As a result, Nepal should undertake necessary steps to improve digital connectivity and create digitally ready society, which are critical to tap the potential of the ongoing digital transformation. These investments will also result in jobs through BPO and ITeS industry, and the emergence of new business models.

### Digital Initiatives Roadmap to Digital Foundation in Nepal

Following digital initiatives are identified to address challenges of the digital foundation sector in Nepal:

1 Technology and Infrastructure	2 Entrepreneurship/PPP	3 Talent and Skills Development
<ul style="list-style-type: none"> <li>• Establish the Internet as an essential service</li> <li>• Improve spectrum availability management and optimization</li> <li>• Take the lead in 5G network deployment</li> <li>• National Optical Fiber Network</li> <li>• High-speed Internet connectivity for efficient delivery of Public services</li> <li>• Special Economic Zones for ICT sector</li> <li>• Government of Nepal App</li> <li>• Use of Government Enterprise Architecture (GEA)</li> <li>• Paperless Government to promote collaboration</li> <li>• Public Wi-Fi Hotspots</li> </ul>	<ul style="list-style-type: none"> <li>• Digital Innovation and Co-Creation Hub</li> </ul>	<ul style="list-style-type: none"> <li>• Digital Skills Development Initiative</li> <li>• Government eLearning Platform</li> <li>• ICT in Education</li> </ul>

<ul style="list-style-type: none"> <li>● National Cyber Security Center</li> <li>● Provincial Data Centers establishment</li> <li>● Nepali language computational resource pack</li> <li>● National Biometric ID Card</li> <li>● Digital Signature</li> </ul>		
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## Technology and Infrastructure

Effective implementation of smart connectivity in Nepal with the aim of having a digitally connected nation will require an upgrade of infrastructure and technology, and universal connectivity on a nationwide level to reach even the remotest areas. Key projects that the government may consider include:

### 01.01.01.00 Establish the Internet as an essential service

**Solution**                      Establish the Internet as an essential service means that everyone must be able to access the Internet to exercise their right to freedom of expression and other fundamental liberties. It requires the government to ensure that Internet access is broadly available and prevents it from unreasonably restricting an individual's access to information and the Internet.

Several countries including Costa Rica, Estonia, Finland, France, Greece, and Spain have adopted the Internet as a fundamental right. In most of these countries, telecom operators must provide each permanent residence and business office with access to a reasonably priced and high-quality connection with a downstream rate of at least 1 Mbit/s.

**Focus Area**                      Digital Connectivity

- Stakeholders**
- Ministry of Communication and Information Technology
  - Nepal Telecommunications Authority
  - Telecoms / Network operators / ISPs

**Timelines**                      Long-Term

- Outcomes**
- The Internet is the backbone of the Digital Nepal initiative. Ensuring Internet connectivity for all is critical for success of the program
  - Better connectivity across Nepal including remote rural areas
  - Improving the quality of life through better access to information and services
  - Economic growth and job creation through increased investments by telecommunications companies to increase footprint

**01.01.02.00**

**Improve spectrum availability, management and optimization**

<b>Solution</b>	There is a strong correlation between spectrum availability and service quality. Nepal should focus on improving spectrum availability as a key priority in line with its National Frequency Policy 2073 to drive better quality of services.
<b>Focus Areas</b>	Digital Connectivity
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>• Ministry of Communication and Information Technology</li> <li>• National Telecommunications Authority</li> </ul>
<b>Timelines</b>	Immediate
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>• Improvement in Nepal’s rankings on spectrum availability and ICT Development Index</li> <li>• Improvement in quality of mobile services</li> <li>• Address industry’s concerns on spectrum shortage</li> </ul>

**01.01.03.00**

**Take the lead in 5G networks deployment**

<b>Solution</b>	<p>Prepare Nepal for 5G telecom networks through a range of initiatives:</p> <ul style="list-style-type: none"> <li>• Set up a central committee to design a roadmap for implementation, and decide on stakeholders, timelines, pricing</li> <li>• The objective should be to take a lead in 5G, rather than be a follower</li> </ul>
<b>Focus Area</b>	Digital Connectivity
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>• Ministry of Communication and Information Technology</li> <li>• Nepal Telecommunications Authority</li> </ul>
<b>Timelines</b>	<ul style="list-style-type: none"> <li>• Medium-Term</li> </ul>
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>• Taking lead of 5G will put Nepal at the forefront of the ongoing digital transformation</li> <li>• Enhanced prospects for faster economic growth and Job creation on account of investments in 5G rollout</li> <li>• Highly stimulated demand for data positively impacting revenue streams of telecom operators and service providers</li> </ul>

**01.01.04.00**

**National Optical Fiber Network**

<b>Solution</b>	<p>Construct high-speed fiber optic based broadband infrastructure that connects with international networks to improve latency and speeds:</p> <ul style="list-style-type: none"> <li>• Expand FTTH networks to households and rural areas as a means of providing robust last mile connectivity</li> <li>• Replace and modernize current copper lines with fiber broadband that provide stable, high-speed connectivity</li> </ul>
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- Provide Underground fiber connectivity for more reliable connection

**Focus Area** Digital Connectivity

- Stakeholders**
- Ministry of Communication and Information Technology
  - Nepal Telecommunications Authority
  - Telecoms / Network operators /ISPs

**Timelines** Long Term

- Outcomes**
- Give businesses of all sizes, from SMEs to large international corporations, a boost from the high speeds of fiber optic broadband infrastructure.
  - Make businesses more competitive and empower SMEs
  - Create a more favorable innovation and investment environment
  - Boost the efficiency of e-government services. Broadband will make government data more accessible, facilitate the development of new applications and services, reduce government costs and the costs of accessing government services by promoting the use of online channels and deliver front-line services to where they are most needed at a lower cost

**01.01.05.00 High-speed Internet connectivity for efficient delivery of public services**

**Solution** High-speed Internet connectivity refers to bandwidth that is broad enough to handle a lot of data at the same time and let users take advantage of technologies including video conferencing and voice calls over computers, online applications, services, features, games and high quality audio and videos streaming. With patients having access to high-speed Internet, it can enable real-time interactive communication between patients and doctors. This leads to gains in a number of critical areas including health preservation and personal fulfillment.

- Ensure high-speed Internet connectivity for all government establishments, municipal corporations, village development authorities, agriculture knowledge centers, hospitals, and education institutions in the country.
- All healthcare facilities in Nepal should be equipped with high-speed Internet. High-speed Internet access would enable the delivery of healthcare services to remote areas from central/regional hospitals, along with facilitating the roll-out of other digital healthcare initiatives.
- The government should aim to provide 100% high-speed connectivity to all healthcare facilities in Nepal by 2020 (starting with rural healthcare facilities)
- The effort can allow digital access to underprivileged sections of society. For example, the government can mandate opening citizen cyber cafes in municipal corporations, rural municipality, and agriculture knowledge centers to enable citizens to access Internet services for free.

<b>Focus Area</b>	Digital Connectivity
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Communication and Information Technology</li> <li>● Ministry of Health and Population</li> <li>● Department of Health Services</li> <li>● Nepal Telecommunications Authority</li> <li>● Telecoms / Network operators /ISPs</li> <li>● Provincial Government and Local Level</li> </ul>
<b>Timelines</b>	Mid-Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>● High-speed Internet access to healthcare facilities will provide the backbone for the rollout of digital initiatives in the health sector</li> <li>● Create underlying infrastructure for the introduction of government digital programs</li> <li>● Enable Internet access for underprivileged sections of the society</li> <li>● Boost the efficiency of e-government services by making government data more accessible, facilitating the development of new applications and services, reduce government costs and the costs of accessing government services by increasing the use of online channels and delivering front-line services to where they are most needed at a lower cost</li> </ul>

**01.01.06.00 Special economic zones for the ICT sector**

**Solution** The Government of Nepal should consider creating special economic zones to promote ICT services. The government can consider giving special tax incentives (e.g., 3-year tax holidays) to organizations opening new ICT businesses in these areas.

**Focus Area** Digital Skills

- Stakeholders**
- Ministry of Communication and Information Technology
  - Department of Information Technology
  - Ministry of Finance
  - Ministry of Industry, Commerce and Supplies

**Timelines** Medium-Term

- Outcomes**
- Job creation
  - Growth in the export of IT-based services (via BPO/KPOs)

**01.01.07.00 Government of Nepal App**

**Solution** The Government of Nepal should launch an app, which integrates all government departments and bodies. The app should act as an aggregator of all services provided by the government, local agencies, and municipal bodies.

**Focus Area** Digital Governance

- Stakeholders**
- Ministry of Communication and Information Technology
  - Department of Information Technology
  - Nepal Information Technology Centre
  - Local levels

<b>Timelines</b>	Immediate
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>● Improve Nepal's rankings on UN's E-Government Development Index</li> <li>● Make government data more accessible, facilitate the development of new applications and services</li> <li>● Reduce government costs and the costs of accessing government services by increasing the use of online channels</li> <li>● Deliver front-line services to where they are most needed, at a lower cost</li> </ul>

**01.01.08.00 Use of Government Enterprise Architecture (GEA)**

**Solution** The Government of Nepal has made considerable progress in eGovernance in the past few years, as reflected by an improvement in its E-Governance Development Index rankings. However, most government websites and apps offer limited interventional and transactional value in terms of online form submissions, mechanisms for responding to queries and the ability to download forms.

Guided by the principle of citizen centricity, the government will focus more on moving from informational to transactional services, which, among others, enable citizens to carry out transactional interactions such as making online payments securely, on-line forms submission and online request and delivery of services. The Government Enterprise Architecture (GEA) provides a common integrated interoperability platform or service delivery gateway for information exchange and host the national portal of Nepal that will act as the single window (one-stop-shop) for all government e-Services and electronic information of Nepal to be delivered to citizens (G2C), business (G2B) and government employees (G2E).

**Focus Area** Digital Governance

- Stakeholders**
- Ministry of Communication and Information Technology
  - Ministry of Finance
  - Department of Information Technology
  - Nepal Information Technology Centre
  - Office of Controller of Certificate
  - Provincial Government and Local Level

**Timelines** Medium-Term

- Outcomes**
- Improve Nepal's rankings on UN's E-Government Development Index
  - Improve access for citizen services
  - Reduce the cost and effort required for providing and accessing government services

**01.01.09.00 Paperless government to promote collaboration**

**Solution** The Government of Nepal should digitalize all internal and external processes to emerge as a paperless government. The program, led by MoCIT, should be supported by all other government departments. The departments can establish a multi-functional task force for identification and digitalization of processes in a time-bound manner.

As part of the program, the government should consider using collaboration tools and solutions (e.g., HD video conferencing, instant messengers, cloud-based productivity apps) to ensure better inter- and intra-department collaboration.

<b>Focus Area</b>	Digital Governance
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Communication and Information Technology</li> <li>● Department of Information Technology</li> <li>● Nepal Information Technology Centre</li> <li>● Office of Controller of Certificate</li> </ul>
<b>Timelines</b>	Medium-Term
<b>Outcome</b>	<ul style="list-style-type: none"> <li>● Better collaboration within government machinery</li> <li>● Cost reduction and operational efficiency due to the lower need to travel and faster decision making</li> <li>● Digitization of records to result in better document management</li> </ul>

**01.01.10.00 Public Wi-Fi Hotspots**

<b>Solution</b>	<p>A hotspot is a physical location where people may obtain Internet access, typically using Wi-Fi technology, via a wireless local area network (WLAN) using a router connected to an Internet service provider (ISP).</p> <ul style="list-style-type: none"> <li>● Set up Wi-Fi hotspots via PPP route in public places in cities, which offer free basic Internet services (e.g., 1 hour of Internet browsing per day, and chargeable at a nominal rate beyond the limit)</li> <li>● Connect hotspots in key public areas, including tourist spots, airports, railway stations, markets, and educational institutions</li> </ul>
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<b>Focus Area</b>	Digital Connectivity
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Communication and Information Technology</li> <li>● Nepal Telecommunications Authority</li> <li>● Internet Service Providers</li> <li>● Local levels</li> </ul>
<b>Timelines</b>	Long-Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>● Improve access to Internet services</li> <li>● Allow underprivileged sections of society who are unable to afford Internet access due to high service cost to access free Internet</li> </ul>

**01.01.11.00 National Cybersecurity Centre**

<b>Solution</b>	<p>Establish Nepal Cybersecurity Centre for providing advice and support for the public and private sector in how to avoid computer security threats.</p> <p>It should be responsible for Nepal's cybersecurity, with a primary focus on securing government networks, protecting critical national infrastructure, and assisting businesses and citizens in protecting their own systems.</p>
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<b>Focus Area</b>	Digital Governance
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<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>• Ministry of Communication and Information Technology</li> <li>• Ministry of Home Affairs</li> <li>• Ministry of Finance</li> <li>• Department of Information Technology</li> <li>• Nepal Telecommunications Authority</li> <li>• National Information Technology Center</li> <li>• Office of Controller of Certificate</li> <li>• ISP and telecoms operators</li> </ul>
<b>Timelines</b>	Medium Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>• Establishment of National CERT and Sector CERT</li> <li>• Enable government and the private sector to deliver services in a more secure environment</li> </ul>

**01.01.12.00 Provincial Data Center Establishment**

**Solution** Since data is the foundation of digital transformation and government services, secure and accessible data storage is crucial for the development of the overall province. Provincial governments can establish the data center at the most suitable location and develop policies for using the data.

Establishing a data center at provincial level ties in with the current shift of responsibilities from central to provincial government level. Thus, it will enable Local levels to provide the citizen-centric services in a more effective, decentralized and localized form.

The central government can support by providing secure data recovery center which can be used as a fail-safe of the provincial data. Provincial government can also plan for mobile data center for disaster recovery and temporary data center until fully equipped data center setup and operation.

**Focus Area** Digital Governance

- Stakeholders**
- Provincial Local Level Government
  - Ministry of Communication and Information Technology

**Timelines** Medium Term

- Outcomes**
- Establishment of provincial data centers
  - Establishment of local area networks for offices
  - Decentralized provincial databases for failover and recovery

**01.01.13.00 National Language Computational Resource Pack**

**Solution** National language computational resource pack is a combination of technical and non-technical software applications, corpus and other resources to be developed or consolidated as solution for enabling full fledge computing of Nepalese languages being recognized by the Constitution of Nepal. This computational resource pack will in solve the bottleneck and realize the dream of Digital Nepal from the official and Nepalese language computational technical perspective.

- Stakeholders**
- Ministry of Communication Information and Technology
  - Department of Computer Science and Engineering
  - Information and Language Processing Research Lab
  - Language Technology Kendra
  - Universities

**Timelines** Long term

- Outcomes**
- Free computational resource package able to integrated with open source and commercial tools for all

**01.01.14.00**

**National Biometric ID Card**

**Solution**

Many underprivileged and uneducated Nepali citizens are unable to open accounts at financial institutions due to the lack of proper KYC documents.

Nepal, which does not have a national ID card system currently, should consider rolling out a national biometric ID card project to issue a national ID card to each Nepali citizen. The national ID card will not only enable underprivileged Nepali citizens to open bank accounts but also allow them to benefit many other government schemes.

**Focus Area** Digital Governance

- Stakeholders**
- Office of the Prime Minister and Council of Ministers
  - Ministry of Home Affairs
  - Ministry of Communication and Information Technology
  - National Information Technology Center
  - National ID Card Management Center

**Timelines** Medium-Term

- Outcomes**
- Help in achieving SDGs related to the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all (SDGs Target 8.10)
  - National Biometric ID Card will help underprivileged / uneducated Nepali citizens in opening accounts with financial institutions

**01.01.15.00**

**Digital Signature**

**Solution**

The Government of Nepal introduced digital signatures in 2012, but could not implement it due to inadequate infrastructure. The MoCIT and Office of the Controller of Certificate (OCC) declared the official adoption and validity of digital signature in Nepal on December 2015.

In spite of these initiatives, digital signatures is yet to see wide scale adoption in Nepal. Digital signatures are likely to play an important role as Nepal adopts digital financial services.

The Government of Nepal through Nepal Rastra Bank should take steps to encourage higher adoption of digital signatures in the financial services sector. Digital signatures can be used by the financial services sector for issuing various documents and certificates in digital form. Additionally, the government should integrate digital signatures for various e-Government initiatives such as Inland Revenue Department, Office of Company Registrar (OCR), Public Procurement Management Office (PPMO), etc.

<b>Focus Area</b>	Digital Governance
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Finance</li> <li>● Nepal Rastra Bank</li> <li>● Office of Controller of Certificate</li> <li>● Ministry of Communication and Information Technology</li> <li>● National Information Technology Center</li> </ul>
<b>Timelines</b>	Long-Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>● Introduction of Digital Signatures into online banking process will deliver significant and quantifiable results in terms of reduction in cost, security, speed of transaction completion, and enhanced customer satisfaction</li> <li>● Digital Signature will enable companies and organizations to take part in Government e-Tendering process, ensuring that the online transactions are secure, convenient, and transparent</li> </ul>

**Entrepreneurship/Public-Private Partnerships**

**01.02.16.00 Digital Innovation and Co-creation Hub**

**Solution** The Ministry of Communications and Information Technology, Department of Education and provincial universities can collaborate to develop the digital innovation and co-creation hubs in all provinces. The objective of the hub should be to foster development of the digital startup ecosystem.

It should serve as a platform to enable start-ups to have access to high-speed broadband and fiber-optic connectivity, funding (private and government), R&D facilities, collaboration with province universities and other education institutes. It should work towards open innovation hubs, research labs, incubators, and accelerators to foster cooperation between educational institutes and the corporate world on student internships and business-based projects:

- Organize lectures, workshops, and seminars for university students to highlight the latest workplace trends and skills enhancement
- Interact with industry players to redesign education curriculum

<b>Focus Area</b>	Digital Skills
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Communication and Information Technology</li> <li>● Ministry of Finance</li> <li>● Department of Education</li> <li>● Department of Information Technology</li> <li>● Universities / University Grant Commission</li> </ul>

- Foundations
- Private sector

**Timelines** Medium-Term

- Outcomes**
- Development of supporting eco-system for start-ups
  - Reduce brain drain by creating entrepreneurs and increasing job opportunities in Nepal
  - Foster innovation, creativity and entrepreneurship
  - Promote thought leadership and help improve the employability of students, particularly at the university and vocational level
  - Close the gap between education and practical job skills in the country

**Case study: Global GiGA Island Initiative - Digital Bangladesh**

*Korea Telecom (KT)'s GiGA Island is a corporate CSR initiative that aims to enhance the quality of life and provide better access in terms of education, culture, and healthcare for people who live in remote areas, such as highlands and islands, by providing high-speed Internet and ICT solutions.*

*Moheshkhali is a small island located in the southeast of the Bay of Bengal with a total population of 250,000. Due to geographical limitations and poor telecommunications environment, residents of the island had limited access to public services including education, medical services, and information.*

*KT connected the Moheshkhali Island to the inland areas by installing GiGA Microwave wireless network technology and used copper-based giga-level Internet solution GiGA Wires to circulate network traffic within the island. With the GiGA Microwave, the island could successfully receive 500 Mbps Internet service, while the GiGA Wire enables Internet speeds of up to 100 Mbps. The project enabled more than 30% of residents in Moheshkhali to communicate with the world through high-speed Internet.*

**Talent and Skills Development**

**01.03.17.00 Digital Skills Development Initiative**

**Solution** Consider PPPs with local and international NGOs to provide digital literacy training to digitally uninitiated sections of society. The government should encourage NGOs to leverage training centers, computer labs, and citizen cyber cafes in government departments and educational institutions to provide digital literacy courses for a nominal fee/free.

**Focus Area** Digital Skills

- Stakeholders**
- Ministry of Education, Science and Technology
  - Ministry of Communication and Information Technology
  - Department of Information Technology
  - Council for Technical Education and Vocational Training
  - Center for Education and Human Resources Development
  - Curriculum Development Center
  - Local levels
  - Universities

**Timelines** Long-Term

**Outcomes** Digital literacy, especially among underprivileged sections and remote rural areas, is a key barrier for the Digital Nepal program. Digital literacy trainings will enable Nepalese to understand the benefits of the Internet and benefit from the various initiatives to be launched under the program

## 01.03.18.00

## Government eLearning Platform

<b>Solution</b>	<p>Making public servants digitally ready is essential for the success of the Digital Nepal program. MoCIT should take the lead in developing a Government eLearning Platform, which can also be used by other government agencies to provide digital/online training to their employees.</p> <p>MoCIT should develop the centralized platform, which can be used by IT and training teams of respective government departments to create training modules relevant for their needs.</p>
<b>Focus Area</b>	Digital Governance
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>• Ministry of Communication and Information Technology</li> <li>• Department of Information Technology</li> <li>• Ministry of Education, Science and Technology</li> <li>• Department of Education</li> <li>• Nepal Administrative Staff College</li> </ul>
<b>Timelines</b>	Immediate
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>• Make public servants digitally ready</li> <li>• Reduce cost and increase the reach of training programs by leveraging digital technologies</li> <li>• Improve operational efficiency and employee productivity</li> <li>• Improve employee skills and capabilities</li> </ul>

## 01.03.19.00

## ICT in Education

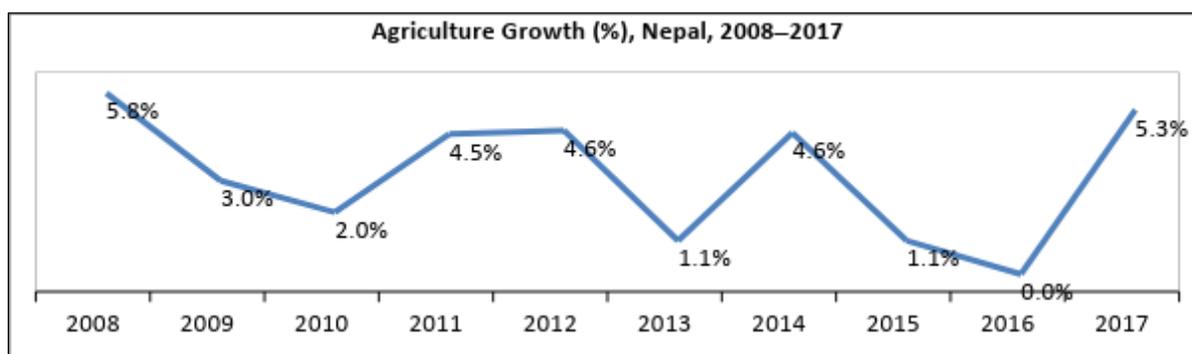
<b>Solution</b>	<p>Investments in digital education are important for the Nepalese to reap the benefits of Digital Nepal. Possible actions include:</p> <ul style="list-style-type: none"> <li>• Compulsory IT education for schools and colleges</li> <li>• Systematically strengthen Nepal's education system's capacity to impart advanced ICT education</li> </ul>
<b>Focus Area</b>	Digital Skills
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>• Ministry of Communication and Information Technology</li> <li>• Ministry of Education, Science and Technology</li> <li>• Curriculum Development Center</li> <li>• Center for Education and Human Resource Development</li> </ul>
<b>Timelines</b>	Long-Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>• Make future generations digital ready by providing digital education as part of the national curriculum</li> <li>• Develop talent pool and address concerns on the shortage of professionals with advanced ICT skills</li> </ul>

## Agriculture



Primarily an agrarian economy, Nepal's agriculture sector accounted for ~33% of the nation's GDP and ~76% of total employment in 2016.<sup>65</sup>

Between 2008 and 2015, agricultural output in Nepal grew at an average 3.7% rate, before slowing considerably following the twin earthquakes that struck the country in 2015.



Source: Ministry of Finance, Government of Nepal

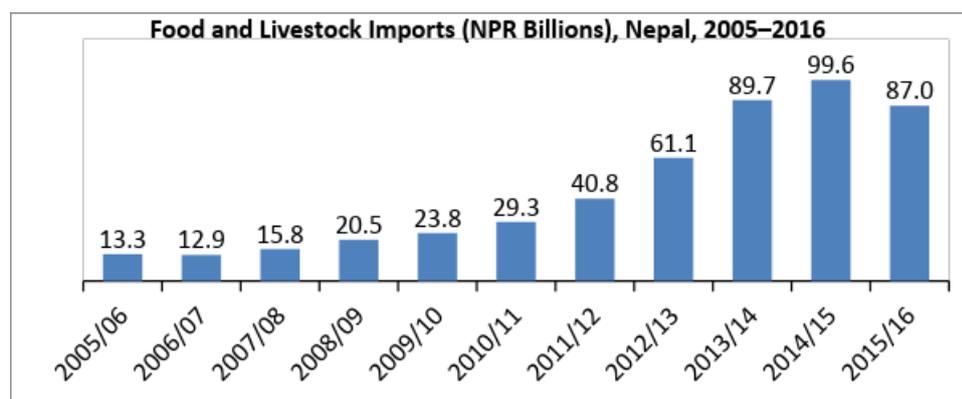
Almost three-fourths of Nepal's population relies on agriculture for their livelihood, making the sector a vital component of the nation's growth agenda. The Government of Nepal considers farming and agriculture as critical to achieving its socioeconomic growth aspirations, allocating nearly 4%–5% of its annual budget to the sector. There are multiple government-led initiatives to drive agriculture sector productivity with a target to achieve self-sufficiency in food production in the near future.

### Challenges in Nepal's Agriculture Sector

Despite continued policy interventions and government focus, progress remains slow and restricted to a few regions in Nepal owing to inherent issues such as high dependence on climate, difficulty obtaining credit and financing, poor distribution infrastructure, and limited access to extension and advisory services.

<sup>65</sup> World Bank

Nepal’s agricultural imports are also growing, showing negative trade balance especially with India. The import of agricultural produce, e.g., cereals, vegetables, and fruits has also surged in the past few years.



Source: Central Bureau of Statistics (CBS), Government of Nepal

Other challenges the agriculture sector faces include:

- Poor access to agricultural inputs and supply, including bottlenecks in obtaining necessary equipment, seeds, breeds and knowledge on agricultural and livestock best practices, particularly in remote rural areas.
- Low yields and declining productivity, especially for principal crops and livestock products such as rice, due to lack of irrigation facilities, smaller land holdings, and reliance on subsistence farming; Nepal has much lower agricultural yield compared to other developing countries in the region.
- Inadequate access to agricultural markets and end customers due to underdeveloped transport, infrastructure, and distribution facilities, increasing the risk of exploitation of farmers by intermediaries.
- Limited access to financial services, including loans and crop insurance.
- Labor shortages as more rural workers migrate to cities in search of better opportunities.

The government is seeking to digitize and modernize the sector to address these issues.

#### Wheat and Rice Yields by Country, 2016–June 2018

Country	Yield (Metric Tons per Hectare)			
	Wheat		Rice	
	2016/17	2017/18	2016/17	2017/18
China	5.33	5.41	6.86	6.91
India	2.88	3.2	3.74	3.85
Pakistan	2.78	2.97	3.77	4.02
Nepal	2.41	2.31	3.48	3.70
Bangladesh	-	-	4.42	4.35
Sri Lanka	-	-	4.35	4.22

Source: United States Department of Agriculture, Foreign Agricultural Service

### **Promise of Digital Solutions in Agriculture**

For decades, the Government of Nepal has used numerous policy instruments to improve farming productivity. However, there are only marginal improvements to the yields of most farmers. Majority of farmers continue to use traditional processes and tools that depend heavily on historical norms and have not evolved for centuries.

As the barrier of entry for farming technology drops and digital tools such as cloud, computer systems, connectivity, and open source software become increasingly affordable, the government can deliver

these technologies to farmers more cost effectively. Authorities should also look at India's Digital India program, as a case example for implementation.

The agriculture sector has made some progress in the use of soil health cards, modern irrigation methods (e.g., sprinkle irrigation technology), mobile apps to access agricultural information, and e-commerce platforms. However, the initiatives seem too few and far between and focused on easily accessible regions, while hard-to-reach mountainous areas continue to be underserved.

Future success would be contingent on a consolidated and centralized ICT policy, led by the state or the central governments, with concerted efforts targeting specific pain points. Use of modern agriculture technologies is likely to provide measurable returns to Nepal, with analysts estimating technologies such as precision agriculture to improve yields on existing agricultural land by ~70%.<sup>66</sup>

#### **Case Study: India's plan to digitalize agriculture benefiting stakeholders across the agricultural value chain and increasing farmers' incomes**

In February 2018, the Prime Minister of India, Narendra Modi, unveiled an agricultural strategy aimed at boosting farmers' incomes, increasing minimum support price, and reducing wastage and production cost.

##### **Objectives**

- Double farmers' incomes by 2022
- Double private corporate investments in farming from the current 2% of agricultural investments
- Indian farms to become outsourcing hubs for global supermarket chains

##### **Initiatives**

- Encouraging the entry of private companies by relaxing investment rules in contract farming, transport, marketing, warehousing, and food processing.
- Creating a unified National Agriculture Market (NAM) to regulate the agriculture market. Through real-time electronic auctioning of commodities and integrated assaying, weighing, storage, and payment systems, the system will enable the participation of both farmers and consumers in the market.
- Initiating completion of 99 irrigation schemes delayed over the past 25–30 years by investing ~INR80,000 crores; ~50% of the schemes are to be completed in 2018.
- Launching Startup Agri India to support agritech entrepreneurs striving to improve the efficiency of the agricultural process; organizing hackathons among leading technology institutes in India to generate out-of-the-box ideas for agriculture.
- Directing a mandatory transfer of 50% of all cropped areas under new insurance schemes.

<sup>66</sup> Goldman-Sachs, 2016

**Agriculture Sector in Nepal: Pain Points, Priorities, and Digital Solutions**

Pain Points	Government of Nepal's Priorities	Digital as an Enabler
<b>Poor access to agricultural input and supply</b>		
<ul style="list-style-type: none"> <li>● Bottlenecks in obtaining essential equipment, seeds, and electricity:                             <ul style="list-style-type: none"> <li>○ &lt;1% of farmers had tractors in 2011<sup>67</sup></li> </ul> </li> <li>● Significant knowledge gaps in best practices and technical know-how</li> </ul>	<ul style="list-style-type: none"> <li>● Offer fertilizers, seeds, and agriculture machinery and tools through the Agriculture and Livestock Service Centers of rural municipalities</li> <li>● Provide soil health cards to farmers</li> <li>● Establish knowledge centers to provide agriculture and livestock technical knowledge and skills to farmers</li> <li>● Promoting agroforestry practices/ Bio pesticides</li> </ul>	<ul style="list-style-type: none"> <li>● Mobile applications to provide information on the weather, market information, prices, and crops</li> <li>● Leverage digital technologies (e.g., mobile apps) for the provision/rental of agriculture machinery and tools</li> <li>● Distance learning program to impart technical knowledge and best practices</li> </ul>
<b>Low yields and declining productivity</b>		
<ul style="list-style-type: none"> <li>● Declines in the production of principal crops, e.g., Nepal currently has a 700,000 MT–800,000 MT shortage of rice<sup>68</sup></li> <li>● Poor irrigation facilities, smaller land holdings, and a low share of high-value crops with greater reliance on subsistence agriculture are major factors causing the shortfall</li> </ul>	<ul style="list-style-type: none"> <li>● Focus on modernization and commercialization to double agriculture production in five years</li> <li>● Plans to extend the Prime Minister's Agriculture Modernization Project</li> <li>● Achieve self-sufficiency in the production of grains, fish, meat, eggs, and milk in two years</li> </ul>	<ul style="list-style-type: none"> <li>● Precision agriculture to improve productivity through the use of satellites, drones, and soil sensors to monitor and manage crop growth in real time</li> <li>● Equipment monitoring using IoT and sensor technology to ensure optimization of resources</li> </ul>
<b>Poor irrigation reach</b>		
<ul style="list-style-type: none"> <li>● Of Nepal's 14.7 billion hectare area, only 2.6 million hectares are arable, and 1.8 million hectares are irrigable<sup>69</sup></li> </ul>	<ul style="list-style-type: none"> <li>● Plans to implement modern irrigation systems in potential agricultural land by 2022</li> <li>● Expand irrigation facility in hills and Terai regions using advanced technology and implementation of irrigation projects</li> </ul>	<ul style="list-style-type: none"> <li>● Smart irrigation systems to minimize water loss and ensure higher irrigation efficiency</li> </ul>

<sup>67</sup> Agricultural Engineering Division (Agriculture Census), 2011

<sup>68</sup> Investment Board Nepal, February 2017

<sup>69</sup> Investment Board Nepal, February 2017

Limited financing and incentives		
<ul style="list-style-type: none"> <li>• Farmers have limited access to bank loans to buy seeds, fertilizer, and tools, despite government policies requiring banks to provide easy loans to the sector</li> <li>• According to the Nepal Rastra Bank (NRB), banks' lending to the agriculture sector was only 6.16% of their total credit portfolio, as at Nov 2017, below the required 20% target</li> </ul>	<ul style="list-style-type: none"> <li>• The government and NRB have put in place several concessional financing schemes, including providing 20% of loans to productive sectors, including agriculture</li> </ul>	<ul style="list-style-type: none"> <li>• Digital payments to farmers and intermediaries via mobile money</li> <li>• Crowdsourcing and credit platforms to provide loan facilities to underserved farmers</li> </ul>
Poor access to markets, transport, and distribution facilities		
<ul style="list-style-type: none"> <li>• Due to the inefficient transport system and poor rural road infrastructure, farmers are unable to reach markets limiting their access and make them vulnerable exploitation by middlemen</li> <li>• Processing, grading, and packaging are not well conceptualized, resulting in significant wastage</li> <li>• Underdeveloped and limited storage facilities</li> <li>• Farmers has not been able to get reasonable price for their production</li> </ul>	<ul style="list-style-type: none"> <li>• Under the Agriculture Development Strategy (ADS), the government aims to support farmers and cooperatives for collective marketing using cleaning and grading equipment, collection centers, and storage facilities</li> </ul>	<ul style="list-style-type: none"> <li>• Use of logistics solutions and sensors to track trucks and obtain location updates</li> <li>• Provide matching platforms to help grade the produce quality</li> <li>• Deploy traceability and tracking systems and Radio Frequency Identification (RFID) for smart packaging</li> <li>• Big data analytics to analyze data for produce quality</li> </ul>
Labor shortage		
<ul style="list-style-type: none"> <li>• Migration of rural workers to urban areas for better opportunities are causing acute labor shortages in the agriculture sector</li> </ul>	<ul style="list-style-type: none"> <li>• Establish professional and technical schools, colleges, and training centers to produce agriculturalists and other human capital for the sector</li> </ul>	<ul style="list-style-type: none"> <li>• Automation for ploughing, leveling, winnowing, harvesting, spraying, and irrigating, reducing the need for manual labor</li> </ul>

### Digital Initiatives Roadmap for the Agriculture Sector

Following digital initiatives are identified to unlock the potential of Nepal's agriculture sector:

1	Technology and Infrastructure	2	Entrepreneurship/PPP	3	Talent and Skills Development
	<ul style="list-style-type: none"> <li>• E-Haat Bazaar</li> <li>• Precision Agriculture</li> <li>• Agriculture Tools Sharing</li> </ul>		<ul style="list-style-type: none"> <li>• Private sector participation</li> </ul>		<ul style="list-style-type: none"> <li>• Education and training programs for farmers</li> </ul>

<ul style="list-style-type: none"> <li>• Digital disbursements for MSP and subsidies</li> <li>• Digitization of land records</li> <li>• Smart Irrigation Project</li> <li>• Smart Livestock &amp; Wildlife Management</li> <li>• Televet Medical Center Establishment</li> <li>• Agriculture Input and Products Quality Tracking System</li> </ul>		<ul style="list-style-type: none"> <li>• State-of-the-Art Knowledge Centers and Government Agriculture Centers</li> </ul>
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## Technology and Infrastructure

02.01.20.00

### E-Haat Bazaar

#### Solution

Develop an E-Haat bazaar platform:

- E-Haat bazaar should be a pan-Nepal electronic trading portal which networks the existing haat bazaars to create a unified national market for agricultural commodities. It should provide a single window service for all haat bazaar-related information and services. This includes commodity arrivals and prices, buying and selling trade offers, and provision to respond to trade offers.
- Introduction of digital payments as part of the platform to credit earnings/funds directly to farmers' accounts to enable them to increase margins and reduce handling costs.
- Build upon the on-going GoN and ADB supported initiatives aimed at raising the income of small and medium farmers, in particular MIS and Agriculture Market Information System components

E-Haat bazaar will be designed in a way so as to make value and supply chains transparent to all stakeholders.

#### Stakeholders

- Ministry of Agriculture and Livestock Development
- Department of Agriculture
- Department of Livestock Services
- Department of Food Technology and Quality Control
- Provincial Government and Local Level
- Farmers/ User Cooperatives
- Local Haat bazar management committees

#### Timelines

Immediate

#### Outcomes

- Help in achieving the following SDGs
  - Correct and prevent trade restrictions and distortions in Nepal's agricultural market, including through the parallel elimination of all

forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round

- Ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, to limit extreme food price volatility
- Improve access to markets for farmers, thereby improving farmer income
- Help farmers to sell their crops directly to the buyers, stimulating growth in the overall agricultural sector and attracting the youths in Nepal to participate in the sector

**02.01.21.00**

**Precision Agriculture**

**Solution**

Current productivity levels in Nepal are low compared to developed countries and its South Asian neighbors, offering valuable lessons in optimal utilization of resources. The use of technology in farm management could improve efficiencies and lead to lower dependency on manpower. Better farm management and monitoring enabled by wireless sensor networks, mobile applications, and precision farming could alert farmers on soil readiness and quality, water requirements, optimal harvest time, and market information.

Precision agriculture initiatives should aim to:

- Enhance efficiencies and reduce labor dependency
- Provide technology-driven applications such as wireless sensors and mobile applications for farm management solutions
- Offer real-time information on market prices, demand and supply, soil quality, climate, and water level
- Higher productivity (output per hectare)

**Stakeholders**

- Ministry of Agriculture and Livestock Development
- Department of Agriculture
- Department of Livestock Services
- Nepal Agricultural Research Council
- Nepal Academy of Science and Technology

**Timelines**

Medium-Term

**Outcomes**

- Help in achieving the following SDGs
  - End hunger, achieve food security and improved nutrition and promote sustainable agriculture
  - Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, to limit extreme food price volatility
  - Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labor-intensive sectors

## 02.01.22.00

## Agriculture Tools Sharing

<b>Solution</b>	<p>The Government of Nepal plans to provide farms with agricultural input and tools such as fertilizers, seeds, chemicals (e.g., pesticides and insecticides), and farm machinery through agriculture and livestock service centers in rural municipalities.</p> <p>The government should consider leveraging digital platforms (e.g., mobile apps) to efficiently manage the process of agriculture input provision and rental of agricultural machinery from these service centers. These tools could enable sharing of farmer-owned agriculture machinery. For example, framers can rent out their tractors to other farmers in the locality when not in use.</p>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>• Local levels</li> <li>• Farmer groups</li> <li>• Aama Samuha (Women's Group)</li> <li>• Local co-operatives</li> </ul>
<b>Timelines</b>	Immediate
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>• Help in achieving SDG to achieve higher levels of economic productivity through diversification, technological upgrading and innovation</li> <li>• Utilizing resources efficiently and narrowing the demand-supply gap</li> <li>• Improving agricultural productivity due to better access agriculture tools and technologies</li> </ul>

## 02.01.23.00

## Digital disbursements for MSP and subsidies

<b>Solution</b>	The Government of Nepal should promote digital payments to farmers' accounts for crops procured at minimum support prices (MSP). All government subsidies and payments should be made directly into the beneficiaries' accounts.
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>• Ministry of Agriculture and Livestock Development</li> <li>• Ministry of Communication and Information Technology</li> <li>• Ministry of Finance</li> <li>• Nepal Rastra Bank/ Agricultural Development Bank</li> <li>• Financial institutions such as banks</li> <li>• Private payment gateway owners</li> </ul>
<b>Timelines</b>	Medium-Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>• Help in achieving SDGs related to encouraging and expanding the access to banking, insurance and financial services</li> <li>• Streamline and shorten the time required for payment</li> <li>• Reduce leakages and corruption, as payments go directly to the beneficiaries' accounts</li> <li>• Increase the financial inclusion of farming communities</li> <li>• Improve tracking and auditing processes</li> </ul>

## 02.01.24.00

## Digitization of land records

<b>Solution</b>	Create an electronic register of agricultural land across regions and villages, computerization of registration documents, digitize maps and survey, and update all settlement records to improve transparency around productive land, enable better monitoring, and reduce land disputes.
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Land Management, Cooperatives and Poverty Alleviation</li> <li>● Ministry of Agriculture and Livestock Development</li> <li>● Department of Land Reform Management</li> <li>● Department of Forests and Soil Conservation</li> <li>● Department of Agriculture</li> <li>● Survey Department</li> </ul>
<b>Timelines</b>	Immediate
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>● Ensure secure tenure rights to land with legally recognized documentation, and who perceive their rights to land as secure, by sex and type of tenure</li> </ul>

## 02.01.25.00

## Smart Irrigation Project

<b>Solution</b>	<p>Lack of irrigation facilities in remote areas and high dependency on monsoon season are triggering the need for IoT in Nepal's agriculture sector. IoT deployment for smart irrigation considers factors like humidity, temperature, and soil moisture to calculate the water volume required for irrigation on respective fields to minimize water loss and ensure higher irrigation efficiency.</p> <p>The government should consider leveraging smart irrigation technologies to extend irrigation projects to underserved, remote areas as well as offer incentives to foster the adoption of these technologies in farms.</p>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Energy, Water Resource and Irrigation</li> <li>● Ministry of Forests and Environment</li> <li>● Ministry of Agriculture and Livestock Development</li> <li>● Ministry of Land Management, Cooperatives and Poverty Alleviation</li> <li>● Department of Irrigation</li> <li>● Nepal Agriculture Research Center (NARC)</li> <li>● Nepal Academy of Science and Technology</li> </ul>
<b>Timelines</b>	Long-Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>● Helps in achieving the following SDGs <ul style="list-style-type: none"> <li>– Protect, restore and promote the sustainable use of terrestrial ecosystems, sustainable forests, combat desertification, halt and reverse land degradation and halt biodiversity loss</li> </ul> </li> </ul>

- By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services
- Ensure availability and sustainable management of water
- By 2030, implement integrated water resources management at all levels, including through trans boundary cooperation as appropriate

**02.01.26.00**

**Smart Livestock and Wildlife Management**

<b>Solution</b>	<p>Use IoT sensors, drones, cameras, and image recognition software, to monitor cattle, sheep, farm birds as well as wildlife.</p> <p>The sensors will be connected to a central control room, which collates all the data and notifies in case of any changes in climate, environmental conditions or animal behavior.</p>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Agriculture and Livestock Development</li> <li>● Ministry of Education, Science and Technology</li> <li>● Department of Livestock Services</li> </ul>
<b>Timelines</b>	Medium-Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>● Improve animal health and productivity</li> <li>● Prevent illegal practices such as poaching and protect endangered animals</li> <li>● Help maintain ecological balance in Nepal’s wildlife sector</li> </ul>

**02.01.27.00**

**Televet Medical Center Establishment**

<b>Solution</b>	<p>Livestock farming is one of the key means of livelihood in vast sections of rural Nepal. It is within this context that ensuring the provision of better veterinary services becomes very crucial.</p> <p>Given that provision of such extension services through traditional means remains extremely challenging given the diverse geography of Nepal, it is recommended that digital technology solutions be used as a means of providing veterinary and animal husbandry services remotely.</p> <p>Establishment of televet centers will be one of the key outputs of such an initiative. The primary objective of such centers will be to connect farmers with livestock and veterinary experts at the regional and central level as a means of helping them tap into related domain expertise that is not available locally. Local televet centers can be established at Local level ward offices or at private veterinary institutes.</p>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Agriculture and Livestock Development</li> <li>● Department of Livestock Services</li> <li>● Nepal Agricultural Research Council</li> <li>● Nepal Academy of Science and Technology</li> <li>● Local levels</li> </ul>

- Local communities

**Timelines**

Medium-Term

**Outcomes**

- Improve animal health and productivity
- Improve agricultural productivity by imparting necessary knowhow to farmers
- Center of Excellence (CoE) of Livestock and veterinary experts
- Help in achieving the following SDGs
  - End hunger, achieve food security and improved nutrition and promote sustainable agriculture
  - Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
  - Enhance the use of enabling technology, in particular ICT to strengthen the agriculture sector

02.01.28.00

**Agriculture Input and Product Quality Tracking System**

**Solution**

Digital record keeping and sharing of quality-related information and competitive prices of seeds, breeds, fertilizers and saplings with feedback options on quality will help farmers to choose appropriate raw materials resulting in better quality production of agricultural and livestock products.

This would also benefit consumers through online information regarding quality and competitive price of agricultural and livestock products. This information can be made available via web-based platform and mobile apps for farmers, consumers and all relevant stakeholders.

**Stakeholders**

- Ministry of Agriculture and Livestock Development
- Department of Agriculture
- Department of Livestock Services
- Department of Food Technology and Quality Control

**Timelines**

Medium-Term

**Outcomes**

- Improve access to markets for farmers, thereby improving farmer income
- Utilizing resources efficiently and narrowing the demand-supply gap
- Help in achieving the following SDGs
  - Ensure the proper functionality of food commodity markets and their derivatives and facilitate timely access to markets and market information, including on food reserves, to avoid extreme food price volatility
  - End hunger, achieve food security and improved nutrition and promote sustainable agriculture.

## Entrepreneurship/Public-Private Partnerships

- **Private Sector Participation**

Open the agriculture sector to private sector participation and foreign investments to boost competitiveness by relaxing norms and simplifying regulations for investments in various agricultural activities:

- A strong case for the entry of tech start-ups to promote technology adoption in the sector in partnership with the government and local NGOs

Consider offering incentives, grants, subsidies, and tax breaks to companies and start-ups engaging in agricultural research.

Additionally, Nepal can consider starting an Agriculture Start-up Initiative to support agritech start-ups seeking to improve the efficiency of agricultural processes.

**Stakeholders:**

- Ministry of Finance
- Ministry of Agriculture and Livestock Development

**Timelines:** Medium term

**Outcome:**

- Enhance the use of enabling technology, in particular ICT for better productivity

### Case study: Govi Mithuru – A mobile agriculture service by Dialog, Sri Lanka

Dialog Sri Lanka's Govi Mithuru (Farmer's Friend or *Uzavar Tholan* in the Tamil language version) is a value-added service (VAS) commercially launched in October 2015. The product rollout was supported by a matched funding agreement between Dialog Sri Lanka and GSMA under the mNutrition Initiative funded by the Department of International Development (DFID) in the UK. By December 2016, the service had acquired over 250,000 registered users.

Govi Mithuru promises to secure crop and family health. It aims to offer comprehensive advice to farmers in Sri Lanka and focus on reducing dependence on chemical input, an issue frequently raised in Sri Lanka. Users register with a one-click response to an outbound dialing (OBD) message, after which they are profiled through a series of OBD calls requiring one-click responses for profile perimeters, or by dialing 616 and navigating through an interactive voice response (IVR) registration menu.

The service offers agricultural advice at each stage of the farming cycle, from land preparation to post-harvest support. Content is provided for eight crops, alongside nutrition and home gardening content, all provided by Centre for Agriculture and Biosciences International (CABI) Sri Lanka and quality-assured by the Sri Lankan Department for Agriculture.

### Case study: Start-ups in India targeting supply chain inefficiencies, falling yields, knowledge-sharing issues, and agricultural wastage

**Crofarm:** Founded in May 2016, Crofarm is an agricultural supply chain start-up that aims to address wastage during distribution and sale of farm produce by digitizing the supply chain for fruits and vegetables. The system:

- Procures products with longer shelf life from national sourcing zones and perishables from regional sourcing zones
- Enables farmers using the platform to reportedly earn 25% higher than if they sold their produce to rural markets (mandis)

**Aibono:** A smart farming collective that provides farm-related intelligence, technology, expertise and gadgets, and precision agriculture. Shares resources and expertise with small-scale farmers along with shared instruments to map data onto the cloud:

- Helping to increase yields by nearly 50% for 140 farmers working in the Nilgiri hills of Tamil Nadu

**CropIn:** A farm management company that seeks to digitize the entire agriculture ecosystem to deliver smart agriculture solutions with live reporting capabilities, analysis, interpretation, and insights on farming operations.

**EM3 Agri Services:** Aims to increase agricultural productivity by delivering technology and mechanization to the farming community on a pay-per-use basis:

- Offers Samadhan Farming-as-a-Service (FaaS), a platform that allows technology to cost-efficiently reach farmers and farms using a network of farm centers (Samadhan Kendras)

**Intello Labs:** Invented a first-of-its-kind application and equipment to test, grade, and analyze the visual quality parameters of agricultural commodities:

- Uses AI and deep learning to measure crop quality parameters including infestation incidence, nutrient deficiencies, harvest quality, evaluation of fruits, vegetables, grains and other crops, and farm-to-fork commodities

**Tessol:** Provides energy-efficient and fuel-saving refrigeration technologies for cold chain storage and logistics. Its flagship range, PLUGnCHILL, targets transport refrigeration and uses the proprietary phase change material (PCM) heat exchanger technology, providing 60% cost savings by eliminating the use of fuels.

Other prominent start-ups in agriculture include Aarav Unmanned Systems, Ninjacart, Gramco Infratech Pvt Ltd, FarmLink, and Gold Farm.

## Talent and Skills Development

02.03.29.00

### Education and training programs for farmers

#### Solution

Modernizing the sector requires building the skills of farmers. The government should develop training curriculum covering areas such as climate change, supply chain, and standard compliance to produce skilled and knowledgeable farmers.

Qualified farmers can enroll in familiarization and attachment programs via collaborations with national and international bodies. Skills training on the use and maintenance of farming machinery and equipment to accelerate farm mechanization and automation are essential to increasing productivity and reducing labor reliance on foreign workers.

#### Stakeholders

- Ministry of Education, Science and Technology
- Nepal Agricultural Research Council
- Council for Technical Education and Vocational Training
- Agriculture cooperatives, universities
- Agriculture Information and Training Center
- Agriculture Knowledge Center

- Timelines** Medium-Term
- Outcomes:**
- Help in improving agricultural productivity by imparting necessary know-how to farmers
  - Help in achieving the following SDGs
    - By 2030, ensure equal access to affordable and quality technical, vocational and tertiary education, including university

**02.03.30.00 State-of-the-Art knowledge centers and government agriculture centers**

**Solution** Establish knowledge centers to provide technical knowledge and skills on agriculture and livestock to farmers. Additionally, provide applied and practical know-how on technology and skills through government agriculture centers.

The government should ensure that the proposed knowledge and agriculture centers have state-of-the-art infrastructure (e.g., high-speed Internet access, video conferencing facilities) to enable distance learning.

- Stakeholders**
- Ministry of Agriculture and Livestock Development
  - Ministry of Education, Science and Technology
  - Department of Agriculture
  - Department of Livestock Services
  - Council for Technical Education and Vocational Training
  - Agriculture cooperatives, universities

**Timelines** Long-Term

- Outcomes**
- Helps in achieving the following SDGs
    - Ensure inclusive and equitable quality education and promote lifelong learning opportunities for farmers
    - By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training
    - Enhance the use of enabling technology, in particular information and communications technology to strengthen the agriculture sector
    - Provide universal and affordable access to the Internet

## Health



Since the past decade, healthcare has been a key priority for successive Nepal governments, with public and private healthcare spending increasing considerably year on year. Total healthcare expenditure in Nepal as a percentage of GDP grew from 4% in 2006 to exceed 6% in 2015, comparatively higher than its neighbors such as India, Pakistan, Bhutan, and Sri Lanka with healthcare spending at 2.6% and 4.7% of GDP.<sup>70</sup>

The rise in healthcare expenditure and continued focus by the government in enhancing healthcare policies and infrastructure have enabled Nepal to achieve vast improvements in its healthcare KPIs in the past 20 years. For example, neonatal and child mortality rates have declined significantly since 1995. Moreover, Nepal's consistent track record in improving other health outcomes such as maternal mortality, death rates, and life expectancy is acknowledged internationally.

**Mortality and Life Expectancy Rates, Nepal, 1995–2015**

Subject	Unit of Measurement	1995	2000	2005	2010	2015
Neonatal mortality	Per 1,000 Live Births	47.7	39.3	32.5	26.7	22.2
Infant mortality	Per 1,000 Live Births	76.8	59.6	46.3	36.3	29.4
Under-5 mortality	Per 1,000 Live Births	107.7	80.6	60	45.4	35.8
Crude birth rate	People per 1,000	36	32.1	27.5	22.9	20.2
Death rate	People per 1,000	10.4	8.5	7.3	6.7	6.3
Life expectancy at birth	Years	58.5	62.3	65.5	68	70
Maternal mortality ratio	Per 100,000	660	548	444	349	258

Source: World Health Organization

<sup>70</sup> World Health Organization

Despite improvements in Nepal’s key healthcare outcomes, the country continues to trail its Asian peers and international benchmarks. For example, while efforts to enhance maternal and neonatal care in rural Nepal have resulted in substantial improvements in maternal mortality rates, yet the maternal mortality ratio in Nepal (at 258 per 100,000 live births) is notably higher than its Asian counterparts in India, Pakistan, Bhutan, and Bangladesh (at 148–178 per 100,000 live births).

### Challenges in Nepal’s Health Sector

In 2007, Nepal’s Interim Constitution recognized access to primary healthcare as a right for every citizen. However, more than a decade later, primary healthcare for all remains an elusive dream for the citizens. In fact, Nepal lags behind its Asian peers and international standards on health service coverage, according to the World Health Organization (WHO).

Nepal, like many low- and middle-income countries, faces common issues such as:

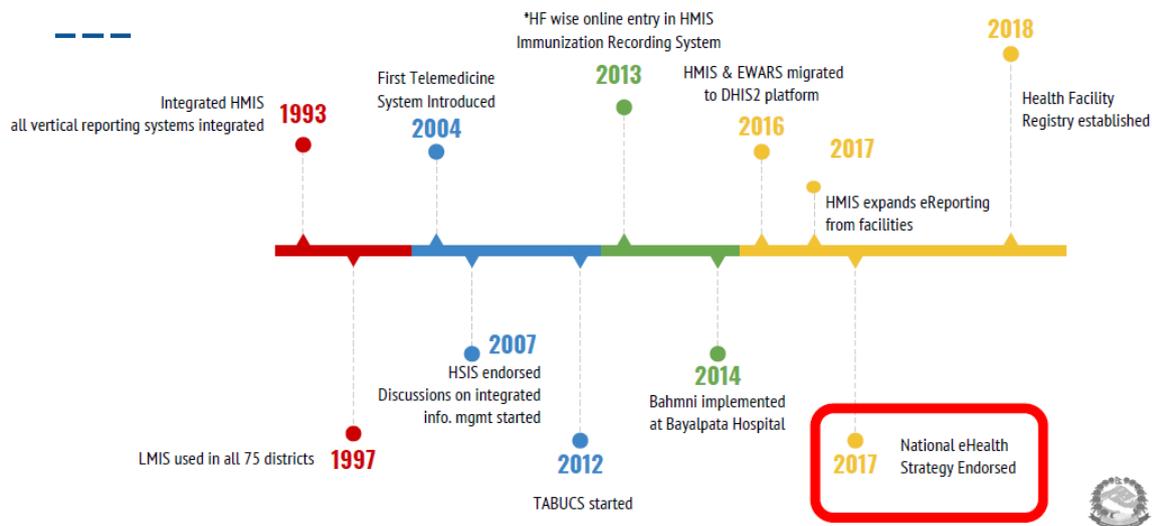
- Limited access to healthcare, especially in remote rural areas, where patients need to travel long distances to receive quality healthcare
- Chronic shortage of healthcare professionals and reluctance of public servants to serve in remote areas
- Underdeveloped infrastructure limiting access to safe drinking water, sanitation, and hygiene practices
- Poverty and illiteracy coupled with the high cost of private healthcare services
- Poor quality of care services at public sector hospitals and institutions

Nonetheless, Nepal’s new government aims to change this during its tenure. Acknowledging health as the primary right of every citizen, the government intends to roll out various initiatives (e.g., establishing a 15-bed hospital in every local area, extending health insurance for all citizens) to address these issues.

### Promise of Digital Initiatives in Health

Nepal started its digital journey in the health sector with the launch of integrated Health MIS (HMIS) in 1993. Since then, Nepal has undertaken several initiatives such as the introduction of the telemedicine system. Recently in 2017, the Government of Nepal launched its eHealth Strategy 2017, which provides roadmap for digitalization of health sector in Nepal over the next few years.

#### E-Health Interventions of the Ministry of Health and Population



Source: Ministry of Health and Population

**Existing Digital Initiates in Nepali Health sector**

<p><b>Health Management Information System (HMIS)</b></p> <ul style="list-style-type: none"> <li>• Monthly aggregate health statistics being collected</li> <li>• All 77 districts submitting data digitally</li> <li>• 1000+ facilities submitting data digitally</li> <li>• 25 million+ data points captured every year</li> <li>• A mix of digital and paper based recording &amp; reporting</li> <li>• Based on the open-source DHIS2 software platform</li> </ul>	<p><b>Logistics Management Information System (LMIS)</b></p> <ul style="list-style-type: none"> <li>• Full supply chain MIS for MoHP</li> <li>• A mix of digital and paper based recording and reporting</li> <li>• Linked to the procurement system</li> </ul>	<p><b>Electronic Health Records (EHR) Systems</b></p> <ul style="list-style-type: none"> <li>• Combination of Electronic Medical Records (EMR) and hospital management system</li> <li>• Currently being used in 3 hospitals including public facilities</li> <li>• Based on the open-source OpenMRS platform</li> </ul>
<p><b>Human Resource Information System (HuRIS)</b></p> <ul style="list-style-type: none"> <li>• System to manage human resources for health</li> <li>• Database of all public health workers including permanent and temporary hires</li> </ul>	<p><b>Health Facility Registry (HFR)</b></p> <ul style="list-style-type: none"> <li>• Unified code provided to all health facilities (public and private)</li> <li>• System to support linkages of other health information systems</li> </ul>	

Digital technologies have a potential to address critical challenges faced by Nepal's health sector by improving coverage of quality health services, reducing the cost of healthcare services to deprived sections of society, plugging funding leakages, and optimizing utilization of healthcare skills and resources.

While the Government of Nepal has undertaken several initiatives in the health sector, there is a pressing need for the government to adopt additional broad-based initiatives to optimize its resources and attract greater private sector involvement.

**Case Study – How Novartis’ telemedicine model in Ghana is helping to expand access to quality care in remote rural areas**

**Objective:** Expand access to quality care in remote rural areas to reduce transport times and costs to patients while minimizing unnecessary referrals.

**Model:** The telemedicine model was developed around frontline health workers using digital technology to enable centralization of healthcare expertise. Under the model, healthcare professionals at the teleconsultation centers coach and guide less-skilled community health workers in patient care. The initiative is not only empowering community health workers, but also improving the quality of care with a direct impact on patient health outcomes. In 2016, for example, more than half of all teleconsultations were resolved directly by phone, including 31% that avoided referrals.

**Timelines:** 2012 onwards

**Results:** The model pioneered in the Amansi West region through the joint efforts of the Ghana Ministry of Health and Population, the Ghana Health Service, the National Health Insurance Authority, the Ambulance Services of Ghana, Millennium Promise, and the Novartis Foundation. The initiative is now successfully scaling throughout Ghana with strong local ownership by Ghanaian health authorities.

**Health Sector in Nepal: Pain Points, Priorities, and Digital Solutions**

Pain Points	Government of Nepal's Priorities	Digital as an Enabler
<b>Wide rural/urban gap in healthcare facilities</b>		
<ul style="list-style-type: none"> <li>83% of Nepal's population live in villages, while the country's healthcare infrastructure and caregivers are predominantly in urban areas</li> <li>Most private hospitals and institutions in Nepal are concentrated in cities such as Kathmandu, Pokhara, and Biratnagar</li> </ul>	<ul style="list-style-type: none"> <li>Aims to improve the quality of basic and specialized healthcare services</li> <li>Plans to offer free basic health services at the local level; specialized and referral health services from provinces, and modern and specialist health services from central health institutions</li> </ul>	<ul style="list-style-type: none"> <li>Digital health (e.g., mobile health, telemedicine) can extend the reach of healthcare services to rural areas:                             <ul style="list-style-type: none"> <li>Equipping all healthcare centers in rural areas with high-speed Internet should be the top priority for the government</li> </ul> </li> </ul>
<b>Chronic shortage of health professionals</b>		
<ul style="list-style-type: none"> <li>Nepal has only 5.4 skilled health professionals per 10,000 population; compared to 24.1 and 14.0 skilled health professionals per 10,000 population in India and Pakistan, respectively</li> <li>High brain drain among medical professionals and preference for medical workers to join the private sector</li> </ul>	<ul style="list-style-type: none"> <li>Set up at least one 15-bed hospital at each local level between 2018 and 2022</li> <li>Hire at least one medical doctor in each local level</li> </ul>	<ul style="list-style-type: none"> <li>eHealth/mHealth can effectively utilize and expand the reach of healthcare professionals</li> <li>Tap into healthcare talent from other countries (e.g., India, the Philippines) to plug the demand-supply gap</li> </ul>
<b>Access to safe drinking water, poor hygiene habits, and sanitation facilities is a key challenge</b>		
<ul style="list-style-type: none"> <li>Nepal has the highest mortality rate due to unsafe hygiene, water, and sanitation compared to neighboring countries</li> <li>Open defecation is a norm in Nepal (especially in rural areas)                             <ul style="list-style-type: none"> <li>30% of the Nepali population practice open defecation</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Provision of clean and safe drinking water and sanitation facilities to all citizens is a priority for the new government</li> <li>Become an open defecation-free country by 2022</li> </ul>	<ul style="list-style-type: none"> <li>Innovative use of digital technologies can boost awareness about the need to follow proper hygiene and sanitation practices</li> <li>Technology can enhance access and simplify the usage of public facilities</li> </ul>
<b>Expensive healthcare services</b>		
<ul style="list-style-type: none"> <li>Underdeveloped public healthcare infrastructure and poor perception of service quality at public hospitals has led to a surge in</li> </ul>	<ul style="list-style-type: none"> <li>Improve healthcare services by building quality infrastructure, medical equipment, and human resources</li> </ul>	<ul style="list-style-type: none"> <li>Economies of scale and lower investment requirements for digital healthcare can help</li> </ul>

<p>private/household healthcare expenses</p> <ul style="list-style-type: none"> <li>• 27% of Nepal’s population spend over 10% of their household income on healthcare</li> </ul>	<ul style="list-style-type: none"> <li>• Extend health insurance program to cover all Nepalese</li> </ul>	<p>lower the cost of healthcare services</p>
<p>Mismanagement of funds and supplies in rural Nepal</p>		
<ul style="list-style-type: none"> <li>• Mismanagement of funds and government subsidies, inadequate supply of essential drugs, and budget limitations restrict the government’s ability to provide proper healthcare facilities for its citizens</li> </ul>	<ul style="list-style-type: none"> <li>• Zero tolerance for corruption</li> </ul>	<ul style="list-style-type: none"> <li>• Leveraging the latest Health Information Management (HIM) and procurement solutions can enhance auditing and compliance processes, minimizing the risk of mismanagement of funds and government subsidies</li> </ul>

**Digital Initiatives Roadmap for the Health Sector**

The Government of Nepal should consider setting aside at least 10% of its central health budget for Digital Health programs. The Ministry of Health and Population (MoHP) should establish a separate department/task force to drive implementation of Digital Health initiatives, with a focus on the following areas to reap the benefits of digital technologies in the health sector.

1	Technology and Infrastructure	2	Entrepreneurship/PPP	3	Talent and Skills Development
	<ul style="list-style-type: none"> <li>• National Digital Healthcare Platform</li> <li>• Next-Generation Digital Healthcare Facilities</li> <li>• Electronic Health Records 2.0</li> <li>• Mobile Health Units</li> <li>• e-Maternal Care</li> <li>• Drones for delivery of emergency medical supplies</li> </ul>		<ul style="list-style-type: none"> <li>• Ease of doing business in digital healthcare</li> <li>• Private sector participation in rural healthcare</li> </ul>		<ul style="list-style-type: none"> <li>• Centralized Telemedicine Center</li> </ul>

**Technology and Infrastructure**

The following initiatives targeting Digital Healthcare are identified as “quick wins” to be implemented as part of the Digital Nepal program. Following digital initiatives are identified to unlock the potential of Nepal’s health sector:

## 03.01.31.00

## National Digital Healthcare Platform

**Solution**

A National Digital Health Platform/Mobile App connecting all public sector health facilities in Nepal. The platform should provide all information pertaining to public sector healthcare facilities to citizens and enable easier access to healthcare services.

The platform/app could offer the following facilities:

- Information on public healthcare systems and programs
- Information of all nearby healthcare hospitals and centers
- Online booking of appointments with healthcare professionals
- Tracking patients' healthcare records

The platform should be linked to existing eHealth systems such as Health Management Information System (HMIS), Electronic Health Records (EHR) Systems, and Health Facility Registry (HFR)

Nepal should emulate the Telangana Ministry of Health and Population (India) app that allows its citizens to access services at over 800 public health facilities; the app was developed by the Government of Telangana in partnership with Mahindra Comviva

**Stakeholders**

- Ministry of Health and Population
- Department of Health Services
- Ministry of Finance
- Ministry of Communication and Information Technology
- Provincial Government and Local Level
- Hospitals

**Timelines**

Immediate

**Outcomes**

- Help in achieving SDGs related to universal access to healthcare (Social Sustainable Goal # 3: Ensure healthy lives and promote well-being for all at all ages)
- Improve access to healthcare services for Nepali citizens
- Enable better citizen experience by providing basic services such as appointment booking and locating nearby facilities.

## 03.01.32.00

## Next-Generation Digital Healthcare Facilities

**Solution**

New public sector health facilities (including the proposed 15-bed hospitals at each local level) should be equipped with next-generation digital infrastructure with the goal to provide specialist healthcare services in remote areas.

The new healthcare facilities should be equipped with digital technologies like:

- High-speed Internet access
- High-definition video conferencing
- e-Learning and Collaboration tools

- Digitalization of existing processes, such as appointments, patient records, perceptions, etc.

- Stakeholders**
- Ministry of Health and Population
  - Department of Health Services
  - Ministry of Finance
  - Provincial Government and Local Level

**Timelines** Long-Term

- Outcomes**
- Help in achieving SDGs related to universal access to healthcare (Social Sustainable Goal # 3: Ensure healthy lives and promote well-being for all at all ages)
  - Improve access to healthcare services for Nepali citizens

**03.01.33.00 Electronic Health Records 2.0**

**Solution** Nepal has rolled out Electronic Health Records (EHR) System which combines Electronic Medical Records (EMR) and hospital management system.

EHR aims to be a miniature warehouse of medical records where the prescriptions, test reports, medical history, physical and psychological examinations, medication prescribed, diagnosis and prognosis, result of treatment and procedure implemented, allergies and other risk factors, disabilities and many more are accumulated in one folder without letting patients carry away those details.

However, the EHR system is currently being used by only 3 hospitals. Nepal should aim to rollout EHR system across all public and private healthcare facilities in the country.

- Stakeholders**
- Ministry of Health and Population
  - Ministry of Communication and Information Technology
  - Department of Health Services
  - Department of Information Technology
  - Nepal Information Technology Centre

**Timelines** Medium-Term

- Outcomes**
- Providing accurate, up-to-date, and complete information about patients at the point of care
  - Reducing costs through decreased paperwork, improved safety, reduced duplication of testing, and improved health
  - Enabling quick access to patient records for more coordinated, efficient care
  - Securely sharing electronic information with patients and other clinicians
  - Helping providers more effectively diagnose patients, reduce medical errors, and provide safer care

## 03.01.34.00

## Mobile Health Units

<b>Solution</b>	<p>Launch of mobile health units/vans to improve the reach of healthcare services in rural, underserved areas. Mobile health units/vans will allow regional healthcare facilities to extend their reach by going directly to the people in their communities, potentially saving lives and money.</p> <p>The mobile health units should be equipped with digital connectivity and GPS services for effective tracking, route management, and digital records management.</p>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Health and Population</li> <li>● Department of Health Services</li> <li>● Provincial Government and Local Level</li> <li>● Hospitals</li> </ul>
<b>Timelines</b>	Medium-Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>● Help in achieving SDGs related to universal access to healthcare (Social Sustainable Goal # 3: Ensure healthy lives and promote well-being for all at all ages)</li> <li>● Provide healthcare facilities in rural remote areas with limited / no healthcare infrastructure</li> <li>● Improve access to healthcare services for Nepali citizens</li> </ul>

## 03.01.35.00

## e-Maternal Care

<b>Solution</b>	<p>E-Maternal Care is designed to be a technological platform to track pregnant women and babies. The objective is to maintain accurate medical records for pregnant women and children, provide healthcare-related information, and enable access to healthcare services on a regular basis.</p> <p>Target beneficiaries of this initiative are pregnant women, mothers, and newborns.</p>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Health and Population</li> <li>● Ministry of Women, Children and Senior Citizen</li> <li>● Ministry of Communication and Information Technology</li> <li>● Nepal Telecommunications Authority</li> <li>● ISPs</li> </ul>
<b>Timelines</b>	Medium-Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>● Help in achieving the following SDGs: <ul style="list-style-type: none"> <li>– Ensure healthy lives and promote well-being for all at all ages</li> <li>– Maternal mortality ratio: By 2030, reduce the maternal mortality ratio to less than 70 per 100,000 live births</li> <li>– Under-five mortality ratio: By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce</li> </ul> </li> </ul>

- neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births
- Achieve gender equality and empower all women and girls

**03.01.36.00**

**Drones for delivery of emergency medical supplies**

<b>Solution</b>	<p>Consider the use of drones for delivery of medical supplies and equipment in case of a medical emergency or natural disaster. Drones can be utilized for the delivery of essential medical supplies to remote areas where people are often isolated due to difficult terrain, bad road conditions, and seasonal flooding.</p> <p>Ministry for Communication and Information Technology, Ministry for Health and Population, Ministry for Civil Aviation and Ministry of Home Affairs should work together to draft a policy to allow the drones for medical emergencies. Additionally, the government should consider the use of drones in the health sector for disaster management and preparedness.</p>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Health and Population</li> <li>● Ministry of Communication and Information Technology</li> <li>● Ministry of Culture, Tourism and Civil Aviation</li> <li>● Ministry of Home Affairs (for drone license)</li> <li>● Department of Health Services</li> <li>● Nepal Academy of Science and Technology</li> <li>● Provincial Government and Local Level</li> </ul>
<b>Timelines</b>	Long-Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>● Help in achieving SDGs related to universal access to healthcare (Social Sustainable Goal # 3: Ensure healthy lives and promote well-being for all at all ages)</li> <li>● Provide healthcare facilities in rural remote areas with limited / no healthcare infrastructure</li> <li>● Improve access to healthcare services for Nepali citizens</li> </ul>

**Entrepreneurship/Public-Private Partnerships**

The Government of Nepal should consider initiating the following policy interventions to create an enabling environment:

- **Ease of doing business in digital healthcare:** Private sector start-ups and telecom participants play a pivotal role in developing digital health solutions in many markets globally. The Government of Nepal should focus on creating an enabling business environment to encourage private sector players and start-ups to contribute to these priority areas.

Focus on improving ease of doing business, developing an ecosystem (e.g., digital payment platforms), tax holidays for NGOs and enterprises focusing on digital health in poor/remote areas.

- **Private sector participation in rural healthcare:** Private healthcare providers, which primarily focus on urban areas currently, should be encouraged to invest in digital healthcare programs to capture a broader market and contribute to the society as part of their Corporate Social

Responsibility (CSR) effort. Consider necessary policy interventions (e.g., tax benefits) to attract greater private sector involvement

## Talent and Skills Development

Chronic shortage of healthcare professionals, brain drain to foreign countries, and reluctance of caregivers to join medical facilities in remote areas are restricting the government's ability to improve the quality and coverage of healthcare services.

To address these challenges, Nepal needs to systematically scale-up the capacity of its healthcare system by increasing the intake of students in existing medical colleges and opening new medical colleges to meet demand. Additionally, Nepal can leverage ICT solutions (e.g., Centralized Telemedicine Center) for skills development of its healthcare professionals in remote areas.

03.03.37.00

### Centralized Telemedicine Center

<b>Solution</b>	<p>A telemedicine model developed around frontline health workers, with digital technology allowing for the centralization of healthcare expertise.</p> <p>Under the model, healthcare professionals at the teleconsultation center of a major public hospital in Kathmandu can coach and guide less-skilled community health workers from various healthcare facilities in Nepal.</p>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Health and Population</li> <li>● Department of Health Services</li> <li>● Ministry of Communication and Information Technology</li> <li>● Nepal Telecommunications Authority</li> <li>● Hospitals</li> </ul>
<b>Timelines</b>	Immediate
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>● Systematically enhance capabilities of frontline healthcare workers, which will in turn, result in improvement in the quality of healthcare services to the citizens</li> </ul>

#### **Case study: Telecom operator partners with Sri Lankan hospitals to build a digital health Platform**

In 2016, Dialog, a leading telecom operator in Sri Lanka, entered a joint venture with Asiri Hospital Holdings to set up a Digital Health platform. Following the success of this initiative, two more hospitals in Sri Lanka joined the effort in March 2018. The joint venture connects more than 1,500 doctors in over 80 hospitals via its digital health platform, accessible through doc.lk, by dialing 990 or the Doc990 app.

Doc990 currently offers a range of medical services including channeling doctor sessions at hospitals island-wide for physical consultations, the Tele Doctor Service where consultants can be contacted over the phone, medicine delivered to the doorstep, and access to lab reports from selected laboratories via the Doc990 web portal.

The Doc990 app is integrated with all mobile operators and banks for multiple payment options such as add-to-bill, eZ Cash, Genie, Amex, Visa, and MasterCard.

**Nepal vs Selected Asian Countries: Comparison of Major Healthcare KPIs**

	Unit of Measurement	Nepal	India	Pakistan	Bhutan	Sri Lanka	China	Japan	Malaysia	Singapore	Korea Rep	Thailand	Bangladesh
Skilled health professional density, 2005–2013	Per 10,000 population	5.4	24.1	14	12.4	23.2	31.5	137.9	44.7	77.1	71.5	24.7	5.7
Maternal mortality ratio, 2015	Per 100,000 births	258	174	178	148	30	27	5	40	10	11	20	176
Skilled birth attendance, 2007–2017	%	58	86	55	89	99	100	100	99	100	100	99	50
Under-five mortality and neonatal mortality rate, 2016	Per 1000 births	34.5	43	78.8	32.4	9.4	9.9	2.7	8.3	2.8	3.4	12.2	34.2
Health Service Coverage Index, 2015	Index*	46	56	40	59	62	76	80	70	80	80	75	46
Financial protection, 2007–2015	% of population spending large health expenditure	27.4	17.3	1	N/A	2.9	17.7	6.2	N/A	N/A	13.5	3.4	13.6
Mortality rate due to unsafe hygiene, water, and sanitation, 2016	per 100,000 population	19.8	18.6	19.6	4	1.2	0.6	0.2	0.4	<0.1	1.8	3.5	11.9
All vaccine coverage, 2016	% of population	25	76	53	90	99	99	93	99	88	97	95	93
Domestic general government health expenditure 2015	% of general government expenditure	5.5	3.4	3.7	9.1	7.9	10.1	N/A	8.3	12	12.9	16.6	2.8
Access to safe drinking water, 2015	% of population	27	N/A	36	34	N/A	N/A	97	92	100	98	N/A	56
Total health expenditure, 2014–2015	% of GDP	6.2	4.7	2.6	3.6	3.5	5.5	10.2	4.2	4.9	7.4	4.1	2.8
Total expenditure on health per capita, 2014–2015	US\$	135	267	129	281	369	731	3727	1040	4047	2531	600	88
Life expectancy at birth, 2016	Years	70.2	68.8	66.5	70.6	75.3	76.4	84.2	75.3	82.9	82.7	75.5	72.7

Source: WHO; UNICEF

Legend: Green-Amber-Red Scale, where dark green signifies best-in-class performance, while dark red signifies worst-in-class performance

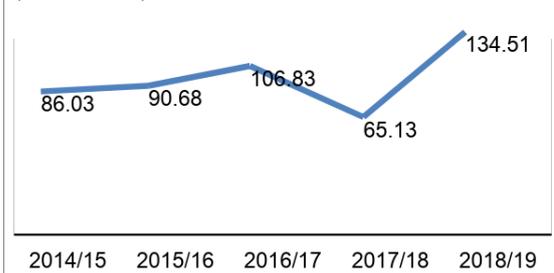
## Education



### Overview

Nepal's education sector has made notable strides in the past 20 years. Between 1991 and 2017, the country's net primary school enrolment rates grew from 68.0% to 94.7%,<sup>71</sup> making it one of the few developing countries to reach near gender parity. Education is a key priority sector for Nepal, accounting for the largest share of the total national budget at ~10.1%<sup>72</sup> in FY2018/19, registering 11.8% CAGR over the past five years (2014/15–2018/19) to reach NPR134.5 billion (US\$1.23 billion).<sup>73</sup>

**Education Budget, Nepal, 2014/15–2018/19, (NPR Billions)**



Source: Central Budgets (Government of Nepal)

Development of the sector appears to be a crucial imperative to drive Nepal's progress from least developed country status to a developing nation by 2022. Access to education is even more critical given the country's large youth base, with ~32% of its total population aged 14 and below.<sup>74</sup>

To support its vision, the Government of Nepal is pursuing revisions to its education policy aiming for inclusiveness by making education up to secondary level compulsory and free.

#### Key Education Targets<sup>75</sup>

- Investment of at least 20% of the national budget each year in education
- All school-age children to be enrolled in school in the next two years

<sup>71</sup> UNESCO

<sup>72</sup> Calculated using figures in the Budget Speech for FY 2018/19, Ministry of Finance

<sup>73</sup> Calculated using figures in the Budget Speech for FY 2018/19, Ministry of Finance

<sup>74</sup> UNESCO Institute for Statistics, Data for the Sustainable Development Goals by Country

<sup>75</sup> Joint Election Manifesto

- All citizens to be literate in the next five years
- ICT usage to be made compulsory in schools
- E-library to be established and students to be provided modern education materials (e.g., laptops and textbooks)
- Higher education to be specialized by involving students in research and innovation
- Gurukuls, Monasteries, Gumbas, Madrasas, and open and alternative education programs to be affiliated with the national education system

Source: Joint Election Manifesto (Please note this list is not exhaustive)

The government has also formulated supporting policies, grants, funding schemes, and investment incentives, as well as turned to foreign aid to improve its primary education metrics.

### Key Government Policies

School Sector Development Plan (SSDP), 2016–2023	Five-year Roadmap
<p>Aims for inclusive and equitable access, participation, and learning outcomes of the education system through:</p> <ul style="list-style-type: none"> <li>• Investment of ~US\$10.66 billion from 2016–2023 in multiple areas including teacher management and professional development; school governance and management; institutional capacity development; disaster risk reduction; school safety, monitoring, evaluation, and assessment; examination and accreditation, ICT, and health and nutrition</li> <li>• Support from the EU for the program with a recent funding injection of €6 million (~NPR700 million) directly to the Government of Nepal</li> </ul>	<p>In April 2018, the Minister for Education, Science and Technology unveiled a 10-point, five-year roadmap which includes plans to:</p> <ul style="list-style-type: none"> <li>• Improve the quality of the education sector; structural and organizational reforms; primary child education; common commitments; quality of public education; regulation of private education system; higher education; open education; science and technology; and good governance and management</li> </ul>

Despite these initiatives, the quality of education in Nepal falls short of international standards due to inadequate funding, socio economic issues leading to child labor, uneven development between rural and urban areas, lack of basic infrastructure, shortage of trained teachers, unemployability of graduates due to outdated coursework, and insufficient learning materials. This has led to an increase in student mobility among the urban and wealthy population, with many youths moving to other countries to study.

While the country has achieved near-universal enrolments at the primary level (135.4% in 2016), it drops significantly at the secondary (69.5% in 2016) and tertiary levels (11.8% in 2016), indicating substantial dropout rates at higher levels of education.

### Key Education Metrics/KPIs for Nepal

Metrics	2014	2015	2016	2017
Primary total gross enrolment ratio (%)	134.75	134.94	135.38	134.12
Secondary total gross enrolment ratio (%)	66.88	67.14	69.5	71.21
Tertiary total gross enrolment ratio (%)	15.82	14.95	11.8	11.79

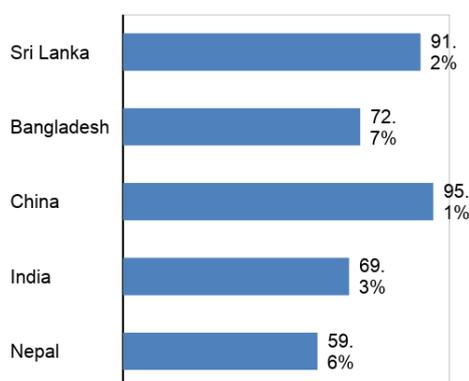
Out-of-school children ('000s)	185.34	103.66	101.86	159.21
Out-of-school adolescents ('000s)	-	-	237.55	222.24
Literacy rate, 15–24 years (%)	84.76*	-	-	-
Literacy rate, 15 years and above (%)	59.63*	-	-	-

Source: UNESCO Institute for Statistics, Data for the Sustainable Development Goals by Country

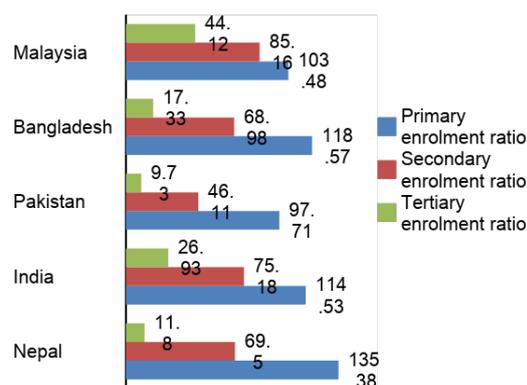
Note: \*Latest available data based on 2011 census

## Challenges in Nepal’s Education Sector

The Government of Nepal recognizes the importance of education and its implications for driving future growth. However, initiatives supporting this aspiration do not appear to be reaching target areas, given the funding delays institutions face and coordination challenges among the main stakeholders in the sector. This has placed Nepal at a disadvantageous position vis-à-vis other Asian developing countries.



Literacy Rate\* (%), Nepal vs Selected Asian Countries, 2016<sup>76</sup>



Enrolment Ratio (%), Nepal vs Selected Asian Countries, 2016<sup>77</sup>

Source: UNESCO Institute for Statistics, Data for the Sustainable Development Goals by Country

Note: \*Latest available census data in the country

Several inherent limitations also hinder the progress of the education sector in Nepal:

- Shortage of teachers per student and insufficient training of teachers, leading to high absenteeism and low student engagement and motivation
- Underdeveloped infrastructure and facilities at both rural and urban institutions, including lack of learning materials and equipment
- Disparities in infrastructure development and availability of quality education and teachers between private and public schools. Prohibitively expensive fees and limited presence of

<sup>76</sup> UNESCO Institute for Statistics, Data for the Sustainable Development Goals by Country

<sup>77</sup> UNESCO Institute for Statistics, Data for the Sustainable Development Goals by Country

private schools are resulting in inequitable access to education and widening the gap between the haves and have-nots

- Poor availability of funding and government support due to an inefficient industry structure, red tape, and corruption
- High dropout rates due to socioeconomic conditions and widespread poverty in rural areas, resulting in children working in menial jobs instead of attending school and creating issues such as child labor and child marriages

The government is demonstrating its focus on addressing these challenges during its tenure by establishing actionable targets for the sector in the current and subsequent budgets.

### Promise of Digital Initiatives in the Education Sector

Near-universal penetration of mobile and Internet and availability of low-cost smartphones and tablets provide a favorable enabling environment for integrating ICT into education. Nepal’s large youth demographic who are comfortable using technology stand to benefit greatly from technology-based delivery and access to education.

The benefits of the use of digital technologies in education are well documented with many success stories and proven results. Nepal should seek to learn from the multiple projects underway across developing countries in Asia and Africa.

Nepal has launched a slew of technology initiatives, including strengthening ICT infrastructure at schools and universities; ICT-enabled teaching and learning; and integrating education management information system (EMIS) as part of the SSDP 2016–2023 Program.

However, stronger technology push coupled with skills development and awareness programs may be required to address persistent challenges, strengthen institutional capacity, bridge the digital divide in the country, and maximize the impact of ICT in the sector.

#### Nepal is actively pursuing ICT programs for education with progress in several areas:

ICT: A Key Component of the SSDP 2016–2023 Agenda	
<p>Key targets include:</p> <ul style="list-style-type: none"> <li>● Providing ICT teaching-learning materials to strengthen interactive teaching approaches</li> <li>● Establishing ICT learning centers at model schools</li> <li>● Preparing ICT teaching and learning materials initially for Science, Math, and English</li> <li>● Providing ICT infrastructure and teaching-learning materials</li> <li>● Implementing the unified computerized accounting software (CGAS) in the Ministry of Education system</li> <li>● Introducing school-based integrated EMIS, including an Equity Index, school profiles, and unique student IDs to enhance the effectiveness of governance and management</li> </ul>	<p>Key achievements include:</p> <ul style="list-style-type: none"> <li>● Establishment of computer labs and Internet connectivity in District Education Offices (DEO) and selected schools</li> <li>● Launch of websites by central agencies, regional education directorates, and 77 DEOs</li> <li>● Development of interactive digital learning materials for students in Grades 2 to 6 in Nepali, Math, English, and Science</li> </ul>
<p><b>Open Learning Exchange (OLE) Nepal:</b> Established in September 2007, OLE Nepal integrates technology in classrooms and the teaching-learning process. Key programs include:</p>	

<ul style="list-style-type: none"> <li>● <i>E-Paath</i>: Interactive educational software that includes multimedia learning modules based on the national curriculum of Nepal; developed 600+ learning modules for teachers</li> <li>● <i>E-Pustakalaya</i>: An open, digital library comprising 6,000+ books</li> <li>● <i>Teacher training</i>: Focuses on IT literacy, child-centric interactive teaching, and integrating ICT-based instruction; has trained 600+ teachers in the program</li> <li>● <i>Technology infrastructure</i>: Helps install school network consisting of servers and Wi-Fi, and provide low-power, low-cost, durable equipment; has deployed 5,000+ laptops in 100+ schools</li> </ul>
<p><b>OpenIDEO</b>: An open innovation platform that works with local organizations in Nepal to provide funding and support, targeting the education sector in rural areas. Key programs include:</p> <ul style="list-style-type: none"> <li>● <b>Picosoft</b>: Rural Internet service provider in Nepal which offers high-speed Internet services using Super Wi-Fi (TV White Space) technology to schools in rural areas where cable and ADSL Internet are not available; also provides state-of-the-art computer labs and develops localized content for ICT in education in partnership with Kull Labs</li> <li>● <b>REED Nepal</b>: NGO that has introduced digital educational platforms and Teacher Training Quality Education Program for schools in earthquake-prone areas</li> </ul>

## Education in Nepal: Pain Points, Priorities, and Digital Solutions

Pain Points	Government of Nepal's Priorities	Digital as an Enabler
<p><b>Shortage of trained teachers</b></p> <ul style="list-style-type: none"> <li>● Lack of qualified, well-trained teachers as well as a decline in the teacher-pupil ratio from 22.7 to 20.3 from 2014–2017<sup>78</sup></li> <li>● Teachers, particularly at public schools and universities, have inadequate technical, content, and pedagogical support and poor IT awareness</li> <li>● Limited ICT use in classrooms and administration, and staff resistance to change, resulting in low teacher attendance</li> <li>● Cases of teachers holding down multiple jobs and engaging in part-</li> </ul>	<p>As part of its latest budget, the government plans to:</p> <ul style="list-style-type: none"> <li>● Expand training programs for technical teachers</li> <li>● Redistribute existing posts for teachers proportionately on the basis of the number of students, subject requirements, and geographical conditions</li> <li>● Provide additional grants to schools to hire more teachers at the secondary level in Science, Math, English, and Technical subjects</li> </ul>	<ul style="list-style-type: none"> <li>● Technology-based teacher training to build awareness and prepare them for using technology in a classroom setting</li> <li>● Deploy videoconferencing, mobile, and collaboration technologies to enable training from any location remotely</li> <li>● Install CCTV cameras and biometric systems in schools to track teacher attendance</li> </ul>

<sup>78</sup> UNESCO Institute for Statistics, Data for the Sustainable Development Goals by Country

<p>time businesses or research, further impacting their performance</p>		
<p><b>Lack of basic infrastructure</b></p> <ul style="list-style-type: none"> <li>• Setting up educational facilities in rural Nepal is a considerable technical and financial challenge due to the difficult geographical terrain</li> <li>• Strain on the distribution of basic learning materials, e.g., textbooks, and poor access to basic necessities like water, sanitation, and hygiene</li> <li>• Public schools and universities in urban areas lack proper facilities and funding to maintain laboratory materials and curriculum to keep pace with new technologies</li> </ul>	<p>The government plans to reduce the urban-rural digital divide and improve infrastructure through:</p> <ul style="list-style-type: none"> <li>• Use of new technology and improvements to education standards</li> <li>• Set up of Rural Telecommunication Fund to provide free high-speed Internet services to community schools</li> </ul>	<ul style="list-style-type: none"> <li>• Use of wireless and satellite technologies to connect institutions' IT infrastructure in hard-to-reach remote areas</li> <li>• Deploy high-density networks at urban schools and university campuses to support the uninterrupted running of devices, IT tools, and applications</li> </ul>
<p><b>Disparities in education development and access</b></p> <ul style="list-style-type: none"> <li>• Huge differences in quality and provision of infrastructure between rural and urban areas, with development mainly concentrated in cities like Kathmandu</li> <li>• Even within cities, gaps exist between private and public institutions, with the former having superior quality of education, teachers, and infrastructure</li> <li>• Low number of private institutions in urban areas and high fees make private education inaccessible to rural and middle-class students</li> <li>• Social inequalities prevent students belonging to lower castes and underprivileged groups from attending schools, e.g., in the Terai region, only 23.1% of Dalits were literate compared to 80% of Brahmans and Chhetris (higher castes), in 2016<sup>79</sup></li> </ul>		<ul style="list-style-type: none"> <li>• Leverage Massive Open Online Courses (MOOCs), i.e., online courses delivered via distance learning as a cost-effective option to reduce disparities in course quality and training</li> <li>• Use of cloud-based unified communication tools to interact with students, teachers, and administrators remotely</li> </ul>
<p><b>High dropout rates</b></p> <p>Dropout rates are particularly high at higher education institutes with gross enrolment rates decreasing from 135.4% at primary level to 69.5% at</p>	<p>In FY 2018/19, the government launched Literate Nepal, and Let's Bring to School, Retain and Teach programs that aim to:</p>	<ul style="list-style-type: none"> <li>• Adopt digital technologies and blended learning techniques that combine online and face-to-face teaching modes in classrooms</li> <li>• Integrate gamification, AR/VR technology, badges, and</li> </ul>

<sup>79</sup> UNESCO

<p>secondary and 11.8% at tertiary level in 2016<sup>80</sup> due to factors such as:</p> <ul style="list-style-type: none"> <li>• Low student engagement and motivation as a result of poor quality of teaching and learning processes and over-reliance on teacher-centered classrooms that do not prepare students to think critically</li> <li>• Socio economic issues in rural areas leading girls to leave school earlier than boys because of early marriages and to support their families financially</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure compulsory education for all school-age children</li> <li>• Education up to secondary level is made free gradually</li> </ul>	<p>rewards in the classroom to increase engagement</p> <ul style="list-style-type: none"> <li>• Introduce interactive learning modules in rural areas on specific subjects, hobbies, and women empowerment initiatives</li> </ul>
<p><b>Inadequate funding</b></p> <p>Public institutions often face delays in obtaining sufficient government support and funding, possibly due to an inefficient education structure:</p> <ul style="list-style-type: none"> <li>• Currently, the sector is supported by the central government, with regional/provincial governments having limited control and resources</li> <li>• Red tape, corruption, and bureaucratic processes exacerbate the issue</li> </ul>	<p>In April 2018, the Minister for Education, Science and Technology unveiled a 10-point, five-year roadmap which includes structural and organizational reforms to improve the efficiency of the sector</p>	<ul style="list-style-type: none"> <li>• eGovernment solutions that automate tasks undertaken by public officials, reducing spending leaks and improving transparency</li> <li>• Introduce an automated, mobile-based customer management system for institutions to file complaints and track resolutions in case of delays in receiving support</li> <li>• Use common Customer Relationship Management (CRM) and Enterprise Resource Planning (ERP) systems across departments and industry hierarchies to enable information sharing</li> </ul>
<p><b>Physical safety issues</b></p> <p>Since the devastating earthquake of April 2015, education authorities in Nepal have yet to open the new academic session in several districts owing to the quake's adverse impacts:</p> <ul style="list-style-type: none"> <li>• Over 16,000 classrooms at ~6,000 public schools were destroyed, over 7,000 classrooms have major cracks while 12,000 have repairable cracks<sup>81</sup></li> </ul>	<ul style="list-style-type: none"> <li>• The government is drafting policies relating to disaster risk reduction and safety under the SSDP program</li> <li>• The National Strategy for Disaster Risk Management in Nepal also highlights the role the education sector can play in reducing the vulnerability and exposure posed by natural hazards</li> </ul>	<ul style="list-style-type: none"> <li>• Use cloud-based back-up and disaster recovery solutions as well as sensor technology to predict and mitigate the effects of natural disasters</li> <li>• Use of laptops and handheld devices by students could help maintain learning continuity in case schools or universities are inaccessible</li> </ul>
<p><b>Poor quality of vocational training and lack of employability</b></p> <p>Nepali students face significant challenges in finding employment after graduation due to gaps between skills gained and industry needs:</p>	<p>In September 2017, the World Bank approved a US\$60 million credit to support the second phase of the Enhanced Vocational Education and Training</p>	<ul style="list-style-type: none"> <li>• Use of online testing tools to assess student capabilities and interests, and recommend courses accordingly</li> <li>• Introduce technology-assisted learning modules, e.g., an institute in the UK introduced a renovation project in its</li> </ul>

<sup>80</sup> UNESCO Institute for Statistics, Data for the Sustainable Development Goals by Country

<sup>81</sup> Independent news articles

<ul style="list-style-type: none"> <li>• Studies focusing on rote learning are not interactive and do not prepare students to tackle real-world situations</li> <li>• Teachers lack skills in scientific teaching methods</li> <li>• Vocational education curriculum is irrelevant and out-of-date</li> </ul>	<p>Project in Nepal, called EVENT II that is:</p> <ul style="list-style-type: none"> <li>• Designed to improve equitable access to market-relevant training programs and strengthen the delivery of Technical Education and Vocational Training (TEVT)</li> </ul>	<p>vocational class that used film and Padlet to develop students' functional Math and English skills in construction</p>
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## Digital Initiatives Roadmap for the Health sector

While the Government of Nepal allocates a substantial share of its budget to the education sector, cohesiveness between initiatives remains a challenge. Development of an integrated digital education ecosystem that combines various ICT policies and aspects of technology adoption under a single umbrella organization by authorities could improve coordination among all stakeholders in the education value chain.

Following digital initiatives are identified to unlock the potential of Nepal's education sector.

1	Technology and Infrastructure	2	Entrepreneurship/PPP	3	Talent and Skills Development
	<ul style="list-style-type: none"> <li>• Smart Classrooms</li> <li>• OLE Nepal 2.0</li> <li>• Online Learning Platform</li> <li>• Rent-a-Laptop program</li> <li>• EMIS 2.0</li> <li>• Centralized admission application</li> <li>• Biometric Attendance Systems and CCTV Cameras</li> </ul>		<ul style="list-style-type: none"> <li>• Promote entry of edutech start-ups</li> </ul>		<ul style="list-style-type: none"> <li>• Mobile learning centers in rural areas</li> </ul>

## Technology and Infrastructure

Technology infrastructure and services are pivotal to deriving the maximum benefits of next-generation education solutions. Key projects that can be undertaken to improve these areas include:

### 04.01.38.00 Smart Classrooms

**Solution** Integrate technology in classrooms at public schools and colleges including:

- Laptops, mobile phones, and tablets for students, along with sufficient charging points and Wi-Fi connectivity
- Projectors, audio-visual equipment, video recorders, and screens for showing teaching content

- Digital whiteboards that provide an interactive learning experience for students

**Stakeholders**

- Ministry of Education, Science and Technology
- Ministry of Communication and Information Technology
- Ministry of Finance
- Telecoms / Network operators / ISPs

**Timelines**

Long-Term

**Outcomes**

- Innovative technological interventions in the classroom are expected to improve the quality of education and learning outcomes
- Exposure to digital technologies in classrooms will help in making students digital ready with an understanding of how to operate and use these technologies

**04.01.39.00**

**OLE Nepal 2.0**

**Solution**

Leverage existing NGO / private initiatives like OLE Nepal to develop a comprehensive digital library of official curricula.

Extend E-Pustakalaya to include digital versions of the pre-primary and higher education (e.g., university and vocational courses) curricula

**Stakeholders**

- Ministry of Education, Science and Technology
- Ministry of Communication and Information Technology
- Council for Technical Education and Vocational Training
- Nepal Open University

**Timelines**

Long-Term

**Outcomes**

- Help to achieve the following SDGs:
  - Equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university, as digitalization of curriculum will expand access across all strata of society
- Help in lowering the cost of education by providing learning material at a lower cost

**04.01.40.00**

**Online Learning Platform**

**Solution**

Collaborate with educational institutions to develop a platform that delivers educational content as per the national curriculum, for school-going and out-of-school youth as well as teachers. The platform should be delivered on websites and mobile-based devices enabling:

- Students to attend pre-loaded video classes on specific subjects, check homework, submit assignments, and self-design learning programs according to their pace or preference
- Teachers to upload assignments, check homework, provide additional help to weak students through video chat, and publish exam schedules
- Integration of a cloud-based library where content can be downloaded onto laptops/mobiles to access in areas with no Internet connectivity

**Stakeholders**

- Ministry of Education, Science and Technology
- Ministry of Communication and Information Technology
- Schools and universities

**Timelines**

Medium-Term

**Outcomes**

- Improve the quality of education and learning outcomes by enabling interactive and self-learning
- Help in providing education to remote rural areas
- Improve understanding of digital technologies among students

**04.01.41.00**

**Rent-a-Laptop Program**

**Solution**

Nepal should consider launching a Rent-a-Laptop program to digitally empower students nationwide. As part of the program, the Government of Nepal can provide basic laptops to students from underprivileged backgrounds at a marginal cost (e.g., a nominal sum of NPR1, 000 for one year).

The program can target underprivileged students studying at senior secondary and tertiary levels (e.g., colleges and vocational training schools).

**Stakeholders**

- Ministry of Education, Science and Technology
- Ministry of Communication and Information Technology
- Ministry of Finance
- Local levels

**Timelines**

Immediate

**Outcomes**

- Help achieve the following SDGs:
  - 75% increase in the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship
- Bridge the technological gap between urban and rural institutions

**04.01.42.00**

**EMIS 2.0**

**Solution**

The Department of Education (DoE) has developed an integrated EMIS, which captures insights related to Nepali education system across levels.

The information from EMIS is managed and leveraged by various institutions, such as the Department of Education, National Examination Board, National

Centre for Education Development, Non-formal Education Centre, Teacher Record Office, University Grants Commission, Council for Technical Education and Vocational Training and Central Bureau of Statistics.

While a comprehensive EMIS is in place, various stakeholders complain about the poor availability of and high number of bugs in the system. The focus needs to be on streamlining and upgrading the system to ensure proper utilization.

Additionally, DoE can consider enhancing systems capabilities to capture details related to life-long education and TEVET (technical education, vocational and entrepreneurship training) related indicators.

- Stakeholders**
- Ministry of Education, Science and Technology
  - Department for Education
  - Council for Technical Education and Vocational Training

**Timelines** Immediate

- Outcomes**
- Help achieve the following SDGs:
    - Almost 100% enrolment and completion of primary education and 95% of students enrolled in grade one to reach grade eight as digitalization of records provides key insights into the current state of the industry and potential improvement areas
  - Reduce absenteeism and dropouts in schools and universities

#### 04.01.43.00 Centralized Admission System

**Solution** Develop a centralized admission System to be used by all public and private schools and universities, which integrates with existing SIS systems and tracks student admissions.

The tool will include an automated provision for admission quota of underprivileged (SC/ST) communities in the public school and university systems, ensuring transparency.

- Stakeholders**
- Ministry of Education, Science and Technology

**Timelines** Medium-Term

- Outcomes**
- Achieve the SDG goal of 90% attendance at pre-primary education
  - Streamline admission process and improve transparency for students and parents

#### 04.01.44.00 Biometric Attendance System and CCTV Cameras

**Solution** Consider rolling out biometric attendance systems and CCTV cameras at all public educational institutions as these would enable better tracking and monitoring of teacher attendance and service quality at public schools.

- Stakeholders**
- Ministry of Education, Science and Technology
  - Department for Education

- Department of Information Technology
- Provincial Government and Local Level

**Timelines** Medium-Term

- Outcomes**
- Help achieve near universal enrollments and attendance at educational institutions
  - Enhance the accuracy of data collection on enrollments and attendance
  - Improve the security and safety of students

**Case study: Leading telecom operator in Indonesia connects 1,000 schools with high-speed Internet**

XL Axiata, a leading telecom operator in Indonesia, launched the 1,000 School Broadband Program in October 2016. As a part of the program, XL Axiata facilitated 1,000 schools in various provinces to connect to high-speed Internet networks as part of its ongoing CSR activities in support of government programs for school digitization. The program helped more than 400,000 students and thousands of teachers in the learning process.

**Entrepreneurship/Public-Private Partnerships**

While the education sector in Nepal shows immense potential to grow, challenges related to the country’s scale and diversity could impact its progress. Partnerships with technology innovators could go a long way in addressing various challenges and improving the implementation of initiatives. The government should consider the following approaches to create a conducive environment for entrepreneurship in the sector:

- **Promote entry of edutech start-ups:** Encourage private sector participation in the education sector, particularly in higher education to boost competitiveness and innovation:
  - Consider offering incentives, grants, subsidies and tax breaks to companies and start-ups engaging in the education sector.

Solutions from start-up and niche online/ digital education providers should address specific challenges facing the sector.

**Stakeholders:**

- Ministry of Education, Science and Technology
- Department of Education

**Timelines:** Medium term

**Outcomes:**

- Boost technological innovation and development in the sector, thereby driving better quality of education, learning outcomes and increased access

**Talent and Skills Development**

Sustainable impact of ICT in education requires targeted awareness and skills development programs for all stakeholders in the education value chain.

**04.03.45.00 Mobile learning centers in rural areas**

<b>Solution</b>	Establish learning centers in rural areas that target underserved population with limited access to formal education: <ul style="list-style-type: none"> <li>• Provide self-learning and interactive learning in specific skills such as plumbing, electrician, technical training, culinary, sewing, and entrepreneurship</li> <li>• Deploy mobile phones, tablets, and laptops to increase the impact of the initiative</li> </ul>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>• Ministry of Education, Science and Technology</li> <li>• Department for Education</li> <li>• Council for Technical Education and Vocational Training</li> <li>• Local levels</li> </ul>
<b>Timelines</b>	Medium-Term
<b>Outcomes</b>	Help to achieve the following SDG goals: <ul style="list-style-type: none"> <li>• Equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university</li> </ul>

***Case study: Vodafone improving education access in rural Africa through its newly-launched Instant Schools For Africa initiative***

**Objective:** Provide young people in Sub-Saharan African markets with free access to online learning materials, addressing the problem of access to quality education.

**Program Description:** Launched in 2017, the initiative provides school-going children in South Africa, the Democratic Republic of Congo (DRC), Ghana, Kenya, Lesotho, Mozambique, and Tanzania with free access to online learning materials. These include video/interactive exercises, optimized for basic mobile devices and low bandwidth. The initiative targets primary to secondary students (5–18 years old) and is part of Vodafone Foundation’s ongoing mission to use digital and mobile technologies to bring critical educational resources to Africa. Other ongoing initiatives by Vodafone in the region include Vodacom e-schools and the KA Lite open-source platform.

**Expected Outcome:** Vodafone is targeting to help three million children and youth through the program by 2020.

## Energy



A well-developed energy sector is critical for the sustainable development of the Nepali society. While per capita energy consumption in the country is significantly less than its Asian peers, robust industrial growth and rising per capita income has resulted in significant increase in energy demand. This trend is likely to continue over the next few years.

Historically, Nepal has relied on traditional energy sources to cater to its energy requirements. Bio-mass continues to remain the primary energy source for approximately 80% of the citizens, but the steady rise in population, increasing energy demand and decreasing forest areas, raise concerns over the availability of fuel wood energy. Other important sources of energy include oil and petroleum products contributing 10% of energy requirements, followed by coal and hydro.

Severe power shortfall in Nepal in the past few decades has led to a chronic imbalance between power supply and consumption. Electricity supply quality in Nepal is among the lowest in the world, ranking 137<sup>th</sup> out of 147 countries.<sup>82</sup> Aggressive expansion in the country's population, agricultural, and industrial activities have resulted in higher demand for power, worsening the severity of power shortages. Similar to other countries in the region, the rate of electrification in Nepal is approximately 76%. However, significant disparities in electricity access between rural and urban areas exist with only 61% of the rural population having access to electricity, compared to 94% of the urban population.<sup>83</sup>

Nepal is a net energy importer, with 34.76% of its energy needs imported from India.<sup>84</sup> As energy generation via the Nepal Electricity Authority (NEA) is insufficient to meet domestic demand, Nepal supplements its energy sources by importing from India, and through Independent Power Producers (IPPs). Nepal's rich hydro resources are estimated to be able to support power generation up to 42,000 MW.<sup>85</sup> However, by the end of 2016, its total installed hydropower capacity was only 802.4 MW, equivalent to less than 2% of its total generation potential.

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<sup>82</sup> Asian Development Bank (ADB)

<sup>83</sup> Energizing Development (EnDev)

<sup>84</sup> NEA 2017

<sup>85</sup> Asian Development Bank (ADB)

## Recent Developments in the Energy Sector

The Government of Nepal continues to actively pursue measures to overcome load shedding and energy shortage issues in the country. Following the appointment of a new director at the NEA and strong government support, Nepal became load shedding free in May 2018 from improvements in the efficiency of supply and demand management. Having resolved load shedding issues for both household and industrial users, the NEA is currently focusing on maintaining consistent power supply with quality and safety as priorities. The NEA is also taking bold steps to strengthen its financial position through organizational restructuring exercises as well as introducing transparent transfer modality and other measures to improve services, reduce power wastage, and collect outstanding revenues.

Recognizing the need to develop its energy sector to reduce poverty and reinvigorate the economy, the government is prioritizing energy development projects with multiple targets set over the next few years. It is also actively driving efforts to develop hydropower capabilities through initiatives such as the Nepal Power Investment Summit 2018.

Additionally, the Nepal government is focusing beyond traditional energy resources. The government intends to leverage its abundant natural resources such as, hydro, solar, wind, and bio-mass to meet the country's energy demands and reduce the power deficit. To promote and upscale the production of renewable energy sources, the Nepal government formed the Alternative Energy Promotion Centre (AEPC), supported by the Renewable Energy for Rural Livelihood (RERL) project.

### Case study – Bhutan's ambitious hydropower developments to become a net exporter of energy

*Over a 10-year period (2005–2015), Bhutan, a developing nation with similar topography to Nepal, increased its electricity production from 460 MW to 1606 MW,<sup>86</sup> mainly generated through hydropower. Bhutan's electricity exports grew from US\$78 million in 2005 to US\$176 million in 2017, contributing to 40% of its total exports and generating 25% of the government's revenue.*

*Four out of five of its major hydropower projects are financed by the Indian government, with the fifth financed by the Asian Development Bank (ADB) and loans from Indian banks. The investment arrangement helps to cover the financial and construction risks of hydropower projects, with India committing to purchase surplus electricity reflecting production costs plus 15%.<sup>87</sup>*

*Rapid development in the energy sector is reinvigorating Bhutan's economy, with gross GDP projected to record 9.9% in the fiscal year ending 2018. Although current and future revenues generated from energy exports are forecast to cover the cost of hydropower investments, the Bhutan government is taking measures to monitor its hydropower-related costs closely. Under a 5-year plan, the government has stipulated that hydropower debt should not exceed 40% of hydropower earnings, while non-hydropower debt is limited to 35% of GDP.*

## Challenges in Nepal's Energy Sector

The Himalayas cover approximately 75% of land in Nepal providing the country with ample water resources and a favorable terrain for electricity production. Despite its power generation potential, Nepal is a net importer of electricity. In meeting the growing demand for energy, Nepal's electricity imports increased at an average annual growth rate (AAGR) of 20.4% between 2011 and 2016, while NEA's electricity generation grew at 0.3% annually over the same period.

Key hurdles facing Nepal's energy sector include:

- Acute power shortfall, particularly during the dry season when water flow drops, adversely affecting hydropower generation

<sup>86</sup> Hydro World

<sup>87</sup> Nikkei Asian Review, Aug 2017

- Inefficiency in energy transmission through high technical and non-technical losses resulting in one of the highest energy losses in the world
- Inadequate energy preserving and storage facilities, which further worsen the issue of energy security in the country.
- High level of leakage and wastage due to theft
- Underexploited hydropower capacity with Nepal only using a fraction of its commercially exploitable potential
- Despite its abundant hydropower resources, Nepal has one of the highest electricity tariffs in the world
- Regulatory barriers associated with foreign investments (including those in energy development projects), and land acquisition (private landowners for construction of transmission lines)
- Inadequate financial and operational performance of the Nepal Electricity Authority

### Energy in Nepal: Pain Points, Priorities, and Digital Solutions

Pain Points	Government of Nepal's Priorities	Digital as an Enabler
Inadequate power generation		
<ul style="list-style-type: none"> <li>• Nepal has a high dependence on energy imports from India as the NEA only meets 40% of Nepal's energy needs (2017)</li> <li>• Energy generation in Nepal fluctuates depending on water flow due to heavy reliance on hydropower, resulting in lower supply during the winter when demand is typically the highest</li> </ul>	<ul style="list-style-type: none"> <li>• Increase electricity consumption per capita over the next 10 years from 110kw/h to 1500kw/h</li> <li>• Establish a center to implement large-scale PPP hydropower projects and provide relevant transaction advice. Additionally, the government intends to diversify power generation to include other sources such as biomass, solar, wind, and solid waste</li> </ul>	<ul style="list-style-type: none"> <li>• Digitally streamlined PPP application processes to mobilize foreign investment in the development of large-scale hydropower projects and high-voltage transmission lines</li> <li>• Smart grid solutions to develop necessary power distribution infrastructure</li> <li>• Smart building/energy management solutions for the public sector and large enterprises to reduce power consumption</li> </ul>
Limited rural electrification		
<ul style="list-style-type: none"> <li>• Large disparity in electricity access with only 72% of the rural population having access to electricity, compared to 96% in urban areas</li> </ul>	<ul style="list-style-type: none"> <li>• Complete electrification throughout the country by 2021</li> </ul>	<ul style="list-style-type: none"> <li>• Smart power (e.g., cloud-based operating systems, applications integration) can extend electricity and energy reach to rural areas through better management</li> </ul>
High transmission energy losses		
<ul style="list-style-type: none"> <li>• Nepal has one of the highest electricity output losses globally, recording 22.9% in 2017 during the transmission and distribution process</li> <li>• Technical losses such as energy dissipation in the</li> </ul>	<ul style="list-style-type: none"> <li>• NEA is leading several projects to improve grid infrastructure and increase efficiencies including the Smart Metering Smart Grid</li> </ul>	<ul style="list-style-type: none"> <li>• Smart grids and Smart meters to conduct system loss analysis to reduce power losses by leveling, reducing or improving the quality and efficiency of power flows</li> </ul>

transmission lines and non-technical losses such as faulty meters and unmetered energy are key contributors for the output loss	Project and the GIS Smart Grid Project	<ul style="list-style-type: none"> <li>Advanced analytics solutions to track energy consumption and check power thefts</li> </ul>
Inefficiency of the Nepal Electricity Authority (NEA)		
<ul style="list-style-type: none"> <li>In FY2016/2017, the NEA incurred a net loss of approximately US\$8.98 million</li> <li>The increasing cost of power purchased from IPPs could destabilize the agency's financial position further</li> <li>Concerns over the NEA's ability to meet contractual obligations in power development projects due to its financial standing</li> </ul>	<ul style="list-style-type: none"> <li>Measures to restructure the NEA and improve the efficiency of related organizations</li> <li>Plans to evaluate and adjust electricity tariff rates, power purchase rates, and wheeling charges according to climate and time, to reduce costs and boost energy distribution efficiency</li> </ul>	<ul style="list-style-type: none"> <li>Use of digital technologies in meter reading collection (smart meters), payment collection, customers services to improve operational efficiency</li> <li>Field force automation solutions for optimal use of field forces such as technicians and meter readers</li> </ul>

**Case study: Digital tech addressing Brazil's power theft crisis**

The rising incidence of electricity theft in Brazil was costing its government billions in lost revenue. On average, 8% of energy in Brazil was being stolen from the grid each year, reaching a staggering 40% in some areas.

**Solution:** Siemens used the innovative Smart Meter software to access, collect, and process data from smart meters, integrating the platform with the billing and management system to ensure efficient energy billing to users. From the analysis of consistent data, Siemens was also able to identify the culprits as being a group of small and mid-sized enterprises that were using stolen energy to reduce their overheads. By building complicated user profiles, smart algorithms continuously compare an estimated consumption pattern to the amount of energy coming from the grid. The system can also detect any anomalies in electricity use, which is then inspected. <sup>88</sup>

**Digital Initiatives Roadmap for the Energy Sector**

The Government of Nepal should consider increasing its focus on digital investments in the energy sector to maximize its ability to meet power demands and generation potential through the following recommended initiatives:

1	Technology and Infrastructure	2	Entrepreneurship/PPP	3	Talent and Skills Development
	<ul style="list-style-type: none"> <li>Smart Metering</li> <li>GIS Smart Grid Project</li> <li>Pan-Nepal roll-out of NEA's- Any Branch Payment System (ABPS)</li> <li>NEA Official Mobile App 2.0</li> <li>Smart Building/Energy Management Project</li> </ul>		<ul style="list-style-type: none"> <li>Digitally streamlined licensing and PPP application processes</li> </ul>		<ul style="list-style-type: none"> <li>NEA e-Learning Platform</li> <li>Contract Management Information System</li> </ul>

<sup>88</sup> Siemens

<ul style="list-style-type: none"> <li>• NEA Field Force Automation Solutions</li> <li>• NEA Customer Service Portal</li> </ul>		
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## Technology and Infrastructure

The recommended initiatives to expand technology-based electricity generation and distribution capacity in Nepal are as follows:

### 05.01.46.00 Smart Metering

<b>Solution</b>	<p>Introduction of smart meters can help reduce energy losses and improve operational efficiencies through data and trend analysis. The government has allocations for smart meters in Nepal in the 2016/2017 budget with the project to be implemented in three phases. This is expected to improve efficiencies in the energy sector through:</p> <ul style="list-style-type: none"> <li>• A nationwide shift from analog to smart meters</li> <li>• Automatic meter reading (AMR) system with advanced metering infrastructure (AMI) application in existing meters</li> <li>• Forecast load demand by actual electricity usage</li> </ul>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>• Ministry of Energy, Water Resources and Irrigation</li> <li>• Nepal Electricity Authority</li> <li>• Electricity Tariff Fixation Commission</li> <li>• Hydropower development companies</li> </ul>
<b>Timelines</b>	Medium-Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>• Reduce and control electricity leakages and wastage resulting in significant improvements in NEA's efficiency</li> <li>• Improves efficiency through automatic reading collection</li> </ul>

### 05.01.47.00 GIS Smart Grid Project

<b>Solution</b>	<p>Smart grids with GIS technology are electricity networks that enable monitoring, analysis, control, and communication capabilities in the electricity supply chain, from the power plant to the end user in the context of geography. Smart grids incorporating GIS technology in Nepal are funded through the 2016/2017 government budget and aim to achieve the following:</p> <ul style="list-style-type: none"> <li>• Manage information about poles, transformers, and meters along with the consumer's information geographically</li> <li>• Forecast load demand by actual electricity usage</li> <li>• Identify and manage electricity leakages</li> </ul>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>• Ministry of Energy, Water Resources and Irrigation</li> <li>• Nepal Electricity Authority</li> <li>• National Transmission Grid Company</li> </ul>

<b>Timelines</b>	Long-Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>● Obtain digital visual maps of the equipment including poles and transformers to help locate failure and increase efficiency in equipment management and maintenance.</li> <li>● Real time demand assessment and efficient energy transmission/supply/ load management.</li> <li>● Better demand prediction and planning</li> <li>● A pool of valuable (geographic dispersion and household energy use) data for better strategic planning and prudent energy security measures.</li> </ul>

**05.01.48.00 Pan-Nepal Roll-out of NEA's- Any Branch Payment System (ABPS)**

<b>Solution</b>	<p>NEA has introduced the Any Branch Payment System (ABPS) in Kathmandu Valley, which allows customers to pay their bill at any NEA location with ease.</p> <p>Deploying ABPS services out across Nepal will make NEA services more accessible to the public and facilitate timely payment of electricity bills.</p>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Energy, Water Resources and Irrigation</li> <li>● Nepal Electricity Authority</li> <li>● Nepal Rastra Bank</li> <li>● Financial institutions</li> <li>● Payment gateway owners</li> </ul>
<b>Timeline</b>	Medium-Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>● Improve customer satisfaction by enabling them to pay electricity bills across NEA branches</li> </ul>

**05.01.49.00 NEA Official Mobile App 2.0**

<b>Solution</b>	<p>In 2017, NEA launched its official mobile application enabling users to access all its functions including electricity tariffs, register complaints, locate areas experiencing a power cut and restoration times as well as electricity bills.</p> <p>As the current version offers limited functionalities, the government and NEA should consider developing the NEA Official 2.0 application to include features such as online bill payment; AI powered voice/chat bots to quickly attend to customer queries on outages and other related matters; and real-time power usage monitoring/tracking.</p>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Nepal Electricity Authority</li> <li>● Financial institutions</li> <li>● Payment gateway owners</li> </ul>
<b>Timeline</b>	Immediate

- Outcomes**
- Improve information availability and customer communication
  - Improve customer satisfaction
  - Use of disruptive technologies to help in improving operational efficiencies

**05.01.50.00 Smart Building/Energy Management Project**

**Solution** Energy management involves optimizing energy consumption in a building by employing energy-efficient measures.

Deployment of smart building/energy management solutions in government offices and departments can be effective in reducing energy consumption and carbon footprint over the next five years.

- Stakeholders**
- Ministry of Energy, Water Resources and Irrigation
  - Department of Electricity Development
  - Department of Urban Development and Building Construction

**Timelines** Long-Term

- Outcomes**
- Reducing power consumption through the use of latest technologies and power efficient products
  - Reducing impact on the environment by reducing carbon emissions

**05.01.51.00 NEA Field Force Automation Solutions**

**Solution** Field force automation solutions can improve the efficiency of NEA's field force in the following ways:

- Automatically schedule and allocate work to field engineers
- Use mobile applications (e.g., GPS tagging, AMR) to enable collection of meter readings and a reduction in complaints/fraud related to meter readings

- Stakeholders**
- Ministry of Energy, Water Resources and Irrigation
  - Nepal Electricity Authority
  - Department of Electricity Development

**Timelines** Long-Term

- Outcomes**
- Better resource allocation and productivity improvement through route optimization and elimination of idle time
  - Increased service revenues
  - Timely attendance to field requests

05.01.52.00

## NEA Customer Service Portal

<b>Solution</b>	<p>As part of its efforts to provide better customer experience, NEA is focusing on leveraging digital technologies such as online payments via partner banks and wallets and customer care helplines.</p> <p>NEA should also consider offering better self-service options to its customer base by developing a customer service portal. It should leverage technologies such as AI and chatbots to handle tasks such as complaints, queries, and digital payment solutions.</p>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>• Ministry of Energy, Water Resources and Irrigation</li> <li>• Nepal Electricity Authority</li> <li>• Department of Electricity Development</li> </ul>
<b>Timelines</b>	Immediate
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>• Improved customer interaction and satisfaction</li> <li>• Increased efficiency in attending to customer queries</li> <li>• Faster response time and consistency across all channels</li> </ul>

**Case study: Smart grid technology reducing power outages in Bosnia and Herzegovina**

*To the people of Brcko, Bosnia and Herzegovina, frequent power outages were a way of life affecting businesses, schools, and homes. During storms or technical failures, residents could lose power for extended periods.*

*USAID and its partners, the US Energy Association, Schweitzer Engineering Laboratories, and Brcko Komunalna, the electric utility serving the Brcko district of Bosnia and Herzegovina, joined forces to support a smart grid technology pilot project between September 2015 and September 2016 that dramatically improved the reliability of electricity supply in Brcko.*

*Schweitzer Engineering's technology could instantly identify the location of power outages caused by storms and technical failures on Brcko's distribution lines. Previously, during a power outage, employees would have to drive or walk along the power lines until they found the problem. The new technology not only reduces the number of trucks and employees needed to restore services, but also improves customer services while reducing emissions and costs associated with the use of diesel-powered backup generators. The project has reduced the frequency and duration of electricity outages. Over the project period, customers on an affected line reported a 51% drop in the number of outages, and 58% reduction – or about 8 hours – in the duration of outages compared with the same period the previous year.<sup>89</sup>*

**Entrepreneurship/Public-Private Partnerships**

The Government of Nepal acknowledges the importance of private sector involvement and investment to fully develop Nepal's hydropower capacity. In considering public-private partnerships (PPPs) hydropower generation models, the government should also work to address constraints to private investments in infrastructure, including regulatory barriers (e.g., simplifying licensing procedures, forest clearance, and land acquisition procedures).

- **Digitally streamlined licensing and PPP application processes**

A digitally streamlined PPP application process creates a conducive environment for private sector mobilization and foreign investment in the development of large-scale hydropower projects and high-voltage transmission lines.

<sup>89</sup> USAID

Additionally, the Department of Electricity Development should digitalize the process of license allocation, in order to ensuring transparency and expedite the process.

**Stakeholders:**

- Ministry of Energy, Water Resources and Irrigation
- Nepal Electricity Authority
- Department of Electricity Development
- Nepal Investment Board

**Timelines:** Immediate

**Outcomes:**

- Help Nepal tap into the potential of its hydro-energy resources, driving economic growth and creating jobs
- Increased private sector investments in Nepal’s energy sector due to better transparency in the process
- Shorten the duration of application for survey and project licensing
- High quality/competitive infrastructure development in the energy sector
- Help in addressing SDGs related to affordable, reliable, sustainable and modern energy for all (SDG # 7)

**Case study: A telecom tower company brings electricity to rural Bangladesh**

edotco Bangladesh, a tower infrastructure company, leverages renewal energy sources to reduce its carbon footprint. The company operates 9,000 telecom towers in Bangladesh, of which 500 towers are powered by solar and wind energy.

The company has launched the Tower to Power project as a part of its CSR initiatives. Through this program, the company distributes a part of electricity generated from its renewable energy powered towers with communities around the site. As of August 2017, more than 160 homes, 13 mosques, and two schools in Bangladesh’s remote areas benefited from edotco’s Tower to Power program.<sup>90</sup>

**Talent and Skills Development**

Training public sector employees working in the electricity sector would be critical for the success of the Digital Nepal initiatives.

**05.03.53.00 NEA e-Learning Platform**

**Solution** A virtual learning platform to support the efforts of NEA Training Centers is essential to impart technical and digital skills and knowledge to its staff for a smooth transition to digital energy.

- Stakeholders**
- Ministry of Energy, Water Resources and Irrigation
  - Nepal Electricity Authority
  - Ministry of Communication and Information Technology
  - Nepal Telecommunications Authority

<sup>90</sup> edotco Group

- ISPs

**Timelines** Medium-Term

**Outcomes**

- Digitally efficient and savvy specialists in the sector to accelerate the country's transition to Digital Nepal

**05.03.54.00 Contract Management Information System**

**Solution** The contract management system will allow the government, investors, and energy companies to have systematic procedures on the creation, negotiation, and approval of all contract types. Maintaining a centralized repository for all contract information can improve the efficiency of managing capital projects, assets, and supply chain processes. As energy projects are a high investment and established with public investment via initial public offering (IPO), the proposed system will provide transparency in project implementation, milestones, audit and fund utilization.

**Stakeholders**

- Ministry of Energy, Water Resources and Irrigation
- Nepal Electricity Authority
- Hydropower development company

**Timelines** Immediate

**Outcomes**

- Locate contracts easily from a central repository
- Maintain contract standardization and reduce operational costs by automating the creation, review, approval, and execution processes
- Helps in tracking contract performance
- Achieve SDG Goal 7 to ensure access to affordable, reliable, sustainable, and modern energy for all

## Tourism



Blessed with world-class tourist attractions, Nepal has a naturally rich topography and culture that caters to diverse travel interests ranging from pilgrimage/religious sites to wildlife parks, mountaineering, adventure trekking, and luxury holidays.

The travel and tourism sector is a primary source of revenue, foreign exchange, and employment for the country, contributing 7.8% to total GDP and 6.6% to total employment (translating into ~1,027,000 jobs) as at 2017.<sup>91</sup> Given the sector's direct positive impact on Nepal's economic growth, the government is stepping up efforts to promote travel and tourism through an array of market-friendly policies, targeted marketing campaigns, and investment programs.

Key initiatives fall under its new policy, the National Tourism Strategy 2016–2025, which envisages a fivefold increase in annual arrivals by 2025.<sup>92</sup> An immediate focus area of the government is the Visit Nepal 2020 program that aims to attract two million tourists and generate one million job opportunities in the sector by 2020.<sup>93</sup>

### Key Government Initiatives in Tourism:

National Tourism Strategy 2016–2025	Visit Nepal 2020
Envisages a fivefold increase in annual arrivals and 9.29% growth in the sector's contribution to GDP by 2025. Also aims to add 4,000 hotel rooms in Kathmandu by 2018–2019.	An immediate focus area of the government, Visit Nepal 2020 aims to attract two million tourists and create one million jobs in the sector by 2020.
Attracting Tourists from Regional Countries	Partnerships with International Organizations
The Government of Nepal is encouraging tourism, mainly from China, its largest tourist	The government has partnered with the World Bank's International Finance Corp (IFC) and FMO, a Netherlands-based development bank,

<sup>91</sup> World Travel & Tourism Council (WTTTC), Data Gateway, Nepal, <https://tool.wttc.org>.

<sup>92</sup> Debanjana Bhattacharya, "Nepal Tourism launches new National Tourism Strategy", Travel News Digest, August 30, 2016, <http://www.travelnewsdigest.in/2016/08/nepal-tourism-launches-new-national-tourism-strategy>.

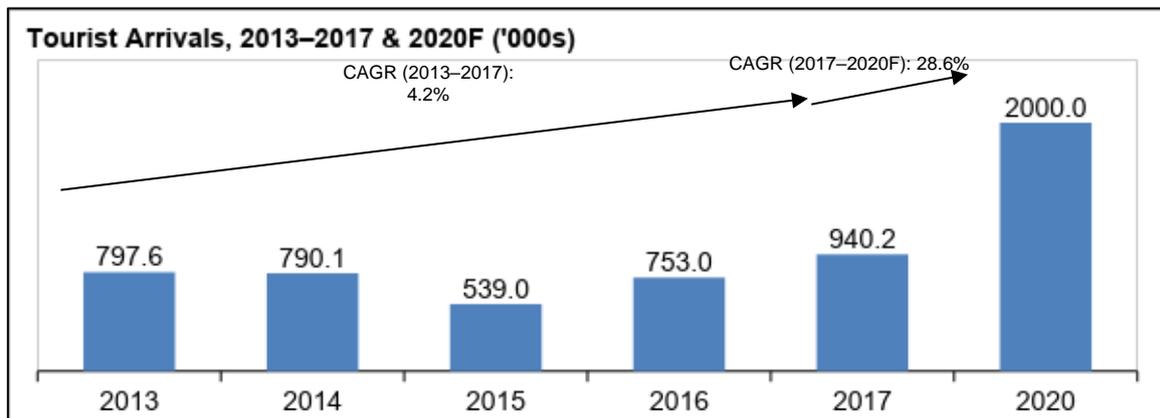
<sup>93</sup> Ministry of Tourism and Civil Aviation, Tourism Vision 2020 Policy Document, May 2009.

demographic, with the launch of its customized website in Chinese language.	to build critical infrastructure including a US\$6 million, green-field, three-star hotel in Kathmandu, under the Fairfield brand. <sup>94</sup>
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**Encouraging Private Investments in the Tourism Sector**

Driven by policies to boost the tourism sector, the hospitality industry in Nepal is in an expansionary mode to accommodate the influx of tourists, with domestic and foreign investors announcing plans to invest NPR60 billion (US\$0.55 billion) in hotel projects across the country in 2016.

Prominent initiatives include the re-entry of Indian hotel chain, Taj Hotels Resorts and Palaces, into Nepal to operate a new lodge in Chitwan; ongoing construction by InterContinental Hotels and the Sheraton Group in various regions in Nepal; and expansion of several local hotel companies including Nepal Hospitality Group, Muktishree Group, and Glacier Hotel.



All figures are rounded. The base year is 2013; Source: World Travel & Tourism Council

Despite the government-led efforts, growth has been relatively slow, with tourist arrivals to Nepal at a five-year CAGR of only ~4.2% (2013–2017), reaching 940,218 tourists in 2017,<sup>95</sup> primarily owing to the country’s underdeveloped infrastructure. To achieve its 2020 target of two million tourists, arrivals will need to increase multifold, at a CAGR of 28.6%, requiring the government to intensify initiatives to boost the sector.

**Challenges in Nepal’s Tourism Sector**

While the Government of Nepal aspires to strengthen the tourism sector’s productivity, income, and image internationally, it continues to trail other countries in the region due to several inherent challenges. In 2017, the sector accounted for ~7.8% of Nepal’s GDP, compared to 21.2% in Thailand, 11.6% in Sri Lanka, and 8.9% for countries in South Asia.<sup>96,97</sup> Critical challenges in Nepal’s tourism and hospitality sector include:

<sup>94</sup>The Himalayan Times, “IFC, FMO invest \$5.5m in Fairfield Marriot Hotel”, June 21, 2017.

<sup>95</sup>Nepal Tourism Statistics 2017 Publication, Ministry of Culture, Tourism & Civil Aviation.

<sup>96</sup>World Travel & Tourism Council (WTTC), Data Gateway, Nepal.

<sup>97</sup>South Asia includes India, Myanmar, China, Bangladesh, Vietnam, Cambodia, Thailand, Sri Lanka, Laos, and Nepal.

- Poor infrastructure to support tourism activities, including congested airports, poor quality of roads and facilities, and weak IT infrastructure to support digital initiatives. The massive April 2015 earthquake that severely damaged many of the country's historic sites further exacerbate this problem
- Lack of effective marketing and promotional activities to promote Nepal as a tourist destination, possibly due to lack of funds
- Tourists' negative perceptions about safety and security risks due to past instances of political turmoil, terrorism from neighboring countries, and natural disasters
- Shortage of skilled and professional workforce, with most tour guides speaking very little English, weakening the image of Nepal as a tourism destination internationally
- Tourists to Nepal often complain about the lack of reliable, up-to-date information on tourist spots, weather conditions, and activities available
- Low focus on promoting domestic tourism, leading to lost revenue opportunities for the sector

The new government intends to revitalize the tourism sector during its tenure by rolling out a 100-day action plan to address various challenges. Key areas under the action plan include:

#### **Technology and Innovation**

- Digitalize and consolidate archives of national importance; catalog, tag, and upload 11,550 of 31,000 handwritten manuscripts, along with 655,000 images preserved at the National Archives
- Form a think tank to gather suggestions and feedback regularly, and draft a concept paper on mobilizing tourism attachés in five major markets

#### **Administrative**

- Establish a secretariat to oversee Visit Nepal 2020
- Form a committee to determine the actual contribution of the tourism sector to Nepal's economy
- Resolve the dispute over the use of modern materials to rebuild the archeological heritage monuments and reconstruct.
- Draft a formal Casino Act to streamline the gambling business and address the evasion of royalties and taxes by casino operators

#### **Infrastructure**

- Finalize the modality of the proposed Nijgadh International Airport in Bara within 100 days
- Build a Guerrilla Trail and Yarsa Trail at least 10km long to offer a unique trekking experience
- Develop model tourist destinations in all seven provinces of Nepal such as Ilam, Janakpur, Makwanpur, Pokhara, Rupandehi, Mugu, and Kailali

## **Promise of Digital Initiatives in the Tourism Sector**

Increasing connectivity driven by the proliferation of Internet and mobile devices and growing affordability of digital technologies are transforming the nature of tourism and consumer demand. Globally, ICT penetration is typically high in the travel, tourism, and hospitality sector, with the automation of almost every process from research, price comparison and ticketing to booking and reservations. Nepal can learn from other countries successfully implementing digital tourism technologies to address the inherent challenges of its tourism sector.

Use of digital technologies in the tourism sector presents new revenue streams for Nepal through increased profitability of its various stakeholders and generates significant benefits for society through a reduction in environmental footprint, better safety and security, and cost and time savings. Nepal appears to be in the early stages of ICT implementation. Currently, digitalization efforts are limited to website development for the Ministry of Culture, Tourism and Civil Aviation (MoCTCA) and Department of Tourism while the hospitality industry operates basic CRM and revenue management systems. Nepal

has a long way ahead to gain measurable benefits from ICT through the large-scale implementation of digital initiatives in tourism.

### Tourism Sector in Nepal: Pain Points, Priorities, and Digital Solutions

Pain Points	Government of Nepal's Priorities	Digital as an Enabler
Inadequate infrastructure		
<p><b>Airports</b></p> <p>Nepal has only one international airport – Tribhuvan International Airport (TIA), considered among the worst in the world according to tourist reviews<sup>98</sup> due to:</p> <ul style="list-style-type: none"> <li>• Small size with just one runway and limited capacity, resulting in overcrowding and baggage collection issues</li> <li>• The runway is developing cracks and potholes, worsening congestion and causing flight delays</li> <li>• Lack of basic amenities like toilets, cleanliness, and e-ticketing services</li> <li>• Untrained and unskilled employees</li> </ul> <p>The airport is the first point of contact for tourists. As such, any negative impression could hamper tourist growth in the country.</p>	<p>Under the 100-day action plan, the government has announced several measures to revitalize its airport, including:</p> <ul style="list-style-type: none"> <li>• Increasing the operation hours of TIA from the current 17 hours/day to over 20 hours/day</li> <li>• Completing 40% of the physical infrastructure of Gautam Buddha International Airport in Bhairahawa and 50% physical progress by June 2018</li> <li>• Purchasing six Twin Otter aircrafts to serve remote areas</li> </ul> <p>There are also plans to complete construction of the Pokhara Airport by 2020.<sup>99</sup></p>	<ul style="list-style-type: none"> <li>• Use of digital signages and touchscreen kiosks to provide tourism information</li> <li>• Advertise tourism-related offers and alerts via free Wi-Fi services at the airport</li> <li>• Digitize immigration, Customs and visa processes through the use of automated gateways to scan passports, visas, and boarding passes</li> <li>• Use of e-visas and digital immigration records to move toward paperless immigration processes which are faster and could alleviate congestion at airports</li> </ul>
<p><b>Road infrastructure</b></p> <ul style="list-style-type: none"> <li>• Congestion in popular tourist areas due to the poor quality of roads and traffic mismanagement</li> <li>• Lack of last-mile connectivity in remote, hard-to-reach areas</li> <li>• Weak regulation of driving licenses is a major contributor to the presence of unsafe, inexperienced drivers on the road, presenting significant reputational and safety risks</li> </ul>	<ul style="list-style-type: none"> <li>• In Jan 2017, ~US\$1.35 million grant was allocated to procure a 150-kilowatt solar power plant to power e-vehicles plying the World Heritage Site of Lumbini, to reduce congestion and pollution</li> <li>• The government has commenced construction of the Kathmandu Nijgadh Fast Track road</li> </ul>	<ul style="list-style-type: none"> <li>• Use of smart traffic management and intelligent lighting control systems for real-time and predictive traffic information</li> <li>• Vehicle tracking and monitoring using RFID tags</li> <li>• Use of GPS technology by cabs transporting tourists to check road conditions</li> </ul>

<sup>98</sup> Dr Perry Haan, "Tourism issues involving Nepal's economy", Watertown Public Opinion, August 17, 2017.

<sup>99</sup> Address by the Right Honorable President of Nepal, Mrs Bidya Devi Bhandari, to the Joint Session of both Houses of the Federal Parliament, May 21, 2018.

<p>Facilities</p> <ul style="list-style-type: none"> <li>• Shortage of tourist facilities like ATMs, information centers, currency exchanges outside mainstream tourist spots</li> <li>• Inadequate information on health, hygiene, and ecology</li> <li>• Limited connectivity in popular trekking areas, resulting in the inability to track tourists in case of emergencies</li> </ul>	<ul style="list-style-type: none"> <li>• Under the Visit Nepal 2020 campaign, the government is investing in the development of additional tourist facilities and infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• Equip self-service kiosks in tourist centers</li> <li>• Enable booking through mobile and web channels</li> <li>• Install Wi-Fi hotspots</li> <li>• Develop websites and portals with comprehensive tourism information</li> </ul>
<p>4. IT infrastructure to support digitalization</p> <ul style="list-style-type: none"> <li>• Inability to perform digital payments due to poor integration between payment systems of banks, mobile wallets, and merchants; and lack of facilitation for foreign currency payments</li> <li>• Highly fragmented databases and poor integration between airports, tourism authorities, travel agencies, and hotels</li> </ul>	<ul style="list-style-type: none"> <li>• In May 2017, Nepal Rastra Bank (NRB) reviewed its retail payment systems to identify regulatory gaps and barriers, as well as to develop a national retail payment strategy, to support digital payments</li> </ul>	<ul style="list-style-type: none"> <li>• Implement centralized IT systems such as Global Distributed Software (GDS) and reservation management systems to connect all licensed agencies with the government to enable information sharing</li> </ul>
<p>Limited tourism information availability</p>		
<ul style="list-style-type: none"> <li>• Lack of information on tourism destinations, health and hygiene, natural hazards, changes in biodiversity, and ecology Tourism websites, books, and brochures are limited; and those that are available are scattered, not updated regularly or reliable As tourism is an information-intensive business, poor data access could weaken Nepal's position in the global tourism industry.</li> </ul>	<ul style="list-style-type: none"> <li>• Nepal Tourism Board (NTB) has launched <a href="http://www.welcomenepal.com">www.welcomenepal.com</a>, its official tourism website, with detailed information on tourist attractions, activities, events, climate, and local transport options</li> </ul>	<ul style="list-style-type: none"> <li>• Develop an official website and mobile application for the NTB with regular updates on attractions, weather, travel, accommodation, and e-ticketing</li> <li>• Equip tourist centers with self-service information kiosks, digital signages, and maps</li> </ul>
<p>Lack of effective marketing strategies</p>		
<p>Despite its rich cultural heritage and terrain, Nepal is not at the top of the travel list for most tourists owing to several factors:</p> <ul style="list-style-type: none"> <li>• Lack of promotional activities advertising Nepal as a tourism destination</li> </ul>	<ul style="list-style-type: none"> <li>• The government has introduced several tourism campaigns including Visit Nepal 2018, Campaign HAN, and Himalayan Travel Mart 2018</li> <li>• Launch a customized website in Chinese language to attract visitors from China who form a majority of Nepal's tourists</li> </ul>	<ul style="list-style-type: none"> <li>• Use augmented reality apps to provide tourism information, navigation, guides, and translations</li> <li>• Virtual reality technology to recreate tours, showcase accommodation, and advertise hotels</li> </ul>

<ul style="list-style-type: none"> <li>• Lack of opportunity to fully capitalize on the country’s mountaineering, pilgrimage, medical tourism, and ecotourism features, indicating lost revenue channels</li> <li>• The government’s inability to diversify tourism products, possibly due to lack of funding</li> <li>• Poor grievance-handling for tourists across multiple channels such as email, social media and phone.</li> </ul>	<ul style="list-style-type: none"> <li>• In 2017, the NTB signed up with BBC World, Reuters, and TripAdvisor to display promotional videos of Nepal through the media channels</li> </ul>	<ul style="list-style-type: none"> <li>• Deploy online marketing, SEM/SEO tools including targeted ads for travelers</li> <li>• Social media marketing, peer reviews, and user-generated content build brand value and attract visitors</li> <li>• Automate customer service and outsource grievance handling to specialized IT providers</li> </ul>
<p>Shortage of skilled workforce in the tourism sector</p>		
<p>As the majority of the country’s skilled talent have migrated overseas for work, Nepal’s tourism sector is forced to hire unskilled people from rural areas with little experience; gender equality issues and socio-cultural factors also prevent women from working in the sector</p>	<ul style="list-style-type: none"> <li>• Nepal Academy of Tourism and Hotel Management offers Bachelor’s and Master’s Degrees in Hospitality Management, as well as Bachelor’s Degree in Travel and Tourism</li> <li>• The Government plans to set up training centers to coach tourist guides, and a Tourism University to offer higher education in tourism to meet human capital demand</li> </ul>	<ul style="list-style-type: none"> <li>• Use of automated tour guides that connect to visitors’ mobile phones and provide historical information, reducing the need for physical tour guides</li> <li>• Monuments and heritage sites can be connected with sensor/IoT technology, QR codes, and RFID tags to provide information</li> </ul>
<p>Low focus on domestic tourism</p>		
<p>Majority of tourism policies in Nepal target foreign tourists with little being done to promote domestic tourism, leading to:</p> <ul style="list-style-type: none"> <li>• Growth in outbound tourism as Nepalese travel overseas during the holiday season (October–November)</li> <li>• Loss of opportunity to tap into the rising disposable incomes and spending power of Nepalese</li> </ul>	<ul style="list-style-type: none"> <li>• Government-led initiatives to improve infrastructure and marketing/promotional activities could benefit both international and domestic tourism</li> <li>• Ongoing programs by NTB to boost domestic tourism such as Travel Nepal and Photo Nepal to promote Nepali tourism using photography; Safa Nepal to foster cleanliness around heritage sites, and Chulo Nepal to publicize Nepali food and hygiene conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Create websites/helplines in local Nepali languages to cater to the diverse ethnic local population</li> <li>• Train local entrepreneurs, particularly in rural tourists hotspots like Manang, Mustang, Rara Lake, and Ghandruk, to boost domestic tourism</li> </ul>

### Digital Initiatives Roadmap for the Tourism Sector

The Government of Nepal should consider formulating a comprehensive model for the tourism industry, encompassing infrastructure, attractions, accessibility, amenities, and ancillary services, along with key technology tools.

Following digital initiatives are identified to unlock the potential of Nepal's tourism sector:

1	Technology and Infrastructure	2	Entrepreneurship/PPP	3	Talent and Skills Development
	<ul style="list-style-type: none"> <li>• Welcome Nepal Website and Mobile App 2.0</li> <li>• Electronic Visas &amp; Immigration Process Improvement</li> <li>• Multilingual Helpline</li> <li>• Augmented and Virtual Reality tours</li> <li>• Electronic Tour Guides</li> <li>• Omnichannel Marketing</li> <li>• Tourist Security Infrastructure</li> </ul>		<ul style="list-style-type: none"> <li>• Entry of travel startup and foreign companies</li> <li>• Public private investments and partnerships with sharing economy players</li> </ul>		<ul style="list-style-type: none"> <li>• Training programs for local guides</li> <li>• Tie-ups with educational institutions</li> </ul>

## Technology and Infrastructure

The following initiatives seek to address the gaps in insufficient tourism infrastructure. Selected projects for the consideration of the Government of Nepal include:

06.01.55.00

### Welcome Nepal Website and Mobile App 2.0

#### Solution

Enhance the official web portal [www.welcomenepal.com](http://www.welcomenepal.com) to make it a one-stop shop offering services such as direct booking of accommodation, transport, e-tickets to sites, flights, visa and immigration information, support for special needs/disabled tourists, and helpline/emergency contact details:

- Integrate AI/ chatbot technology to answer tourist queries
- Enable tourists to obtain trekking permits through the website or mobile application

Expand the Welcome Nepal web portal to the mobile platform to include services such as online ticket booking to all tourist spots in the country, barcodes at heritage sites to provide information on the area in tourists' local language, online booking feature for cabs and tourist guides, accommodation details, and other tourist-related services. Enable tourists to obtain trekking permits through the website or mobile application.

The website is currently available on Android and should be extended to include other operating systems such as Apple iOS and Linux to increase reach.

#### Stakeholders

- Ministry of Culture, Tourism and Civil Aviation
- Nepal Tourism Board

- Nepal Information Technology Centre

**Timelines** Immediate

- Outcome**
- Support the government’s target of achieving two million tourist arrivals by 2020, as a comprehensive website will provide end-to-end information through a single interface
  - Position Nepal as a tourist friendly destination
  - Address concerns on poor/unreliable information availability
  - Foster closer relationships amongst various industry stakeholders
  - Provide on-the-go information to tourists
  - Save time and effort in making bookings and planning holidays
  - Encourage cashless transactions, which in turn, will further boost the Nepali economy

**06.01.56.00**

**Electronic Visas and Immigration Process Improvement**

**Solution** Introduce online visa applications and issuance of electronic visas (e-visas) for entry into Nepal to replace the current paper visa application system.

Build a digital border management system and an e-immigration service, which will digitize internal systems of the Department of Immigration and check-posts; develop a secure and centralized network to track and facilitate travelers; and create a web-based application that provides information on immigration options and includes answers to common immigration questions.

Start with a few pilot countries including India and China and extend to other nations over the next five years.

- Stakeholders**
- Ministry of Culture, Tourism and Civil Aviation
  - Ministry of Home Affairs
  - Ministry of Foreign Affairs
  - Ministry of Communication and Information Technology
  - Department of Immigration

**Timelines** Long-Term

- Outcome**
- Boost Nepal’s image as an international tourist destination as the immigration process creates the “first impression” of a country
  - Helps in improving tourist experience due to an efficient visa and immigration process and lower wait times at airports.
  - Allow visitors to easily access information on the immigration process and store their data in a digital format

**06.01.57.00 Multilingual Helpline**

**Solution** Develop multilingual support – phone, website, and mobile application – to cater to multiple nationalities seeking to visit Nepal. Focus on English, Hindi, Bengali, and Chinese – the group of language speakers that constitute the highest share of tourists.

- Stakeholders**
- Ministry of Culture, Tourism and Civil Aviation
  - Department of Tourism
  - Nepal Tourism Board

**Timelines** Immediate

- Outcome**
- Consistent user experience across multiple touch points and devices – including phone, web and mobile
  - Increase in traveler engagement due to the option of interacting in the preferred local language
  -

**06.01.58.00 Augmented and Virtual Reality tours**

**Solution** Deploy AR/VR technology on Nepal's official tourism website and mobile app to showcase popular attractions (e.g., temples, Mount Everest) and immersive content, giving travelers a real-world feel.

- Stakeholders**
- Ministry of Culture, Tourism and Civil Aviation
  - Department of Tourism
  - Nepal Tourism Board

**Timelines** Long-Term

- Outcome**
- Enhance travel experience and increase visitor engagement
  - Increase consumer attention and attraction by providing a realistic look and feel of tourist destinations
  - Boost conversions for tour and activity operators
  - Optimize Nepal Tourism Board's marketing and promotions ROI

**06.01.59.00 Electronic Tour Guides**

**Solution** Provide devices with pre-loaded historical information on key tourist sites, temples, and museums; and offer travelers the option to purchase and rent the device:

- Phase II would cover the development of a mobile version of the guide that can be downloaded on travelers’ phones upon paying a small fee

- Stakeholders**
- Ministry of Culture, Tourism and Civil Aviation
  - Department of Tourism
  - Nepal Tourism Board

**Timelines** Medium-Term

- Outcome**
- Promote Nepal as a tourist friendly destination and improve tourist experience
  - Enables users to customize their experience and explore at their own pace

**06.01.60.00**

**Omnichannel Marketing**

**Solution** Launch a comprehensive omnichannel marketing campaign across all channels – online, mobile, social media, TV, and print (e.g., newspapers, flyers) with a common theme and positioning to promote Nepal’s attractions:

- Consider partnerships with popular lifestyle magazines such as Time Out and sites like Trip Advisor to provide information about the best options for a night out, music, restaurants, films, and hotels in the area
- Look at India’s “Incredible India” tourism campaign and other efforts by its various state governments as examples for implementation
- Build communities on social networking sites, targeting frequent travelers with a large follower base
- Encourage international travelers to share videos/ visual content, and other assets to further promote Nepal’s tourism in the international arena

Consider outsourcing customer complaint- and grievance-handling across multiple customer touch-points (email, social media, phone) to specialized IT providers

- Stakeholders**
- Ministry of Culture, Tourism and Civil Aviation
  - Department of Tourism
  - Nepal Tourism Board
  - ICT companies

**Timelines** Immediate

- Outcome**
- Position Nepal as a low-cost, tourist-friendly destination
  - Increase awareness of Nepal and its reach in the international tourism space
  - Encourage social media referrals

**06.01.61.00 Tourist Security Infrastructure**

<b>Solution</b>	Deploy VSAT technology and satellite phones to track and check on tourists, communicate with centralized control rooms, and store data, particularly in remote mountaineering expeditions. Develop a network of tourist information areas and police stations in popular destinations and major cities in the country.  Integrate all information into the Welcome Nepal mobile application and website.
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Culture, Tourism and Civil Aviation</li> <li>● Department of Tourism</li> <li>● Nepal Tourism Board</li> </ul>
<b>Timelines</b>	Long-Term
<b>Outcome</b>	<ul style="list-style-type: none"> <li>● Improve tourist safety and security</li> <li>● Increase consumer confidence in and attractiveness of Nepal as a tourist destination</li> </ul>

**Entrepreneurship/Public-Private Partnerships**

Digital initiatives in the tourism sector require active government-industry-consumer collaboration. To promote a vibrant tourism ecosystem, the government should consider the following:

- **Entry of travel start-ups and foreign companies**

Promote entry of start-ups that cater to niche segments of the tourism sector, e.g., online travel communities, travel planning, activities and experiences, travel guide services, food delivery, customized travel packages, community/crowdsourcing platforms, and hotel booking:

Provide a market-friendly environment for tech start-ups by offering benefits including incentives, tax holidays, and knowledge parks/hubs

**Stakeholders:**

- Ministry of Culture, Tourism and Civil Aviation
- Ministry of Finance
- Ministry of Foreign Affairs
- Ministry of Industry, Commerce and Supplies

**Timeline:** Medium Term

**Outcome:**

- Attract participation from international hotel chains to increase tourism promotion and marketing activities
- Encourage competition and entrepreneurship to improve service quality
- Help increase tourist arrivals

- **Public- private investments and partnerships with sharing economy players**

Foster public-private partnerships to improve travel infrastructure and transport in Nepal. Launch hop-on hop-off tourist bus services operated by a private company under a PPP model to offer services such as free onboard Wi-Fi, digital commentary on sites along the route, real-time bus tracking, and online ticketing platform.

Promote the sharing economy for ridesharing by allowing entry of companies like Uber and Ola as travelers are familiar with such services.

**Stakeholders:**

- Ministry of Culture, Tourism and Civil Aviation
- Department of Tourism
- Ministry of Physical Infrastructure and Transportation
- Department of Roads

**Timelines:** Medium Term

**Outcome:**

- Improve tourist experience, thereby attracting more tourists to Nepal
- Job creation on account of new business models and services such as Hop-on Hop-off buses and ride sharing.

## Talent and Skills Development

The tourism sector in Nepal is unorganized and highly fragmented with several small-scale players. Due to its non-technical nature, most workers in the sector, while skillful, come from rural areas and do not have proper education.

As part of its goal to formalize the sector and improve infrastructure, the government needs to introduce language training and ICT education programs to improve the quality of human capital.

- **Training programs for local guides**

Create a structured training program for local tour guides in the areas of communication (English and other languages), technical know-how (e.g., operate trekking equipment), driving, and professional etiquette, among others.

**Stakeholders:**

- Ministry of Culture, Tourism and Civil Aviation
- Department of Tourism
- Ministry of Education, Science and Technology
- Council for Technical Education and Vocational Training

**Timelines:** Medium Term

**Outcome:**

- Improve tourist experience as tour guides become more professional in their conduct
  - Increase the skills base and employability of the local workforce
- **Tie-ups with educational institutions**
- Set up specialized learning institutes that offer courses in hotel and travel management to cope with demand for travel professionals. These institutes can consider alliances with existing hotels to provide practical, on-the-job training to existing employees in the tourism sector.

**Stakeholders:**

- Ministry of Culture, Tourism and Civil Aviation
- Ministry of Education, Science and Technology
- Council for Technical Education and Vocational Training
- Universities

**Timelines:** Long Term

**Outcome:**

- Support the “Visit Nepal 2020” vision of creating one million jobs in the sector by 2020

**Case Study: Government-led initiatives and digital programs improving India’s tourism infrastructure**

**Government Schemes**

<b>“Ude Desh ka Aam Nagrik” (UDAN)</b>	A regional airport development and connectivity scheme aimed at improving transport connectivity to several major tourist spots, including investments in last-mile road and air connectivity in underserved areas.
<b>National Heritage City Development &amp; Augmentation Yojana (HRIDAY); Pilgrimage Rejuvenation and Spirituality Augmentation Drive (PRASAD)</b>	Launched in January 2015, the plan focuses on the development and rejuvenation of cultural/religious spots such as monuments, Ghats, and temples as well as revival of intangible assets in cities such as Ajmer, Amaravati, Amritsar, Badami, Dwarka, Gaya, Kanchipuram, Mathura, Puri, Varanasi, Velankanni, and Warangal.

**Digital Initiatives**

<b>Incredible India digital calendar</b>	A digital tourism calendar application for 2018 for Android and iOS platforms that features notifications and updated information on events and festivals in India during the year; personal travel planner; customized reminders for events and option to share event information with friends.
<b>eTicketing of monument entrance tickets</b>	e-tickets for access to 116 monuments across India using the web and mobile phones. While at the site, tourists can use their phones to access the available audio-visual guides and combine them with venue-specific barcodes encapsulating the information.
<b>Multilingual helpline</b>	Introduction of the 1363 helpline in 12 languages, one-of-its-kind in the world. The helpline also offers human assistance by dialing a “tourist’s friend” or tourist facilitator. It includes other travel-related services, prices, comparators, and certified experts.
<b>Digital magazines</b>	The Incredible India website includes e-versions of travel magazines such as India & You, INDES, and Colors of India.

Source: Press Information Bureau, Government of India, January 12, 2018

## Finance



Despite the size of its economy, Nepal has a relatively diversified financial services sector. As at July 2017, there are 28 commercial banks in Nepal with a paid up capital of NPR8 billion, 40 development banks, and 32 finance companies. As one of the largest contributors to Nepal's economy, the financial services sector contributed 23% of GDP in FY2016. It is also one of the largest employers in the country with commercial banks alone employing nearly 30,000 people in July 2017.

A key driver for the financial services sector is the high volume of remittances sent to Nepal by the thousands of Nepalese working abroad since the 1990s. Remittances in 1995 accounted for 1.3% of GDP, growing to an estimated US\$6.6 billion, about 31.3% of the country's GDP in 2016.<sup>100</sup>

While the sector consists of a diverse range of financial institutions, Nepal has yet to reap the benefits of a mature financial services sector as a large section of Nepali society remains unbanked and unable to access these services. Only 47.72% of adults in Nepal are formally banked through an account with a financial institution.<sup>101</sup> As a result, Nepal continues to be a cash economy with most transactions occurring outside its financial system.

Nepal's sizeable unbanked population is its biggest hurdle to achieving financial inclusion in the country. In addressing this issue, the Government of Nepal and the Nepal Rastra Bank – Central Bank of Nepal (NRB) should consider promoting financial inclusion initiatives as a critical growth enabler and undertaking policy interventions to encourage banks and other financial institutions to expand their presence in remote areas. An increase in the number of financial institution branches could improve financial access in Nepal.

### Challenges in Nepal's Financial Sector

A large unbanked population and predominantly cash economy are the biggest barriers to the development of the financial services sector in Nepal. More than half of Nepali citizens do not have a bank account, with consumption of financial solutions remaining low even for people with access to financial services.

<sup>100</sup> World Bank

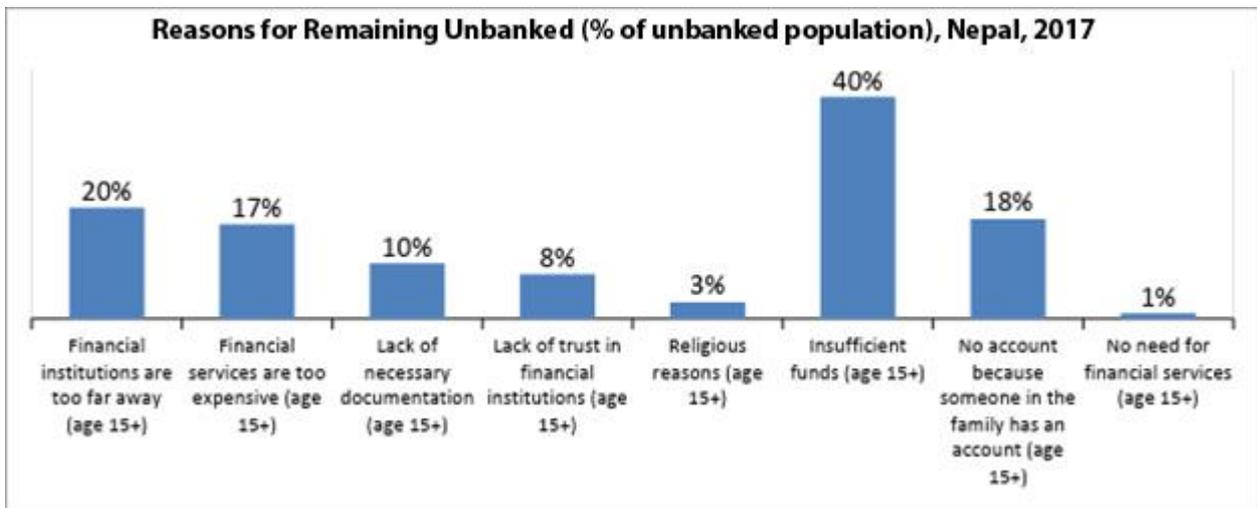
<sup>101</sup> World Bank

**Fast Facts**

45% of Nepali citizens are formally banked	Only half of bank account holders withdrew money from their accounts in the past year	15% of salaried employees receive their wages through a bank account
9% of Nepali citizens own debit cards	1% of Nepali citizens own credit cards	16% Nepali citizens have made or received a digital payment

Source: World Bank, 2017

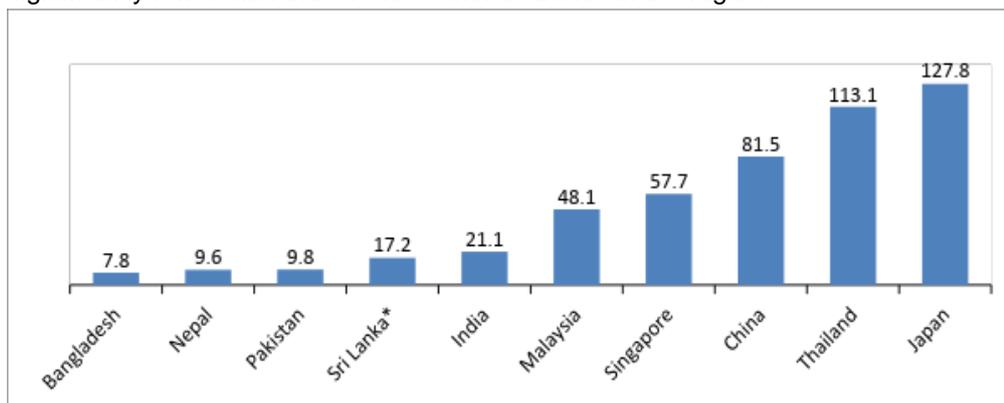
Banking fees, low literacy levels, and inaccessibility of bank services in rural areas due to poor infrastructure are vital factors mainly hampering the uptake of formal financial services in Nepal. Lack of legal identity documentation has also been reported to be a barrier to creating bank accounts.



Source: Global Findex Database – World Bank

Overall, the financial ecosystem in Nepal is still in its infancy due to several challenges hindering its adoption:

- Sizeable unbanked population due to a multitude of issues including:
  - Difficulty in accessing physical bank branches (especially in remote, rural areas). As at March 2018, only 394 of the 753 Local levels formed under the new federal structure have bank branches. Additionally, ATM and commercial branch penetration in Nepal is significantly lower than that of most other countries in the region



- High cost of financial services and lack of proof-of-identity (or know your customer, KYC) documents limiting access to financial services for the poor and deprived sections of society
- Underdeveloped digital financial services ecosystem with low credit and debit card penetration, low use of digital payments, online and mobile banking, and restrictive government policies (e.g., low maximum limit of digital payments)
- Widespread preference for informal financial channels (e.g., informal remittance transfer systems) that results in reduced resources for the Government to make productive investments, encourages tax evasion, and negatively impacts governance and exchange reserves
- Lack of financial and digital literacy

Source: World Bank, 2016; \* Sri Lanka data is for 2015

## Promise of Digital Initiatives in the Financial Sector

With Internet penetration rate at 63%, Nepal is well positioned to benefit from digital financial services. These solutions (e.g., mobile/Internet banking, mobile wallets, online digital payments) have the potential to address challenges such as difficulties accessing banks and the high cost of services.

Globally, financial services institutions, IT companies, and telecom operators are joining forces to increase digital inclusion to drive socioeconomic growth. Given the nearly ubiquitous mobile penetration in Nepal, intelligent finance solutions combining digital technologies and telecom operators' nationwide presence can be a feasible way to boost financial inclusion in the country. Nepal should learn from the success of mobile wallets in many African nations to expand digital inclusion and socioeconomic growth.

Development of the digital financial services ecosystem at existing banks and financial services institutions is integral to driving all aspects of the economy. In 2002, Kumari Bank pioneered digital payment services in Nepal with the introduction of Internet banking services for its customers. In recognizing the proven opportunities digital payment services offer, more digital solutions are beginning to become available in Nepal from traditional financial institutions and fintech start-ups such as eSewa, IMEPay, Khalti, and iPay.

The Government of Nepal considers financial inclusion as a critical lever to driving socioeconomic growth, and as a result, has undertaken these recent measures:

- FY2018–19 budget allocation to digitize government payments and revenue collection (e.g., tax payments via mobile application)
- Launch of opening bank accounts campaign targeting every Nepali citizen
- Formulating and implementing necessary laws and regulations for electronic transactions to facilitate and govern digital payments

### **Case study: Kenya M-Pesa transforming the economy through mobile money services<sup>102</sup>**

**Objective:** Using mobile money technology to offer financial services in rural and marginalized areas.

**Model:** The M-Pesa mobile payment platform launched in March 2007 as a product developed by Vodafone, in partnership with Safaricom, by integrating a mobile wallet with Safaricom's rating, billing, and provisioning systems. The onboarding of customers on the platform was achieved by replacing the SIM of registered Safaricom users with the M-Pesa enabled SIM. Users load money into the mobile wallet by depositing cash with an agent to obtain e-Float currency. The digital currency is then used for payments or transferred to other users through encrypted SMS.

<sup>102</sup> Vodafone; Safaricom; MIT

The platform currently acts as a mobile wallet offering money deposits, payments, balance checking, cash withdrawal, and international money transfer services at a minimal cost. Besides Kenya, digital wallet services are also available in Tanzania, Afghanistan, India, Romania, Egypt, Albania, and South Africa.

M-Pesa’s success in Africa can be attributed to its focus on micropayments, targeting consumers at the base of the banking sector pyramid. By offering convenient digital money transfer regardless of the value of the transaction, M-Pesa has achieved widespread adoption throughout the financial ecosystems in its markets.

Before M-Pesa was introduced in Kenya, the nearest bank was on average 9.4 km away from users. As at 2017, 96% of Kenya’s population can access financial services using their mobile phones, with an M-Pesa agent an average of 1.4km away.

In the first half of 2017, transactions through M-Pesa amounted to 48.76% of Kenya’s GDP. By the end of 2017, Vodacom processed US\$7.3 billion worth of M-Pesa transactions globally per month.

Today, its widespread usage in Kenya has been credited with raising 2% of Kenyan households out of extreme poverty through access to mobile money services between 2008 and 2016. It also plays a crucial role in offering opportunities to small businesses as well as a range of financial services such as international transfers, loans, and health provisions using mobile.

### Financial Sector in Nepal: Pain Points, Priorities, and Digital Solutions

Pain Points	Government of Nepal’s Priorities	Digital as an Enabler
Difficulties in accessing banks		
<ul style="list-style-type: none"> <li>▪ As at 2017, about 81%<sup>103</sup> of Nepal’s population lives in rural areas, with 20% of Nepali adults citing the distance they need to travel to banks as the main reason for not opening a bank account</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ensure BFIs establish rural branches first to be eligible to set up outlets in urban areas</li> <li>▪ Offer interest-free loans to assist BFIs to expand into remote districts</li> </ul>	<ul style="list-style-type: none"> <li>▪ Increased adoption of digital transactions and payments to minimize the need to visit bank branches</li> </ul>
Large unbanked population		
<ul style="list-style-type: none"> <li>● Only 40% of Nepali citizens are formally banked</li> <li>● 26% of the adult population in Nepal are illiterate, impairing their ability to engage with financial services</li> <li>● A quarter of the adult population lack a citizenship certificate, making them ineligible to apply for formal banking channels</li> <li>● Mostly homogenous products offered by financial services providers (FSPs) do not meet the needs of consumers across various segments</li> <li>● Low-income consumer market with highly seasonal and irregular</li> </ul>	<ul style="list-style-type: none"> <li>● Introduction of microfinance institutions in Nepal to target the financially excluded, particularly in rural areas</li> <li>● NRB is currently implementing a five-year strategic action plan (2012–2016) with financial inclusion as a strategic priority</li> <li>● Introduction of an e-mapping system to prioritize approval of new bank branches or channel points in unbanked areas</li> </ul>	<ul style="list-style-type: none"> <li>● Launch digital payment systems in Nepal to help Nepali citizens leapfrog conventional banking systems to the digital payment system</li> <li>● Promote convenience of digital payment systems to build adoption momentum in Nepal                             <ul style="list-style-type: none"> <li>○ With the adoption of digital payment methods, the distance between end users and the nearest bank will no longer be an inhibiting factor with the integration of formal financial services</li> </ul> </li> </ul>

<sup>103</sup> World Bank

incomes have unique needs for FSPs		
High fees incurred from banking services		
<ul style="list-style-type: none"> <li>Banking services in Nepal charge relatively high fees for financial services.</li> </ul>	<ul style="list-style-type: none"> <li>Consider reducing transaction service charges to encourage digital payment adoption</li> <li>Offer subsidies to banks to offset the costs incurred through payments</li> </ul>	<ul style="list-style-type: none"> <li>Adoption of digital processes throughout the financial system to streamline processes, and in turn, reduce the cost of banking services at financial institutions</li> </ul>
Preference for informal remittance methods		
<ul style="list-style-type: none"> <li>Informal channels to remit funds to Nepal, such as the <i>hundi</i> or <i>hawala</i> system which is popular among Nepalese overseas mainly due to the hefty fees incurred through formal channels</li> </ul>	<ul style="list-style-type: none"> <li>Foreign Exchange Management Department (FEMD), under the NRB, regulates the entire remittance industry in Nepal</li> </ul>	<ul style="list-style-type: none"> <li>Digitalization of payment modes through partnerships with financial institutions to reduce the cost of remittance and encourage more Nepalese to remit money digitally</li> </ul>
Slow user adoption of digital platforms		
<ul style="list-style-type: none"> <li>Complex user interface</li> <li>Language barriers</li> <li>The complexity of products offered</li> </ul>	<ul style="list-style-type: none"> <li>Actively encouraging the adoption of digital payment systems via development of a common platform for strengthening digital payment system in the South Asian Association for Regional Cooperation (SAARC) region</li> </ul>	<ul style="list-style-type: none"> <li>Reduction in the number of steps to make payments and reload mobile wallet</li> <li>Simplification of user interface</li> <li>Platforms available in multiple languages</li> </ul>
Maximum limit for digital transactions		
<ul style="list-style-type: none"> <li>NRB has introduced various limits for digital payments such as credit/debit card, mobile banking, Internet banking and mobile wallet restricting the payments that can be made digitally as well as the remittance amounts from abroad</li> <li>The transaction limit for mobile payments has been set NPR10,000 (US\$146) a day, in stark contrast to M-Pesa's maximum transaction of US\$686</li> </ul>	<ul style="list-style-type: none"> <li>NRB has expressed that the limits may be adjusted to accommodate industry requirements</li> </ul>	<ul style="list-style-type: none"> <li>NRB should increase the limit on digital transactions to encourage more transactions</li> <li>Currently Citizen Certificate (Nagarikta) Database can be taken as reference for KYC until Digital National ID rollout. Possible policy reform might be required to take this into action.</li> </ul>

## Digital Initiatives Roadmap for the Financial Sector

Digital offers a plethora of opportunities in driving financial inclusion, from improving access to financial services to improving tax collection. The Government is taking measures toward achieving this, such

as digitalizing all government transactions to boost the adoption of digital payments. It has also started distributing social security allowances and all other government-to-citizen payments through banks to encourage financial inclusion.

1	Technology and Infrastructure	2	Entrepreneurship/PPP	3	Talent and Skills Development
	<ul style="list-style-type: none"> <li>National Payment Gateway</li> <li>Credit Ratings (Individual or Corporate Accounts)</li> <li>Database management of Nepalese migrants</li> </ul>		<ul style="list-style-type: none"> <li>Mobile Wallet Services</li> <li>Encourage digital payments in Nepal</li> <li>Development of single window for business and industry promotion</li> <li>Development and promotion of ecommerce and ITeS ecosystem</li> </ul>		<ul style="list-style-type: none"> <li>Digital Payments Campaign</li> </ul>

## Technology and Infrastructure

The following initiatives targeting financial services sector can be implemented in Nepal to boost financial inclusion:

07.01.62.00

### National Payment Gateway

**Solution** Nepal Rastra Bank (NRB) is mulling over introducing a national payment gateway to monitor digital payment system and transactions nationwide.

National payment gateway will integrate different payment channels to simplify the electronic payment process and lower the cost of interbank transactions in Nepal. It will also encourage foreign payment systems to join the national payment gateway. Over the past few years Nepal has witnessed a sharp rise in the mobile payment system and made rapid technological advancements, making it the right time for NRB to introduce the national payment system.

**Stakeholders**

- Ministry of Finance
- Nepal Rastra Bank
- Ministry of Communication and Information Technology
- National Information Technology Center
- Financial Comptroller General Office

**Timelines** Immediate

**Outcomes**

- National payment gateway will reduce the cost of interbank financial transactions, thereby making financial services more affordable
- Will help in developing a safe and efficient national payment system
- Drive adoption of digital financial transactions in Nepal

07.01.63.00

**Credit Ratings (Individual or Corporate Accounts)**

<b>Solution</b>	<p>Currently Nepal does not have a formal credit rating system for individuals and corporate accounts. As Nepal's financial ecosystem matures, its necessary for the country to develop a robust credit rating system, which can be leveraged by financial institutions to make informed decisions while providing loans to individuals and corporates, thereby reducing loan defaults and non-performing assets.</p> <p>Ministry of Finance can consider establishing a government backed credit bureau under the aegis of Nepal Rastra Bank, or encourage the entry of private credit bureaus like Equifax, TransUnion and Experian.</p>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Finance</li> <li>● Nepal Rastra Bank</li> </ul>
<b>Timelines</b>	Medium-Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>● Enable financial institutions to make informed decisions for sanctioning loans</li> <li>● Reduce loan defaults and non-performing assets</li> </ul>

07.01.64.00

**Information management system of Nepali migrant workers**

<b>Solution</b>	<p>Overseas employment is one of the main factors for international migration in Nepal. The Department of Foreign Employment (DoFE) issued 786,564 new permits, for more than 100 destination countries as per labor migration for employment status report 2015/2016 – 2016/2017.</p> <p>Migration of people poses a complex global challenge to the government which has policy implications like labor market participation and integration and also border management.</p> <p>Relevant high quality data will help in designing implementing and evaluating policies that will be beneficial for humanitarian, social and economic wellbeing of the country and migrants.</p> <p>Furthermore, prospective migrants can register online through web-based migrant data management system and get help in emergency situations.</p>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Labour, Employment and Social Security</li> <li>● Ministry of Foreign Affairs</li> <li>● Department of Labour and Occupational Safety</li> <li>● Department of Immigration</li> <li>● Department of Foreign Employment</li> <li>● Foreign Employment Promotion Board</li> </ul>
<b>Timelines</b>	Medium Term

**Outcomes** Significantly improved policy making, management and oversight capability on part of Ministry of Labour, Employment and Social Security.

## Entrepreneurship/Public-Private Partnerships

The Government of Nepal should undertake the following policy interventions to create an enabling environment for digital financial services:

07.02.65.00

### Mobile Wallet Services

**Solution** Globally, telecom operators play an essential role in the financial services sector with the rollout of digital financial services such as M-Pesa and mobile wallets.

NRB and Nepal Telecommunications Authority (NTA) should work together to draft a policy framework that allows the involvement of telecom operators and IT companies in promoting financial inclusion in Nepal. Telecom operators can be given the licenses to operate e-wallet/digital financial services using existing telco KYC for authentication purposes.

**Stakeholders**

- Ministry of Finance
- Ministry of Communication and Information Technology
- Nepal Telecommunications Authority
- Nepal Rastra Bank

**Timelines** Immediate

**Outcomes**

- Help in achieving SDGs related to the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all (SDG Target 8.10)
- This will enable telecom operators to leverage their existing nationwide network of retailers to increase the reach of financial services in remote / rural areas.

07.02.66.00

### Encourage digital payments in Nepal

**Solution** Only 15% of Nepali wage earners receive their salaries in their accounts. The Government of Nepal should consider introducing policies that encourage employers (public and private sectors) to transfer wages and other payments directly to employees and suppliers using financial services.

The government should mandate the compulsory transfer of salaries beyond a minimum threshold level to bank accounts. Until the rollout of a national biometric ID card, the onus of helping employees in opening bank accounts should lie with the employers. Similar policies can be considered for other private and public sector payments.

**Stakeholders**

- Ministry of Finance
- Nepal Rastra Bank

- Ministry of Communication and Information Technology
- National Information Technology Center

**Timelines**

Medium Term

**Outcomes**

- Help in achieving SDGs related to the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all (SDG Target 8.10)
- The digital payment system will lead to greater financial inclusion by reaching remote areas.
- It will boost the overall economy of the country by providing convenient access to a diverse range of financial products and services for individuals as well as small, medium and large businesses.

**07.01.67.00**

**Development of single window for business and industry promotion**

**Solution**

Implementation of a single window system will enhance the trading community's convenience and efficiency as traders will be able to submit their regulatory documents at a single site or location. The regulatory documents may be customs declarations, applications for import/export permits, and other supporting documents such as certificates of origin and trading invoices.

Through electronic interface like government portals or websites, traders can meet their service delivery at a single delivery point which will reduce transaction cost of regulation and also transparency in services.

**Stakeholders**

- Government
  - Customs
  - Permit-issuing agencies
  - Ministries (and other trade monitoring bodies)
- Banking and insurance community

**Timelines**

Medium Term

**Outcomes**

- e-single window and paperless trading
- Cross-border data harmonization and exchange
- National data harmonization
- Document simplification and alignment
- Reduced transaction cost
- Improved customer satisfaction

**07.01.68.00**

**Development and promotion of ecommerce and ITeS ecosystem**

**Solution**

Development of a focused strategic framework for the promotion of entrepreneurial activities around ecommerce and IT enabled services in Nepal. This entails the review of current policy and regulatory frameworks,

strengthening digital payments regime for on-line transactions along security and interoperability dimensions, formulating policy incentives for the growth of ITeS sector, skills development, strengthening of intellectual property protection regime, reviewing consumer protection laws and strengthening delivery and fulfillment logistics infrastructure, among others. Initiatives in the ecommerce domain can further be complemented by developing related skills among small businesses, promoting digital entrepreneurship and innovation management, developing government e-procurement and e-trade networks to encourage enterprises and entrepreneurs to adopt online transactions, and raise the overall digital literacy and general awareness of all stakeholders about e-commerce.

<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Industry, Commerce and Supplies Nepal Chamber of Commerce</li> <li>● FNCCI</li> <li>● Handicraft Association of Nepal</li> <li>● Private sector businesses</li> </ul>
<b>Timelines</b>	Medium Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>● Employment generation and economic growth resulting from the growth in ITeS (BPO, KPO and BPMs)</li> <li>● Enhanced growth level in the trade of goods and services through ecommerce</li> <li>● <b>SDG Goal 9.</b> Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation</li> <li>● <b>SGD Goal 17.</b> Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development</li> </ul>

## Talent and Skills Development

In addition to infrastructure support, talent and skills development is essential to ensuring the successful adoption of digital payments in Nepal. To support the digital payments ecosystem, the country requires skilled programmers, financial technology experts, and operational support teams. Retailers also need to be sufficiently trained in managing digital payment systems to ensure the smooth flow of payments. These challenges can be addressed by training the local talent pool through partnerships with digital payment services providers to familiarize them with the system.

The government could also launch educational campaigns to build awareness among consumers on the benefits of digital payments and financial inclusion to ensure the effectiveness of the other initiatives implemented.

07.03.69.00

### Digital payments campaign

**Solution** Advertisements on social media and radio/television that highlight the advantages of using digital payments.

**Stakeholders**

- Ministry of Finance
- Nepal Rastra Bank
- Ministry of Communication and Information Technology
- Media agencies

**Timelines**

Long-Term

**Outcomes**

- Educate and create awareness about the benefits of digital financial services which can lead to greater financial inclusion, as well as expansion of financial services to non-financial sectors, and basic services to individuals using mobile phones
- Helps in achieving SDGs related to covering a large section of the unbanked population through these campaigns
- Increase in the volume of financial transactions will lead to higher tax revenue collection for the government and boost the country's GDP

Comparison of Key Financial KPIs, Nepal vs Selected Asian Countries, 2017

	UoM	Nepal	India	Pakistan	Sri Lanka	Bangladesh	China	Japan	Malaysia	Singapore	Korea, Rep.	Thailand
Account holders	%	45%	80%	21%	74%	50%	80%	98%	85%	98%	95%	82%
Withdrawal in the past year	% of account holders	51%	43%	66%	48%	52%	78%	90%	70%	91%	95%	70%
Used the Internet to pay bills in the past year	%	1%	3%	7%	5%	2%	40%	24%	25%	50%	64%	10%
Used the Internet to buy something online in the past year	%	2%	3%	1%	3%	1%	45%	46%	34%	48%	72%	17%
Paid online for Internet purchase	% Internet purchases	14%	33%	-	24%	7%	85%	-	49%	89%	-	52%
Debit card ownership	%	9%	33%	8%	32%	6%	67%	87%	74%	92%	75%	60%
Borrowed from a financial institution or used a credit card	%	14%	8%	3%	17%	9%	23%	54%	23%	47%	63%	20%
Borrowed from family or friends	%	53%	33%	29%	16%	21%	28%	4%	15%	4%	12%	29%
Received wages: into a financial institution account	% wage recipients	15%	31%	23%	44%	22%	65%	87%	72%	96%	94%	48%
Received wages: in cash only	% wage recipients	77%	59%	67%	48%	69%	25%	12%	20%	3%	3%	45%
Credit card ownership	%	1%	3%	1%	5%	0%	21%	68%	21%	49%	64%	10%
Received government payments: into a bank account	% payment recipients	36%	57%	0%	59%	0%	74%	86%	72%	87%	79%	67%
Made or received digital payments in the past year	%	16%	29%	18%	47%	34%	68%	95%	70%	90%	92%	62%

Source: World Bank

## Urban Infrastructure



Nepal is among the least urbanized countries in South Asia. However, it is modernizing rapidly with urban population growing 6% annually since the 1970s.<sup>104</sup>

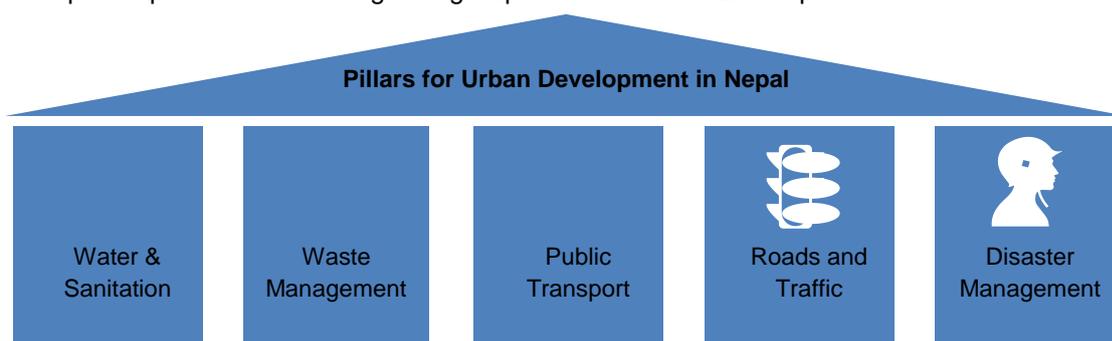
Urbanization in Nepal is dominated by a few large and mid-sized cities with population concentrated mostly in the Kathmandu Valley. The urban population distribution is uneven across the country with high urban growth in the Kathmandu Valley, Pokhara Valley, Inner Terai Valleys, and several markets and border towns located on highways.

Urbanization is likely to accelerate in the future, as Nepalese increasingly move from rural areas to cities in search of better opportunities and facilities. This trend toward urban migration presents both opportunities and challenges for urban development and municipal authorities:

- **Urbanization as an engine for growth:** To contribute to more sustainable growth across regions, it is essential for Nepal to develop other urban towns to decongest the more popular cities (e.g., Kathmandu, Pokhara)
- **Need for investments in urban infrastructure:** Rapid urbanization can place immense pressure on an already weak urban infrastructure (especially water supply, sewage and drainage, waste management, public transport, and public safety). Urban development authorities and municipal corporations in Nepal need to systematically upgrade infrastructure to cope with the surge in demand

<sup>104</sup> Asian Development Bank

Urban development and municipal authorities in Nepal need to focus on the following five infrastructure development pillars to deal with growing requirements and citizen expectations:



## Challenges in Nepal’s Urban Infrastructure

The wide deficits in basic urban infrastructure and quality benchmarking in leading cities in Nepal are highlighted by the poor quality of water supply, sanitation, solid waste management, transport, and safety.

Nepal ranks poorly on urban infrastructure when compared with other countries in the region. Nepal was ranked 100 among 140 countries on infrastructure in the Global Competitive Index 2015–2016.<sup>105</sup>

The gaps in urban infrastructure have been a result of poor urban planning, inorganic growth of urban cities, and below-par quality standards – subsequently devastated by the twin earthquakes in 2015.

### State of Urban Infrastructure in Nepal

**Water and Sanitation**

Despite an abundance of fresh water resources, most cities in Nepal battle with chronic water management challenges

- Nepal has 2.7% of fresh water reserves globally which makes the country the second after Brazil with the highest water reserves<sup>106</sup>
- Low quality and quantity of drinking water in cities with only 32.9% of households in the urban Terai regions having access to piped water supply<sup>107</sup>

Sanitation infrastructure in Nepal is also poor compared with its peers

- Only 56.1% of urban households have access to a sanitation system with only 88.2% of households having access to a toilet<sup>108</sup>

**Waste Management**

Unplanned waste management system with poor collection and open dumping practices:

<sup>105</sup> Global Competitive Index 2015-16, World Economic Forum

<sup>106</sup> International Institute of Water Management

<sup>107</sup> National Urban Development Strategy (NUDS), 2017

<sup>108</sup> National Urban Development Strategy (NUDS), 2017



- The Kathmandu Valley discards about 1,000 tons of solid waste per day of which only 900 tons are collected

Lack of landfill sites for waste management:

- Of the 58 municipalities in Nepal, only 6 have sanitary landfill sites while only 5 practice controlled waste dumping<sup>109</sup>



Public transport in Nepal is still in its nascent stages with limited investments from the Government of Nepal in developing the sector. Road transport (buses) system is unorganized and managed by private operators resulting in low reliability and quality of services.

Kathmandu Valley and a few developed metros are in dire need of a public transportation system that is reliable, safe, and comfortable. The government should consider creating a multi-modal transport system consisting of bus, rail and/or metro networks.



Lack of resources and investment as well as topological structure (hilly terrain) are major challenges for road infrastructure improvement.

Construction and maintenance of roads remain a challenge. Narrow and unplanned roads, unreliable public transport, and increasing private ownership of vehicles are worsening traffic congestion and air pollution.



Nepal has a high vulnerability to disasters due to its topology and fragile geology. Natural disasters such as floods and landslides are a regular phenomenon in Nepal. Globally, the country ranks 4<sup>th</sup>, 11<sup>th</sup>, and 30<sup>th</sup> in its level of vulnerability to climate change, earthquakes, and flood risks, respectively.<sup>110</sup>

Disaster planning and management are critical functions for Nepal's urban development and municipal authorities due to looming dangers associated with natural disasters.

**Case study: – AI and drones for Tainan's Smart City, Taiwan**

<sup>109</sup> National Urban Development Strategy (NUDS), 2017

<sup>110</sup> UNDP Nepal

**Description:** The city of Taiwan launched the AI X Drone smart city project in July 2017, where drones collect aerial images on a periodic basis for the integration and development of Taiwan's AI image recognition and analysis technology.

**Objective:** AI computing technology is used in the maintenance of historic sites, sightseeing assistance, environmental monitoring, and traffic monitoring, among others.

**Partners:** Ministry of Science and Technology. GeoSat, NAR Labs

### Urban Infrastructure in Nepal: Pain Points, Priorities, and Digital Solutions

Pain Points	Government Priorities	Digital as an Enabler
Water and sanitation		
<p>Shortage of drinking water</p> <ul style="list-style-type: none"> <li>Acute shortage of safe, drinking water in large cities, in spite of the abundance of fresh water resources</li> <li>Legacy infrastructure due to the lack of expansion of the piped network, and leakages due to old water pipes</li> </ul>	<ul style="list-style-type: none"> <li>Formulated an umbrella act and policy for the water, sanitation and hygiene (WASH) sector that aims to raise the quality and performance of water supply and sanitation services</li> <li>The government has established the Sanitation &amp; Hygiene Master Plan to support effective planning, budgeting, human resource mobilization, monitoring, implementation, evaluation, and follow up of hygiene and sanitation programs and projects</li> </ul> <p>Key priorities and initiatives include:</p> <ul style="list-style-type: none"> <li>Supply safe and pure drinking water to 95% of the population by 2030<sup>111</sup></li> <li>Started Melamchi Water Supply project to ease water shortage in Kathmandu by diverting ~170 MLD of fresh water</li> </ul>	<ul style="list-style-type: none"> <li>Crowdsourcing solutions for citizens to report leakages, and supply problems.</li> <li>Mobile apps to help citizens report service issues, and for data collection on water, sanitation and hygiene by municipalities and NGOs for planning and allocation of resources</li> <li>Water and Sanitation Information System (SIBS) monitoring system that monitors water pipes, and tanks at residents' homes to assess factors such as water supply, flow, and pressure</li> </ul>
<p>Pollution and contamination of water</p> <ul style="list-style-type: none"> <li>High water pollution due to:                             <ol style="list-style-type: none"> <li>release of untreated domestic and industrial waste into rivers, and</li> <li>seepages from poor domestic sewage systems</li> </ol> </li> <li>A survey conducted in 2014 found that more than 82.2% of household stored water was contaminated with E.coli<sup>112</sup></li> </ul>		
<p>Sanitation</p> <ul style="list-style-type: none"> <li>Lack of adequate sanitary facilities, proper hygiene practices, and taboos on menstruation, due to prevailing attitudinal and cultural barriers</li> <li>Disparities in sanitation coverage across areas and socio-cultural groups</li> </ul>		

<sup>111</sup> Government of Nepal, National Planning Commission National (Preliminary) Report, Sustainable Development Goals, 2016-2030

<sup>112</sup> The 2014 Nepal Multiple Indicator Cluster Survey (MICS)

Waste management		
<p>Poor collection &amp; disposal</p> <ul style="list-style-type: none"> <li>• Underdeveloped waste management infrastructure and limited use of digital technologies resulting in poor quality of waste management services for citizens</li> <li>• Many municipalities practice road-side waste pickup from open piles and open dumping, creating environmental and health risks</li> <li>• Dumping of untreated waste in rivers and water is leading to severe contamination in many parts of Nepal</li> </ul>	<p>Solid waste management (including collection, treatment and disposal of waste) is a responsibility of municipalities. Municipal authorities are undertaking various initiatives to improve solid waste management. Examples include:</p> <ul style="list-style-type: none"> <li>• Kathmandu City plans to build a robust waste management system consisting of, e.g., e-toilets, underground waste disposal system</li> <li>• The partnership between Hetauda Sub-Metropolitan City and a private company for door-to-door waste collection services, the establishment of a resource Recovery facility with compost plan to encourage segregation of recyclable and non-recyclable waste</li> <li>• Similar initiatives (especially around the door-to-door collection of waste) are being undertaken by other municipalities as well</li> </ul>	<ul style="list-style-type: none"> <li>• Electronic Waste Management system which consists of IoT/sensor enabled waste bins to inform authorities, which bins reached their full capacity</li> <li>• GSP tracking for waste collection vehicles for effective route planning and waste management</li> <li>• Predictive waste management analytics for effective planning and reviewing of waste management services</li> <li>• Crowdsourcing to enable citizens to report unattended waste collection</li> <li>• Automation of waste treatment plants</li> </ul>
Public transport		
<ul style="list-style-type: none"> <li>• Most urban areas in Nepal lack an efficient public transport system.</li> <li>• Key challenges include a shortage of public transport vehicles, unreliable schedules, poor maintenance, cleanliness, and overcrowding</li> </ul>	<ul style="list-style-type: none"> <li>• Kathmandu Sustainable Urban Transport project: The ADB is working with the Government of Nepal to develop an efficient public transport system and roads with pedestrian space that preserve heritage values. Provided a US\$10 million grant for the program</li> </ul>	<ul style="list-style-type: none"> <li>• Use of sensors and RFID tags for monitoring and real-time information on public transport</li> <li>• Mobile apps to provide information on routes, schedules, fares, and real-time updates on all public transport models</li> <li>• Integrated Smart Card based fare collection system for all private and public transport operators</li> </ul>
Road & Traffic		
<ul style="list-style-type: none"> <li>• Construction, improvement, and maintenance of roads remain a challenge due to lack of resources and a complex topological structure</li> <li>• Increasing demand for mobility is leading to road congestion and rising pollution</li> </ul>	<ul style="list-style-type: none"> <li>• The Kathmandu Valley Road Improvement Project is focusing on widening the current lanes</li> <li>• Kathmandu Sustainable Urban Transport Project aims to: <ul style="list-style-type: none"> <li>– Improve 25 junctions in Kathmandu city center</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Micro-simulation modeling for predicting vehicle and pedestrian traffic at specific times</li> <li>• CCTV cameras, wireless sensors, and trackers on roads and at major crossings</li> </ul>

<ul style="list-style-type: none"> <li>• Inefficient intersections, lack of guidelines, and rampant violation of traffic rules are worsening congestion and traffic accidents</li> </ul>	<ul style="list-style-type: none"> <li>– Improve the Bishnumati Link Road from Shova Bhagawati to Teku on the left bank of Bishnumati River and construct two bridges</li> </ul>	<ul style="list-style-type: none"> <li>to manage traffic, accidents, crime</li> <li>• Intelligent parking and toll management solutions to address parking and traffic issues</li> </ul>
<p>Disaster management</p>		
<ul style="list-style-type: none"> <li>• Nepal is highly prone to natural disasters such as earthquakes, floods, famines, epidemics, and landslides, some of which occur frequently</li> <li>• Nepal has limited capabilities to deal with large-scale disasters. The 2015 earthquake highlighted several shortcomings including outdated systems, poor data management and weak search, and rescue capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Nepal is developing a new disaster management act, and national strategic plan of action, in line with the framework adopted in Sendai, Japan</li> <li>• The government formulated a Post Disaster Recovery Framework (2016-2020) and Post Disaster Needs Assessment to provide a systematic, structured, and prioritized framework for implementing recovery and reconstruction, following the 2015 earthquake</li> <li>• Settlements at high risk relocation and unified settlement development working method 2075</li> </ul>	<ul style="list-style-type: none"> <li>• National Disaster Management Plan for effective disaster preparedness, response, recovery, and mitigation</li> <li>• IoT based early warning and monitoring systems for disaster management and planning</li> <li>• Emergency telecommunications equipment for better disaster response and recovery</li> <li>• Use of drones for delivery of relief supplies, damage assessment, and communications</li> </ul>

**Promise of Digital Initiatives in the Urban Infrastructure Sector**

Use of digital technology to improve the functioning and efficiency of cities and municipalities has become a well-known strategy for urban planning worldwide. Nepal can pick up valuable lessons and best practices from ongoing programs demonstrating positive results in Asia’s developing countries.

The proliferation of enabling technologies such as analytics, mobile, cloud, and broadband, as well as declining cost of sensors, hardware, and IoT devices, are also expected to create significant opportunities for Nepal to integrate digital technology for infrastructure development.

As part of its National Urban Development Strategy (NUDS) 2017, the country has laid down plans to modernize urban planning including land use, housing, transportation, and energy, and construct smart cities in Kathmandu, Lalitpur, Bhaktapur, and Kirtipur.

This is likely to enable Nepal to improve efficiencies, enhance visibility, boost governance mechanisms, and build robust connectivity, and open up new investment opportunities for infrastructure and real estate development in the country.

**Intelligent urban planning is expected to translate into measurable benefits**

The global smart waste management market is estimated to be worth US\$2.37 billion by 2021, at a robust CAGR of 16.9% over 2016–2021.<sup>113</sup>

<sup>113</sup> Smart Waste Management Market by Solution, Markets and Markets, August 2016

In order to provide universal access to water and sanitation by 2030 globally, every US\$1 invested in water and sanitation will generate US\$4.30 in economic returns through increased productivity.<sup>114</sup>

The global Intelligent Transportation Systems market is estimated to be a US\$72.32 billion industry by 2022,<sup>115</sup> contributing to improved road safety, greater sustainability of vehicles, and environmental protection.

Emergency preparedness initiatives by UNICEF and the World Food Program (WFP) in selected developing countries has saved a total of US\$12 million toward future humanitarian response and created net savings of US\$6.4 million, on an investment of US\$5.6 million.<sup>116</sup>

### Digital Initiatives Roadmap for the Urban Infrastructure Sector

The Government of Nepal should focus on infrastructure development and up gradation using ICT solutions, which is expected to promote economic growth and provide quality services.

1	Technology and Infrastructure	2	Entrepreneurship/PPP	3	Talent and Skills Development
	<ul style="list-style-type: none"> <li>Water ATMs</li> <li>Smart metering for water</li> <li>Intelligent Waste Management System</li> <li>Automated Waste sorting</li> <li>Municipality Mobile Application</li> <li>Connected Public Transport / Public Transport Mobile Application</li> <li>Intelligent Traffic Management</li> <li>Intelligent Parking Lot Management</li> <li>Intelligent Toll Booths</li> <li>National Disaster Management System</li> </ul>		<ul style="list-style-type: none"> <li>Ride Sharing</li> <li>PPP for urban planning and infrastructure</li> </ul>		<ul style="list-style-type: none"> <li>Disaster Management Training</li> </ul>

### Technology and Infrastructure

Recommended initiatives for infrastructure upgrade with a Smart city vision of to address key social and environmental challenges in cities and municipalities:

<sup>114</sup> The Toilet Board Coalition Report, The Circular Sanitation Economy, November 2017

<sup>115</sup> Global Intelligent Transportation Systems Market, Analysis and Forecast: 2017–2022, Research and Markets, April 2017

<sup>116</sup> BCG, The ROI of Emergency Preparedness

08.01.70.00

## Water ATMs

<b>Solution</b>	<p>Install water ATMs in selected public places in Nepal such as market areas, bus stands, railway stations, and airports, where people can purchase fresh, hygienic bottled water by paying a token sum (say, NPR2 for 300ml of water)</p> <ul style="list-style-type: none"> <li>● Consider a pilot implementation in the Kathmandu district, and subsequently expand into other municipalities</li> <li>● Look at a similar initiative undertaken by the Delhi Jal Board in India, as an example for implementation</li> </ul>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Water Supply</li> <li>● Department of Water Supply and Sewage</li> <li>● Provincial Government and Local Level</li> <li>● Municipal Association of Nepal</li> <li>● Water and Energy Commission Secretariat</li> </ul>
<b>Timelines</b>	Immediate
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>● Help achieve the following goals under SDG 6 to “ensure availability and sustainable management of water and sanitation for all”: <ul style="list-style-type: none"> <li>– Achieve universal and equitable access to safe and affordable drinking water for all</li> <li>– 99% household access to basic water supplies <sup>[1]</sup><sub>SEP</sub></li> </ul> </li> <li>● Provide clean and safe drinking water at a low cost for the poor population</li> <li>● Reduce wastage and induce accountability through tracking and monitoring of consumption and dispensing, as well as recycling of water</li> <li>● Price transparency and flexibility due to cashless dispensing and pay-per-use approach</li> </ul>

08.01.71.00

## Smart metering for water

<b>Solution</b>	<p>Replace analog meters with smart digital meters for automatic reading collection. The rollout of smart meters could result in better operational efficiency, reduced complaints, and improvements in leakage management.</p>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Water Supply</li> <li>● Department of Water Supply and Sewage</li> <li>● Provincial Government and Local Level</li> <li>● Municipal Association of Nepal</li> <li>● Water and Energy Commission Secretariat</li> </ul>
<b>Timelines</b>	Long-Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>● Support in achieving the following SDG goals: <ul style="list-style-type: none"> <li>– Substantially increase water-use efficiency across all sectors</li> <li>– Implement integrated water resources management at all levels</li> </ul> </li> </ul>

- Improve efficiency and accuracy of water supply
- Encourage water savings through regular monitoring of water usage
- Lower energy consumption and carbon footprint of customers
- Save installation costs, time and effort, as well as reduce monthly utility bills of customers
- Build trust between water providers and customers
- Increase accountability of water utilities

## 08.01.72.00

## Intelligent Waste Management System

**Solution**

Deploy IoT technology and wireless connectivity to automate waste collection and management, which will improve the efficiency of operations and reduce delays in trash collection. Includes:

- **Smart waste bins:** Bins installed with sensors in densely populated cities like Kathmandu, which will provide information on the type of waste in garbage containers and measure the level of waste fill. Provides alerts in case of overflows or physical damage
- **Intelligent fleet management:** GPS devices in waste collection trucks, which will collect data from bins to help in real-time decisions for optimal waste collection. Also provides data on vehicle status and waste collection schedule
- **Waste management analytics system:** Centralized, web-based waste management analytics system in all municipal offices to collect data from waste collection trucks and connected bins, as well as monitor nearby areas or districts
  - Has a visual dashboard and analytical tools for comprehensive insights into waste management operations in the local area
  - Deploys predictive analytics to visualize waste generation patterns up to 24 hours into the future, allowing districts and municipalities to optimize waste collection and use more efficient routes
- **Electronic waste management system:** Develop an e-recycling system for disposal of electronic equipment and gadgets, such as cameras, mobile phones, laptops, printers and microwaves.

**Stakeholders**

- Ministry of Water Supply
- Ministry of Urban Development
- Provincial and Local Level Government

**Timelines**

Medium-Term

**Outcomes**

- Achieve the following SDGs:
  - Access to adequate and equitable sanitation and hygiene for all and end open defecation
  - All communities are open defecation free
  - All urban households are connected to a sewerage system

- Protect the environment and reduce pollution through appropriate handling and management of toxic chemical waste, and eliminating unnecessary dumps and landfills
- Improve population health as proper waste disposal will reduce long-term exposure to hazardous waste, as opposed to street dumping
- Create employment in the sector as demand for drivers, waste pickers, and analysts will increase
- Reduce operational costs associated with inefficient waste collection

**08.01.73.00**

**Automated Waste Sorting**

<b>Solution</b>	Deploy automated waste sorting systems in recycling plants and centers where garbage is collected. Uses optical sorters, sensors, and RFID to sort waste materials based on composition and chemicals structure.
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>• Ministry of Urban Development</li> <li>• Nepal Academy of Science and Technology</li> <li>• Municipal Association of Nepal</li> <li>• Local Communities</li> </ul>
<b>Timelines</b>	Long-Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>• Improve waste recycling as it is automatically segregated based on the type</li> <li>• Reduce environmental pollution and costs associated with garbage sorting</li> <li>• Efficiently manage the expected increase in waste in urban areas</li> </ul>

**08.01.74.00**

**Municipality Mobile Application**

<b>Solution</b>	<p>Mobile app to enable residents of the municipality to share feedback and complaints on various infrastructure-related services offered by the municipality.</p> <p>For example, the app will allow residents to share photos of uncollected waste and water leakages with officials. The photos along with GPS location can be shared by with app with the relevant authorities for quick action and monitoring.</p>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>• Local levels</li> <li>• Municipal Association of Nepal</li> <li>• Local communities</li> </ul>
<b>Timelines</b>	Immediate
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>• Empower citizens by providing transparent information on facilities and services and enabling customers to lodge complaints</li> <li>• Improve the quality of services offered</li> <li>• Increase accountability of municipal department</li> <li>• Cost savings for both municipal department and customers</li> </ul>

08.01.75.00

**Connected Public Transport / Public Transport Mobile App**

<b>Solution</b>	<p>Install RFID and GPS systems in public transport vehicles such as buses and taxis, connected to a central system at the Department of Transport, enabling them to monitor the schedules, frequency, and condition of public vehicles.</p> <ul style="list-style-type: none"> <li>● Real-time information from the connected vehicles can also be integrated into the public transport apps to provide real-time transport schedules to citizens</li> <li>● Allows the department to communicate with drivers and ensure the safety and security of passengers in case of any unwanted incidents</li> <li>● Buses should install digital displays that mention the next stop along with automated, IVR-based announcements</li> </ul> <p>Create an official mobile app for the Department of Transport in Nepal that lays down details of various public transport modes including taxi, metro, and buses in the city. Provides information on the various routes connecting key locations, availability/frequency/transport schedule, time estimates, and fare details.</p>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Physical Infrastructure and Transportation</li> <li>● Ministry of Urban Development</li> <li>● Department of Transportation Management</li> <li>● Traffic Police</li> <li>● Public Vehicles Committees</li> <li>● Ministry of Communication and Information Technology</li> </ul>
<b>Timelines</b>	January 2019 / Medium-Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>● Improve the safety and security of passengers</li> <li>● Reduce wait times and increase convenience for customers by offering real-time information</li> <li>● Improve passenger experience and service quality by providing visibility into upcoming schedules and offering more amenities</li> <li>● Help manage traffic and passenger congestion</li> <li>● Improve passenger experience by providing real-time, on-the-go information and enabling 24x7 instant communication with customers</li> <li>● Result in hassle-free ticket purchases, faster boarding times, and cash savings through mobile ticketing</li> <li>● Makes it easier to access and sort through complex public transport schedule data and route maps</li> </ul>

08.01.76.00

**Intelligent Traffic Management**

<b>Solution</b>	<p>Install CCTV cameras, road sensors, traffic detectors, and speed cameras at major/busy traffic crossings and roads such as New Road and Durbar Square in Kathmandu, and Kamal Binayak-Nagarkot road.</p> <ul style="list-style-type: none"> <li>● Monitor traffic conditions and collect real-time data on vehicle flow to reduce congestion and ensure smoother traffic flow</li> </ul>
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- Enable the authorities to get information on accidents and crimes, vehicle speeds, and adherence to traffic rules (e.g., skipping traffic signals, incorrect lane driving), improving safety on roads
- The detectors connect to the local police station and automatically issue penalties or “challans” in case of violation of traffic rules and guidelines

**Stakeholders**

- Ministry of Physical Infrastructure and Transportation
- Department of Transport Management
- Department of Road
- Ministry of Home Affairs
- Traffic Police

**Timelines**

Medium-Term

**Outcomes**

- Reduce traffic congestion, travel time, and improve road conditions
- Improve the safety and security of citizens
- Help decrease infrastructure damage
- Help to effectively enforce traffic rules and regulations

**08.01.77.00**

**Intelligent Parking Lot Management**

**Solution**

Intelligent parking lot management solutions to provide parking availability status to motorists through an app. The solution will require users to update their requirements at any given time on the app following which the system will reflect the current occupancy status of the slots. The system can also update the user about the prevalent parking rates at the designated spot, and allow them to reserve the parking using mobile payment.

Large cities in Nepal should also consider the construction of automated parking in busy markets and business areas for effective management of limited space.

**Stakeholders**

- Ministry of Physical Infrastructure and Transportation
- Ministry of Communication and Information Technology
- Local municipal authorities

**Timelines**

Medium-Term

**Outcomes**

- Boost security by identifying and recording illegally parked vehicles
- Manage the overflow of traffic on roads
- Cost efficient as compared to traditional parking methods
- Automate and decrease time spent manually in searching for parking
- New revenue streams for lot owners

**08.01.78.00**

**Intelligent Toll Booths**

**Solution**

Deploy RFID tag readers (for frequent travelers) at toll booths on national highways that enable automatic deduction of toll charges and allow cars to pass

through smoothly and reduce congestion, eliminating the need to stop for cash transactions.

<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Physical Infrastructure and Transportation</li> <li>● Ministry of Finance</li> <li>● Ministry of Communication and Information Technology</li> <li>● Ministry of Home Affairs</li> <li>● Traffic Police</li> </ul>
<b>Timelines</b>	Medium-Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>● Increase revenue for road builders and infrastructure providers</li> <li>● Increase vehicle speeds, manage traffic flow and highway congestion and</li> <li>● improve passenger satisfaction and comfort</li> <li>● Reduce fuel utilization by start/stop process</li> </ul>

**08.01.79.00**

**National Disaster Management System**

**Solution** Implement a comprehensive disaster management system to help predict disasters before they happen as well as develop response and management strategy following the incident.

Such a system will generally be the amalgamation of the following:

- **Information systems** – Early warning/remote sensing systems, broadcast emergency warning systems, mobile broadcast warning and notification systems (via SMS), digital signages, message boards, and voice delivery systems
- **Satellite remote sensing and GIS technology** - Application of remote sensing and GIS technologies in vulnerability assessment studies, preparation of disaster response strategies and enhancing the level of disaster preparedness.
- **Search and rescue systems**
- **Connectivity** – Portable emergency communication system, buried optical fiber links, emergency mobile networks, local wireless mesh networking, delay tolerant networking, satellite communications (VSAT systems, mobile satellite PTT)
- **Use of drones:** Formalize policies regarding the use of drones to provide aid during disasters
- Enable the government to map terrain more effectively, assess damage in real time, increase situational awareness through high-resolution mapping, as well as provide live-stream footage of critical rescue efforts
- Deliver aid and supplies more efficiently in remote and unreachable areas

Establish **Emergency Operations Centre (EOC)** at the village and district levels, which will include emergency tools and personnel trained in emergency response in disaster-prone areas.

<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>● Ministry of Home Affairs</li> <li>● Ministry of Defense</li> <li>● Nepal Army/ Nepal Police/ APF</li> <li>● Ministry of Communication and Information Technology</li> <li>● Nepal Telecommunications Authority</li> <li>● ISPs</li> </ul>
<b>Timelines</b>	Long-Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>● Improve response, preparedness and management of emergencies and natural disasters</li> <li>● Minimize loss of life and cost incurred from damages</li> <li>● Improves ability to restore, rebuild and recover following a disaster</li> <li>● Time savings and enhanced productivity through real-time collaboration</li> </ul>

**Case study : – How Shenzhen alleviated its traffic situation using smart technologies**

**Challenge:** Growth of Shenzhen, China, from a small town into a metropolis resulted in major growing pains, particularly relating to traffic congestion. Shenzhen's land size is less than 2,000km<sup>2</sup>, with just over 600km of roads. It has the highest vehicle density in China with an average of about 530 vehicles per km.

**Solution:** Shenzhen's Traffic Police Bureau collaborated with Huawei to implement innovative ICT solutions to manage road congestion, under an initiative known as Traffic Brain, which included:

- **Ultra-broadband traffic network:** Leverage Huawei's high-speed Optical Transport Network (OTN) that enables transmission at 400 Gbit/s, data storage of over 20 PB, and data processing capacity for tens of billions of elements to support the data needs of Shenzhen's police network
- **Data analysis of city-wide traffic:** Installation of a road monitoring system that can detect traffic conditions through license plate identification, video surveillance, and other methods with a detection accuracy rate of up to 95%. Collects 700 million pieces of vehicle data monthly, and integrates nearly 40 TB of data from 78 internal and external system databases
- **AI-assisted law enforcement:** Use of AI technology and big data analytics platform to check for traffic violations, processing up to 10 million images per day. The technology enabled the department to identify vehicle features and traffic violation images at an accuracy rate of more than 95%
- **Crime fighting efficiency using big data:** Use of a big data platform and traffic analysis modeling engine by the Traffic Police Bureau to generate reports for disqualified driving, drunk driving, and cars with multiple violations. Intelligence could be generated within 30 minutes, from seven days previously
- **Increase in road capacity:** Set up of a real-time surveillance system for all signal-equipped intersections in Shenzhen, and precise traffic signal control mode based on the traffic time-space software engine. Collection of data via converged checkpoints and roaming police cars to establish lanes through intersections and organize traffic flow through big data management, enabling the city to increase road capacity by about 8%

**Results:** Investigated and closed 37,055 cases of serious violations and detained 874 vehicles with fake or cloned license plates. Vehicles with cloned or fake license plates, scrapped vehicles, and vehicles with multiple violations have now almost disappeared from the streets of Shenzhen.

**Going forward:** The Shenzhen Traffic Police Bureau plans to develop smart police terminals based on 5G technologies; conduct analysis of historical data by means of traffic simulation to predict traffic volume in each corner of the city and; invest CNY3 billion (USD453 million) to upgrade all checkpoint systems, including an improved high-definition video system, so that its coverage rate will exceed 70%.

## Entrepreneurship/Public-Private Partnerships

- **Ride Sharing**

Ride sharing platforms have the potential to emerge as a strong alternative to the weak public transport system in Nepal. The government should encourage the entry of ride sharing service providers like Uber and Ola. Alternatively, municipal corporations can also consider developing their own ride sharing platforms to ensure efficient utilization of existing taxis.

**Stakeholders:**

- Ministry of Physical Infrastructure and Transportation
- Department for Transport Management

**Timelines:** Immediate

**Outcome:**

- Reduce passenger wait times and vehicle pollution
- Improve traffic conditions by reducing the number of vehicles on roads
- Allows taxi drivers to work shorter shifts
- Greater security of passengers due to real time monitoring and tracking of vehicles

- **PPP for urban planning and infrastructure**

Undertake public-private partnerships for urban planning and infrastructure, including offering incentives, preferential procurement terms, and tax free investments to the private sector

For disaster management, partner with local NGOs and international organizations in areas such as aid programs, disaster planning, relief efforts

**Stakeholders:**

- Ministry of Home Affairs
- Ministry of Land Management, Cooperatives and Poverty Alleviation
- Ministry of Communication and Information Technology
- Department for Transport Management
- Survey Department
- Nepal Telecommunications Authority
- Council of Technical Education and Vocational Training
- Nepal Army/ Nepal Police/ APF
- Local levels
- NGOs/ INGOs
- ISPs

**Timelines:** Medium Term

**Outcome:**

- Gain access to capital and new technology
- Improve service delivery efficiency
- Distribute risks between the government and private sectors

### Selected examples of smart urban infrastructure projects in Nepal:

**Ncell initiatives in disaster management**

In July 2016, NCell signed a Memorandum of Understanding (MoU) with the Department of Hydrology and Meteorology (DHM) to send early warning alerts through SMS to its customers living in areas with a high risk of flood and landslides, including West Rapti, Narayani, Kankai, Koshi, Bagmati, Karnali, Babai, and Kamala River.

- DHM was tasked to provide SMS content to Ncell, which would be triggered based on water levels in rivers. Ncell would immediately send early warning SMS from short code numbers based on the real-time situation. Upon receiving the message about the dangerous water levels, people could then move to government-designated safe locations. Once the water levels returned to normal, SMS alerts would be sent again to inform the people that there is no immediate risk

Ncell also initiated various steps to assist disaster victims as part of its CSR efforts. Initiatives included:

- The contribution of NPR 201 million and basic utilities, following the torrential rains that triggered landslides and flooding in 2017
- An offer of bonus talk time to Sindhupalchowk’s flood and landslide affected customers

**Multi-level automated car parking system in Dharmapath and Teku**

Construction of an automated parking system in Kathmandu Metropolitan City within two years at the cost of NPR90 million under a PPP model.

**Talent and Skills Development**

Illiteracy is a major challenge in the country, and may become a barrier for the effective implementation and operation of smart solutions in transport, water and sanitation practices, waste management, and disaster preparedness. The government should consider the following projects:

<b>08.03.80.00</b>	<b>Disaster Management Training</b>
<b>Solution</b>	<p>Training government employees at all levels – central, state, district, and village – in protocols, use of technology and emergency communications during disasters. Also provide training, drills, and exercises to the military and police in rescue and search operations</p> <ul style="list-style-type: none"> <li>• Allow participation of the private sector and NGOs in the training programs</li> <li>• Promote greater awareness and sharing of best practices through conferences and workshops</li> <li>• Leverage regional Emergency Operation Centers (proposed above) to impart training</li> </ul>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>• Council for Technical Education and Vocational Training</li> </ul>
<b>Timelines</b>	Long-Term
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>• Increase the employability of population and encourage job creation</li> <li>• Improve awareness and preparedness among general population</li> </ul>

## Sustainable Development Goals (SDGs) Mapping in Digital Nepal

In global context SDGs has been defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The Sustainable Development agenda rests on three pillars - Economic, Social and Environment. For implementing SDGs framework, there are four core factors at stake, which are as follows - Identification of priorities, Intervention of policy instruments, Investment of resources and Institutional readiness. SDGs helps to promote a long-term approach to addressing global challenges that are not typical just for some countries but are faced by most and require joint actions. Having a long-term agenda and targets that has been agreed upon by 193 countries, promotes sustainability of actions and reinforces commitment of the states regardless of changes in the national political context.

Based on the Millennium Declaration of the UNGA (September 2000), Nepal pledged to adopt the eight MDGs. The SDGs eventually replaced the MDGs, hence continuing Nepal's commitment to it. As presented by the Sustainable Development Goals National Report<sup>117</sup>, Nepal aspires to emerge as an inclusive, equitable, and prosperous middle-income country by 2030 with the spirit of a welfare state. The country aims for sustainable poverty reduction and human development with low vulnerability and higher human security and has set the goal of graduating from LDC status by 2022. Nepal has been an active member of the global initiative for sustainable development goals and has taken up the SDGs as a national priority for the nation. Nepal has made significant progress on meeting the targets of the SDGs, and most of the national projects have embedded the SDGs into their outcomes. The Digital Nepal framework attempts to do the same in aligning the Digital Nepal initiatives with the SDGs<sup>118</sup>. The Digital Nepal Program will be a catalyst in helping Nepal achieve its vision of meeting the SDGs by 2030. The Digital Nepal Program will accelerate Nepal's socio-economic growth and will significantly contribute towards the long term development of Nepal.



<sup>117</sup> NPC, Sustainable Development Goals 2016-2030, National (Preliminary) Goals

<sup>118</sup> See Annexure V for the SDGs Mapping with Digital Nepal Initiatives

## Recommendations

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### 1.0 Governance framework for Digital Nepal

The success of the Digital Nepal Program will remain contingent upon an operational and delivery framework anchored in sufficiently mandated institutional arrangement befitting the scope and depth of the program. The overarching scope of the program with all its attendant ramifications offers a challenging context within which the institutional and delivery arrangements need to be positioned.

Along those lines, we envision an institutional and delivery framework for the execution of the Digital Nepal Program that would provide for the highest level of political oversight and a mechanism for operationalizing political and bureaucratic commitments that have been forthcoming since its conceptual phase.

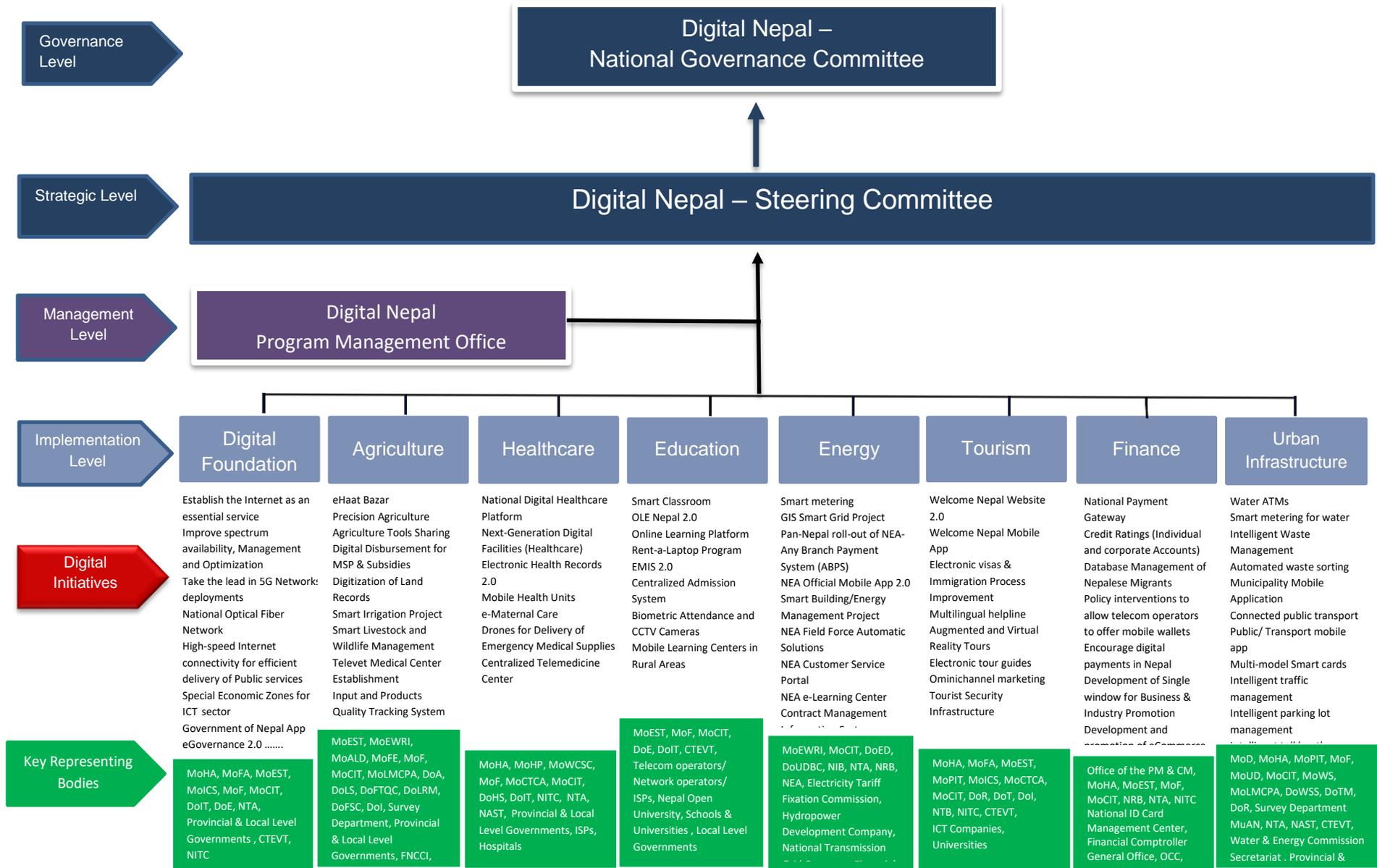
The diagram below depicts the recommended institutional arrangement with the Prime Minister chairing the *Digital Nepal National Steering Committee* for driving the mission agenda and the Minister for Communication and Information Technology serving as the Vice-Chair. The Member Secretary of the Steering Committee shall be the Secretary of the Ministry of Communication and Information Technology. Comprising of high level sectorial government representatives as members, the National Steering Committee (NSC) will be primarily responsible for providing leadership and oversight in relation to ensuring congruence of the program with national development objectives, goals and priorities.

The steering committee will be supported by the *National Implementation Committee* (NIC) under the chairmanship of the Secretary of the Ministry of Communication and Information Technology. The Member Secretary of NIC will be the IT Division Chief of the Ministry of Communication and Information Technology. NIC will be primarily responsible for delivery, execution and coordination support for projects and activities carried out under the Digital Nepal Program with periodic reporting arrangements to the National Steering Committee. NIC will oversee the activities of sector specific sub-committees to be formed at sectorial agencies covered under the Digital Nepal program. The Committee will meet on a quarterly basis and the coordinator of each sub-committee (sector) will provide updates on the execution and progress of the initiatives in the respective sectors. They will also discuss inter-departmental issues and potential areas of collaboration.

A Digital Nepal Program Management Office (DNPMO) will also be created to support the NIC in terms of directly overseeing execution of projects and activities, providing project support and coordination services as well as carrying out monitoring and evaluation (M&E) activities. This committee will be led by the IT Division Chief of the Ministry of Communication and Information Technology. This committee will also comprise IT, governance, program management and monitoring experts along with representatives from the private sector and development partners.

As indicated earlier, it is recommended that dedicated functional entities in the form of sub-committees be created within the lead agencies representing each of the sector identified to serve as sector specific implementation units of the Digital Nepal Program. Sectorial agencies identified as key stakeholders must reflect activities relating to the Digital Nepal Program in their strategic frameworks, annual plans and resource allocation priorities. These sector focused committees will hold monthly meetings to discuss the progress of the selected initiatives, issues and challenges in their execution.

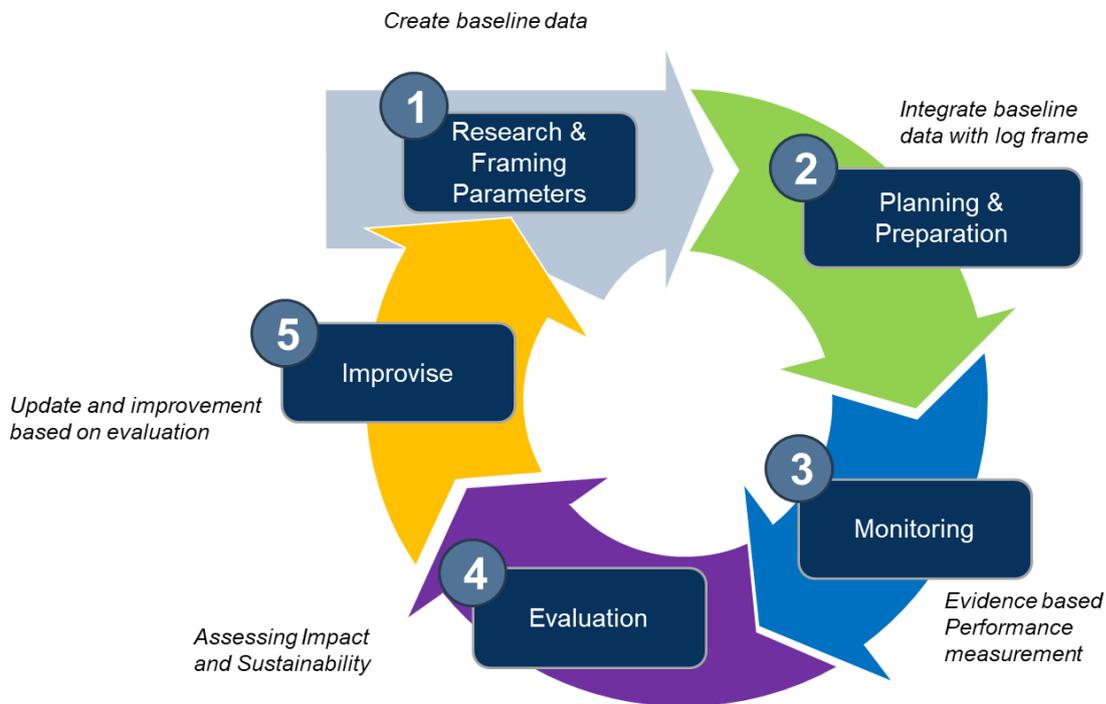
# 2019 DIGITAL NEPAL FRAMEWORK



## 2.0 The need for a strong M&E framework

Nepal's digital journey so far - particularly in relation to automation of government agencies- has been fraught with a number of challenges. Budget and time overruns of IT and automation projects in government agencies are all too common. In addition, cases of misalignment of automation project activities with expected outcomes also abound pointing towards lack of a strong project oversight and monitoring mechanism. These challenges will be substantially compounded in the context of an all-encompassing mission like Digital Nepal if the projects executed under the program are not subjected to structured monitoring and continually evaluated for their impacts. Along those lines, it is strongly recommended that a strong monitoring and evaluation framework be developed and built into the overall structure of the initiative. The following exhibit depicts key elements of a broad M&E framework for the Digital Nepal Program.

### Proposed Digital Nepal M&E Framework



### 3.0 Review of policy and regulatory environment

Policy and regulatory environment constitute one of the key components of critical success factors underpinning the Digital Nepal Program. The largely cross-sectoral nature of the program with its potential for transformative impacts across sectors demand a thorough analysis of policy and regulatory environment, identification of any gaps therein and re-orientation of policy instruments towards the goals and objectives of the program.

It is recommended that the following policy areas be thoroughly reviewed in relation to creating an environment conducive to the success of the Digital Nepal Program:

#### 3.1 Intellectual Property Rights policy regime

The successful execution of Digital Nepal Program is expected to spur innovation leading to the growth of knowledge services industry resulting in intensified creation of digital assets. In order to ensure that digitally enabled creation of value across socio-economic spectrum remains sustained by being anchored on strong incentive regime, it is imperative to assess Nepal's IPR policy and regulatory framework in relation to the demands of the emerging digital economy. This will be particularly important from the perspective of creating an ecosystem favorable to innovation, fostering a vibrant start-up and entrepreneurship environment.

#### 3.2 Data protection, security and privacy

Expanding digital footprint emanating from the program and the extent to which all this stands to permeate social and economic interactions would invariably underscore the need for a robust framework for ensuring trust in digital interactions for all the stakeholders involved. Data protection, security and privacy constitute three crucial pillars for strengthening the overall trust regime in an emergent digital economy. It is imperative therefore that a thorough assessment of existing policy provisions on data protection, security and privacy in Nepal is carried out with a view to creating an ecosystem favorable for the uptake of digital solutions deployed through the Digital Nepal Program.

#### 3.3 Telecommunication and broadband

Connectivity will be one of the foundational pillars of the Digital Nepal Program. Even though overall connectivity footprint in Nepal is growing, thanks in part to increased competitive intensity in the sector, observations reveal that its expansion has largely remained skewed in distribution and issues across access, availability and affordability dimensions continue to remain challenging. For example, retail broadband prices continue to remain high in relation to Nepal's GNI per capita and a sizable portion of Nepal's population is yet to enjoy the benefits of quality broadband connections including access to 4G networks. Given that one of the program's key aspirations is to take a regional lead in the 5G deployment space, it is important to assess overall policy and regulatory environment governing the telecommunication and broadband sector in Nepal, especially along spectrum governance, competition and universal service obligation dimensions.

#### 3.4 Digital payments policy and regulations

Among others, the extent to which digital enablement of financial transactions among participating entities become available and used will increasingly underpin the value that Digital Nepal Program will ultimately be able to generate across Nepal's socio-economic spectrum. Creation of a nationwide digital payments regime is one area that will need focused policy attention going forward. The need for a highly secure, interoperable and efficient digital payments system cannot be overemphasized if significant benefits are to be reaped from the digitalization of services. Among others, key questions that need to be asked in this area are a) whether or not policy and regulatory frameworks exist in the country to enable secure and interoperable digital payments regime and b) whether or not the existing policy and regulatory instruments are in sync with frenetic pace of innovation happening in digital payments domain.

### **3.5 Private sector participation**

The Digital Nepal Program envisages the private sector as one of its key actors. The success of the program will, to a considerable extent, be dependent upon an efficient public-private partnership arrangement in the execution of the program. Measures must be undertaken to ensure that avenues of private sector participation in the program are clearly identified. Along those lines, it will be important to review existing public procurement policies and practices with a view to lowering barriers to entry of Nepali private sector in projects implemented under the ambit of the Digital Nepal Program.

The Digital Nepal Program is expected to spur domestic demand for digital services of varying nature presenting the private sector with the opportunity to grow and be competitive. The role of the private sector will remain crucial in driving innovation and entrepreneurship and providing significant value to the Nepali economy within the program framework. One of the policy areas that need to be looked into is whether there exists a favorable innovation and start-up ecosystem in Nepal.

### **4.0 Promote Digital inclusion**

Digital Nepal must be an all-inclusive program in order for it to generate far reaching outcomes and impacts that it envisages to generate. As it is, exclusion in access to digital technologies and resources has its roots in socio-economic fault lines that exist in Nepali society. This underscores the need for targeted strategies aimed at enabling the excluded and marginalized communities and individuals to participate in the emerging digital economy. Digital inclusion of individuals result in inclusion in information, process and opportunities in all areas. Thus, it can be a tool for the government to become closer to its citizens and make state deliveries more effective. It can minimize inequality and promote efficiency by providing access to basic information and services.

As digital technology diversifies and grows in an unanticipated speed, the magnitude of the digital divide among the users of technology is simultaneously creating a newer status quo. It is crucial to harness the potentials of digital inclusion of the excluded and marginalized groups not only to achieve the goals of growth, equality and cooperation, but also to tackle the deep structures of exclusion. The exclusion is more critical for individuals with a disability, old age, remote residency and women restricted by social norms. Simultaneously, measures must be taken to strengthen the availability of accessible Knowledge, Information and Communication for Persons with Disabilities in alignment with the principles enshrined in The Convention on the Rights of Persons with Disabilities (CRPD), of which Nepal is a signatory. Among others, the program must factor in the complementarity between physical accessibility and ICT/digital accessibility and seek to formulate strategies accordingly. The focus should be on strengthening broad based digital accessibility relating to the application and integration of enhanced and technology- facilitated processes to meet the specific needs of those who are usually excluded.

## **5.0 Future proofing the mission: emerging and disruptive technologies and business models**

The frenetic pace of innovation happening in the digital arena stands to further deepen transformative processes in the way governments and societies function around the world in the days ahead. For example, AI, robotics and automation stand poised to fundamentally redefine job markets, productivity and economic competitiveness with profound implications for developing world economies. Similarly, IoT offers compelling prospects of game changing levels of context awareness embedded in systems that will fundamentally reshape our collective abilities to analyze and respond to events. Crypto currencies hold the potential of profoundly shaking up the financial sector where the traditional bastions of fiscal regulatory power might find themselves woefully ill-equipped to stay relevant. The emerging block chain technology offers the promise of exponentially enhanced trust perception in digital transactions while ushering in an era of smart contracts with far reaching and game changing implications. In addition, the growth in near ubiquitous connectivity is also fundamentally reshaping business models -ushering in a whole new concept of sharing economy.

The strategic framework underpinning the Digital Nepal Program must factor in the role these transformative innovations will ultimately play in Nepal's digital economy space. While concrete plans need to be in place to assess the implications and challenges of these innovations and their attendant disruptive potentials, the need for strategies aimed at harnessing tremendous prospects offered by these technological innovations should attract a large share of policy attention in the days ahead. Specific programs need to be launched to promote innovations around these emerging technologies. Research capacities of universities need to be strengthened and the building of robust business incubation, innovation and start-up ecosystem must be accorded a very high strategic priority if Digital Nepal mission is to be future proofed. Equally important is the need to factor in the role that big data analytics can play in fundamentally reshaping policy making processes.

## **6.0 Mapping digital initiatives to all 3 tiers of government**

The success of digital Nepal mission will remain solely contingent on the extent to which this broad framework outlining the digital initiatives are mapped out to new political reality of Nepal – i.e., Nepal's transition from unitary system of government to a federal one with Provincial Government and Local Level constitutionally empowered to take full charge of their socio-economic development agenda. It is imperative therefore to ensure that strategies are developed to fully on-board Provincial Government and Local Level as key pillars of mission execution and concrete follow-up measures are taken to map digital initiatives to all 3 tiers of the government.

**Annexure I: Integrated Action Matrix**

**Digital Foundation**

## 2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
01.01.01.00	<b>Establish the Internet as an essential services</b>	P2	Broadband Internet access classified as an essential service	Wide-scale political support exists for the initiative	Internet becomes universally available within the country	Medium -Term	1	1	1			MoCIT	MoLJPA, NTA, ISPs, Telecom Operators
<b>Major Activities</b>													
01.01.01.01	Carry out policy, regulatory and legislative reforms needed to ensure that access to the Internet is established as an essential service, Internet access is broadly available and individuals are protected against unreasonable restriction on access to information and Internet and freedom of expression on Internet is protected.						1					MoCIT	NTA
01.01.01.02	Review and incorporate necessary changes in the Broadband policy and other Policy documents to secure congruence with constitutional provisions on the Internet.						1					MoCIT	NTA
01.01.01.03	Formulate and launch mission oriented programs to ensure universal access to the internet throughout the country in alignment with the National ICT Policy and National Broadband Policy.							1	1			MoCIT	NTA
01.01.01.04	Review Universal Service Obligation (USO) provisions and market mechanism to ensure on-demand access and availability of Internet access to all desiring users throughout the country.								1	1		MoCIT	NTA
01.01.01.05	Set a timeline by when the Internet as a essential service could be ensured and incorporated into the legal provisions of Nepal.									1		MoCIT	House of Representatives, MoLJPA
01.01.01.06	Strengthen mechanism to ensure that proper recourse is available for consumers if they are denied QoS commitments made by the Internet and Telecom service providers.										1	NTA	MoCIT, ISPs, Telecom Operators

**2019 DIGITAL NEPAL FRAMEWORK**

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
01.01.02.00	<b>Improve spectrum availability, management and optimization</b>	P1	Spectrum governance and allocation regime significantly improved to the satisfaction of key stakeholders	- Spectrum issues continue to receive timely policy attention by MoCIT/NTA - Wide stakeholder participation in spectrum governance and allocation strategy is ensured	All citizen be covered by reliable mobile broadband services	Medium -Term	1	x	x	x	x	MoCIT, NTA	Service Providers
<b>Major Activities</b>													
01.01.02.01	Take stock of underutilized or un-allocated radio frequency spectrum in consultation with the industry and concerned stakeholders with a view to inform policy decision on efficient spectrum regulation.						1					NTA	MoCIT
01.01.02.02	Review the National Frequency Plan with a view to ensuring the availability of spectrum to service providers and its allocation in a transparent manner through market related processes. This includes making necessary provisions for the availability of harmonized and contiguous spectrum required for deployment of next generation access technologies in alignment with IMT recommendations as well as intensifying 4G/LTE roll-out.						1	1	1	1	1	NTA	MoCIT
01.01.02.03	Review policy and regulatory provisions on promoting technology neutral licensing						1	1				MoCIT	NTA
01.01.02.04	Identify and make available new Spectrum bands for Access and Back-haul segments for deployment of 5G networks.						1	1				NTA	MoCIT

**2019 DIGITAL NEPAL FRAMEWORK**

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
01.01.03.00	<b>5G network deployment</b>	P2	- % of 5G users  - % of 5G coverage or No. of coverage area	A strong business case for 5G roll-out is created in Nepal and telecoms and enterprises are motivated to capture value from new 5G use cases including IoT	IoT based implementations in areas like smart cities and smart agriculture begin to be rolled-out	Long-Term	1	1	1	1	1	NTA	MoCIT, Telecom Operators
<b>Major Activities</b>													
01.01.03.01	Conduct a feasibility study for driving investments in 5G networks in Nepal, drawing upon global best practices, market dynamics and readiness assessment						1					NTA	MoCIT
01.01.03.02	Launch initiatives to identify relevant business and use cases of 5G as a means of addressing issues from the demand side. This includes incentivizing innovation around the application of 5G technologies, identifying potential technology solutions aligned with a range of digital initiatives identified as part of Digital Nepal program, improving business and entrepreneurship ecosystem for digitally enabled business models.						1	1				NTA	MoCIT, Telecom Operators
01.01.03.03	Develop policy guidelines, implementation framework and road-map for 5G network roll-out in Nepal.							1	1			NTA	MoCIT, Telecom Operators
01.01.03.04	Ensure availability of the spectrum to the service providers needed for 5G and its allocation in a transparent manner through market related processes.						1	1	1			NTA	MoCIT, Telecom Operators
01.01.03.05	Launch first set of 5G trials in Nepal (at 4 metropolitan cities)									1	1	Telecom operators	NTA, MoCIT

2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
01.01.04.00	<b>National Optical Fiber Network</b>	P1	Length of optical fiber installation	Necessary measures are taken urgently to address challenges in ensuring optimal mobilization of RTDF and investment from service providers	Improved delivery of services and growth of the digital economy in Nepal	Long-Term	1	1	1	1	1	NTA	MoCIT, Network Service Providers, Telecom Operators
<b>Major Activities</b>													
01.01.04.01	Carry out a baseline survey of the existing national fiber optic networks and International connectivity with assessment along resilience and redundancy dimensions						1					NTA	MoCIT
01.01.04.02	Develop a detailed project proposal for National Optical Fiber Network, building upon networks either already in existence or currently in progress (like Mid-hill backbone network) in alignment with National Broadband Policy. This should include the creation of SPV/ institutional arrangement for establishment, management and operation of National Optical Fiber Network.						1	1				NTA	MoCIT
01.01.04.03	Design network architecture for National Optical Fiber Network including local access network and last mile connectivity strategies							1				NTA	MoCIT,
01.01.04.04	Identify areas that are outside the coverage of existing broadband networks (both wireless and wireline) with recommendations on measures to expand broadband connectivity in those areas								1	1		NTA	NITC, npIX

**2019 DIGITAL NEPAL FRAMEWORK**

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
01.01.04.05	Develop strategies aimed at reducing international Internet transit costs, improving latency by setting up local Internet Exchanges with a view to keeping the local traffic local and enhancing user experience in local content consumption.						1					NTA	NITC, npIX, MoCIT
01.01.04.06	Develop policy and strategy framework for promoting infrastructure sharing (both active and passive)						1					NTA	MoCIT, Network Service Providers
01.01.04.07	Develop a strategic framework for action for strengthening and widening the scope of national education and research network						1	1				MoEST	MoCIT

2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
01.01.05.00	<b>High-speed Internet connectivity for efficient delivery of public services</b>	P1	No. of government agencies with high-speed internet connectivity (Local level, hospitals, schools and other government agencies)	Supporting Infrastructure available for expanding high speed Internet in government offices.	Significantly enhanced level of readiness among agencies across all level of governments to provide integrated services through digital means	Long-Term	1	1	1	1	1	MoCIT, MoFAGA	OPMCM, MoH, Provincial Government and Local Level, NTA
<b>Major Activities</b>													
01.01.05.01	Carry out baseline surveys on existing connectivity footprint of government and public sector agencies across all 3 tiers of government						1					MoCIT	
01.01.05.02	Develop and implement a road-map for connecting public entities across all 3 tiers of government (e.g. hospitals, Local level entities, agencies related to agriculture, health and education)							1	1	1	1	MoFAGA	MoCIT
01.01.05.03	Prepare and enforce a common standard guideline document for establishing high-speed Internet and broadband connectivity in government establishments across all the tiers (federal, provincial and local) incorporating sustainability, SLA and security parameters						1	1	1			MoCIT	Related sectoral agencies
01.01.05.04	Develop and enforce Internet usage guidelines at government establishments by public servants and beneficiaries.						1	1				Related sectoral agencies	

**2019 DIGITAL NEPAL FRAMEWORK**

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
01.01.06	<b>IT knowledge park establishment in Special economic Zones</b>	P2	No. of IT knowledge park established	- Strong business plan and focused strategy for implementation factoring in the lesson learned from earlier failure in IT Park operationalization. - Strong commitment by the government - Government is amenable to competitive policies and fiscal incentives schemes for SEZ tenants	Job creation and contribution to economic growth	Long-Term	1	1	1	1	1	MOCIT, MoICS	MoF, Provincial government
<b>Major Activities</b>													
01.01.06.01	Commission a study to develop an IT/knowledge industry cluster within existing or upcoming SEZ projects						1					MoICS	MoCIT, MoF
01.01.06.02	Develop required policies and regulatory framework for data security, data protection and online privacy in alignment with the requirements of the BPO/BPM, KPO, ITS and ITes services.						1	1				MoICS	MoCIT
01.01.06.03	Develop special policy framework targeted at knowledge based companies set up within SEZ drawing upon Nepal's experience in related initiatives						1	1	1			MoICS	MoCIT, MoF
01.01.06.04	Develop detailed business plan for the operation and management of SEZ including model lease agreements for potential tenants (including provisions for virtual presence)						1	1	1	1	1	MoICS	MoCIT, MoF

**2019 DIGITAL NEPAL FRAMEWORK**

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
01.01.07	<b>Government of Nepal App for Citizen Services</b>	P1	Citizens use mobile app to avail government services	Parallel initiatives aimed at promoting digital literacy are undertaken so as to make access to services more inclusive	Government services become more accessible among masses	Immediate	1	1	x	x	x	OPMCM, MOCIT	NITC, DOIT, Provincial Government and Local Level
<b>Major Activities</b>													
01.01.07.01	Carry out assessment of existing citizen facing on-line services currently being offered by government agencies for integration into the mobile app including a detailed road-map for integration, including back-end architecture						1					NITC	MoCIT, DoIT, Local levels
01.01.07.02	Build and deploy a common, unified platform and common mobile app to facilitate single point access of major government services through mobile devices across all 3 tiers of government						1					NITC	MoCIT, DoIT, Local levels

## 2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
01.01.08	<b>Use of Government Enterprise Architecture (GEA) / eGovernance 2.0</b>	P1	All government IT systems follow GEA standards	GEA is international standard for ICT systems	Highly efficient delivery of government services based on better coordination among agencies	Medium -Term	1	1	1	1	1	MOCIT	DoIT, NITC, OCC, Other government agencies, Provincial Government and Local Level
<b>Major Activities</b>													
01.01.08.01	Carry out thorough assessment of GEA/NEGIF including the current state of implementation and assessment of the need for revision specially in relation to emerging technologies like IoTs						1					PIC-DN	MoCIT, MoF, DoIT, NITC
01.01.08.02	Develop eGov 2.0 road-map involving all tiers of government						1	1				PIC-DN	MoCIT, MoF, DoIT, NITC
01.01.08.03	Develop and implement an electronic single window system to facilitate processes for business registration, FDI industry registration and business life-cycle management							1	1			PIC-DN	MoCIT, MoF, DoIT, NITC

**2019 DIGITAL NEPAL FRAMEWORK**

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors	
							1	2	3	4	5			
01.01.09	<b>Paperless government</b>	P1	No. of government agencies across government make a transition towards paperless workflows of processes within their organization.	Government agencies are prepared with strategies to address challenges associated with change management resulting from process automation and security and authentication mechanism are adequately addressed in system design	Significantly enhanced internal process workflows driving efficiency, transparency and enabling tracing accountability	Medium -Term	1	1	1	1	1	OPMCM, MoCIT	DoIT, NITC, OCC, Provincial and Local level	
<b>Major Activities</b>														
01.01.09.01	Develop a strategic and operational framework for paperless government in a phased manner with a reference architecture to be used by all 3 tiers of government.							1	1				MoCIT	DoIT, NITC, OCC
01.01.09.02	Develop security, data protection, disaster recovery, resilience and business continuity strategies and reference framework for paperless government and government automation initiatives to be used by all 3 tiers of government								1	1			MoCIT	DoIT, NITC, OCC
01.01.09.03	Fully automate Chief Minister's offices in all provinces including complete workflow automation, deployment of groupware, setting up of video conferencing facilities and related capacity building initiatives, among others								1	1	1	1	MoCIT	DoIT, NITC, OCC

**2019 DIGITAL NEPAL FRAMEWORK**

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
01.01.10	<b>Public Wi-Fi Hot-spots</b>	P1	No. of Public Wi-Fi Hotspots	Need of Wi-Fi Hotspots at public place	Free internet services in identified locations	Long-Term	1	1	1	x	x	NTA, Provincial Government and Local Level	MoCIT, ISPs
<b>Major Activities</b>													
01.01.10.01	Develop operational guidelines, modalities and mechanism for establishing, operating, supporting, maintaining, ownership delegation, revenue sharing and sustaining public WiFi hot-spots						1					NTA	Government Agencies, Private Sector, ISPs
01.01.10.02	Define standards to be followed for the safety, security, QoS and other technical benchmarking of public WiFi						1	1				NTA	MoCIT, Local Level Governments, ISPs
01.01.10.03	Formulate a policy framework to incentivize the installation, operation and management of public WiFi in partnership with the local public/private organizations, with a mechanism to ensure adherence to basic QoS and usage standards, and technical specifications for public WiFi services							1				NTA	MoCIT, Local levels, ISPs
01.01.10.04	Open call to local public institutions and the private sector for installing and operating public WiFi in public spaces, including tourist attractions, open amenities, public offices, and places where the community at large can safely and freely access the public WiFi.							1	1			NTA	MoCIT, Local levels, ISPs

## 2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
01.01.11	<b>National Cyber security Center</b>	P1	Establishment of the National Cyber security Center	Necessary policy, regulatory and legal framework is in place and operational.	Significantly heightened trust perception leading to higher uptake of digital technologies and services	Medium -Term	1	1	1	x	x	MoCIT	NTA, MoHA, MoF, NRB, ISP, Telecom Operator, NITC, DoIT, OCC, Network Operators
<b>Major Activities</b>													
01.01.11.01	Set up National Cyber security Center as the national nodal agency for responding to Cyber threats and computer security incidents						1	1				MoCIT	DoIT, OCC, MoHA
01.01.11.02	Formulate Cyber security plans and policies with recommendations on Cyber security standards to be adopted by public agencies and the private sector						1					MoCIT	DoIT, OCC, MoHA
01.01.11.03	Set-up province level Cyber security agencies in coordination with the National Cyber security Center								1			MoCIT	DoIT, OCC, MoHA

## 2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
01.01.12	<b>Provincial Data Centers Establishment</b>	P1	No. of provinces data centers/ cloud infrastructure	For delivery of digital citizen service separate data centers are required in provincial and Local level	Secure data archival and efficient citizen services delivery	Long-Term	1	1	1	1	1	MOCIT	NTA, MoFAGA, NITC, Provincial government
<b>Major Activities</b>													
01.01.12.01	Prepare a work-plan on setting up provincial data centers complete with institutional structure, operational modalities, provincial government cloud, sustainability strategy and overall architecture of data center/ provincial government cloud						1					Provincial Government	MoCIT, MoFAGA, NITC
01.01.12.02	Prepare a reference architecture for provincial level data center and provincial level government cloud						1					Provincial Government	MoCIT, MoFAGA, NITC
01.01.12.03	Draw-up recommended architecture for PWAN as a converged backbone network for data, voice and video communications							1				Provincial Government	MoCIT, MoFAGA, NITC
01.01.12.04	Set-up at least one data center/provincial government cloud in each province							1	1	1	1	Provincial Government	MoCIT, MoFAGA, NITC
01.01.12.05	Roll-out PWANs covering all three tiers of government											Provincial government	MoCIT, MoFAGA, NITC

## 2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
01.01.13	<b>National Language Computational Resource Pack</b>	<b>P1</b>	- Number of research projects centered around linguistic computing in Nepal - Finished products and applications supporting computation in national languages	Linguistic computing premised on local languages receives wide-scale stakeholder support and technical backstopping.	More inclusive access to digital resources and platforms	Long-Term	1	1	1	1	1	DoIT, LC, Provincial government	MoCIT, Language Technology Kendra, Computer Science and Engineering Department, UGC, University
<b>Major Activities</b>													
01.01.13.01	Prepare a project concept note, detailed work-plan, design components necessary for national language resource pack						1	1				MoCIT	LC, DoIT, NA, UGC, University, LTK
01.01.13.02	Develop national language computing standardization framework for official language computing in Nepal						1	1	1			MoCIT	LC, DoIT, NA, UGC, University, LTK
01.01.13.03	Develop a detailed framework for promoting research and development in Nepali language computing in collaboration with UGC, universities, research centers, NGOs/civil Society. This includes but not limiting to development of core language compatibility like full data interoperability and archiving standardization, OCR, speech recognition and text-to-speech solutions for official language of Nepal.							1	1	1	1	MoCIT	LC, DoIT, NA, UGC, University, LTK
01.01.13.04	Develop high end generic applications for these official languages including corpus (both written, spoken), dictionaries, spellcheckers, spelling corrections, and grammar corrections							1	1			NA	MoCIT, DoIT, LC, UGC, University, LTK

## 2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
01.01.14	<b>National Bio-metric ID Card</b>	P1	Pan Nepal roll out of national bio-metric ID card	Legal framework exists for NID	Use as ID for delivery of different services enabling improving of the citizen centric services	Medium -Term	1	1	1	x	x	MoHA	OPMCM, MoCIT, NITC, National ID Card Management Center
<b>Major Activities</b>													
01.01.14.01	Review legal and regulatory environment governing the handling, privacy protection and use of bio-metric data collected by the government and prepare a detailed set of recommendations aimed at putting in place a highly secure environment for handling such data						1					MoHA	OPMCM, MoCIT, NITC, NID
01.01.14.02	Develop detailed project along with funding proposal to roll-out national ID all throughout the country						1	1				MoHA	OPMCM, MoCIT, NITC, NID
01.01.14.03	Develop a national bio-metric ID card integration strategy and guidelines in a range of service delivery and electronic transaction scenarios						1					MoHA	OPMCM, MoCIT, NITC, NID
01.01.14.04	Roll out the national bio-metric ID card throughout Nepal						1	1	1			MoHA	OPMCM, MoCIT, NITC, NID

## 2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
01.01.15	<b>Digital Signature and e-authentication</b>	<b>P1</b>	Use digital signature certificates in all government services	Use of digital signature is mandatory in all digital transactions for legal authenticity	Secure digital transaction	Long-Term	1	1	1	1	1	OCC	MoCIT, MoF, NRB, Certifying agencies
<b>Major Activities</b>													
01.01.15.01	Conduct a thorough review of the current government initiated digital signature certificate regime in Nepal. This includes PKI enabled certification processes launched by OCC						1					OCC	MoF, NRB
01.01.15.02	Develop and strengthen strategy for promoting the use of digital signature certificates in public and private sector agencies.						1	1	1	1	1	OCC	MoF, NRB
01.01.15.03	Conduct sensitization workshops in all provinces on the role of digital signature certificate and government PKI regime						1					OCC	MoF, NRB
01.01.15.04	Conduct a review of security practices adopted by banking and financial institutions in dealing with electronic transactions							1	1			OCC	MoF, NRB

## 2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
01.02.16	<b>Digital Innovation and Co-creation Hub</b>	P1	No. of digital innovation and co-creation hub set up in Nepal	Strengthen digital innovation and start-up ecosystem, especially on the policy front	Entrepreneurship based on innovative ideas to emerge	Medium-Term	1	1	1	1	1	MoICS	MoEST, MoCIT, MoF, DoIT, Universities, UGC, Foundations, Private Sector
<b>Major Activities</b>													
01.02.16.01	Develop a comprehensive project concept note on setting up digital innovation and co-creation hub in Nepal						1					MoICS	MoEST, Universities
01.02.16.02	Recommend policy framework for promoting appropriate investment model and funding mechanisms for the startups.						1					MoICS	MoEST, Universities
01.02.16.03	Setup digital innovation and co-creation hubs							1	1			MoICS	MoEST, Universities

## 2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
01.03.17	<b>Digital Skills Development</b>	P1	- Number of digital skills programs conducted - Completion of a Strategic framework to promote professional digital skills and competencies	- Importance of digital literacy is well established among a wider section of society - Ample supply of professional trainers	Digital economy becomes more inclusive	Long-Term	1	1	1	1	1	MoCIT, MoICS	MoEST, DoIT, CTEVT, Provincial Government and Local Level, Universities
<b>Major Activities</b>													
01.03.17.01	Develop a national plan and strategies on promoting digital literacy in relation to bridging the digital divide with clearly defined objectives, goals and implementation arrangements						1					MoCIT	MoEST, DoIT, CTEVT, Local levels, Universities
01.03.17.02	Conduct awareness in digital literacy among communities and Local level jurisdictions in collaboration with NGOs/Civil society, development agencies and educational institutions						1	1	1	1	1	MoCIT	DoIT, CTEVT, Local levels
01.03.17.03	Develop a national standard and certification regime for professional/occupational level digital skills, digital competency and professional skills development in alignment with global best practices and emerging technology trends						1					MoCIT	MoEST, DoIT, CTEVT, Universities
01.03.17.04	Review course curricula of Universities and educational institutions in relations to seeking their alignment with skills and competency requirements in the emerging digital economy							1				MoEST	MoCIT, DoIT, CTEVT, Universities
01.03.17.05	Implement Digital Skills development strategies						1	1	1	1	1	MoCIT	DoIT, CTEVT, Universities

**2019 DIGITAL NEPAL FRAMEWORK**

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
01.03.18.00	<b>Government eLearning Platform</b>	P2	Number of government employees using Government eLearning Platform	Administrative leadership remains committed to developing digitally ready workforce	Improvement in public service delivery and governance mechanism owing to the growing number of digitally ready government employees	Mid-term	1	1	1	x	x	NASC	MoCIT, MoEST, DoE, DoIT
<b>Major Activities</b>													
01.03.18.01	Design, develop and deploy an integrated Government eLearning Platform complete with a reference architecture at both federal as well as provincial government						1					NSAC	MoCIT, MoEST, DoE, DoIT

**2019 DIGITAL NEPAL FRAMEWORK**

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
01.03.19	<b>ICT in Education</b>	P1	- Number of Teachers trained in using ICTs in education as pedagogical tool - Number of public schools equipped with IT labs	Digital technologies can significantly mitigate structural challenges in the education delivery scenario in Nepal	Quality education to all citizen	Long-Term	1	1	1	1	1	MoEST	MoCIT, NTA, CDC, CEHRD
<b>Major Activities</b>													
01.03.19.01	Conduct a study on the status of implementation of ICT in Education Master-Plan including its impact on key indicators of educational outcomes						1					MoEST	CDC
01.03.19.02	Prepare a broad set of recommendations for timely revision and effective implementation of ICT in education Master-Plan in line with Digital Nepal mission						1	1				MoEST	CDC
01.03.19.03	Incorporate Educational Technology and ICT in Education as a course component in Bachelor's in Education (B.Ed) Programs						1					MoEST	CDC
01.03.19.04	Develop and implement strategies for promoting universal, equitable, open and free access to a state of the art ICT and ICT enabled tools and resources for all students and teachers						1	1	1	1	1	MoEST	CDC

# Agriculture

## 2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
02.01.20.00	<b>eHaat Bazaar</b>	P2	Virtual agriculture commodity marketplace established	Necessary actions are taken for required policies improvement on agriculture project value and supply-chain	Higher income to farmers on account of efficient e-marketplace	Medium-Term	1	1	1	x	x	MoALD,	DoA, DoLS, Provincial Government and Local Level, Farmers Cooperatives and User Cooperatives, Local Haat Bazaar Management Committee, DFTQC
<b>Major Activities</b>													
02.01.20.01	Prepare eHaat Bazaar project proposal highlighting business model, stakeholder mapping, operational, revenue, sustainability and governance model, identification of champions and best entry point/pilots						1	1				MoALD	Farmers cooperatives
02.01.20.02	Design and prepare a detailed architectural framework for e-Haat Bazaar portal							1				MoALD	Farmers cooperatives, CCI
02.01.20.03	Carry out development, testing and implementation of eHaat Bazaar portal							1				MoALD	Farmers cooperatives, CCI
02.01.20.04	Conduct sensitization workshops targeted to all relevant stakeholders including commodity associations, private sector champions, local market ecosystem actors in eHaat Bazaar online system.							1				MoALD	Farmers cooperatives, CCI
02.01.20.05	Develop a mechanism for regular maintenance, training, upgrading, monitoring and evaluation of the eHaat Bazaar initiative.							1				MoALD	Farmers cooperatives, CCI

**2019 DIGITAL NEPAL FRAMEWORK**

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
02.01.21	<b>Precision Agriculture</b>	P3	Number of pilots in precision agriculture	Sufficient domain expertise exist to identify intervention points in precision agriculture	Improved agricultural yields and increased employment opportunities	Medium-term	1	1	1	1	1	MoALD	DoA, NARC, NAST
<b>Major Activities</b>													
02.01.21.01	Prepare a detailed project concept note on potential digital technology tools, deployment strategies and overall readiness to address precision agriculture needs in Nepali context						1	1				MoALD	DoA, NARC, NAST
02.01.21.02	Conduct sensitization workshops on the role of precision agriculture tools and solutions to key stakeholders							1				MoALD	DoA, NARC, NAST
02.01.21.03	Develop an action plan for deploying precision agriculture tools in Nepal, mapping out potential intervention points, institutional and monitoring arrangements							1				MoALD	DoA, NARC, NAST
02.01.21.04	Roll-out at least 6 precision agriculture pilots in each province							1	1			MoALD	DoA, NARC, NAST

2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
02.01.22.00	<b>Agriculture Tools Sharing</b>	P1	Development and deployment of agriculture tools sharing platform	Farmers are made digital literate to be able to effectively participate in the tool sharing platform	Improved farm productivity and income owing to lowered input costs to farmers	Medium-Term	1	1	1	x	x	Local levels	Village Farmer Groups, Aama Samuha (Women's Group), Local Co-operatives
<b>Major Activities</b>													
02.01.22.01	Prepare a detailed Project Concept Note for developing agriculture inputs sharing platform accessible through multiple channels, with clear stipulation of business model, governance structure, stakeholder participation and sustainability factors						1					Local levels	Village Farmer Groups, Aama Samuha (Women's Group), Local Co-operatives
02.01.22.02	Design and develop digital agriculture inputs sharing platform accommodating C2C, B2C, G2C topologies with a clear set of functionalities covering leasing, lending, and sharing						1					Local levels	
02.01.22.03	Conduct sensitization workshops to drive the uptake of agriculture inputs sharing platform						1					Village farmer group	Local levels
02.01.22.04	Develop and carry out regular monitoring and evaluation, system upgrade, maintenance and support to agriculture tools sharing platform.						1					Local levels	

## 2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
02.01.23	<b>Digital disbursements for MSP and subsidies</b>	P3	Digital disbursement platform for MSP and subsidies becomes available	Strong beneficiary authentication framework is developed	Reduced chances of misuse and misappropriation of MSPs/subsidies	Medium-term	1	1	1	x	x	MoALD,	MoALD, MoCIT, MoF, NRB, Financial Institutions (e.g. banks) Private Payment Gateway Owners
<b>Major Activities</b>													
02.01.23.01	Commission a study to aggregate all MSP and subsidies schemes provided by the central, Provincial Government and Local Level.							1				MoALD	Farmers cooperatives
02.01.23.02	Design and develop a suitable IT enabled digital disbursement solution for MSP and subsidies with integration functionality with the existing financial institutions.							1	1			MoALD	Farmers cooperatives
02.01.23.03	Onboard all the major financial institutions, governing bodies, and relevant private actors and stakeholders to align with the objective of the digital initiative. Provide early-movers incentives to the stakeholders.								1	1	1	MoF	Farmers cooperatives
02.01.23.04	Work out a phased roll-out strategy of the platform							1	1	1	1	MoALD	Farmers cooperatives

## 2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
02.01.24	<b>Digitization of land records</b>	<b>P1</b>	Number of digitized land titles and other records  % of land area	Clearly set out modalities and legal framework exist for the use of digitized land records	Efficient land and land revenue administration leading to better service delivery and revenue collection on part of the government	Immediate	1	1	1	1	1	MoLMC PA	MoALD, MoLCPA, DoLRM, Survey Department, DoFSC, provincial and local level of government.
<b>Major Activities</b>													
02.01.24.01	Prepare a position paper on current status, scope and limitations of the digitization of land records and administration, taking into consideration the existing digital or legacy manual system within the survey department and land revenue department and innovating with new and emerging technologies in spatial and attribute data of land records.						1	1				MoLMC PA	Local and Provincial Govt. bodies
02.01.24.02	Develop digital land records policy and implementation guidelines for both survey department and land revenue department including legal aspects of digitalized land records							1				MoLMC PA	Local and Provincial Govt. bodies
02.01.24.03	Conduct training and capacity development of technical staff and other public servants at the local level to accept, adopt and use the digital land records information/system for regular business related to land management, administration and land title authentication							1				MoLMC PA	Local and Provincial Govt. bodies

**2019 DIGITAL NEPAL FRAMEWORK**

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
02.01.25	<b>Smart Irrigation</b>	P2	No. of Smart irrigation projects	Supporting infrastructure exists for rolling out smart irrigation projects	Optimum utilization of water resources	Long-Term	1	1	1	1	1	MoEWR I, MoLMC PA,	Provincial and local level governments
<b>Major Activities</b>													
02.01.25.01	Conduct a readiness assessment study for deploying SMART irrigation technologies in Nepal, factoring in evolving innovations and best practices around the world						1	1				MoEWR I	Farmers cooperatives
02.01.25.02	Define the product and services requirement specification of both decentralized standalone operational IoT enabled units of the smart irrigation system to be deployed in farmer's fields, and centralized system to make aware, inform, manage, coordinate, evaluate, and innovate the smart irrigation system with real-time data and other analytics.					1	1					MoEWR I	Farmers cooperatives
02.01.25.03	Procure the smart irrigation system units for piloting in 1 district each of across all 7 provinces.						1	1	1	1		MoEWR I	Farmers cooperatives

## 2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
02.01.26	<b>Smart Livestock and Wildlife Management</b>	P2	Number of use cases based on IoT sensors	High level of coordination exists among agencies responsible for livestock management, wildlife management, infrastructure providers and regulators	-Reduction in illegal practices such as poaching and protection of endangered animals.  -Availability of up-to-date data of livestock.	Medium -Term		1	1	1	x	MoALD, MoFE	DoFSC, DoLSD, DNPWC
<b>Major Activities</b>													
02.01.26.01	Conduct a study to review and recommend the areas of integration of digital technologies in smart livestock management and wildlife protection.						1					MoALD	Farmers Cooperatives
02.01.26.02	Define the product and services requirement specification of both decentralized stand-alone operational IoT enabled units of the system to be deployed in livestock or wildlife management							1				MoALD	Farmers Cooperatives
02.01.26.03	Roll-out at least 3 pilots each in all provinces based on the application of digital technologies for wildlife and livestock management							1	1			MoALD, MoFE	Farmers Cooperatives
02.01.26.04	Develop a mechanism to incentivize market actors, researchers, farmers and other stakeholders to promote and accelerate the system.							1				MoALD	Farmers Cooperatives

**2019 DIGITAL NEPAL FRAMEWORK**

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
02.01.27	<b>Televet Medical Center Establishment</b>	<b>P2</b>	Number of tele vet centers	There is a great deal of receptivity among stakeholders in tele vet center	Improvement in the health of livestock's	Medium -Term	1	1	1	x	x	MoALD,	NARC, NAST, Local level, Local Communities
<b>Major Activities</b>													
02.01.27.01	Prepare a detailed project plan on setting up televet centres with details on operational arrangements, complete stakeholder mapping, technological configuration and sustainability strategies						1	1				MoALD,	
02.01.27.02	Set-up at least 6 televet centres in each province							1	1	1	1	MoALD,	

**2019 DIGITAL NEPAL FRAMEWORK**

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
02.01.28	<b>Agriculture Inputs and Products Quality Tracking System</b>	<b>P1</b>	Number of agricultural commodities covered by the system	All stakeholders remain committed to the need for collaboration to ensure traceability of agriculture inputs and products	Better competitive standing of agriculture products on account of the traceability capability  Information of produced products	Medium-Term		1	1	1	x	DFTQC	MoALD, DoA
<b>Major Activities</b>													
02.01.28.01	Conduct a study to identify local agricultural commodities that stand to benefit substantially from traceability functionality along marketability and export competitiveness dimensions						1					MoA	MoALD, DoA, DFTQC
02.01.28.02	Take stock of international best practices in using traceability and quality tracking system across agriculture commodity supply and value chain including available third party technology solutions						1					MoA	MoALD, DoA, DFTQC
02.01.28.03	Prepare a set of recommendations on appropriate technology solutions for traceability and quality tracking							1				MoA	MoALD, DoA, DFTQC
02.01.28.04	Deploy traceability and quality tracking solution covering at least 12 agricultural commodities and farm products							1				MoA	MoALD, DoA, DFTQC

**2019 DIGITAL NEPAL FRAMEWORK**

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
02.03.29.00	<b>Skills development trainings for Farmers</b>	P1	No of training and skills development for farmers	Initiatives taken to enhance digital literacy of farmers and agriculture extension workers Domain expertise leveraged to ensure on-line learning platform generate value to farmers	Significant improvement in farm productivity across the country	Medium-term	1	1	1	x	x	MoALD	MoEST, NARC, CTEVT, Agri-Cooperatives, Universities
<b>Major Activities</b>													
02.03.29.01	Conduct provincial level workshops to assess knowledge and skills development needs of farmers						1					MoALD	NARC, CTEVT, Agri-Cooperatives, Universities
02.03.29.02	Design, develop and deploy on-line learning platform aimed at enhancing various skill sets of farmers with functionality to address their context specific knowledge needs. (multichannel and multimedia learning environment tailored to local context)							1	1			MoALD	MoEST, NARC, CTEVT, Agri-Cooperatives, Universities
02.03.29.03	Develop training/skills development materials in collaboration with the local, national and international organizations active in the domain including partnership arrangements with agriculture universities academic and research institutions and practitioners in the field							1	1			MoALD	MoEST, NARC, CTEVT, Agri-Cooperatives, Universities
02.03.29.04	Conduct workshops to facilitate and support the self-help group and farmer's cooperatives in making use of digital learning environment/platforms							1				MoALD	NARC, CTEVT, Agri-Cooperatives, Universities

**2019 DIGITAL NEPAL FRAMEWORK**

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
02.03.30.00	<b>Cutting edge digital agriculture knowledge centre</b>	P1	Digitally enabled state-of-the-art knowledge center is set up	Policy emphasis is placed on developed research and dissemination of cutting edge knowledge	Significant improvement in agricultural and farm productivity	Long-term	1	1	1	1	1	MoALD	MoEST, DoA, CTEVT, Agri-Cooperatives, Universities
<b>Major Activities</b>													
02.03.30.01	Commission a study to design and develop a state of the art knowledge center and Government agriculture center, with clearly spelt out knowledge and information dissemination strategy						1	1	1			MoALD	Farmers cooperatives
02.03.30.02	Onboard all agriculture experts, universities, colleges, researchers and practitioners who can either contribute or seek benefits from the knowledge centers. provide early-movers incentives to be onboard.							1	1			MoALD	Farmers cooperatives
02.03.30.03	Design and develop knowledge center portal, mobile app, IVR based system and digital ombudsman service targeted to farmers							1	1			MoALD	Farmers cooperatives
02.03.30.05	Plan and host regular conferences, technology transfer workshops, skills development trainings and other extension services for agriculture services and farmers.							1	1	1	1	MoALD	Farmers cooperatives

# Health

2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
03.01.31.00	<b>National Digital Healthcare Platform</b>	P1	Development and deployment of service seeker centric national healthcare platform	The readiness of all stakeholders is essential for the use of digital health service platforms.	Efficient delivery of healthcare services overcoming barriers imposed by shortage of medical professionals, lack of coordination among healthcare services providers, lack of patient support network and poor maintenance of patient history and data	Immediate	1	1	1	1	1	MoHP	MoF, MoCIT, MoHP, DoHS, Provincial Government and Local Level, Hospitals
<b>Major Activities</b>													
03.01.31.01	Conduct e-readiness assessment surveys of health care system participants						1					MoHP	DoHS, Hospitals, MoCIT
03.01.31.02	Develop a framework to be mapped to National Digital Healthcare platform leading to seamless integration of all elements of healthcare ecosystem — doctors, patients, labs,						1					MoHP	DoHS, Hospitals, MoCIT

2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
	pharmacies, imaging centers, health systems, and other members of the healthcare ecosystem												
03.01.31.03	Carry out requirements analysis, design and development for National Digital Healthcare platform and m-health application.						1					MoHP	DoHS, Hospitals, MoCIT
03.01.31.04	Develop and carry out regular monitoring and evaluation, system enhancement, upgrade, maintenance and support to system and digital contents.						1					MoHP	MoF, DoHS, Hospitals, MoCIT

## 2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
03.01.32.00	<b>Next-Generation Digital Healthcare Facilities Service Centers</b>	P2	Number of healthcare facilities with a high level of technological/digital resources	Healthcare centers are connected with supporting infrastructure like high speed broadband and have a certain level of in-house capability to manage technology	Significantly improved healthcare services to patients	Long-Term	1	1	1	1	1	MoHP	MoF, DoHS, Provincial Government and Local Level
<b>Major Activities</b>													
03.01.32.01	Prepare a position paper on emerging digital health and medical technologies with the potential to address structural challenges facing Nepali health sector						1					MoHP	MoF, MoHP, DoHS, Provincial Government and Local Level
03.01.32.02	Develop a strategic framework for deploying selected emerging digital health and medical technologies/ next-generation digital facilities in Nepali health care system factoring in operational and sustainability challenges							1	1			MoHP	MoF, DoIT, DoHS, Provincial Government and Local Level

## 2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
03.01.33	<b>Electronic Health Records 2.0</b>	P1	Web based nationwide EHR system and no. of digital health records	A policy and regulatory environment exists for the protection of privacy and security of patient records	- Significantly improved delivery of effective health services and health policy formulation processes - Improved capacity to drive innovation around precision health care service delivery	Medium -Term	1	1	1	1	1	MoHP	MoCIT, MoHP, DoIT, DoHS, NITC
<b>Major Activities</b>													
03.01.33.01	Initiate a scope-definition / feasibility study for EHR 2.0 digital initiative. Draw a baseline and best practice scenarios of the existing applications and practices of EHR and EMR in Nepal and elsewhere.						1					MoHP	MoCIT, DoIT, DoHS, NITC
03.01.33.02	Develop required policies and regulatory framework for ensuring the security and privacy of data with trusted national partners, vendors and service providers. Set specific guidelines for communication for implementation recommendations, workflow ideas, problems and concerns related to EHR						1	1				MoHP	MoCIT, DoIT, DoHS, NITC
03.01.33.03	Design a complete web based application (EHR) that runs across multiple platforms						1	1	1			MoHP	MoCIT, DoIT, DoHS, NITC
03.01.33.04	Identify and pilot the EHR 2.0 services on-boarding the doctors, patients, health systems, and other members of the healthcare ecosystem.							1	1			MoHP	MoCIT, DoIT, DoHS, NITC

2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
03.01.34	<b>Mobile Health Service</b>	P1	Number of Digital technologies powered mobile health units in operation	There is a policy of healthcare for everyone	People from rural areas are provided with quality health services.	Medium-Term	1	1	1	x	x	MoHP	DoHS, Provincial Government and Local Level, Hospitals
<b>Major Activities</b>													
03.01.34.01	Commission and conduct a study to incorporate the best practices of digitally enabled MHU and essential services deliverable to integrate it with the existing legacy model and practices of health services provided at the central, province and local level.						1	1				MoHP	MoHP, DoHS, Provincial and Local Level Governments, Hospitals
03.01.34.02	Establish a minimum standards for the procuring the MHU units for piloting in 1 district each of all 7 provinces and grow the numbers and scale of the districts in a linear fashion.						1					MoHP	MoHP, DoHS, Provincial Government and Local Level, Hospitals
03.01.34.03	Develop a road-map for the phased roll-out of MHUs backed by SOPs, institutional arrangements, sustainability strategies and monitoring frameworks							1	1			MoHP	MoHP, DoHS, Provincial and Local Level Governments, Hospitals
03.01.34.04	Develop possible funding and operational mechanism for MHUs including CSRs, non-profit lines of funding sources						1	1				MoHP	MoHP, DoHS, Provincial and Local Level Governments, Hospitals
03.01.34.05	Regular review, monitoring, mapping and research of performance of the MHUs, schedules and services of the community served for improvement, upgrade or optimization of MHUs coverage.								1			MoHP	MoHP, DoHS, Provincial Government and Local Level, Hospitals

## 2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
03.01.35	<b>e - Maternal Health Services</b>	P1	Number of pregnant and nursing mothers benefiting from the platform	Sufficient level of digital literacy among expecting and nursing mothers	Help reduce child and maternal mortality	Medium -Term	1	1	1	x	x	MoHP	MoWCSC, MoCIT, NTA, ISPs
<b>Major Activities</b>													
03.01.35.01	Commission at study to identify the best-practices and recommend the most suitable model for e-Maternal care digital initiative in Nepal.						1					MoHP	MoWCSC, MoCIT, NTA, ISPs
03.01.35.02	Develop a road-map, action plan and other necessary documents and resources for initiating and implementing the e-Maternal care digital initiative						1					MoHP	MoWCSC, MoCIT, NTA, ISPs
03.01.35.03	Launch a nationwide awareness campaign to introduce, on-board, adopt and use of the e-Maternal care platform by the primary health care workers, pregnant women, hospitals, private sectors, government agencies and other relevant stakeholders.						1					MoHP	MoWCSC, MoCIT, NTA, ISPs
03.01.35.04	Develop and carry out regular monitoring and evaluation, system upgrade, maintenance and support to e-Maternal care system.						1	1	1			MoHP	MoWCSC, MoCIT, NTA, ISPs

## 2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
03.01.36	<b>Drones for delivery of emergency medical supplies</b>	P3	Number of instances of drone deployment for delivery of emergency medical supplies	Regulatory mechanisms for use of drones are available.	Citizens of remote areas will be benefited from health care.	Long Term	1	1	1	1	1	MoHP, MoHA	MoHP, MoCIT, MoCTCA, MoD, MoHA
<b>Major Activities</b>													
03.01.36.01	Commission a study to assess logistics gaps in delivery of essential medical supplies in remote areas of Nepal with a view to identifying candidate sites for deploying drones for such deliveries						1					MoHP	MoCIT, MoCTCA, MoD, MoHA
03.01.36.02	Develop policy guidelines, implementation framework and road-map for allowing the use of drones for medical emergencies and healthcare services in both urban and rural populations of Nepal.						1					MoHA	MoCIT, MoCTCA, MoD, MoHP
03.01.36.03	Onboard all health professionals, government bodies, relevant private actors and community at large to serve in remote areas.							1	1			MoHP	MoCIT, MoCTCA, MoD, MoHA
03.01.36.04	Incorporate the components of regulation and monitoring of minimum standards to be followed for the safety, security and regulation and other technical bench-marking of drones in production, operation or disposal.							1	1	1	1	MoHP	MoCIT, MoCTCA, MoD, MoHA

2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
03.03.37	<b>Centralized Telemedicine Center</b>	P2	No of centralized Telemedicine Center and beneficiaries	National health policy and enough fund is managed in the center.	A sizable portion of the population in remote locations benefit from access to expert health consultations	Medium -Term	1	1	x	x	x	MoHP	MoCIT, DoHS, NTA, Hospitals
<b>Major Activities</b>													
03.03.37.01	Commission a study to take stock of Telemedicine related initiatives in Nepal with a view to assessing challenges and their overall impact on overall health service delivery						1					MoHP	MoHP, MoCIT, DoHS, NTA, Hospitals
03.03.37.02	Develop a regulatory framework for ensure, credentialing and privileging of Telemedicine service providers						1					MoHP	MoHP, MoCIT, DoHS, NTA, Hospitals
03.03.37.03	Develop an enhanced deployment model of Telemedicine factoring in lessons learnt, relevant innovation in digital health space including remote diagnostics. This should include set of recommendations on sustainability and operational strategies						1	1				MoHP	MoHP, MoCIT, DoHS, NTA, Hospitals
03.03.37.04	Training and on-boarding front-line health workers, medical professionals, doctors for regularly scheduled tele-sessions and other service delivery activities.							1	1			MoHP	MoHP, MoCIT, DoHS, NTA, Hospitals
03.03.37.05	Develop and carry out regular monitoring and evaluation, system upgrade, maintenance and support to Telemedicine center and associated system.							1	1			MoHP	MoHP, MoCIT, DoHS, NTA, Hospitals

# Education

## 2019 DIGITAL NEPAL FRAMEWORK

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
04.01.38	<b>Smart Classrooms</b>	<b>P1</b>	Number of government schools with smart Class rooms set up	Capacity development of the teachers in order to be able to make productive use of Smart Classroom resources	Improved quality of pedagogy leading to measurable better learning outcomes.	Long-Term	1	1	1	1	1	MoEST	MoCIT, MoF, NDCL
<b>Major Activities</b>													
04.01.38.01	Baseline survey to identify the numbers of schools and colleges in each of the 7 provinces for implementation of the Smart Classroom initiative.						1					MoEST	MoCIT, MoF, Telecom, ISPs.
04.01.38.02	Develop a basic design and strategy document for setting up smart class rooms in selected schools						1	1				MoEST	MoCIT, MoF, Telecom, ISPs.
04.01.38.03	Conduct provincial level training programs for teachers and educators on smart classrooms						1					MoEST	MoCIT, MoF, Telecom, ISPs.
04.01.38.04	Set-up at least 1 smart class room each in all 165 constituencies and study the impact on overall learning outcomes						1	1				MoEST	MoCIT, MoF, Telecom, ISPs.
04.01.38.05	Upon successful piloting, establish new smart classrooms in 7 X 100 = 700 in schools/colleges on an annual basis.							1	1			MoEST	MoCIT, MoF, Telecom, ISPs.
04.01.38.06	Upgrade existing IT labs and other facilities of the school/college to smart classrooms in 7 X 100 = 700 on an annual basis.								1	1		MoEST	MoCIT, MoF, Telecom, ISPs.
04.01.38.07	Develop and training teachers (7X35) and Learning facilitators (7X35)						1	1	1	1	1	MoEST	MoCIT, MoF, Telecom, ISPs.

**2019 DIGITAL NEPAL FRAMEWORK**

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
04.01.38.08	Develop smart classroom operating and guidance manual (1+1) / model schedule (5) / smart classroom Logbook (2) to operate a smart classroom (SoP-2)						1	1				MoEST	MoCIT, MoF, Telecom, ISPs.
04.01.38.09	Develop monitoring and evaluation framework and measures for smart classrooms						1					MoEST	MoCIT, MoF, Telecom, ISPs.
04.01.38.10	Regular monitoring and evaluation of established classrooms						1	1	1	1	1	MoEST	MoCIT, MoF, Telecom, ISPs.

## 2019 DIGITAL NEPAL FRAMEWORK

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
04.01.39	<b>OLE Nepal 2.0</b>	P2	Roll-out of OLE 2.0 digital initiative and enrolled students	Easy availability of the digital library.	Improvement in the education quality of the students of public schools.	Long-Term	1	1	1	1	1	MoEST	MoCIT, CTEVT, Nepal Open University.
<b>Major Activities</b>													
04.01.39.01	Initiate a scope-definition for OLE Nepal 2.0 digital initiative.						1					MoEST	MoCIT, CTEVT
04.01.39.02	Carry out impact assessment of current deployment of e-Pustakalaya and e-Path in terms of their impact on learning outcomes, ease of use and overall design						1					MoEST	MoCIT, CTEVT, Nepal Open University.
04.01.39.03	Develop appropriate delivery models across platforms as well as off-line access to the content						1	1				MoEST	CTEVT, Nepal Open University.
04.01.39.04	Develop and deploy OLE 2.0							1	1	1	1	MoEST	Nepal Open University.

## 2019 DIGITAL NEPAL FRAMEWORK

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
04.01.40	<b>Online Learning Platform</b>	P1	Number of students and other stakeholders using the platform	Connectivity and sustainability issues are accorded equal priority	People from rural and less facilities will get quality education	Medium-Term	1	1	1	x	x	MoEST	MoCIT, NTA, Schools and Universities
<b>Major Activities</b>													
04.01.40.01	Study and map the requirements, existing best-practices, initiatives, online learning contents, software and technologies available in Nepal and worldwide and other important resources to design, develop, manage and sustain online learning platform for Nepal. Assess readiness and current status in terms of availability of high speed internet, video, image, voice, text, creative content generation skills						1					MoEST	MoCIT, MoEST, Schools and Universities
04.01.40.02	Develop a strategy to engage and collaborate with educational institutions for initial piloting and complete implementation of an online learning platform						1					MoEST	MoCIT, MoEST, Schools and Universities
04.01.40.03	Train and on-board teachers, management and students from schools, colleges, open university for orientation and regular operation of the platform.						1	1	1			MoEST	MoCIT, MoEST, Schools and Universities
04.01.40.04	Ensure regular content updating, monitoring mechanism for data security, privacy, trust and minimum standards of services delivered through the online learning platform.							1	1			MoEST	MoCIT, MoEST, Schools and Universities

**2019 DIGITAL NEPAL FRAMEWORK**

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
04.01.41	<b>Rent-a-Laptop Program</b>	P3	Number of students participating in the Rent-a-Laptop program	Lack of computer ownership in students of poor class.	Enhanced level of digital literacy and significantly improved quality of education as cost barriers to device ownership are significantly reduced	Medium -Term	1	1	x	x	x	MoEST	MoCIT, MoF, Local levels
<b>Major Activities</b>													
04.01.41.01	Develop a detailed project proposal for implementing the rent-a-laptop program with recommended device configuration, rental policies, project operational modality and modalities for ensuring their productive use						1					MoEST	MoCIT, MoF, Local Level Governments
04.01.41.02	Develop a governance model for the project with a framework for ensuring collaboration with the educational institutions, libraries, Local levels and other relevant stakeholders for initial piloting and complete implementation of rent-a-laptop digital initiatives.						1					MoEST	MoCIT, MoF, Local Level Governments
04.01.41.03	Develop policies, plans, minimum standards and guidelines to receive, re-use, and re-cycle the laptops.						1					MoEST	MoCIT, MoF, Local Level Governments
04.01.41.04	Develop and carry out regular monitoring and evaluation, system upgrade, maintenance and support for rent-a-laptop program.						1					MoEST	MoCIT, MoF, Local Level Governments

## 2019 DIGITAL NEPAL FRAMEWORK

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
04.01.42	<b>EMIS 2.0</b>	P2	Numbers of public schools using EMIS 2.0	Use of EMIS 2.0 is made mandatory for all public schools	Evidence based and data driven policy making significantly facilitated	Medium -Term	1	1	1	x	x	MoEST	DoE, CTEVT, Universities
<b>Major Activities</b>													
04.01.42.01	Conduct a study to document the outcome, learning and shortcomings and requirements for improving upon the existing EMIS system and prepare a design document for EMIS 2.0 incorporating current issues and expected changes from the upgraded system.						1					MoEST	DoE, CTEVT
04.01.42.02	Finalize system requirements of EMIS 2.0, carry out necessary changes in the existing system and port all data, users and other documents for day-to-day operation.						1					MoEST	DoE, CTEVT
04.01.42.03	Conduct workshops on training and on-boarding of the management, administration, faculties and technical team members of schools, colleges, and various boards at central, provincial and local level to accept, adopt and use the EMIS2.0 for regular inputs, updates and operation of educational institutions.						1	1				MoEST	DoE, CTEVT
04.01.42.04	Develop and carry out regular monitoring and evaluation, system upgrade, maintenance and support for EMIS 2.0.						1	1	1			MoEST	DoE, CTEVT

## 2019 DIGITAL NEPAL FRAMEWORK

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
04.01.43	<b>Centralized Admission System</b>	P2	Deployment of a centralized admission system in all Universities	Issues like security and authenticity are adequately addressed while considering system development and deployment	Efficient admission processes benefits both students and Universities	Medium-Term	1	1	1	x	x	MoEST	DoE, CTEVT, Universities.
<b>Major Activities</b>													
04.01.43.01	Conduct a preliminary study for the design and development of integrated centralized student admission information system to efficiently administer application to accredited courses and enable access to information about students.						1					MoEST	MoCIT, MoF, Local levels
04.01.43.02	Draw up integration strategy of the system with existing applications being used by schools, colleges and universities for automating data sharing process						1	1				MoEST	MoCIT, MoF, Local levels
04.01.43.03	Carry out regular training and on-boarding initiatives for management, administration and technical staffs of the respective schools and colleges to ensure data is updated and monitored regularly.							1	1			MoEST	MoCIT, MoF, Local levels
04.01.43.04	Develop a mechanism to facilitate processes leading to the provision of incentives provided by the government to these schools/colleges upon the assessment of the admission information and abiding by the compliance of the government quota system.							1	1			MoEST	MoCIT, MoF, Local levels

**2019 DIGITAL NEPAL FRAMEWORK**

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
04.01.44	<b>Bio-metric Attendance System and CCTV Cameras</b>	P2	No of the school equipped with Bio-metric attendance system and CCTV cameras	Availability of solutions from the local level if any technical difficulties arise.	Students, teachers and operations staff at Schools get punctual. Security of the school premises increases.	Medium -Term	1	1	1	x	x	MoEST	DoIT, Provincial Government and Local Level, Public schools
<b>Major Activities</b>													
04.01.44.01	Revise policy frameworks and guidelines to incentivize and mandate schools to install and adopt CCTV camera and Bio-metric attendance devices to monitor student records and teachers activities in schools.						1					MoEST	DoIT, Provincial Government and Local Level, Public schools
04.01.44.02	Formalize a mechanism to extract high level information from bio-metric attendance and CCTV camera for improvement, quality control and monitoring by relevant stakeholders						1	1	1			MoEST	DoIT, Provincial Government and Local Level, Public schools

**2019 DIGITAL NEPAL FRAMEWORK**

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
04.03.45	<b>Mobile Learning Centers in Rural Areas</b>	P1	Number of mobile learning centers deployed and beneficiaries covered	Access to broadband becomes available to mobile learning centers.	Expansion of learning and skills development opportunities for people living in remote areas to use mobile.	Medium-Term	1	1	1	x	x	MoEST	DoE, CTEVT, Local levels
<b>Major Activities</b>													
04.03.45.01	Commission a study to document and review the best practices to suggest the most suitable model for hi-tech digital enabled mobile learning centers units for rural areas of Nepal that can facilitate the process of help both formal as well as informal education for all.						1					MoEST	MoEST, DoE, CTEVT, Local levels
04.03.45.02	Develop or procure mobile learning centers along with trained learning facilitators who can drive these units to rural areas.						1					MoEST	MoEST, DoE, CTEVT, Governments
04.03.45.03	Develop a partnership model and promote trainings and workshops by different stakeholders including NGOs/INGOs in rural areas. encourage people toward self-learning using interactive multimedia components like video, animation and texts to enhance their knowledge for getting job opportunities.						1	1				MoEST	MoEST, DoE, CTEVT, Local Level Governments
04.03.45.04	Maintain and keep a record of learners associated with each mobile learning centers and evaluate at regular intervals.						1	1	1			MoEST	MoEST, DoE, CTEVT, Local levels
04.03.45.05	Develop and carry out regular monitoring and evaluation, system upgrade, maintenance and support for mobile learning center units.							1	1			MoEST	MoEST, DoE, CTEVT, Local levels

# Energy

2019 DIGITAL NEPAL FRAMEWORK

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
05.01.46	<b>Smart metering</b>	P1	Number of users of smart meters.	NEA is ready for the development of required infrastructures for deploying Smart Metering.	Reduction in Electric leakage through improvement in operation capabilities	Medium-Term	1	1	1	x	x	MoEWR	NEA, Electricity Tariff Fixation Commission
<b>Major Activities</b>													
05.01.46.01	Develop a nationwide master plan to shift from analog to smart meters in phased manner based upon best practice scenarios, including the establishment of communication/network hub, data services, and in-home displays.						1					MoEWI	MoEWI, NEA, Electricity Tariff Fixation Commission
05.01.46.02	Procure and provide/replace smart meters in districts identified for initial piloting. develop guidelines and support mechanisms for smart meters in each region							1	1			MoEWI	MoEWI, NEA, Electricity Tariff Fixation Commission
05.01.46.03	Develop software and applications to measure the changes in demand due to smart meters and integrate mechanisms to control loss and identify defaulters.							1	1			MoEWI	MoEWI, NEA, Electricity Tariff Fixation Commission

2019 DIGITAL NEPAL FRAMEWORK

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
05.01.47	<b>GIS Smart Grid Project</b>	<b>P3</b>	Number of GIS Smart Grid projects.	Government of Nepal is committed for the development of GIS Smart Grid Project.	Reduction in No-Light and Electric leakage, Development of Electric Distribution management system.	Long-Term	1	1	1	1	1	MoEWR I	NEA, National Transmission Grid Company
<b>Major Activities</b>													
05.01.47.01	Conduct a study the feasibility for transitioning to the GIS enabled smart grid along investment outlays and economic benefits dimensions.						1	1				MoEWR I	MoEWRI, NEA, National Transmission Grid Company
05.01.47.02	Select pilot locations for smart grid implementation (including smart control centers, smart transmission networks, and smart substations							1	1	1	1	MoEWR I	MoEWRI, NEA, National Transmission Grid Company
05.01.47.03	Upgrade existing grid to GIS smart grid system in phased manner at selected pilot sites							1	1	1	1	MoEWR I	MoEWRI, NEA, National Transmission Grid Company
05.01.47.04	Procure or develop applications and software to monitor, analyses and control the smart grid distribution system.							1	1	1	1	MoEWR I	MoEWRI, NEA, National Transmission Grid Company
05.01.47.05	Regular monitoring and evaluation, system upgrade, maintenance and support for system.						1	1	1	1	1	MoEWR I	MoEWRI, NEA, National Transmission Grid Company

**2019 DIGITAL NEPAL FRAMEWORK**

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
05.01.48.00	<b>Pan-Nepal Roll-out of NEA's- Any Branch Payment System (ABPS)</b>	<b>P1</b>	Number of NEA's branches using ABPS	NEA is committed for the development and operation of ABPS	Ease in payment for NEA's customers.	Medium-Term	1	1	1	x	x	NEA	MoEWRI, NRB, Banks and Financial Institutions
<b>Major Activities</b>													
05.01.48.01	Study from the existing NEA ABPS operating in the Kathmandu Valley.						1	1				NEA	Banks and Financial institutions
05.01.48.02	Incorporate the needs arising and issues faced with the ABPS system in operation.						1	1				NEA	Banks and Financial institutions
05.01.48.03	Roll out the existing system for all other branches of NEA in Nepal.						1	1	1	1		NEA	Banks and Financial institutions

2019 DIGITAL NEPAL FRAMEWORK

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
05.01.49	<b>NEA Official Mobile App 2.0</b>	<b>P1</b>	Number of people installing and using NEA official mobile app	NEA ready to develop and deploy cutting edge mobile apps.	Ease in NEA's information and service flow	Immediate	1	x	x	x	x	NEA	NRB, Financial Institutions, Payment Service Provider / Operator
<b>Major Activities</b>													
05.01.49.01	Commission a study to document the upgraded system requirement for the NEA official Mobile App 2.0 and its integration with the smart grid information.						1					NEA	NRB, Financial Institutions, Payment Service Provider / Operator
05.01.49.02	Design, develop and upgrade the existing version of the NEA official mobile app 2.0 with specified features and specifications.						1	1				NEA	Payment Service Provider
05.01.49.03	Develop, oversee, monitor, and upgrade automated customer response feature. ensure security/privacy, accessibility, functionality/UX and app performance						1					NEA	Payment Service Provider

2019 DIGITAL NEPAL FRAMEWORK

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
05.01.50	<b>Smart Building/Energy Management Project</b>	<b>P3</b>	Number of buildings making use of smart building technologies	Policy framework is developed for smart building construction	Reduction in energy usage and carbon footprint by means of efficient energy management	Long-Term	1	1	1	1	1	MoEWR	MoUD, MoFAGA, Local levels
<b>Major Activities</b>													
05.01.50.01	Commission a study to develop a standard for developing smart buildings and energy management units.						1					MoFAG A	Local levels
05.01.50.02	Develop strategies for promoting smart buildings by helping showcase technology solutions in conjunction with the private sector, architecture and engineering community and Engineering colleges						1	1				MoFAG A	Local levels
05.01.50.03	Prepare and implement policies, regulations, and guidelines necessary to ensure data security, privacy, and IoT enabled devices, sensors and services in these smart structures.						1	1				MoFAG A	Local levels

2019 DIGITAL NEPAL FRAMEWORK

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
05.01.51	<b>NEA Field Force Automation Solutions</b>	<b>P2</b>	Number of users using FFA solutions to streamline internal management of NEA	Considerable effort is put into assessing complete set of requirements for Field Force Automation Solution	Enhanced level of organizational efficiency owing to real time access to information and data	Long-Term	1	1	1	1	1	NEA	MoEWRI, DoED
<b>Major Activities</b>													
05.01.51.01	Review existing system in relation to current workflows and identify design issues for enhanced FFA solutions						1	1				NEA	MoEWRI, DoED, NEA
05.01.51.02	Develop and roll-out FFA Solutions followed by capacity building initiatives for the users							1	1	1	1	NEA	MoEWRI, DoED, NEA

2019 DIGITAL NEPAL FRAMEWORK

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
05.01.52	<b>NEA Customer Service Portal</b>	<b>P1</b>	Number of users making use of NEA customer service portal	NEA leadership realigns organizational work flows and processes to the requirements of Customer Service Portal	Significantly improved customer relationship management and ease in service delivery of NEA	Immediate	1	x	x	x	x	NEA	DoEWI, DoED
<b>Major Activities</b>													
05.01.52.01	Develop complete System Requirements Specifications for NEA customer service portal.						1					NEA	DoEWI, DoED, NEA
05.01.52.03	Realign organizational mechanism to address requirements of the Service Portal						1	1				NEA	DoEWI, DoED, NEA
05.01.52.04	Deploy NEA Customer Service Portal							1	1			NEA	DoEWI, DoED, NEA

**2019 DIGITAL NEPAL FRAMEWORK**

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)						Focal Agency	Supporting Actors
							1	2	3	4	5	6		
05.03.53	<b>NEA e-Learning platform</b>	P1	Number of NEA personnel using NEA e-Learning platform	NEA leadership remains committed and workforce motivated to learn using e-learning platform	Enhanced level of organizational efficiency resulting from better trained workforce	Medium-Term	1	1	1	x	x	NEA	MoEWRI, MoCIT, NTA	
<b>Major Activities</b>														
05.03.53.01	Develop a project on design, development and operationalization e-Learning platform based upon comprehensive skills needs assessment of NEA staff						1					NEA	MoEWRI, MoCIT, NTA, ISPs	
05.03.53.02	Design course content to be made available through the online platform						1					NEA	MoEWRI, MoCIT, NTA, ISPs	
05.03.53.03	Carry out monitoring and evaluation of NEA eLearning courses							1	1			NEA	MoEWRI, MoCIT, NTA, ISPs	
05.03.53.04	Ensure all the topics and areas covered through e-learning to staff enhances their digital skills and knowledge								1			NEA	MoEWRI, MoCIT, NTA, ISPs	
05.03.53.06	Design, analyze and develop mobile and web applications for training interface, develop an audio/video for both online and offline references and feedback mechanisms								1			NEA	MoEWRI, MoCIT, NTA, ISPs	

2019 DIGITAL NEPAL FRAMEWORK

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)						Focal Agency	Supporting Actors
							1	2	3	4	5	6		
05.03.54	<b>Energy Sector - Contract Management Information System</b>	P1	Deployment of Contract Management and the number of contracts made using the system	Targeted initiatives are undertaken to on-board the contractors	Ease in Energy Contracts and their Management as well as Monitoring.	Medium Term	1	1	1	x	x	NEA	MoEWRI, Hydropower Development Company (HDC)	
<b>Major Activities</b>														
05.03.54.01	Develop complete Requirement Specification for Contract Management Information System						1						NEA	Private sector contractors
05.03.54.02	Develop and deploy Contract Management System						1	1					NEA	Private sector contractors
05.03.54.03	Conduct workshops for on-boarding contractors							1					NEA	Private sector contractors

# Tourism

**2019 DIGITAL NEPAL FRAMEWORK**

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
06.01.55	<b>Welcome Nepal Website 2.0 / Nepal Mobile App</b>	<b>P1</b>	Number of downloads and use of mobile app by tourists and other stakeholders	An acceptable level of e-readiness exists among all key players of tourism ecosystem	Improved access to information for tourist and enhanced market opportunities for private sector actors making use of the platform	Immediate	1	x	x	x	x	NTB	MoCTCA, NITC
<b>Major Activities</b>													
06.01.55.01	Carry out assessment of a range of existing and enhanced features of on-line services currently being offered by the Welcome Nepal website for integration into the Mobile app including a detailed road-map for integration, including back-end architecture						1					NTB	TAAN, Travel and Tour Operators
06.01.55.02	Build a common, unified platform and common mobile app to facilitate single point access of for tourism services through the Welcome Nepal website 2.0 and mobile app across all platform						1					NTB	TAAN, Travel and Tour Operators

**2019 DIGITAL NEPAL FRAMEWORK**

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
06.01.56	<b>Electronic Visas and Immigration Process Improvement</b>	<b>P1</b>	Number of visitors using e-Visa	Appropriate legal provisions are ensured for issuance of e-Visa	Ease in Visa Processing resulting in strong destination brand perception	Long-Term	1	1	1	1	1	DoI	MoHA, MoFA, MoCIT, MoCTCA, NITC
<b>Major Activities</b>													
06.01.56.01	Develop a strategic and operational framework for e-visa and immigration process in a phased manner with a reference architecture.						1					DoI	MoHA, MoFA, MoCIT, MoCTCA, NITC
06.01.56.02	Develop security, data protection, disaster recovery, resilience and business continuity strategies and reference framework for e-visa and immigration process automation initiatives						1					NITC	MoHA, MoFA, MoCIT, MoCTCA, NITC
06.01.56.03	Fully automate the e-visa and immigration process includes complete workflow automation, deployment and related capacity building initiatives, among others.							1	1	1	1	DoI	MoHA, MoFA, MoCIT, MoCTCA, NITC

**2019 DIGITAL NEPAL FRAMEWORK**

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	1	1	x	x		
06.01.57	<b>Multilingual Helpline</b>	<b>P2</b>	Number of tourists using the helpline	Persons with high level of language proficiency in the indicated languages are available	Improvement in tourist experience and increase in engagement and exploration of new destinations.	Immediate	1	1	1	x	x	MoCTC A	DoT, NTB,TAAN
<b>Major Activities</b>													
06.01.57.01	Design, develop and deploy an integrated Multi-Lingual Tourist Helpline Platform incorporating platform including the 24x7 Toll Free number, short code service and mobile app complete with reference architecture that could also be used in provincial and local level settings						1					MoCTC A	DoT, NTB,TAAN

**2019 DIGITAL NEPAL FRAMEWORK**

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
06.01.58	<b>Augmented and Virtual Reality Tour App</b>	<b>P3</b>	Number of AR/VR applications developed and deployed, aimed at enriching tourist experience	AR/VR applications necessary to enrich overall tourist experience and optimize the Nepal Tourism Board's marketing and promotions' ROI	Growth in the number of tourist arrivals due to prospects for conversions for tour and activity operators	Long-Term	1	1	1	1	1	NTB	DoT
<b>Major Activities</b>													
06.01.58.01	Carry out a study backed by workshop with key actors in tourism vertical to identify areas within tourism product and experience category in Nepal that could benefit from AR/VR media deployment						1					NTB	MoCTCA, DoT, NTB
06.01.58.02	Develop and deploy AR/VR media and apps covering identified tourism product and experience						1	1	1	1	1	NTB	MoCTCA, DoT, NTB

**2019 DIGITAL NEPAL FRAMEWORK**

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)						Focal Agency	Supporting Actors
							1	2	3	4	5	6		
06.01.59	<b>Electronic Tour Guides</b>	<b>P3</b>	Number of tourists using electronic tour guides	There is buy-in from stakeholders of key tourist attractions for deploying electronic tour guides	- Nepal image as a tourist friendly destination is strengthened - Tourist satisfaction resulting from better tourist experience	Medium-Term	1	1	1	x	x	NTB	MoCTCA, DoT	
<b>Major Activities</b>														
06.01.59.01	Conduct workshops to identify tourist attractions where Electronic tour guides could be effectively used						1					NTB	Tour Operators, NTA	
06.01.59.02	Prepare system requirement specification for electronic tour guide system for walking tours, trekking and museum related attractions						1	1	1			NTB	Tour Operators, NTA	

**2019 DIGITAL NEPAL FRAMEWORK**

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)						Focal Agency	Supporting Actors
							1	2	3	4	5	6		
06.01.60	<b>Omnichannel marketing</b>	<b>P1</b>	Formulation of a comprehensive Omni-channel marketing strategy and framework for Nepal's tourism promotion  Number of organization enrolled in the program	Omni Channel marketing is essential for efficient tourism promotion.	Enhanced brand perception and visibility of Nepal and its attractions leading to increased tourist arrivals	Immediate	1	1	1	x	x	NTB	MoCTCA, DoT	
<b>Major Activities</b>														
06.01.60.01	Develop a business plan for Omnichannel marketing strategy mapping out stakeholders, target audience and languages to be accommodated						1					NTB	MoCTCA, NTB, Nepali Diplomatic missions overseas, Private sector	

**2019 DIGITAL NEPAL FRAMEWORK**

I-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
06.01.61	<b>Tourism Security Infrastructure</b>	<b>P2</b>	Comprehensive plan for safety and security for tourists by harnessing digital technologies	The usage of radio and wireless technologies are required to enhance tourist safety and security.	- Improved tourist safety and security. - Increased tourists' confidence and attractiveness of Nepal as a tourist destination.	Long-Term	1	1	1	1	1	NTB	MoCTCA, MoHA, DoT
<b>Major Activities</b>													
06.01.61.01	Conduct a study to assess overall safety and security environment for the tourists						1					NTB	MoCTCA, DoT, NP
06.01.61.02	Develop a road map for integrating digital technologies in strengthening safety and security of tourists						1	1				NTB	MoCTCA, DoT, NP
06.01.61.03	Implement recommendations highlighted by the road-map							1	1	1		NTB	MoCTCA, DoT, NP

# Finance

2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
07.01.62	<b>National Payment Gateway</b>	<b>P1</b>	- Establishment of National Payment Gateway - Volume of transactions passing through National Payments Gateway	-NRB remains committed to ensure a strong governance model for national payment gateway in order to ensure participation from all key actors	Secured payment system, reduction in business expenses and digital inclusiveness.  Improvement in digital economy	Medium -Term	1	1	1	x	x	NRB	MoF, MoCIT, NITC, FCGO, Banks and financial institutions.
<b>Major Activities</b>													
07.01.62.01	Carry out assessment of Digital payments landscape in Nepal						1					NRB	Bankers Association, Finance Companies, Digital payments solutions providers
07.01.62.02	Develop a broad concept note for National Payment Gateway - mapping out key stakeholders, security requirements and international best practices						1					NRB	Bankers Association, Finance Companies, Digital payments solutions providers
07.01.62.03	Develop requirements specifications for National Payment Gateway						1	1				NRB	Bankers Association, Finance Companies, Digital payments solutions providers
07.01.62.04	Develop and deploy National Payment Gateway							1	1			NRB	Bankers Association, Finance Companies, Digital payments solutions providers

**2019 DIGITAL NEPAL FRAMEWORK**

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
07.01.63	<b>Credit Ratings (Individual/ Corporate Accounts)</b>	<b>P1</b>	- A functioning credit rating system and number of financial institutions and regulatory agency making use of the same - Measurable reduction in loan defaults and non-performing assets	Legal framework exist for the operation of credit rating agency	- Financial institutions able to take informed decisions for sanctioning loan. - Reduction in loan defaults and non-performing assets.	Medium -Term	1	1	1	x	x	NRB	MoF, Nepal Bankers' Association, Financial institutions
<b>Major Activities</b>													
07.02.63.01	Develop legal framework for credit rating agency						1					NRB	MoF
07.02.63.02	Develop data sharing guidelines for credit rating agency						1					NRB	MoF
07.02.63.03	Develop requirements specification for credit rating application complete with security, data protection and data sharing features						1					NRB	MoF
07.02.63.04	Develop and deploy Credit Rating application							1	1			NRB	MoF, Bankers Association, Financial institutions

**2019 DIGITAL NEPAL FRAMEWORK**

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
07.01.64	<b>Information Management System of Nepali Migrant Workers</b>	<b>P1</b>	Number of overseas workers as well as destination countries covered by the system	High Level of government priority is accorded to the initiative especially in relation to back-end readiness and level of effort required on part of all participating entities	Significantly improved policy making, workers safety assurance, management and oversight capability on part of Ministry of Labour, Employment and Social Security.	Medium Term	1	1	1	x	x	DoLOS	MoLESS, MoFA, DoI, DoFE
<b>Major Activities</b>													
07.01.64.01	Map out as-is assessment of migrant workers management and oversight capability view to identifying key challenges						1					DoLOS	MoLESS, MoFA, DoLOS, DoI, DoFEPB
07.01.64.02	Carry out requirements specification for the Information Management System of Nepali Migrant workers including identification of key information points to enable quick response							1	1			DoLOS	MoLESS, MoFA, DoLOS, DoI, DoFEPB
07.01.64.03	Develop and deploy Migrant Workers Information Management System						1	1				DoLOS	MoLESS, MoFA, DoLOS, DoI, DoFEPB

**2019 DIGITAL NEPAL FRAMEWORK**

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
07.02.65	<b>Operators to offer mobile wallets</b>	<b>P2</b>	Number of operators providing mobile wallet services and number of their mobile wallet users	Operators make requisite organizational arrangements to position themselves also as digital payment service providers	Wider expansion of digital payments services.	Medium Term	1	1	1	x	x	NRB, NTA	MoCIT, MoF, Telecom Service Providers.
<b>Major Activities</b>													
07.02.65.01	Carry out necessary regulatory amendments to allow operators to roll-out digital payment services as per guidelines issued by NRB						1					NRB	MoCIT, MoF, NTA
07.02.65.03	Major operators to roll-out mobile wallet services							1	1			NRB	MoCIT, MoF, NTA

**2019 DIGITAL NEPAL FRAMEWORK**

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
07.02.66	<b>Encourage digital payments in Nepal</b>	<b>P1</b>	Growth in value of transaction based on Digital payment instruments.	Merchant costs rationalization, security and interoperability issues are accorded high policy priority	Digital payment system lead to significantly lowered transaction costs resulting in growth in economic activities	Medium -Term	1	1	1	x	x	MoF	NRB, Banks, Payment services providers and operators
<b>Major Activities</b>													
07.02.66.01	Take measures to drive uptake of digital payment solutions in Nepal based upon recommendations listed out in a number of studies carried out in this area. This include simple merchant enrollment formalities, mechanism to ensure interoperability, among others						1					MoF	NRB
07.02.66.02	Develop an implementable strategic framework for expanding the portfolio of existing digital payment gateways/clearing houses in Nepal						1	1	1			MoF	NRB

**2019 DIGITAL NEPAL FRAMEWORK**

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
07.02.67	<b>Development of Single window for Business &amp; Industry Promotion</b>	P1	Number of single window service for business and industry promotion developed	High Level of government priority is accorded to the initiative especially in relation to back-end readiness	Marked improvement in World Bank ease of doing business rankings	Medium -Term	1	1	1			MolCS	DoC, DoT, IRD, FNCCI, CCI, Trade Support Institutions, CRO
<b>Major Activities</b>													
07.02.67.01	Conduct readiness assessment of key stakeholders in electronic single window system						1					MolCS	FNCCI, CCI, Trade Support Institutions, IRD, DoC, CRO
07.02.67.02	Develop a project concept note on Electronic Single Window system highlighting legal and regulatory environment, recommendations on institutional arrangement on OSS including operation and sustainability model, initial investment required, participants and stakeholders on-boarding strategies						1					MolCS	FNCCI, CCI, Trade Support Institutions, IRD, DoC, CRO
07.02.67.03	Develop detailed requirements specifications, including technology and business architecture for Single Window System						1	1				MolCS	FNCCI, CCI, Trade Support Institutions, IRD, DoC, CRO
07.02.67.04	Develop and deploy Electronic Single Window system							1	1	1	1	MolCS	FNCCI, CCI, Trade Support Institutions, IRD, DoC, CRO

2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
07.02.68	<b>Development and promotion of eCommerce and ITeS ecosystem</b>	P1	Increase in total number of eCommerce and ITeS organisations and the volume of their transaction	Amends are made in customs act and regulation, fiscal act and regulations to facilitate e-commerce and e-trade	-Employment generation and economic growth resulting from the growth in ITeS (BPO, KPO and BPMs) -Enhanced level of growth in the trade of goods and services through eCommerce	Mid Term	1	1	1	x	x	MoICS	MoCIT, NCC, FNCCI, HAN, Private Sector Businesses
<b>Major Activities</b>													
07.02.68.01	Conduct a diagnostic study on the current state of the ecommerce sector in Nepal, including overall policy environment (e.g. IP rights, consumer protection, electronic contracts)						1					MoICS	MoCIT
07.02.68.02	Carry out regulatory and policy gap analysis on the development of ecommerce and sharing economy business models and prepare recommendations on creating an environment conducive to the growth of these sectors							1	1			NCC	MoICS

## 2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
07.03.69	<b>Digital Payments Campaign</b>	<b>P1</b>	Value of gross national transaction carried out through digital payments infrastructure and instruments	Government is committed for digital payment and required policies are ready	Growth in commercial and other transaction activities resulting from lower transaction costs and convenience	Long-Term	1	1	1	1	1	NRB	MoF, MoCIT, Banks, Payment Gateways
<b>Major Activities</b>													
07.03.69.01	Develop a project proposal on the scope, structure and execution modality of the campaign						1					MoF	NRB
07.04.69.02	Develop incentive structure to drive the uptake of digital payments solutions among SME's						1	1				MoF	NRB
07.03.69.02	Organize sensitization workshops on digital payments to small and medium enterprises							1	1	1	1	MoF	NRB

# Urban Infrastructure

2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
08.01.70	<b>Water ATMs</b>	P2	Number of units of water ATMs in operation.	An innovative model for the sustainability of water ATMs is worked out and appropriate investments made in supporting logistics arrangements	Help achieve universal and equitable access to safe and affordable drinking water for all.	Immediate	1	x	x	x	x	Provincial Government and Local Level	MoWS, DWSSM, WECS, MuAN, Private companies
<b>Major Activities</b>													
08.01.70.01	Develop project proposal for rolling out water ATMs including identification of locations for situating water ATM, cost and pricing structure, institutional arrangement, operational strategies and sustainability						1					MoUD, MoWS	Local level and PPP
08.01.70.01	Develop requirements specification for Water ATMs						1					MoUD, MoWS	Local level and PPP
08.01.70.02	Install Water ATMs						1					MoUD, MoWS	Local level and PPP

2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
08.01.71.00	<b>Smart Metering for Water</b>	<b>P2</b>	Percentage of customers using smart meters	Supporting infrastructure exists for the operation of smart meters	Efficient management water supply resulting in reduction in wastage	Long-Term	1	1	1	1	1	MoWS	DWSSM, WECS, MuAN, Local levels, WECS
<b>Major Activities</b>													
08.01.71.01	Conduct a feasibility study for deploying Smart Water Meters						1					MoWS	MoWS, DWSSM, WECS, MuAN, Local levels
08.01.71.02	Develop basic requirement specification for Smart Water Metering system including back-end architecture and customer interface						1	1				MoWS	MoWS, DWSSM, WECS, MuAN, Local levels
08.01.71.03	Define scope for pilot roll-out of smart meter and roll-out at least 2000 pilots each in each of the provinces							1	1	1	1	MoWS	MoWS, DWSSM, WECS, MuAN, Local Governments

2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
08.01.72	<b>Intelligent Waste Management</b>	P2	Number of fully operational intelligent waste management systems installed	Supporting infrastructure in terms of connectivity exists for intelligent waste management	Reduce the risk of waste and possible improvement on healthy-life	Medium -Term	1	1	1	x	x	MoUD	DWSSM, Provincial Government and Local levels
<b>Major Activities</b>													
08.01.72.01	Carry out readiness assessment survey for intelligent waste management in Kathmandu Metropolitan City						1					MoUD	MoUD, DWSSM, Local levels
08.01.72.02	Develop technical specification for intelligent waste management solution highlighting the business case for such solutions						1					MoUD	MoUD, DWSSM, Local levels
08.01.72.03	Develop a project proposal for deploying intelligent waste management solutions highlighting sustainability strategies, cost factors and appropriate investment model						1					MoUD	MoUD, DWSSM, Local levels

2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
08.01.73	<b>Automated waste sorting</b>	P3	Number of automated waste sorting plants installed and volume of the waste sorted	High level of readiness exist in concerned authorities to deploy automated waste sorting given technological complexities and investment required	Lower carbon footprint on account of efficient sorting of waste and high possibility of recycling	Long Term	1	1	1	1	1	MoUD, Local level	MoUD, NAST, Local Communities, DWSS
<b>Major Activities</b>													
08.01.73.01	Prepare a detailed concept note on Automated waste sorting in Nepal highlighting international best practices, feasibility parameters and scope for private sector participation						1					MoUD, Local Government	MoUD, NAST, Local Communities DWSS
08.01.73.02	Prepare a detailed project proposal for setting up automated waste sorting facility in Kathmandu valley initially						1	1				MoUD, Local Government	MoUD, NAST, Local Communities DWSS
08.01.73.03	Set-up Automated waste sorting facility at at least 5 sub-metropolitan cities in Nepal							1	1	1	1	MoUD, Local Government	MoUD, NAST, Local Communities DWSS

2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
08.01.74	<b>Municipality Mobile App</b>	P1	Functioning municipality mobile app, number of installations and number of crowd-sourcing participants	Political readiness to provide services through mobile apps	Participatory municipal governance leading to efficient functioning of municipalities	Immediate	1	x	x	x	x	MoFAG A	Local levels, Local Communities
<b>Major Activities</b>													
08.01.74.01	Conduct scoping study and system requirements specification of municipality mobile application, drawing also upon best practice scenarios						1					Local level	MoCIT, MoFAGA, Local Communities
08.01.74.02	Carry out necessary organizational restructuring with clear demarcation of roles and responsibilities in order to address issues raised by crowd-sourcing participants						1					MoFAG A	MoCIT, Local level, Local Communities
08.01.74.03	Develop and deploy Municipality Mobile Application						1	1	1	1	1	MoFAG A	MoCIT, Private Companies

## 2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
08.01.75	<b>Connected public transport / Public Transport Mobile App</b>	P1	Number of app downloads and active users	Public transport operators are ready to follow one door service interface implementation	<ul style="list-style-type: none"> <li>- improvement in Public safety</li> <li>- Reduce wait times and increase convenience for customers by offering real-time information.</li> <li>- Help manage traffic and passenger congestion.</li> </ul>	Immediate	1	1	1	x	x	MoPIT	MoUD, DoTM, Public Vehicles Committee, Traffic Police
<b>Major Activities</b>													
08.01.75.01	Conduct scoping study of Connected Public Transport/Public transport mobile app. Map out key stakeholders and explore the role of the private sector in the initiative						1					MoPIT	Local level, MoUD
08.01.75.02	Prepare a mobile app requirements document highlighting intended functions and design issues concerning the mobile app						1					MoPIT	Local level, MoUD
08.01.75.03	Develop a road map for equipping the selected public transport fleet with GPS tracking devices						1	1				DoTM	Telecom Operators, ISPs
08.01.75.04	Design and develop mobile application for real-time tracking of fleet and other attribute information							1	1			DoTM	MoCIT, MoUD, MoPIT

2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
08.01.76	<b>Intelligent traffic management</b>	P2	Number of intelligent traffic system installed and reduction in the road accidents.	MoPIT remains committed to enhance level of readiness to deploy and sustain intelligent traffic management	Reduction in traffic congestion, improvement in safety and security of road users	Medium-Term	1	1	1	x	x	MoPIT	MoUD, MoHA, DoTM, DoR, Traffic Police
<b>Major Activities</b>													
08.01.76.01	Carry out a detailed scoping study to identify key elements of intelligent traffic management system in relation to traffic management challenges specific to Nepal						1					MoPIT, MoUD	Local Level Government
08.01.76.02	Assess key requirements of Intelligent Traffic Management system and available third party solutions that match the requirements						1	1	1			MoPIT	DoR, DoTM, Traffic Police
08.01.76.03	Procure and deploy intelligent traffic management system in sub-metropolitan cities of Nepal							1	1			MoPIT, MoUD	MoHA, MoCIT, DoR Traffic Police

2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
08.01.77	<b>Intelligent Parking Lot Management</b>	P3	Number of Intelligent parking lot management system deployed and their user base	A level of readiness exists especially among parking lot service providers and sufficient area	- Manage unauthorized parking  - Convenience to drivers and wider gains accrued due to unnecessary loss of resources and time spent in physically locating a parking space	Medium Term	1	1	1	x	x	Local Level	MoPIT, Private companies
<b>Major Activities</b>													
08.01.77.01	Take stock of existing parking lots, their management and operations modalities as well as their readiness in adopting Intelligent Parking Lot management						1					Local level	MoPIT
08.01.77.02	Define key requirements and standards of Intelligent Parking Lot Management in terms of appropriate technology solutions, requirements of mobile app, and SoPs							1				Local level, Private Companies	MoPIT
08.01.77.03	Pilot Intelligent Parking Lot management system in selected urban locations and roll out to the other cities and areas.							1	1				

2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)						Focal Agency	Supporting Actors
							1	2	3	4	5	6		
08.01.78.00	<b>Intelligent Toll-booths</b>	P3	Number of Intelligent Toll-booths established and vehicles having used the same	- All traditional toll booths are ready to move in intelligent tool-booths.	Ease in revenue collection  Increased safe and comfortable mobility of the people across the country.	Medium -Term	1	1	1	x	x	MoPIT	MoF, MoCIT, MoHA, Traffic Police, DoR, Provincial Government and Local level	
<b>Major Activities</b>														
08.01.78.01	Develop a comprehensive model for setting up Intelligent toll booths which is based on RFID tag / GPS system and have mechanism to collect the payment without stopping vehicles from toll booths to save the time at toll plaza and having cash free operation.						1					MoPIT	DoR, Local level	
08.01.78.02	Recommend policy framework for promoting appropriate mechanisms building and operating such kind of facility.						1	1	1			MoCIT	MoPIT	
08.01.78.03	Setup Intelligent toll booths in Nepal						1					DoR	Local level	

2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
08.01.79.00	<b>National Disaster Management System</b>	P1	National Disaster Management System establishment and operation	Government commitment to properly enrich and use the system during all the three phases of a disaster.	Improve prediction, preparedness, response, resilience, manage, rebuild, and minimize loss from emergencies and natural disasters	Long-Term	1	1	1	1	1	MOHA	MoD, MoCIT, NTA, ISPs, Nepal Army, Nepal Police, Armed Police Force, Local levels
<b>Major Activities</b>													
08.01.79.01	Design a comprehensive model for setting up National Disaster Management system and develop mechanism to integrate all the government offices and key population centers across the nation into this system with emphasis on building strategic partnerships at various levels.						1					OPMCM	MoHA, MoD, MoCIT, NTA, ISPs, NA, NP, APF, Local levels
08.01.79.02	Recommend policy framework for promoting appropriate mechanisms building and operating such kind of facility.						1	1					
08.01.79.03	Setup, operate and coordinate the National Disaster Management System across all three level of government in cooperation with agencies at National and International levels.						1	1	1	1	1	MOHA	MOCIT
08.01.79.04	Promote a productive and proactive partnership with the media for national disaster management system.						1	1	1			MOHA, MOCIT	Local levels

2019 DIGITAL NEPAL FRAMEWORK

DI-ID	Digital Initiatives (DI) Programs / Projects	Priority	Indicators	Assumptions	Expected Outcome	Time-frame	Timeline (Year)					Focal Agency	Supporting Actors
							1	2	3	4	5		
08.01.80.00	<b>Disaster Management Training</b>	P1	Number of trainees onboard in disaster management training by the end of 2022	Government agencies remain fully committed towards continuation of regular disaster management training and functioning of at-least one Emergency Operation Centers (EOC) at each local level.	Awareness and preparedness improved among government officials and general population on disaster management activities.	Long Term	1	1	1	1	1	NEOC	MoFAGA, MoH, Provincial Government and Local level, INGO/ NGO
<b>Major Activities</b>													
08.01.80.01	Design digital curriculum and build e-Training platform for disaster preparedness, management, emergency communications, rescue and search operations.						1	1				NEOC	INGO/ NGO
08.01.80.02	Conduct regular training, drills, and exercise sessions and publish updated and standard contents in local language for awareness and preparedness periodically							1	1	1	1	MoCIT, NEOC	MoFAGA
08.01.80.03	Collect feedback on awareness and training programs and improve them as per the disaster management standards								1	1	1	NEOC	MoFAGA

Annexure II: Constitution of Nepal Mapping

Constitution of Nepal Mapping with Digital Nepal Initiatives

Constitution of Nepal 2015	Improve spectrum availability, management and optimization	Government of Nepal App	provincial Data Center Establishment	eGovernance 2.0	Establish the Internet as an essential services	National Optical Fiber Network	Digital Skill Development Initiative	Paperless Government to promote collaboration	Government eLearning Platform	eHaat Bazaar	Education and Training Programs	State-of-the-art Knowledge Centers & Government Agriculture Centers	National Digital Healthcare Platform	Electronic Health Records 2.0	e-Maternal Care	Mobile Learning Centers in Rural Areas	Online Learning Platform	NEA Official Mobile App 2.0	NEA Customer Service Portal	Welcome Nepal Website 2.0/ Welcome Nepal Mobile App	Electronic Tour Guides
<p><b>Part 4:</b> Directive Principles, Policies and Obligations of the State</p> <p><b>51.</b> Policies of the state</p> <p><b>(f)</b> Policies relating to the development</p>																					
<p><b>(5)</b> To ensure easy and simple access of the general public to information technology by developing and expanding information technology to the tune of national needs, and make optimum utilization of information technology in the national development</p>																					

<p><b>Constitution of Nepal 2015</b></p>	<p>Improve spectrum availability, management and optimization</p>	<p>Government of Nepal App</p>	<p>provincial Data Center Establishment</p>	<p>eGovernance 2.0</p>	<p>Establish the Internet as an essential services</p>	<p>National Optical Fiber Network</p>	<p>Digital Skill Development Initiative</p>	<p>Paperless Government to promote collaboration</p>	<p>Government eLearning Platform</p>	<p>eHaat Bazaar</p>	<p>Education and Training Programs</p>	<p>State-of-the-art Knowledge Centers &amp; Government Agriculture Centers</p>	<p>National Digital Healthcare Platform</p>	<p>Electronic Health Records 2.0</p>	<p>e-Maternal Care</p>	<p>Mobile Learning Centers in Rural Areas</p>	<p>Online Learning Platform</p>	<p>NEA Official Mobile App 2.0</p>	<p>NEA Customer Service Portal</p>	<p>Welcome Nepal Website 2.0/ Welcome Nepal Mobile App</p>	<p>Electronic Tour Guides</p>
<p>(7) To develop an integrated national identity management information system and manage all kinds of information and data of the citizens in an integrated manner, and linking such system with the services and facilities provided by the State and with national development plans</p>																					









Digital Nepal Initiatives alignment with Provincial scope of rights

List of State Power	Improve spectrum availability, management and optimization	National Optical Fiber Network	Government of Nepal App	eGovernance 2.0	National Cyber Security Centre	Provincial Data Centers establishment	National language computational resource pack	Digitization of Land Records	Smart Livestock and Wildlife Management	Televet Medical Center Establishment	Agriculture Input and products quality tracking system	National Digital Healthcare Platform	Next Generation Digital Healthcare Facilities	Electronic Health Records 2.0	Mobile Health Units	e-Maternal Care	NEA Official Mobile App 2.0	Energy Sector - Contract Management Information System	Connected Public Transport/ Public Transport Mobile App
State of policy administration peace and order																			
Operation of radio, FM., television																			
House and land registration fee, motor vehicle tax, entertainment tax, advertisement tax, tourism, agro-income tax, service charge, fee, penalty																			
State civil service and other government services																			
State statistics																			
State level electricity, irrigation and water supply services, navigation																			
Health services																			
Matters relating to the State Assembly, State Council of Ministers																			
State highways																			
State Bureau of investigation																			
Physical management and other necessary matters of State governmental offices																			
State Public Service Commission																			
Management of lands, land records																			
Protection and use of languages, scripts, cultures, fine arts and religions																			

Agriculture and livestock development, factories, industrialization, trade, business, transportation

**Digital Nepal Initiatives alignment with common scope of rights of Federal and Provincial governments**

List of Concurrent Powers of Federation and State	High-speed Internet connectivity for efficient delivery of Public services	Government of Nepal App	eGovernance 2.0	National Optical Fiber Network	eHaat Bazaar	Digital Disbursements for MSP and Subsidies	Digitization of Land Records	Agriculture Input and products quality tracking system	National Digital Healthcare Platform	Mobile Health Units	e-Maternal Care	Centralized Telemedicine Center	Energy Sector - Contract Management Information System
Civil and criminal procedure, evidence and oaths (legal recognition, public acts and records, and judicial proceedings)													
Supply, distribution, price control, quality and monitoring of essential goods and services													
Preventive detention for reasons connected with the security of the country, prison and detention management, and maintenance of peace and order													
Transfer of accused persons, detainees and prisoners from one State to another State													
Laws relating to family affairs (marriage, transfer of property, divorce, persons on the verge of extinction, orphan, adoption, succession and joint family)													

## 2019 DIGITAL NEPAL FRAMEWORK

List of Concurrent Powers of Federation and State	High-speed Internet connectivity for efficient delivery of Public services	Government of Nepal App	eGovernance 2.0	National Optical Fiber Network	eHaat Bazaar	Digital Disbursements for MSP and Subsidies	Digitization of Land Records	Agriculture Input and products quality tracking system	National Digital Healthcare Platform	Mobile Health Units	e-Maternal Care	Centralized Telemedicine Center	Energy Sector - Contract Management Information System
The acquisition, requisitioning of property and creation of right in property													
Drugs and pesticides													
Planning, family planning and population management													
Legal profession, auditing, engineering, medicines, Ayurvedic medicines, veterinary, Amchi and other professions													
Matters related to means of communication													
Land policies and laws relating thereto													
Employment and unemployment benefit													

Digital Nepal Initiatives alignment with scope of rights of Local Level governments

	List of local level Power	Improve spectrum availability, management and optimization	Digital Innovation and Co-creation Hub	National Biometric ID Card	Provincial Data Centers establishment	National language computational resource pack	eHaat Bazaar	Precision Agriculture	Digitization of Land Records	Smart Livestock and Wildlife Management	Televet Medical Center Establishment	Agriculture Input and products quality tracking system	State-of-the-art Knowledge Centers & Govt Agriculture Centers	National Digital Healthcare Platform	Next Generation Digital Healthcare Facilities	Mobile Health Units	e-Maternal Care	Smart classrooms	OLE Nepal 2.0	Online Learning Platform	Mobile Learning Centers in Rural Areas	GIS Smart Grid Project	Smart metering for water	Connected Public Transport/ Public Transport Mobile App	Intelligent traffic management	National Disaster Management System	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration
Town police																													
Operation of FM																													
Local taxes (wealth tax, house rent tax, land and building registration fee, motor vehicle tax), service charge, fee, tourism fee, advertisement tax, business tax, land tax																													

2019 DIGITAL NEPAL FRAMEWORK

	List of local level Power	Improve spectrum availability, management and optimization	Digital Innovation and Co-creation Hub	National Biometric ID Card	Provincial Data Centers establishment	National language computational resource pack	eHaat Bazaar	Precision Agriculture	Digitization of Land Records	Smart Livestock and Wildlife Management	Televet Medical Center Establishment	Agriculture Input and products quality tracking system	State-of-the-art Knowledge Centers & Govt Agriculture Centers	National Digital Healthcare Platform	Next Generation Digital Healthcare Facilities	Mobile Health Units	e-Maternal Care	Smart classrooms	OLE Nepal 2.0	Online Learning Platform	Mobile Learning Centers in Rural Areas	GIS Smart Grid Project	Smart metering for water	Connected Public Transport/ Public Transport Mobile App	Intelligent traffic management	National Disaster Management System	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration
(land revenue), penalty, entertainment tax, land revenue collection																													
Management of the Local services																													
Collection of local statistics and records																													
Basic and secondary education																													
Basic health and sanitation																													
Local market management, environment																													

2019 DIGITAL NEPAL FRAMEWORK

	List of local level Power	Improve spectrum availability, management and optimization	Digital Innovation and Co-creation Hub	National Biometric ID Card	Provincial Data Centers establishment	National language computational resource pack	eHaat Bazaar	Precision Agriculture	Digitization of Land Records	Smart Livestock and Wildlife Management	Televet Medical Center Establishment	Agriculture Input and products quality tracking system	State-of-the-art Knowledge Centers & Govt Agriculture Centers	National Digital Healthcare Platform	Next Generation Digital Healthcare Facilities	Mobile Health Units	e-Maternal Care	Smart classrooms	OLE Nepal 2.0	Online Learning Platform	Mobile Learning Centers in Rural Areas	GIS Smart Grid Project	Smart metering for water	Connected Public Transport/ Public Transport Mobile App	Intelligent traffic management	National Disaster Management System	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration
protection and bio-diversity																													
Local roads, rural roads, agro-roads, irrigation																													
Local records management																													
Distribution of house and land ownership certificates																													
Agriculture and animal husbandry, agro-products management, animal health, cooperatives																													

2019 DIGITAL NEPAL FRAMEWORK

List of local level Power	Improve spectrum availability, management and optimization	Digital Innovation and Co-creation Hub	National Biometric ID Card	Provincial Data Centers establishment	National language computational resource pack	eHaat Bazaar	Precision Agriculture	Digitization of Land Records	Smart Livestock and Wildlife Management	Televet Medical Center Establishment	Agriculture Input and products quality tracking system	State-of-the-art Knowledge Centers & Govt Agriculture Centers	National Digital Healthcare Platform	Next Generation Digital Healthcare Facilities	Mobile Health Units	e-Maternal Care	Smart classrooms	OLE Nepal 2.0	Online Learning Platform	Mobile Learning Centers in Rural Areas	GIS Smart Grid Project	Smart metering for water	Connected Public Transport/ Public Transport Mobile App	Intelligent traffic management	National Disaster Management System	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	
Management of senior citizens, persons with disabilities and the incapacitated																													
Collection of statistics of the unemployed																													
Management, operation and control of agricultural extension																													
Water supply, small hydropower projects, alternative energy																													

2019 DIGITAL NEPAL FRAMEWORK

List of local level Power	
	Improve spectrum availability, management and optimization
	Digital Innovation and Co-creation Hub
	National Biometric ID Card
	Provincial Data Centers establishment
	National language computational resource pack
	eHaat Bazaar
	Precision Agriculture
	Digitization of Land Records
	Smart Livestock and Wildlife Management
	Televet Medical Center Establishment
	Agriculture Input and products quality tracking system
	State-of-the-art Knowledge Centers & Govt Agriculture Centers
	National Digital Healthcare Platform
	Next Generation Digital Healthcare Facilities
	Mobile Health Units
	e-Maternal Care
	Smart classrooms
	OLE Nepal 2.0
	Online Learning Platform
	Mobile Learning Centers in Rural Areas
	GIS Smart Grid Project
	Smart metering for water
	Connected Public Transport/ Public Transport Mobile App
	Intelligent traffic management
	National Disaster Management System
	Government of Nepal App
	eGovernance 2.0
	Paperless Government to promote collaboration
Disaster management	
Protection of watersheds, wildlife, mines and minerals	
Protection and development of languages, cultures and fine arts	

Digital Nepal Initiatives alignment with common scope of rights of Federal, Provincial and local level governments

List of Concurrent Powers of Federation, State and Local Level	Government of Nepal App	eGovernance 2.0	Provincial Data Centers establishment	Government eLearning Platform	ICT in Education	Education and training programs for farmers	State-of-the-art Knowledge Centers & Govt Agriculture Centers	Televet Medical Center Establishment	National Digital Healthcare Platform	Electronic Health Records 2.0	Mobile Health Units	e-Maternal Care	Smart classrooms	OLE Nepal 2.0	Online Learning Platform	Co-creation Hubs	Mobile Learning Centers in Rural Areas	NEA Official Mobile App 2.0	NEA Customer Service Portal	Intelligent Toll-booths	National Disaster Management System	Disaster Management Training	
Education, health and newspapers																							
Services such as electricity, water supply, irrigation																							
Service fee, charge, penalty and royalty from natural resources, tourism fee																							
Mines and minerals																							
Disaster management																							
Social security and poverty alleviation																							
Personal events, births, deaths, marriages and statistics																							
Archaeology, ancient monuments and museums																							
Motor vehicle permits																							

Annexure III: ICT Policy Mapping with Digital Nepal Initiatives

Digital Foundation

Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	National Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
<b>ICT Policy 2015</b>																			
<b>1 Human Resource</b>																			
1.1 Specific measures will be taken to develop human resources in the ICT and related domain targeting critical skill areas across key sectors of the economy in order to accelerate the development of Nepal's information society and economy;																			
1.2 Initiatives will be taken to ensure that educational institutions imparting ICT courses and specific skill sets are incentivized to align their course offering with technological dynamism shaping the sector. Along these lines, the institutional capacity of such institutions along infrastructure and human resources dimensions will be enhanced.																			
1.3 Youth and gender issues will be mainstreamed in ICT related human resource development activities.																			

Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	National Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
<b>2.ICT in education, research &amp; development</b>																			
2.1 Appropriate measures will be taken to facilitate and promote the integration of ICTs within the entire Nepali educational system to support administration, pedagogy, learning and research, with a view to improving the quality of education and training at all levels and enhancing access to education																			
2.2 A nationwide E-Schools and other related initiatives will be formulated and launched to promote E-learning and E-Education as well as life-long learning. ICT capacities of tertiary level educational institutions will also be enhanced in a way that helps improve broad learning outcomes.																			
2.3 Arrangements will be made to ensure effective implementation of ICT in Education Master Plan formulated by the Ministry of Education.																			
2.5 Science and technical education will be strengthened as the basis for laying the foundation for human resource and skills development in ICT;																			

Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	National Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
2.6 A National ICT Research and Development Fund will be created with a view to promoting a) The development and deployment of applications and relevant content associated with Government developmental goals to be delivered over telecommunications networks (including via smart phones and tablets) and through telecentres, b) The development of Intellectual Property in ICT, particularly in telecommunications and Information technology domains, working in conjunction with the international research and development community.																			
<b>3.Promoting public access and content development</b>																			
3.1 Universal access/service goals and strategies for rural telecommunications/ICTs, radio and TV transmission infrastructure and service rollout will be developed with immediate effect.																			
3.2 The initiative to transform Postal Offices and Community libraries as public access points for ecommerce, E-Government and Internet based services with the support of the																			

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	National Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
private sector and civil society will be strengthened;																			
3.3 A countrywide program to attract community, civil society and private sector participation to install basic communication services including Internet connectivity around community centers such as schools, health posts, VDC and community buildings will be developed and implemented;																			
3.4 Directives will be issued whereby provision of toll-free service to not-for-profit agencies working on key social agenda in areas such as education, healthcare and counseling services across the country will be made mandatory for telephone (fixed and/or wireless) service providers																			
3.5 An enabling and conducive framework will be created that provides special incentives especially for youths and women in the establishment of ICT services in rural and underserved areas across the country.																			

Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	National Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
3.6 Specific measures will be taken to drive innovation around the development of ICT based content and services tailored to meet key development and service delivery challenges																			
<b>4 Developing the ICT Industry Sector</b>																			
4.1 An ICT Enterprise Development Fund structured along the lines of venture capital fund will be created in conjunction with financial institutions and the private sector to support start-ups and innovative Nepalese ICT companies and entrepreneurs																			
4.2 Appropriate mechanism for Incubator projects targeting SMEs in the ICT sector will be developed and implemented. Along these lines, measures will be taken to provide seed capital for such projects																			
4.3 An open and transparent forum/environment for consultation/dialogue on matters of interest for policy makers, regulators, operators, consumers and other stakeholders in the ICT sector will be created in close coordination with the private sector																			

Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	National Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
4.4 Special initiatives and measures will be implemented aimed at promoting local and Foreign Direct Investment (FDI) in ICTs including technology transfer programmes between local and foreign companies;																			
4.5 Special incentives to local ICT industry will be provided with a view to helping them develop into a globally competitive software industry based on proprietary, free and open source solutions to serve the domestic and export markets. Along these lines, specific measures will be taken to lower the barriers to entry of local IT firms and service providers in participating in government ICT projects funded through internal or international resources.																			
4.6 A special IT-ITES/BPO business promotion cell will be created within the Ministry of Commerce and Supplies in alignment with Nepal Trade Integration Strategy (NTIS)																			
4.7 An enabling regulatory framework will be created addressing key issues of IPR, privacy and data protection.																			

Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	National Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
4.8 A Software and Services Industry Promotion Board will be established through collaborative arrangements between the public and the private sector to promote ICT industry development and IT-ITES/BPO sector.																			
4.10 Specific policy measures will be taken to attract investments in IT Park located at Banepa, Kavre.																			
<b>5 ICT for Government service innovation and good governance</b>																			
5.1 Initiatives aimed at streamlining delivery of on-line services by government agencies and strengthening government wide uptake of ICTs will continue to be strengthened. Along these lines, the Government will formulate and introduce revised eGovernment Master plan by the year 2016.																			
5.2 Arrangements will be made to ensure that ICTs are leveraged to complement sectoral development strategies. Along those lines, government agencies will be required to incorporate ICT enablement of operational management and delivery of citizen facing services in the respective agencies as part of their annual plans and programs.																			

Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	National Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
5.3 Special measures will be taken to secure congruence of ICT strategies with emerging governance, political and state restructuring direction that the country will take within the overall context of a new constitution																			
5.4 A Government-wide network and communication system will be developed utilizing the same infrastructure backbone as the foundation for implementation of the E-Government strategy;																			
5.5 All necessary work leading upto the successful implementation of Electronic Transaction and Digital Signature Act and Regulations will be completed by the year 2016. Along these lines, Nepal's PKI infrastructure along with complete operational modality will be rolled out within the year 2016.																			
<b>6 ICT in SMEs &amp; promotion of e-commerce</b>																			
6.1 Measures will be taken to encourage and strengthen the electronic payment system in the country to facilitate enhanced growth of ecommerce and enable on-line payment transaction in eGovernment services.																			

Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	National Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
6.7 In advancing its e-commerce strategy, the Government will promote its collaboration with the private sector and its international counterparts to position and promote ecommerce and e-business in Nepal.																			
6.9 Measures will be taken to address issues relevant to privacy, such as protection for personal information and confidentiality of consumer related matters;																			
6.11 Special measures will be taken to ensure that export oriented small and medium-sized enterprises (SMEs) in Nepal are set to increase exports of their goods and services using virtual marketplaces (VMPs)																			
<b>7 Telecommunications Infrastructure</b>																			
7.1 National broadband network will be built taking into account the particular topography and suitability of the media.																			
7.2 In order to avoid the duplication of investment in infrastructure construction, utilization of the existing cross sector infrastructure and sharing of the telecommunications infrastructure will be will be implemented.																			

Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	National Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
7.5 Special emphasis will be given to improve international connectivity.																			
<b>9 ICT in agriculture</b>																			
9.1 Appropriate programs will be developed and implemented to improve productivity as well competitiveness of the agricultural sector through the use of ICTs in the planning, implementation, monitoring, market expansion and the information delivery processes.																			
9.2 Private sector investment in the development and provision of ICT services including infrastructure in rural areas having marked intensity in agriculture related activities will be incentivized along with public resources																			
9.3 Appropriate measures will be adopted to deploy, exploit and integrate ICTs and other technologies into the operations and activities of the sector from production, through to processing, packaging, marketing and distribution;																			
<b>10 ICT in Health</b>																			

Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	National Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
10.1 A detailed strategic framework will be developed in collaboration with key stakeholder to improve access to quality healthcare as close to the community as possible through the deployment and exploitation of ICTs and other modern technologies.																			
10.5 A legal/regulatory and ethical framework will be developed for effective use of the Health Information and security measures to safeguard the privacy of patient information inherent in digitized health care records will be implemented;																			
<b>16 Conformance, Interoperability and Standards in Telecommunications and ICTs</b>																			
16.1 Nepal will meaningfully engage with related international agencies involved in the area of interoperability and conformity of telecommunication/ICT equipment with a view to reducing interference, ensuring interoperability, quality and reliability among communication systems and helping stakeholders make informed procurement decisions.																			
<b>17 Cloud computing</b>																			

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	National Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
17.1 All government agencies will be required to evaluate safe, secure cloud computing options before making any new investments on ICT hardware, application and services.																			
17.2 A cloud computing/ shared services framework will be deployed using Government Integrated Data Center with a view to maximizing capacity utilization, improving IT flexibility and responsiveness, and minimizing cost in using ICTs in Government agencies.																			
<b>18 Access to telecommunications and ICT services for rural and remote areas</b>																			
18.1 Specific strategies will be developed to further expand access to ICT services to people living in rural and remote areas of Nepal																			
18.2 Mechanisms to mobilize RTDF will be strengthened to secure meaningful deployment of ICTs in rural and under-served areas																			
<b>19 Access to Telecommunications and ICT services for persons with disabilities and specific needs</b>																			

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	National Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
19.1 Specific measures will be taken to promote ICT accessibility and access to ICTs for persons with disabilities with a view to increasing the access of such persons to public services and to promote independent living																			
<b>20 ICTs for Youth, women and Girls</b>																			
20.3 Specific directives will be issued to make it mandatory for telephone (fixed or wireless) service providers to provide toll-free service to support special not-for-profit organisations targeting their services at youths, women, vulnerable and the physically challenged groups;																			
20.4 Specific measures will be implemented to counter gender imbalances affecting women's participation and their ability to benefit from the information society at all levels;																			
20.6 The development of ICT based platform will be encouraged to provide a forum for collaboration and exchange of ideas on matters affecting youths and women;																			
20.7 Measures will be taken to enable full and equal participation of women and youths in creating the Information society.																			

Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	National Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
<b>21 Building confidence and security in the use of ICTs</b>																			
21.1 Cyber security policies that enhance individual and collective security while preserving Nepali citizens' right to privacy and other fundamental values and freedoms will be developed and implemented.																			
21.2 Measures will be taken to mandate all organizations providing public information and communication services such as telecommunication, Internet, email services to incorporate administrative, technological and other such practical measures to enable national security agencies to curb misuse and unsolicited content and/or information																			
21.3 Steps will be taken to secure full and comprehensive implementation of Electronic Transaction Act with required amendments in the legal and regulatory framework to allow for effective investigation and prosecution of cyber related crimes;																			

**Agriculture**

	<b>Digital Initiatives</b>										
	eHaat Bazaar	Precision Agriculture	Agriculture tools sharing	Digital Disbursements for MSP and Subsidies	Digitization of Land Records	Smart Irrigation Project	Smart Livestock and Wildlife Management	Televet Medical Center Establishment	Agriculture Input and Output Product Quality Tracking System	Education and training programs for farmers	State-of-the-art Knowledge Centers & Govt Agriculture Centers
<b>ICT Policy 2015</b>											
<b>1 Human Resource</b>											
1.1 Specific measures will be taken to develop human resources in the ICT and related domain targeting critical skill areas across key sectors of the economy in order to accelerate the development of Nepal's information society and economy;											
1.2 Initiatives will be taken to ensure that educational institutions imparting ICT courses and specific skill sets are incentivized to align their course offering with technological dynamism shaping the sector. Along these lines, the institutional capacity of such institutions along infrastructure and human resources dimensions will be enhanced.											
1.3 Youth and gender issues will be mainstreamed in ICT related human resource development activities.											
<b>2. ICT in education, research &amp; development</b>											
2.1 Appropriate measures will be taken to facilitate and promote the integration of ICTs within the entire Nepali educational system to support administration, pedagogy, learning and research, with a view to improving the quality of education and training at all levels and enhancing access to education											
2.2 A nationwide E-Schools and other related initiatives will be formulated and launched to promote E-learning and E-Education as well as life-long learning. ICT capacities of tertiary level educational institutions will also be enhanced in a way that helps improve broad learning outcomes.											

Digital Initiatives	eHaat Bazaar	Precision Agriculture	Agriculture tools sharing	Digital Disbursements for MSP and Subsidies	Digitization of Land Records	Smart Irrigation Project	Smart Livestock and Wildlife Management	Televet Medical Center Establishment	Agriculture Input and Output Product Quality Tracking System	Education and training programs for farmers	State-of-the-art Knowledge Centers & Govt Agriculture Centers
2.5 Science and technical education will be strengthened as the basis for laying the foundation for human resource and skills development in ICT;											
2.6 A National ICT Research and Development Fund will be created with a view to promoting a) The development and deployment of applications and relevant content associated with Government developmental goals to be delivered over telecommunications networks (including via smart phones and tablets) and through telecentres, b) The development of Intellectual Property in ICT, particularly in telecommunications and Information technology domains, working in conjunction with the international research and development community.											
<b>3.Promoting public access and content development</b>											
3.2 The initiative to transform Postal Offices and Community libraries as public access points for ecommerce, E-Government and Internet based services with the support of the private sector and civil society will be strengthened;											
<b>4 Developing the ICT Industry Sector</b>											
4.5 Special incentives to local ICT industry will be provided with a view to helping them develop into a globally competitive software industry based on proprietary, free and open source solutions to serve the domestic and export markets. Along these lines, specific measures will be taken to lower the barriers to entry of local IT firms and service providers in participating in government ICT projects funded through internal or international resources.											

	Digital Initiatives	eHaat Bazaar	Precision Agriculture	Agriculture tools sharing	Digital Disbursements for MSP and Subsidies	Digitization of Land Records	Smart Irrigation Project	Smart Livestock and Wildlife Management	Televet Medical Center Establishment	Agriculture Input and Output Product Quality Tracking System	Education and training programs for farmers	State-of-the-art Knowledge Centers & Govt Agriculture Centers
<b>5 ICT for Government service innovation and good governance</b>												
5.2 Arrangements will be made to ensure that ICTs are leveraged to complement sectoral development strategies. Along those lines, government agencies will be required to incorporate ICT enablement of operational management and delivery of citizen facing services in the respective agencies as part of their annual plans and programs.												
<b>6 ICT in SMEs &amp; promotion of e-commerce</b>												
6.1 Measures will be taken to encourage and strengthen the electronic payment system in the country to facilitate enhanced growth of ecommerce and enable on-line payment transaction in eGovernment services.												
6.6 Special program will be formulated in conjunction with trade and commerce related organizations to drive the uptake of ecommerce in Nepal												
6.10 Small and medium enterprises (SMEs) will be encouraged to apply ICT to develop their business and enhance competitiveness, focusing on ICT for management, production and linkages to buyers.												
6.11 Special measures will be taken to ensure that export oriented small and medium-sized enterprises (SMEs) in Nepal are set to increase exports of their goods and services using virtual marketplaces (VMPs)												
6.12 Initiatives will be taken in conjunction with related stakeholders to roll out payment infrastructure services involving Transaction, Clearing and Settlement infrastructures.												

	Digital Initiatives										
	eHaat Bazaar	Precision Agriculture	Agriculture tools sharing	Digital Disbursements for MSP and Subsidies	Digitization of Land Records	Smart Irrigation Project	Smart Livestock and Wildlife Management	Televet Medical Center Establishment	Agriculture Input and Output Product Quality Tracking System	Education and training programs for farmers	State-of-the-art Knowledge Centers & Govt Agriculture Centers
<b>9 ICT in agriculture</b>											
9.1 Appropriate programs will be developed and implemented to improve productivity as well as the competitiveness of the agricultural sector through the use of ICTs in the planning, implementation, monitoring, market expansion and the information delivery processes.											
9.2 Private sector investment in the development and provision of ICT services including infrastructure in rural areas having marked intensity in agriculture related activities will be incentivized along with public resources											
9.3 Appropriate measures will be adopted to deploy, exploit and integrate ICTs and other technologies into the operations and activities of the sector from production, through to processing, packaging, marketing and distribution;											
<b>12 Telecommunication and ICTs in mitigating the impact of Climate Change</b>											
12.1 Special measures will be taken to develop innovative approaches to climate change adaptation through the integration of traditional and emerging ICTs, including the development of 'e-adaptation' applications that support the implementation NAPA as well as LAPA. In addition, such measures will also be geared towards supporting specific sectoral strategies on key areas affected by climate change such as water, food security, health, disasters.											
<b>13 ICT in Environment and natural resources.</b>											
13.3 A comprehensive set of ICT applications and systems will be implemented so as to enhance the management and monitoring of the efficient and effective utilization of Nepal's natural resources and heritage;											

	eHaat Bazaar	Precision Agriculture	Agriculture tools sharing	Digital Disbursements for MSP and Subsidies	Digitization of Land Records	Smart Irrigation Project	Smart Livestock and Wildlife Management	Televet Medical Center Establishment	Agriculture Input and Output Product Quality Tracking System	Education and training programs for farmers	State-of-the-art Knowledge Centers & Govt Agriculture Centers
<b>18 Access to telecommunications and ICT services for rural and remote areas</b>											
18.1 Specific strategies will be developed to further expand access to ICT services to people living in rural and remote areas of Nepal											
18.2 Mechanisms to mobilize RTDF will be strengthened to secure meaningful deployment of ICTs in rural and under-served areas											
<b>20 ICTs for Youth, women and Girls</b>											
20.3 Specific directives will be issued to make it mandatory for telephone (fixed or wireless) service providers to provide toll-free service to support special not-for-profit organisations targeting their services at youths, women, vulnerable and the physically challenged groups;											

Health

	Digital Initiatives	National Digital Healthcare Platform	Next-generation digital healthcare facilities	Electronic Health Records 2.0	Mobile Health Units	e-Maternal Care	Drones for delivery of emergency medical supplies	Centralized Telemedicine Center
<b>ICT Policies</b>								
<b>3.Promoting public access and content development</b>								
3.4 Directives will be issued whereby provision of toll-free service to not-for-profit agencies working on key social agenda in areas such as education, healthcare and counseling services across the country will be made mandatory for telephone (fixed and/or wireless) service providers								
3.5 An enabling and conducive framework will be created that provides special incentives especially for youths and women in the establishment of ICT services in rural and underserved areas across the country.								
<b>10 ICT in Health</b>								
10.1 A detailed strategic framework will be developed in collaboration with key stakeholder to improve access to quality healthcare as close to the community as possible through the deployment and exploitation of ICTs and other modern technologies.								
10.2 Appropriate measures will be taken to promote investment in ICT-based healthcare systems to increase the opportunity for citizens to have access to adequate and appropriate modern health services irrespective of time, distance and location;								
10.3 A comprehensive national telemedicine programme will be developed and implemented to efficiently and effectively utilize scarce human resources and to further improve human capacity in the healthcare delivery system;								

	Digital Initiatives	National Digital Healthcare Platform	Next-generation digital healthcare facilities	Electronic Health Records 2.0	Mobile Health Units	e-Maternal Care	Drones for delivery of emergency medical supplies	Centralized Telemedicine Center
10.4 A collaborative approach involving the public sector, private sector and civil society will be adopted in the deployment and utilization of ICTs in the health sector								
10.5 A legal/regulatory and ethical framework will be developed for effective use of the Health Information and security measures to safeguard the privacy of patient information inherent in digitized health care records will be implemented;								
<b>14 Telecommunications and ICTs for natural disaster preparedness, mitigation and relief</b>								
14.1 A comprehensive telecommunication/ICT disaster preparedness plan will be developed incorporating strategies for disaster risk reduction, prediction, preparedness, mitigation and response.								
<b>20 ICTs for Youth, women and Girls</b>								
20.1 Specific programs will be developed for positioning ICTs as an instrument to mainstream youth and women issues in all activities of the economy and society as well as to empower youths and women through opportunities created by the implementation of ICT projects and programmes in the country.								
20.2 Activities that promote women and youth friendly initiatives will be encouraged through specific policy measures. Fair access to ICTs by youths and women as well as the disadvantaged in society will also be promoted;								
20.5 Creativity and innovation around ICTs among youths and women will be encouraged through the introduction of specific programs leading to entrepreneurship development;								

Education

	Smart classrooms	OLE Nepal 2.0	Online Learning Platform	Rent-a-Laptop Program	EMIS 2.0	Centralized Admission System	Biometric Attendance and CCTV Cameras	Mobile Learning Centers in Rural Areas
<b>ICT Policy 2015</b>								
<b>1 Human Resource</b>								
1.2 Initiatives will be taken to ensure that educational institutions imparting ICT courses and specific skill sets are incentivized to align their course offering with technological dynamism shaping the sector. Along these lines, the institutional capacity of such institutions along infrastructure and human resources dimensions will be enhanced.								
<b>2. ICT in education, research &amp; development</b>								
2.1 Appropriate measures will be taken to facilitate and promote the integration of ICTs within the entire Nepali educational system to support administration, pedagogy, learning and research, with a view to improving the quality of education and training at all levels and enhancing access to education								
2.2 A nationwide E-Schools and other related initiatives will be formulated and launched to promote E-learning and E-Education as well as life-long learning. ICT capacities of tertiary level educational institutions will also be enhanced in a way that helps improve broad learning outcomes.								
2.5 Science and technical education will be strengthened as the basis for laying the foundation for human resource and skills development in ICT;								
<b>3. Promoting public access and content development</b>								
3.4 Directives will be issued whereby provision of toll-free service to not-for-profit agencies working on key social agenda in areas such as education, healthcare and counseling services across the country will be made mandatory for telephone (fixed and/or wireless) service providers								
3.5 An enabling and conducive framework will be created that provides special incentives especially for youths and women in the establishment of ICT services in rural and underserved areas across the country.								
<b>17 Cloud computing</b>								

**2019 DIGITAL NEPAL FRAMEWORK**

Digital Initiatives	Smart classrooms	OLE Nepal 2.0	Online Learning Platform	Rent-a-Laptop Program	EMIS 2.0	Centralized Admission System	Biometric Attendance and CCTV Cameras	Mobile Learning Centers in Rural Areas
17.1 All government agencies will be required to evaluate safe, secure cloud computing options before making any new investments on ICT hardware, application and services.								
17.2 A cloud computing/ shared services framework will be deployed using Government Integrated Data Center with a view to maximizing capacity utilization, improving IT flexibility and responsiveness, and minimizing cost in using ICTs in Government agencies.								
<b>18 Access to telecommunications and ICT services for rural and remote areas</b>								
18.1 Specific strategies will be developed to further expand access to ICT services to people living in rural and remote areas of Nepal								
18.2 Mechanisms to mobilize RTDF will be strengthened to secure meaningful deployment of ICTs in rural and under-served areas								

Energy

	Smart metering	GIS Smart Grid Project	Pan-Nepal roll-out of Any Branch Payment System (ABPS)	NEA Official Mobile App 2.0	Smart Building/Energy Management Project	NEA Field Force Automation Solutions	NEA Customer Service Portal	NEA e-Learning Platform	Energy Sector - Contract Management Information System
<b>Digital Initiatives</b>									
<b>1 Human Resource</b>									
1.2 Initiatives will be taken to ensure that educational institutions imparting ICT courses and specific skill sets are incentivized to align their course offering with technological dynamism shaping the sector. Along these lines, the institutional capacity of such institutions along infrastructure and human resources dimensions will be enhanced.									
<b>3.Promoting public access and content development</b>									
3.6 Specific measures will be taken to drive innovation around the development of ICT based content and services tailored to meet key development and service delivery challenges									
<b>5 ICT for Government service innovation and good governance</b>									
5.2 Arrangements will be made to ensure that ICTs are leveraged to complement sectoral development strategies. Along those lines, government agencies will be required to incorporate ICT enablement of operational management and delivery of citizen facing services in the respective agencies as part of their annual plans and programs.									
5.4 A Government-wide network and communication system will be developed utilizing the same infrastructure backbone as the foundation for implementation of the E- Government strategy;									
<b>6 ICT in SMEs &amp; promotion of e-commerce</b>									
6.1 Measures will be taken to encourage and strengthen the electronic payment system in the country to facilitate enhanced growth of ecommerce and enable on-line payment transaction in eGovernment services.									
6.12 Initiatives will be taken in conjunction with related stakeholders to roll out payment infrastructure services involving Transaction, Clearing and Settlement infrastructures.									

	Digital Initiatives									
	Smart metering	GIS Smart Grid Project	Pan-Nepal roll-out of Any Branch Payment System (ABPS)	NEA Official Mobile App 2.0	Smart Building/Energy Management Project	NEA Field Force Automation Solutions	NEA Customer Service Portal	NEA e-Learning Platform	Energy Sector - Contract Management Information System	
<b>13 ICT in Environment and natural resources.</b>										
13.1 Special emphasis will be accorded to facilitate the conservation of Nepal's natural resources & heritage as well as protection of the environment.										
13.2 Specific policy measures will be implemented to ensure that development of all ICT infrastructure in the country as well as any manufacture and disposal of ICT products shall be done in conformity with existing and future policies and guidelines on heritage/natural resources conservation and environmental protection;										
13.3 A comprehensive set of ICT applications and systems will be implemented so as to enhance the management and monitoring of the efficient and effective utilization of Nepal's natural resources and heritage;										
<b>17 Cloud computing</b>										
17.1 All government agencies will be required to evaluate safe, secure cloud computing options before making any new investments on ICT hardware, application and services.										
17.2 A cloud computing/ shared services framework will be deployed using Government Integrated Data Center with a view to maximizing capacity utilization, improving IT flexibility and responsiveness, and minimizing cost in using ICTs in Government agencies.										
<b>18 Access to telecommunications and ICT services for rural and remote areas</b>										
18.1 Specific strategies will be developed to further expand access to ICT services to people living in rural and remote areas of Nepal										

**Tourism**

	Digital Initiatives	Welcome Nepal Website and Mobile App 2.0	Electronic visas and Immigration Process Improvement	Multilingual helpline	Augmented and Virtual Reality tours	Electronic tour guides	Omnichannel marketing	Tourist Security Infrastructure
<b>Policies Mapping</b>								
<b>3. Promoting public access and content development</b>								
3.6 Specific measures will be taken to drive innovation around development of ICT based content and services tailored to meet key development and service delivery challenges								
<b>11 ICT in tourism</b>								
11.1 Comprehensive measures will be taken to integrate ICTs in the development of the tourism industry.								
11.2 Steps will be taken to work closely with the private sector as agents for extending and expansion of the ICT infrastructure and services in all major tourist destinations throughout Nepal								

Finance

Digital Initiatives	National Payment Gateway	Credit Ratings (Individual or Corporate Accounts)	Database Management of Nepalese Migrants	Mobile Wallet Services	Encourage Digital Payments in Nepal	Development of Single window for Business & Industry Promotion	Development and promotion of eCommerce and ITeS ecosystem	Digital Payments Campaign
<b>ICT Policy 2015</b>								
<b>4 Developing the ICT Industry Sector</b>								
4.6 A special IT-ITES/BPO business promotion cell will be created within the Ministry of Commerce and Supplies in alignment with Nepal Trade Integration Strategy (NTIS)								
4.9 A diagnostic study of current state of play of IT, IT enabled services/ BPO in Nepal will be carried out within the year 2016.								
<b>6 ICT in SMEs &amp; promotion of e-commerce</b>								
6.1 Measures will be taken to encourage and strengthen the electronic payment system in the country to facilitate enhanced growth of ecommerce and enable on-line payment transaction in eGovernment services.								
6.2 A comprehensive national ecommerce Readiness Assessment will be carried out featuring benchmarking with international best practices								
6.3 Steps will be taken to create an internationally compatible legal and regulatory framework that accommodates rules for commercial;								
6.4 Appropriate monetary and fiscal policy measures will be established to ensure consumer confidence in e- Commerce								
6.5 Mechanisms to protect intellectual property rights related to ecommerce will be strengthened.								
6.6 Special program will be formulated in conjunction with trade and commerce related organizations to drive the uptake of ecommerce in Nepal								
6.7 In advancing its e-commerce strategy, the Government will promote its collaboration with the private sector and its international counterparts to position and promote ecommerce and e-business in Nepal.								

**2019 DIGITAL NEPAL FRAMEWORK**

<b>Digital Initiatives</b>	National Payment Gateway	Credit Ratings (Individual or Corporate Accounts)	Database Management of Nepalese Migrants	Mobile Wallet Services	Encourage Digital Payments in Nepal	Development of Single window for Business & Industry Promotion	Development and promotion of eCommerce and ITeS ecosystem	Digital Payments Campaign
6.8 A conducive system for the protection of intellectual property rights in cyberspace will be put in place;								
6.9 Measures will be taken to address issues relevant to privacy, such as protection for personal information and confidentiality of consumer related matters;								
6.10 Small and Medium Enterprises (SMEs) will be encouraged to apply ICT to develop their business and enhance competitiveness, focusing on ICT for management, production and linkages to buyers.								
6.11 Special measures will be taken to ensure that export oriented Small and medium-sized enterprises (SMEs) in Nepal are set to increase exports of their goods and services using virtual marketplaces (VMPs)								
6.12 Initiatives will be taken in conjunction with related stakeholders to roll out payment infrastructure services involving Transaction, Clearing and Settlement infrastructures.								
<b>21 Building confidence and security in the use of ICTs</b>								
21.2 Measures will be taken to mandate all organizations providing public information and communication services such as telecommunication, Internet, email services to incorporate administrative, technological and other such practical measures to enable national security agencies to curb misuse and unsolicited content and/or information								

Urban Infrastructure

Digital Initiatives	Water ATMs	Smart metering for water	Intelligent Waste Management	Automated Waste Sorting	Municipality mobile application	Connected public transport / Public Transport mobile app	Intelligent traffic management	Intelligent Parking Lot Management	Intelligent Toll-booths	National Disaster Management System	Disaster Management Training
<b>ICT policy 2015</b>											
<b>2.ICT in education, research &amp; development</b>											
2.1 Appropriate measures will be taken to facilitate and promote the integration of ICTs within the entire Nepali educational system to support administration, pedagogy, learning and research, with a view to improving the quality of education and training at all levels and enhancing access to education											
<b>3.Promoting public access and content development</b>											
3.6 Specific measures will be taken to drive innovation around the development of ICT based content and services tailored to meet key development and service delivery challenges											
<b>5 ICT for Government service innovation and good governance</b>											
5.2 Arrangements will be made to ensure that ICTs are leveraged to complement sectoral development strategies. Along those lines, government agencies will be required to incorporate ICT enablement of operational management and delivery of citizen facing services in the respective agencies as part of their annual plans and programs.											

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	Water ATMs	Smart metering for water	Intelligent Waste Management	Automated Waste Sorting	Municipality mobile application	Connected public transport / Public Transport mobile app	Intelligent traffic management	Intelligent Parking Lot Management	Intelligent Toll-booths	National Disaster Management System	Disaster Management Training
<b>6 ICT in SMEs &amp; promotion of e-commerce</b>											
6.7 In advancing its e-commerce strategy, the Government will promote its collaboration with the private sector and its international counterparts to position and promote ecommerce and e-business in Nepal.											
<b>14 Telecommunications and ICTs for natural disaster preparedness, mitigation and relief</b>											
14.1 A comprehensive telecommunication/ICT disaster preparedness plan will be developed incorporating strategies for disaster risk reduction, prediction, preparedness, mitigation and response.											

Annexure IV: Broadband Policy Mapping with Digital Nepal Initiatives

Digital Foundation

	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	National Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
To avail broadband connection of at least 512 kbps of download speed in general and exclusively expand the availability of broadband service based on 10 Mbps for urban areas.																			
To ensure access and coverage of broadband to 45% households of Nepal by 2018																			
To provide the urban consumers with the options of multiple broadband service providers by 2018.																			
To expand Optical Fiber networks to all the districts headquarters by 2018.																			
To develop rural municipalities as e-municipalities with the broadband infrastructure and services respectively by 2018.																			

2019 DIGITAL NEPAL FRAMEWORK

	Digital Initiatives																		
	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	National Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
To develop the accessibility of wired or wireless broadband to all rural municipalities by 2020.																			
To ensure access of broadband services to the rural areas, community schools, social organizations and rural health-posts apart from the extension of broadband services for business purpose by 2020.																			
To provide spectrum bands wireless services identified by World Radio Communication Conferences (WRCs) for IMT and IMT Advanced technology with priority by 2018																			
To establish community information centers (e-center) in every rural municipalities by 2020.																			
To provide broadband services to all Government hospitals and health-posts or at least 80 % of them within 2020																			
To promote utility services of all the government agencies based in the district by building informative websites and provisions of downloading information's and forms providing them with broadband services by 2020.																			

**Agriculture**

	<b>Digital Initiatives</b>										
	eHaat Bazaar	Precision Agriculture	Agriculture tools sharing	Digital Disbursements for MSP and Subsidies	Digitization of Land Records	Smart Irrigation Project	Smart Livestock and Wildlife Management	Televet Medical Center Establishment	Input and Output Product Quality Tracking System	Education and training programs for farmers	State-of-the-art Knowledge Centers & Govt Agriculture Centers
To avail broadband connection of at least 512 kbps of download speed in general and exclusively expand the availability of broadband service based on 10 Mbps for urban areas.											
To develop rural municipalities as e- municipalities with the broadband infrastructure and services respectively by 2018.											
To develop the accessibility of wired or wireless broadband to all rural municipality by 2020.											
To establish community information centers (e-center) in every rural municipalities by 2020.											
To promote utility services of all the government agencies based in the district by building informative websites and provisions of downloading information's and forms providing them with broadband services by 2020.											

Health

Digital Initiatives	National Digital Healthcare Program	Next-generation digital health care facilities	Electronic Health Records 2.0	Mobile Health Units	e-Maternal Care	Drones for delivery of emergency medical supplies	Centralized Telemedicine Center
To avail broadband connection of at least 512 kbps of download speed in general and exclusively expand the availability of broadband service based on 10 Mbps for urban areas.							
To ensure access of broadband services to the rural areas, community schools, social organizations and rural health-posts apart from the extension of broadband services for business purpose by 2020.							
To provide broadband services to all Government hospitals and health-posts or at least 80 % of them within 2020							

Education

Digital Initiatives	Smart classrooms	OLE Nepal 2.0	Online Learning Platform	Rent-a-Laptop Program	EMIS 2.0	Centralized Admission system	Biometric Attendance and CCTV Cameras	Mobile Learning Centers in Rural Areas
To avail broadband connection of at least 512 kbps of download speed in general and exclusively expand the availability of broadband service based on 10 Mbps for urban areas.								
To ensure access of broadband services to the rural areas, community schools, social organizations and rural health-posts apart from the extension of broadband services for business purpose by 2020.								
To establish community information centers (e-center) in every rural municipality by 2020.								

Energy

Digital Initiatives	Smart metering	GIS Smart Grid Project	Pan-Nepal Roll-out of Any Branch Payment System (ABPS)	NEA Official Mobile App 2.0	Smart Building/Energy Management Project	NEA Field Force Automation Solutions	NEA Customer Service Portal	NEA e-Learning Platform	Energy Sector - Contract Management Information System
To avail broadband connection of at least 512 kbps of download speed in general and exclusively expand the availability of broadband service based on 10 Mbps for urban areas.									

**Tourism**

	<b>Digital Initiatives</b>	Welcome Nepal Website and Mobile App 2.0	Electronic visas and Immigration Process Improvement	Multilingual helpline	Augmented and Virtual Reality tours	Electronic tour guides	Omnichannel marketing	Tourist Security Infrastructure
To avail broadband connection of at least 512 kbps of download speed in general and exclusively expand the availability of broadband service based on 10 Mbps for urban areas.								
To promote utility services of all the government agencies based in the district by building informative websites and provisions of downloading information's and forms providing them with broadband services by 2020.								

Finance

Digital Initiatives	National Payment Gateway	Credit Ratings (Individual or Corporate Accounts)	Database Management of Nepalese Migrants	Mobile Wallet Services	Encourage Digital Payments in Nepal	Development of Single window for Business & Industry Promotion	Development and promotion of eCommerce and ITeS ecosystem	Digital Payments Campaign
To avail broadband connection of at least 512 kbps of download speed in general and exclusively expand the availability of broadband service based on 10 Mbps for urban areas.								

Urban Infrastructure

Digital Initiatives	Water ATMs	Smart metering for water	Intelligent Waste Management	Automated Waste Sorting	Municipality mobile application	Connected public transport / Public Transport mobile app	Intelligent traffic management	Intelligent Parking Lot Management	Intelligent Toll-booths	National Disaster Management System	Disaster Management Training
To avail broadband connection of at least 512 kbps of download speed in general and exclusively expand the availability of broadband service based on 10 Mbps for urban areas.											

Annexure V: Sustainable Development Goals (SDGs) Mapping with Digital Nepal Initiatives

Digital Foundation

	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	Nepal Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card/ Digital Identity	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education	
<b>Sustainable Development Goals, Targets &amp; Indicators</b>																				
<b>Goal 1. End poverty in all its forms everywhere</b>																				
<b>Target 1.a Ensure significant mobilization of resources from a variety of sources, including through enhanced development cooperation, in order to provide adequate and predictable means for developing countries, in particular least developed countries, to implement programmes and policies to end poverty in all its dimensions</b>																				
<b>INDICATOR 1.a.1 Proportion of domestically generated resources allocated by the government directly to poverty reduction programmes</b>																				
<b>INDICATOR 1.a.2 Proportion of total government spending on essential services (education, health and social protection)</b>																				

2019 DIGITAL NEPAL FRAMEWORK

	Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	Nepal Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card/ Digital Identity	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
<b>Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture</b>																				
<b>Target 2.a Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries</b>																				
<b>INDICATOR 2.a.1 This initiative will support government to achieve target set on agriculture orientation index for government expenditures which is 0.26 by 2022 and 0.38 by 2030.</b>																				
<b>INDICATOR 2.a.2 Total official flows (official development assistance plus other official flows) to the agriculture sector</b>																				
<b>TARGET 2.c Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.</b>																				
<b>INDICATOR 2.c.1 Indicator of food price anomalies</b>																				
<b>Goal 3. Ensure healthy lives and promote well-being for all at all ages</b>																				

2019 DIGITAL NEPAL FRAMEWORK

	Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	Nepal Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card/ Digital Identity	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
<p><b>Target 3.7</b> By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes</p>																				
<p><b>INDICATOR 3.7.1</b> This initiative will aid government to reach its proportion of women of reproductive age (aged 15-49 years) who have their need for family planning satisfied with modern methods that is 74 by 2022 and 80 by 2030.</p>																				
<p><b>Target 3.8</b> Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all</p>																				
<p><b>INDICATOR 3.8.1</b> Coverage of essential health services (defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access, among the general and the most disadvantaged population)</p>																				

2019 DIGITAL NEPAL FRAMEWORK

	Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	Nepal Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card/ Digital Identity	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
<b>Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all</b>																				
<b>Target 4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes</b>																				
<b>INDICATOR 4.1.1 Proportion of children and young people (a) in grades 2/3; (b) at the end of primary; and (c) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex.</b>																				
<b>Target 4.2 By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education</b>																				
<b>INDICATOR 4.2.2 Participation rate in organized learning (one year before the official primary entry age), by sex</b>																				
<b>Target 4.3 By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university Tar</b>																				

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	Digital Initiatives																			
	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	Nepal Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card/ Digital Identity	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education	
<b>INDICATOR 4.3.1</b> Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex.																				
<b>Target 4.4</b> By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.																				
<b>INDICATOR 4.4.1</b> Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill																				
<b>Target 4.5</b> By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations.																				
<b>INDICATOR 4.5.1</b> Parity indices (female/male, rural/urban, bottom/top wealth quintile and others such as disability status, indigenous peoples and conflict-affected, as data become available) for all education indicators on this list that can be disaggregated																				
<b>Target 4.6</b> By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy																				

2019 DIGITAL NEPAL FRAMEWORK

	Digital Initiatives																		
	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	Nepal Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card/ Digital Identity	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
<p><b>INDICATOR 4.6.1</b> Proportion of population in a given age group achieving at least a fixed level of proficiency in functional (a) literacy and (b) numeracy skills, by sex.</p>																			
<p><b>Target 4.a</b> Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all.</p>																			
<p><b>INDICATOR 4.a.1</b> Proportion of schools with access to (a) electricity; (b) the Internet for pedagogical purposes; (c) computers for pedagogical purposes; (d) adapted infrastructure and materials for students with disabilities; (e) basic drinking water; (f) single-sex basic sanitation facilities; and (g) basic hand washing facilities (as per the WASH indicator definitions).</p>																			
<p><b>Target 4.b</b> By 2020, substantially expand globally the number of scholarships available to developing countries, in particular least developed countries, small island developing States and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes, in developed countries and other developing countries.</p>																			

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	Nepal Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card/ Digital Identity	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
<b>INDICATOR 4.b.1</b> Volume of official development assistance flows for scholarships by sector and type of study.																			
<b>Target 4.c</b> By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States.																			
<b>INDICATOR 4.c.1</b> Proportion of teachers in: (a) pre-primary; (b) primary; (c) lower secondary; and (d) upper secondary education who have received at least the minimum organized teacher training (e.g. pedagogical training) pre-service or in-service required for teaching at the relevant level in a given country.																			
<b>Goal 5. Achieve gender equality and empower all women and girls</b>																			
<b>Target 5.1</b> End all forms of discrimination against all women and girls everywhere																			
<b>INDICATOR 5.1.1</b> Whether or not legal frameworks are in place to promote, enforce and monitor equality and non-discrimination on the basis of sex																			

2019 DIGITAL NEPAL FRAMEWORK

	Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	Nepal Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card/ Digital Identity	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
<b>Target 5.2 Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation</b>																				
<b>INDICATOR 5.2.1 Proportion of ever-partnered women and girls aged 15 years and older subjected to physical, sexual or psychological violence by a current or former intimate partner in the previous 12 months, by form of violence and by age.</b>																				
<b>Target 5.b Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women</b>																				
<b>INDICATOR 5.b.1 This initiative will help government to reach its percentage on use of Internet by women aged 15-24 years that is 56.2 by 2022 and 98 by 2030.</b>																				
<b>Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all</b>																				
<b>Target 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services.</b>																				
<b>INDICATOR 7.1.1 This initiative will assist government to increase its access to electricity for proportion of population from 85.7 in 2022 to 99 in 2030.</b>																				

2019 DIGITAL NEPAL FRAMEWORK

	Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	Nepal Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card/ Digital Identity	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
<b>Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all</b>																				
<b>Target 8.3 Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services</b>																				
<b>INDICATOR 8.3.1 This initiative will assist government to reach its target for proportion of informal employment in non-agriculture employment, by sex by more than half that is 42 by 2022 and 10 by 2030.</b>																				
<b>Target 8.6 By 2020, substantially reduce the proportion of youth not in employment, education or training</b>																				
<b>INDICATOR 8.6.1 Proportion of youth (aged 15–24 years) not in education, employment or training.</b>																				
<b>TARGET 8.10 Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all.</b>																				

2019 DIGITAL NEPAL FRAMEWORK

	Digital Initiatives																			
	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	Nepal Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card/ Digital Identity	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education	
<b>INDICATOR 8.10.1</b> This initiative will give assistance to government to reach its target of 26 by 2022 and 36 by 2033 for (a) Number of commercial bank branches per 100,000 adults and (b) number of automated teller machines (ATMs) per 100,000 adults.																				
<b>INDICATOR 8.10.2</b> This initiative will give assistance to government to reach its target of 64.3 by 2022 and 99 by 2030 for proportion of adults (15 years and older) with an account at a bank or other financial institution or with a mobile-money-service provider																				
<b>Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation</b>																				
<b>Target 9.3</b> Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets																				
<b>INDICATOR 9.3.2</b> This initiative will facilitate government to achieve its percentage of proportion of small-scale industries with a loan or line of credit which is 24.7 by 2022 and 30 by 2030.																				
<b>Target 9.a</b> Facilitate sustainable and resilient infrastructure development in developing countries																				

2019 DIGITAL NEPAL FRAMEWORK

	Digital Initiatives																			
	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	Nepal Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card/ Digital Identity	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education	
through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States.																				
INDICATOR 9.a.1 Total official international support (official development assistance plus other official flows) to infrastructure.																				
Target 9.b Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities.																				
INDICATOR 9.b.1 Proportion of medium and high-tech industry value added in total value added																				
Target 9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020																				
INDICATOR 9.c.1 This initiative will help government to achieve its target for proportion of population covered by a mobile network, by technology (%) which is 97.1 by 2022 and 100 by 2030.																				
Goal 10. Reduce inequality within and among countries																				

2019 DIGITAL NEPAL FRAMEWORK

	Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	Nepal Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card/ Digital Identity	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
<b>Target 10.b Encourage official development assistance and financial flows, including foreign direct investment, to States where the need is greatest, in particular least developed countries, African countries, small island developing States and landlocked developing countries, in accordance with their national plans and programmes</b>																				
<b>INDICATOR 10.b.1 Total resource flows for development, by recipient and donor countries and type of flow (e.g. official development assistance, foreign direct investment and other flows)</b>																				
<b>Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable</b>																				
<b>Target 11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations.</b>																				
<b>INDICATOR 11.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population.</b>																				

2019 DIGITAL NEPAL FRAMEWORK

	Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	Nepal Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card/ Digital Identity	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
<b>Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels</b>																				
<b>Target 16.10 Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements</b>																				
<b>INDICATOR 16.10.2 Number of countries that adopt and implement constitutional, statutory and/or policy guarantees for public access to information</b>																				
<b>Target 16.a Strengthen relevant national institutions, including through international cooperation, for building capacity at all levels, in particular in developing countries, to prevent violence and combat terrorism and crime.</b>																				
<b>INDICATOR 16.a.1 Existence of independent national human rights institutions in compliance with the Paris Principles.</b>																				
<b>Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development</b>																				
<b>Target 17.3 Mobilize additional financial resources for developing countries from multiple sources.</b>																				

2019 DIGITAL NEPAL FRAMEWORK

	Digital Initiatives																			
	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	Nepal Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card/ Digital Identity	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education	
<b>INDICATOR 17.3.1 Foreign direct investment (FDI), official development assistance and South-South cooperation as a proportion of total domestic budget.</b>																				
<b>Target 17.4 Assist developing countries in attaining long-term debt sustainability through coordinated policies aimed at fostering debt financing, debt relief and debt restructuring, as appropriate, and address the external debt of highly indebted poor countries to reduce debt distress.</b>																				
<b>INDICATOR 17.4.1 This initiative will give assistance to government to achieve its target for debt service as a proportion of exports of goods and services which is 13.7 by 2022 and 15 by 2030.</b>																				
<b>Target 17.6 Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge-sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism.</b>																				
<b>INDICATOR 17.6.2 Fixed Internet broadband subscriptions per 100 inhabitants, by speed.</b>																				

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	Digital Initiatives	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	Nepal Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card/ Digital Identity	Digital Signature	Digital Innovation and Co-creation Hub	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education
<b>Target 17.7 Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed</b>																				
<b>INDICATOR 17.7.1 Total amount of approved funding for developing countries to promote the development, transfer, dissemination and diffusion of environmentally sound technologies.</b>																				
<b>Target 17.8 Fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology</b>																				
<b>INDICATOR 17.8.1 Proportion of individuals using the Internet</b>																				
<b>Target 17.11 Significantly increase the exports of developing countries, in particular with a view to doubling the least developed countries' share of global exports by 2020</b>																				
<b>Indicator 17.11.1 Developing countries' and least developed countries' share of global exports.</b>																				

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	Digital Initiatives																		
17.16 Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries	Establish the Internet as an essential services	Improve spectrum availability, management and optimization	Take the lead in 5G networks deployment	National Optical Fiber Network	High-speed Internet connectivity for efficient delivery of Public services	Special Economic Zones for ICT sector	Government of Nepal App	eGovernance 2.0	Paperless Government to promote collaboration	Public Wi-Fi Hotspots	Nepal Cyber Security Centre	Provincial Data Centers establishment	Nepali language computational resource pack	National Biometric ID Card/ Digital Identity	Digital Signature	Digital Innovation and Co-creation Hub			
INDICATOR 17.16.1 Number of countries reporting progress in multi-stakeholder development effectiveness monitoring frameworks that support the achievement of the sustainable development goals.																	Digital Skill Development Initiative	Government eLearning Platform	ICT in Education

**Agriculture**

Digital Initiatives	e-Haat Bazaar	Precision Agriculture	Agriculture Tools Sharing	Digital Disbursements for MSP and Subsidies	Digitization of Land Records	Smart Irrigation Project	Smart Livestock and Wildlife Management	Televet Medical Center Establishment	Agriculture Input and Output Product Quality Tracking System	Education and training programs for farmers	State-of-the-art Knowledge Centers & Govt Agriculture Centers
<b>Sustainable Development Goals, Targets &amp; Indicators</b>											
<b>Goal 1. End poverty in all its forms everywhere</b>											
<b>Target 1.4</b> By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance.											
<b>Indicator 1.4.1</b> Proportion of population living in households with access to basic services											
<b>Indicator 1.4.2</b> Proportion of total adult population with secure tenure rights to land, (a) with legally recognized documentation, and (b) who perceive their rights to land as secure, by sex and type of tenure.											
<b>Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture</b>											
<b>Target 2.5</b> By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of											

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	e-Haat Bazaar	Precision Agriculture	Agriculture Tools Sharing	Digital Disbursements for MSP and Subsidies	Digitization of Land Records	Smart Irrigation Project	Smart Livestock and Wildlife Management	Televet Medical Center Establishment	Agriculture Input and Output Product Quality Tracking System	Education and training programs for farmers	State-of-the-art Knowledge Centers & Govt Agriculture Centers
benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed											
INDICATOR 2.5.1 Number of plant and animal genetic resources for food and agriculture secured in either medium or long-term conservation facilities.											
INDICATOR 2.5.2 Proportion of local breeds classified as being at risk, not at risk or at unknown level of risk of extinction.											
Target 2.a Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries.											
INDICATOR 2.a.1 This initiative will support government to achieve target set on agriculture orientation index for government expenditures which is 0.26 by 2022 and 0.38 by 2030.											
INDICATOR 2.a.2 Total official flows (official development assistance plus other official flows) to the agriculture sector.											

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	e-Haat Bazaar	Precision Agriculture	Agriculture Tools Sharing	Digital Disbursements for MSP and Subsidies	Digitization of Land Records	Smart Irrigation Project	Smart Livestock and Wildlife Management	Televet Medical Center Establishment	Agriculture Input and Output Product Quality Tracking System	Education and training programs for farmers	State-of-the-art Knowledge Centers & Govt Agriculture Centers
Target 2.c Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility											
INDICATOR 2.c.1 Indicator of food price anomalies For example : Indicator of Food Price Anomalies (IFPA), by type of product.											
Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all											
Target 4.3 By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university											
INDICATOR 4.3.1 Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex.											
Target 4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations											
INDICATOR 4.5.1: Parity indices (female/male, rural/urban, bottom/top wealth quintile and others such as disability status, indigenous peoples and conflict-affected, as data become available) for all education indicators on this list that can be disaggregated.											

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	e-Haat Bazaar	Precision Agriculture	Agriculture Tools Sharing	Digital Disbursements for MSP and Subsidies	Digitization of Land Records	Smart Irrigation Project	Smart Livestock and Wildlife Management	Televet Medical Center Establishment	Agriculture Input and Output Product Quality Tracking System	Education and training programs for farmers	State-of-the-art Knowledge Centers & Govt Agriculture Centers
Goal 5. Achieve gender equality and empower all women and girls											
Target 5.b Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women											
INDICATOR 5.b.1 This initiative will help government to reach its percentage on use of Internet by women aged 15-24 years that is 56.2 by 2022 and 98 by 2030.											
Goal 6. Ensure availability and sustainable management of water and sanitation for all											
Target 6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate											
INDICATOR 6.5.1 This initiative will help government to accelerate to achieve its degree of integrated water resources management implementation from 28 in 2022 to 60 in 2030, (in scale of 0-100).											
Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all											
Target 8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors											

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	e-Haat Bazaar	Precision Agriculture	Agriculture Tools Sharing	Digital Disbursements for MSP and Subsidies	Digitization of Land Records	Smart Irrigation Project	Smart Livestock and Wildlife Management	Televet Medical Center Establishment	Agriculture Input and Output Product Quality Tracking System	Education and training programs for farmers	State-of-the-art Knowledge Centers & Govt Agriculture Centers
<b>INDICATOR 8.2.1</b> This initiative will assist government to achieve its annual growth rate of real GDP per employed person which 5.5 by 2022 and 10 by 2030.											
<b>Target 8.6</b> By 2020, substantially reduce the proportion of youth not in employment, education or training											
<b>INDICATOR 8.6.1</b> Proportion of youth (aged 15–24 years) not in education, employment or training.											
<b>Target 8.10</b> Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all											
<b>INDICATOR 8.10.1</b> This initiative will give assistance to government to reach its target of 26 by 2022 and 36 by 2033 for (a) Number of commercial bank branches per 100,000 adults and (b) number of automated teller machines (ATMs) per 100,000 adults to reach.											
<b>INDICATOR 8.10.2</b> This initiative will give assistance to government to reach its target of 64.3 by 2022 and 99 by 2030 for proportion of adults (15 years and older) with an account at a bank or other financial institution or with a mobile-money-service provider.											
<b>Goal 9.</b> Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation											
<b>Target 9.3</b> Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable											

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	e-Haat Bazaar	Precision Agriculture	Agriculture Tools Sharing	Digital Disbursements for MSP and Subsidies	Digitization of Land Records	Smart Irrigation Project	Smart Livestock and Wildlife Management	Televet Medical Center Establishment	Agriculture Input and Output Product Quality Tracking System	Education and training programs for farmers	State-of-the-art Knowledge Centers & Govt Agriculture Centers
credit, and their integration into value chains and markets											
INDICATOR 9.3.1 Proportion of small-scale industries in total industry value added For example: Proportion of small-scale industries in total industry value added (%)											
INDICATOR 9.3.2 This initiative will facilitate government to meet its percentage of proportion of small-scale industries with a loan or line of credit which is 24.7 by 2022 and 30 by 2030.											
Target 9.a Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States											
INDICATOR 9.a.1 Total official international support (official development assistance plus other official flows) to infrastructure.											
Target 9.b Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities											
INDICATOR 9.b.1 Proportion of medium and high-tech industry value added in total value added											

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	e-Haat Bazaar	Precision Agriculture	Agriculture Tools Sharing	Digital Disbursements for MSP and Subsidies	Digitization of Land Records	Smart Irrigation Project	Smart Livestock and Wildlife Management	Televet Medical Center Establishment	Agriculture Input and Output Product Quality Tracking System	Education and training programs for farmers	State-of-the-art Knowledge Centers & Govt Agriculture Centers
Target 9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020											
INDICATOR 9.c.1 This initiative will enable government to accomplish its target(%) of 97.1 by 2022 and 100 by 2030 for proportion of population covered by a mobile network, by technology .											
Goal 10. Reduce inequality within and among countries											
Target 10.b Encourage official development assistance and financial flows, including foreign direct investment, to States where the need is greatest, in particular least developed countries, African countries, small island developing States and landlocked developing countries, in accordance with their national plans and programmes.											
INDICATOR 10.b.1 Total resource flows for development, by recipient and donor countries and type of flow (e.g. official development assistance, foreign direct investment and other flows)											
Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss											
Target 15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests,											

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	e-Haat Bazaar	Precision Agriculture	Agriculture Tools Sharing	Digital Disbursements for MSP and Subsidies	Digitization of Land Records	Smart Irrigation Project	Smart Livestock and Wildlife Management	Televet Medical Center Establishment	Agriculture Input and Output Product Quality Tracking System	Education and training programs for farmers	State-of-the-art Knowledge Centers & Govt Agriculture Centers
wetlands, mountains and drylands, in line with obligations under international agreements.											
<b>INDICATOR 15.1.1 Forest area as a proportion of total land area</b> For example: Forest area (thousands of hectares) Forest area as a proportion of total land area (%) Land area (thousands of hectares).											
<b>Goal 17 Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development.</b>											
<b>Target 17.6 Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge-sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism</b>											
<b>INDICATOR 17.6.1 Number of science and/or technology cooperation agreements and programmes between countries, by type of cooperation</b>											
<b>INDICATOR 17.6.2 Fixed Internet broadband subscriptions per 100 inhabitants, by speed.</b>											
<b>Target 17.9 Enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to</b>											

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	e-Haat Bazaar	Precision Agriculture	Agriculture Tools Sharing	Digital Disbursements for MSP and Subsidies	Digitization of Land Records	Smart Irrigation Project	Smart Livestock and Wildlife Management	Televet Medical Center Establishment	Agriculture Input and Output Product Quality Tracking System	Education and training programs for farmers	State-of-the-art Knowledge Centers & Govt Agriculture Centers
implement all the Sustainable Development Goals, including through North-South, South-South and triangular cooperation											
INDICATOR 17.9.1 Dollar value of financial and technical assistance (including through North-South, South-South and triangular cooperation) committed to developing countries.											

Health

Digital Initiatives	National Digital Healthcare Program	Next-generation digital Healthcare facilities	Electronic Health Records 2.0	Mobile Health Units	e-Maternal Care	Drones for delivery of emergency medical supplies	Centralized Telemedicine Center
<b>Goal 1. End poverty in all its forms everywhere</b>							
<b>Target 1.3 Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable.</b>							
<b>INDICATOR 1.3.1 This initiative will support government to achieve its target for proportion of population covered by social protection floors/systems, by sex, distinguishing children, unemployed persons, older persons, persons with disabilities, pregnant women, newborns, work-injury victims and the poor and the vulnerable which is 41.7 by 2022 and 80 by 2030.</b>							
<b>Target 1.a Ensure significant mobilization of resources from a variety of sources, including through enhanced development cooperation, in order to provide adequate and predictable means for developing countries, in particular least developed countries, to implement programmes and policies to end poverty in all its dimensions</b>							
<b>INDICATOR 1.a.2 Proportion of total government spending on essential services (education, health and social protection)</b>							
<b>Goal 3. Ensure healthy lives and promote well-being for all at all ages</b>							
<b>Target 3.1 By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births</b>							

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Digital Initiatives	National Digital Healthcare Program	Next-generation digital Healthcare facilities	Electronic Health Records 2.0	Mobile Health Units	e-Maternal Care	Drones for delivery of emergency medical supplies	Centralized Telemedicine Center
INDICATOR 3.1.1 This initiative will assist government to meet its maternal mortality ratio which is 116 by 2022 to 70 by 2030.							
Target 3.2 By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births							
INDICATOR 3.2.1 This initiative will help government to achieve its under-five mortality rate per 1,000 live births which is 27 by 2022 and 20 by 2030.							
INDICATOR 3.2.2 This initiative will provide assistance to government to attain its neonatal mortality rate which is 16 by 2022 and 12 by 2030.							
Target 3.7 By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes							
INDICATOR 3.7.1 This initiative will aid the government to increase proportion of women of reproductive age (aged 15-49 years) who have their need for family planning satisfied with modern methods from 74 in 2022 to 80 in 2030.							
Target 3.8 Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all							
INDICATOR 3.8.1 Coverage of essential health services (defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access, among the general and the most disadvantaged population)							

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	National Digital Healthcare Program	Next-generation digital Healthcare facilities	Electronic Health Records 2.0	Mobile Health Units	e-Maternal Care	Drones for delivery of emergency medical supplies	Centralized Telemedicine Center
<b>INDICATOR 3.8.2</b> This initiative will assist government to achieve its proportion of population with large household expenditures on health as a share of total household expenditure or income which is 6 by 2022 and 2 by 2030.							
<b>Target 3.c</b> Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries, especially in least developed countries and small island developing States							
<b>INDICATOR 3.c.1</b> This initiative will support government to maintain its health worker density and distribution per 1,000 population which is 4.5 by 2022 and 2030.							
<b>Goal 5. Achieve gender equality and empower all women and girls</b>							
<b>TARGET 5.6</b> Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences.							
<b>INDICATOR 5.6.1</b> Proportion of women aged 15-49 years who make their own informed decisions regarding sexual relations, contraceptive use and reproductive health care.							
<b>Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation</b>							
<b>Target 9.b</b> Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities							

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	National Digital Healthcare Program	Next-generation digital Healthcare facilities	Electronic Health Records 2.0	Mobile Health Units	e-Maternal Care	Drones for delivery of emergency medical supplies	Centralized Telemedicine Center
INDICATOR 9.b.1 Proportion of medium and high-tech industry value added in total value added.							
Target 9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020							
INDICATOR 9.c.1 This initiative will help government to achieve its target for proportion of population covered by a mobile network, by technology (%) which is 97.1 by 2022 and 100 by 2030.							
Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable							
Target 11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations							
INDICATOR 11.5.2 Direct economic loss in relation to global GDP, damage to critical infrastructure and number of disruptions to basic services, attributed to disasters.							
Goal 13. Take urgent action to combat climate change and its impacts[b]							
Target 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries							
INDICATOR 13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population.							

	Digital Initiatives						
INDICATOR 13.1.3 Proportion of Local levels that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies	National Digital Healthcare Program	Next-generation digital Healthcare facilities	Electronic Health Records 2.0	Mobile Health Units	e-Maternal Care	Drones for delivery of emergency medical supplies	Centralized Telemedicine Center

Education

	Digital Initiatives	Smart classrooms	OLE Nepal 2.0	Online Learning Platform	Rent-a-Laptop Program	EMIS 2.0	Centralized Admission System	Biometric Attendance and CCTV Cameras	Mobile Learning Centers in Rural Areas
<b>Goal 1. End poverty in all its forms everywhere</b>									
<b>Target 1.a Ensure significant mobilization of resources from a variety of sources, including through enhanced development cooperation, in order to provide adequate and predictable means for developing countries, in particular least developed countries, to implement programmes and policies to end poverty in all its dimensions</b>									
<b>INDICATOR 1.a.1 Proportion of domestically generated resources allocated by the government directly to poverty reduction programmes</b>									
<b>INDICATOR 1.a.2 Proportion of total government spending on essential services (education, health and social protection)</b>									
<b>Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all</b>									
<b>Target 4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes</b>									
<b>INDICATOR 4.1.1 Proportion of children and young people (a) in grades 2/3; (b) at the end of primary; and (c) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex.</b>									
<b>Target 4.2 By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education</b>									
<b>INDICATOR 4.2.1 Proportion of children under 5 years of age who are developmentally on track in health, learning and psychosocial well-being, by sex.</b>									

2019 DIGITAL NEPAL FRAMEWORK

	Digital Initiatives							
	Smart classrooms	OLE Nepal 2.0	Online Learning Platform	Rent-a-Laptop Program	EMIS 2.0	Centralized Admission System	Biometric Attendance and CCTV Cameras	Mobile Learning Centers in Rural Areas
<b>INDICATOR 4.2.2</b> Participation rate in organized learning (one year before the official primary entry age), by sex.								
<b>Target 4.3</b> By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university								
<b>INDICATOR 4.3.1</b> Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex.								
<b>Target 4.4</b> By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship								
<b>INDICATOR 4.4.1</b> Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill								
<b>Target 4.5</b> By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations								
<b>INDICATOR 4.5.1</b> Parity indices (female/male, rural/urban, bottom/top wealth quintile and others such as disability status, indigenous peoples and conflict-affected, as data become available) for all education indicators on this list that can be disaggregated								
<b>Target 4.a</b> Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all								
<b>INDICATOR 4.a.1</b> Proportion of schools with access to: (a) electricity; (b) the Internet for pedagogical purposes; (c) computers for pedagogical purposes; (d) adapted infrastructure and materials for students with disabilities; (e) basic drinking water; (f) single-sex basic sanitation facilities; and (g) basic hand washing facilities (as per the WASH indicator definitions).								

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	Smart classrooms	OLE Nepal 2.0	Online Learning Platform	Rent-a-Laptop Program	EMIS 2.0	Centralized Admission System	Biometric Attendance and CCTV Cameras	Mobile Learning Centers in Rural Areas
Target 4.c By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States								
INDICATOR 4.c.1 Proportion of teachers in: (a) pre-primary; (b) primary; (c) lower secondary; and (d) upper secondary education who have received at least the minimum organized teacher training (e.g. pedagogical training) pre-service or in-service required for teaching at the relevant level in a given country.								
Goal 5. Achieve gender equality and empower all women and girls								
Target 5.b Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women								
INDICATOR 5.b.1 This initiative will help government to reach its percentage on use of Internet by women aged 15-24 years that is 56.2 by 2022 and 98 by 2030.								
Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all								
Target 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services								
INDICATOR 7.1.1 This initiative will assist government to achieve its target to provide access to electricity for proportion of population which is 85.7 by 2022 and 99 by 2030.								
Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation								
9.b Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities								
INDICATOR 9.b.1 Proportion of medium and high-tech industry value added in total value added.								

	Digital Initiatives							
	Smart classrooms	OLE Nepal 2.0	Online Learning Platform	Rent-a-Laptop Program	EMIS 2.0	Centralized Admission System	Biometric Attendance and CCTV Cameras	Mobile Learning Centers in Rural Areas
<b>9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020</b>								
<b>INDICATOR 9.c.1 This initiative will help government to achieve its target for proportion of population covered by a mobile network, by technology (%) which is 97.1 by 2022 and 100 by 2030.</b>								

Energy

	Digital Initiatives	Smart metering	GIS Smart Grid Project	Pan-Nepal roll-out of Any Branch Payment System (ARPCS)	NEA Official Mobile App 2.0	Smart Building/Energy Management Project	NEA Field Force Automation Solutions	NEA Customer Service Portal	NEA e-Learning Platform	Energy sector-Contract Management Information System
<b>Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all</b>										
<b>TARGET 4.3 By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university.</b>										
<b>INDICATOR 4.3.1 Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex.</b>										
<b>Target 4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship</b>										
<b>INDICATOR 4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill</b>										
<b>Goal 6. Ensure availability and sustainable management of water and sanitation for all</b>										
<b>Target 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity</b>										
<b>INDICATOR 6.4.1 Change in water-use efficiency over time</b>										
<b>Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all</b>										
<b>Target 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services</b>										

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	Smart metering	GIS Smart Grid Project	Pan-Nepal roll-out of Any Branch Payment System (ABPS)	NEA Official Mobile App 2.0	Smart Building/Energy Management Project	NEA Field Force Automation Solutions	NEA Customer Service Portal	NEA e-Learning Platform	Energy sector-Contract Management Information System
<b>INDICATOR 7.1.1</b> This initiative will assist government to achieve its target to provide access to electricity for proportion of population which is 85.7 by 2022 and 99 by 2030.									
<b>INDICATOR 7.1.2</b> Proportion of population with primary reliance on clean fuels and technology For example: Proportion of population with primary reliance on clean fuels and technology (%)									
<b>Target 7.2</b> By 2030, increase substantially the share of renewable energy in the global energy mix									
<b>INDICATOR 7.2.1</b> This initiative will provide assistance to government to meet its target of renewable energy share in the total final energy consumption which is 29.7 by 2022 and 50 by 2033.									
<b>Target 7.3</b> By 2030, double the global rate of improvement in energy efficiency									
<b>INDICATOR 7.3.1</b> Energy intensity measured in terms of primary energy and GDP.									
<b>Target 7.b</b> By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States and landlocked developing countries, in accordance with their respective programmes of support									
<b>7.b.1</b> Investments in energy efficiency as a proportion of GDP and the amount of foreign direct investment in financial transfer for infrastructure and technology to sustainable development services									
<b>Goal 8.</b> Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all									

2019 DIGITAL NEPAL FRAMEWORK

	Digital Initiatives	Smart metering	GIS Smart Grid Project	Pan-Nepal roll-out of Any Branch Payment System (ABPS)	NEA Official Mobile App 2.0	Smart Building/Energy Management Project	NEA Field Force Automation Solutions	NEA Customer Service Portal	NEA e-Learning Platform	Energy sector-Contract Management Information System
<b>Target 8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead</b>										
<b>INDICATOR 8.4.1 Material footprint, material footprint per capita, and material footprint per GDP.</b>										
<b>INDICATOR 8.4.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP.</b>										
<b>Target 8.10 Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all</b>										
<b>INDICATOR 8.10.1 This initiative will give assistance to government to reach its target of 26 by 2022 and 36 by 2033 for (a) Number of commercial bank branches per 100,000 adults and (b) number of automated teller machines (ATMs) per 100,000 adults.</b>										
<b>INDICATOR 8.10.2 This initiative will give assistance to government to reach its target of 64.3 by 2022 and 99 by 2030 for proportion of adults (15 years and older) with an account at a bank or other financial institution or with a mobile-money-service provider.</b>										
<b>Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation</b>										
<b>Target 9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets</b>										

## 2019 DIGITAL NEPAL FRAMEWORK

	Digital Initiatives								
	Smart metering	GIS Smart Grid Project	Pan-Nepal roll-out of Any Branch Payment System (ABPS)	NEA Official Mobile App 2.0	Smart Building/Energy Management Project	NEA Field Force Automation Solutions	NEA Customer Service Portal	NEA e-Learning Platform	Energy sector-Contract Management Information System
<b>INDICATOR 9.3.1</b> Proportion of small-scale industries in total industry value added.									
<b>Target 9.4</b> By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities									
<b>INDICATOR 9.4.1</b> CO2 emission per unit of value added.									
<b>Target 9.b</b> Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities									
<b>INDICATOR 9.b.1</b> Proportion of medium and high-tech industry value added in total value added.									
<b>Target 9.c</b> Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020									
<b>INDICATOR 9.c.1</b> This initiative will help government to achieve its target for proportion of population covered by a mobile network, by technology (%) which is 97.1 by 2022 and 100 by 2030.									
<b>Goal 11.</b> Make cities and human settlements inclusive, safe, resilient and sustainable									
<b>Target 11.6</b> By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management									

2019 DIGITAL NEPAL FRAMEWORK

	Digital Initiatives	Smart metering	GIS Smart Grid Project	Pan-Nepal roll-out of Any Branch Payment System (ABPS)	NEA Official Mobile App 2.0	Smart Building/Energy Management Project	NEA Field Force Automation Solutions	NEA Customer Service Portal	NEA e-Learning Platform	Energy sector-Contract Management Information System
<b>INDICATOR 11.6.1 Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities</b>										
<b>INDICATOR 11.6.2 Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)</b>										
<b>Goal 12. Ensure sustainable consumption and production patterns</b>										
<b>Target 12.2 By 2030, achieve the sustainable management and efficient use of natural resources</b>										
<b>INDICATOR 12.2.1 Material footprint, material footprint per capita, and material footprint per GDP</b>										
<b>Target 12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment</b>										
<b>INDICATOR 12.4.1 Number of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement</b>										
<b>Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels</b>										
<b>Target 16.10 Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements</b>										

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	Smart metering	GIS Smart Grid Project	Pan-Nepal roll-out of Any Branch Payment System (ABPS)	NEA Official Mobile App 2.0	Smart Building/Energy Management Project	NEA Field Force Automation Solutions	NEA Customer Service Portal	NEA e-Learning Platform	Energy sector-Contract Management Information System
INDICATOR 16.10.2 Number of countries that adopt and implement constitutional, statutory and/or policy guarantees for public access to information.									

Tourism

Digital Initiatives	Welcome Nepal Website/ Mobile App 2.0	Electronic visas and Immigration Process Improvement	Multilingual helpline	Augmented and Virtual Reality tours	Electronic tour guides	Omnichannel marketing	Tourist Security Infrastructure
<b>Sustainable Development Goals, Targets &amp; Indicators</b>							
<b>Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation</b>							
<b>Target 9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all</b>							
<b>INDICATOR 9.1.2 Passenger and freight volumes, by mode of transport.</b>							
<b>Target 9.b Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities</b>							
<b>INDICATOR 9.b.1 Proportion of medium and high-tech industry value added in total value added</b>							
<b>Target 9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020</b>							
<b>INDICATOR 9.c.1 This initiative will help government to achieve its target for proportion of population covered by a mobile network, by technology (%) which is 97.1 by 2022 and 100 by 2030.</b>							

**2019 DIGITAL NEPAL FRAMEWORK**

Digital Initiatives	Welcome Nepal Website/ Mobile App 2.0	Electronic visas and Immigration Process Improvement	Multilingual helpline	Augmented and Virtual Reality tours	Electronic tour guides	Omnichannel marketing	Tourist Security Infrastructure
	<b>Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable</b>						
<b>Target 11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons</b>							
<b>Indicator 11.2.1 Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities.</b>							
<b>Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.</b>							
<b>Target 16.1 Significantly reduce all forms of violence and related death rates everywhere.</b>							
<b>Indicator 16.1.4 Proportion of population that feel safe walking alone around the area they live.</b>							
<b>Target 16.3 Promote the rule of law at the national and international levels and ensure equal access to justice for all.</b>							
<b>Indicator 16.3.1 Proportion of victims of violence in the previous 12 months who reported their victimization to competent authorities or other officially recognized conflict resolution mechanisms.</b>							
<b>Target 16.6 Develop effective, accountable and transparent institutions at all levels.</b>							
<b>Indicator 16.6.2 Proportion of population satisfied with their last experience of public services.</b>							

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	Welcome Nepal Website/ Mobile App 2.0	Electronic visas and Immigration Process Improvement	Multilingual helpline	Augmented and Virtual Reality tours	Electronic tour guides	Omnichannel marketing	Tourist Security Infrastructure
<b>Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development</b>							
<b>Target 17.6 Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge-sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism</b>							
<b>INDICATOR 17.6.1 Number of science and/or technology cooperation agreements and programmes between countries, by type of cooperation</b>							
<b>INDICATOR 17.6.2 Fixed Internet broadband subscriptions per 100 inhabitants, by speed.</b>							
<b>Target 17.8 Fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology</b>							
<b>INDICATOR 17.8.1 Proportion of individuals using the Internet</b>							
<b>Target 17.16 Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries</b>							
<b>INDICATOR 17.16.1 Number of countries reporting progress in multi-stakeholder development effectiveness monitoring frameworks that support the achievement of the sustainable development goals</b>							

Finance

Digital Initiatives	National Payment Gateway	Credit Ratings (Individual or Corporate Accounts)	Database Management of Nepalese Migrants	Mobile Wallet Services	Encourage Digital Payments in Nepal	Development of Single window for Business & Industry Promotion	Development and promotion of eCommerce and ITeS ecosystem	Digital Payments Campaign
<b>Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all</b>								
<b>Target 8.10 Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all.</b>								
<b>Indicator 8.10.1 This initiative will give assistance to government to reach its target of 26 by 2022 and 36 by 2033 for (a) Number of commercial bank branches per 100,000 adults and (b) number of automated teller machines (ATMs) per 100,000 adults.</b>								
<b>Indicator 8.10.2 This initiative will give assistance to government to reach its target of 64.3 by 2022 and 99 by 2030 for proportion of adults (15 years and older) with an account at a bank or other financial institution or with a mobile-money-service provider.</b>								
<b>Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation</b>								
<b>Target 9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets.</b>								
<b>Indicator 9.3.1 Proportion of small-scale industries in total industry value added</b>								
<b>Indicator 9.3.2 This initiative will facilitate government to achieve its percentage of proportion of small-scale industries with a loan or line of credit which is 24.7 by 2022 and 30 by 2030.</b>								

## 2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	National Payment Gateway	Credit Ratings (Individual or Corporate Accounts)	Database Management of Nepalese Migrants	Mobile Wallet Services	Encourage Digital Payments in Nepal	Development of Single window for Business & Industry Promotion	Development and promotion of eCommerce and ITeS ecosystem	Digital Payments Campaign
<b>Target 9.b Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities</b>								
<b>Indicator 9.b.1 Proportion of medium and high-tech industry value added in total value added</b>								
<b>Target 9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020</b>								
<b>Indicator 9.c.1 This initiative will help government to achieve its target for proportion of population covered by a mobile network, by technology (%) which is 97.1 by 2022 and 100 by 2030.</b>								
<b>Goal 10. Reduce inequality within and among countries</b>								
<b>Target 10.b Encourage official development assistance and financial flows, including foreign direct investment, to States where the need is greatest, in particular least developed countries, African countries, small island developing States and landlocked developing countries, in accordance with their national plans and programmes</b>								
<b>Indicator 10.b.1 Total resource flows for development, by recipient and donor countries and type of flow (e.g. official development assistance, foreign direct investment and other flows)</b>								
<b>Target 10.c By 2030, reduce to less than 3 per cent the transaction costs of migrant remittances and eliminate remittance corridors with costs higher than 5 per cent.</b>								
<b>Indicator 10.c.1 This initiative will assist government to meet its target for percentage of remittance which is 3.1 by 2022 and 2 by 2030 (as a proportion of the mount remitted).</b>								

## 2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	National Payment Gateway	Credit Ratings (Individual or Corporate Accounts)	Database Management of Nepalese Migrants	Mobile Wallet Services	Encourage Digital Payments in Nepal	Development of Single window for Business & Industry Promotion	Development and promotion of eCommerce and ITeS ecosystem	Digital Payments Campaign
<b>Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels</b>								
<b>Target 16.10 Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements</b>								
<b>Indicator 16.10.1 Number of verified cases of killing, kidnapping, enforced disappearance, arbitrary detention and torture of journalists, associated media personnel, trade unionists and human rights advocates in the previous 12 months</b>								
<b>Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development</b>								
<b>Target 17.3 Mobilize additional financial resources for developing countries from multiple sources</b>								
<b>Indicator 17.3.1 Foreign direct investment (FDI), official development assistance and South-South cooperation as a proportion of total domestic budget</b>								
<b>Target 17.4 Assist developing countries in attaining long-term debt sustainability through coordinated policies aimed at fostering debt financing, debt relief and debt restructuring, as appropriate, and address the external debt of highly indebted poor countries to reduce debt distress</b>								
<b>Indicator 17.4.1 This initiative will give assistance to government to achieve it target for debt service as a proportion of exports of goods and services which is 13.7 by 2022 and 15 by 2030.</b>								

## 2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	National Payment Gateway	Credit Ratings (Individual or Corporate Accounts)	Database Management of Nepalese Migrants	Mobile Wallet Services	Encourage Digital Payments in Nepal	Development of Single window for Business & Industry Promotion	Development and promotion of eCommerce and ITeS ecosystem	Digital Payments Campaign
<b>Target 17.6 Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge-sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism</b>								
<b>Indicator 17.6.1 Number of science and/or technology cooperation agreements and programmes between countries, by type of cooperation</b>								
<b>Indicator 17.6.2 Fixed Internet broadband subscriptions per 100 inhabitants, by speed</b>								
<b>Target 17.8 Fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology</b>								
<b>Indicator 17.8.1 Proportion of individuals using the Internet</b>								
<b>Target 17.16 Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries</b>								
<b>Indicator 17.16.1 Number of countries reporting progress in multi-stakeholder development effectiveness monitoring frameworks that support the achievement of the sustainable development goals</b>								

Urban Infrastructure

Digital Initiatives	Water ATMs	Smart metering for water	Intelligent Waste Management	Automated Waste Sorting	Municipality mobile application	Connected public transport / Public Transport mobile app	Intelligent traffic management	Intelligent Parking Lot Management	Intelligent Toll-booths	National Disaster Management System	Disaster Management Training
<b>Goal 3. Ensure healthy lives and promote well-being for all at all ages</b>											
<b>Target 3.6 By 2020, halve the number of global deaths and injuries from road traffic accidents</b>											
<b>INDICATOR 3.6.1 This initiative will provide assistance to government to achieve its death rate due to road traffic injuries that is 8.94 by 2022 and 4.96 by 2030, (per 100,000 population).</b>											
<b>Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all</b>											
<b>Target 4.3 By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university</b>											
<b>INDICATOR 4.3.1 Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex.</b>											
<b>Target 4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship</b>											

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	Water ATMs	Smart metering for water	Intelligent Waste Management	Automated Waste Sorting	Municipality mobile application	Connected public transport / Public Transport mobile app	Intelligent traffic management	Intelligent Parking Lot Management	Intelligent Toll-booths	National Disaster Management System	Disaster Management Training
<b>INDICATOR 4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill.</b>											
<b>Goal 6. Ensure availability and sustainable management of water and sanitation for all</b>											
<b>Target 6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all</b>											
<b>INDICATOR 6.1.1 Proportion of population using safely managed drinking water services. Proportion of population using safely managed drinking water services, by urban/rural (%)</b>											
<b>Target 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally</b>											
<b>INDICATOR 6.3.2 Proportion of bodies of water with good ambient water quality</b>											
<b>Target 6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate</b>											
<b>INDICATOR 6.5.1 This initiative will help government to accelerate to increase its degree of integrated water resources management implementation from 28 in 2022 to 60 in 2030, (in scale of 0-100).</b>											

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	Water ATMs	Smart metering for water	Intelligent Waste Management	Automated Waste Sorting	Municipality mobile application	Connected public transport / Public Transport mobile app	Intelligent traffic management	Intelligent Parking Lot Management	Intelligent Toll-booths	National Disaster Management System	Disaster Management Training
Target 6.a By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies											
INDICATOR 6.a.1 Amount of water- and sanitation-related official development assistance that is part of a government-coordinated spending plan.											
Target 6.b Support and strengthen the participation of local communities in improving water and sanitation management											
INDICATOR 6.b.1 Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management.											
<b>Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation</b>											
Target 9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all											
INDICATOR 9.1.2 Passenger and freight volumes, by mode of transport											

2019 DIGITAL NEPAL FRAMEWORK

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Target 9.b Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities											
INDICATOR 9.b.1 Proportion of medium and high-tech industry value added in total value added.											
Target 9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020											
INDICATOR 9.c.1 This initiative will help government to achieve its target for proportion of population covered by a mobile network, by technology (%) which is 97.1 by 2022 and 100 by 2030.											
Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable											
Target 11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations											

2019 DIGITAL NEPAL FRAMEWORK

Digital Initiatives	Water ATMs	Smart metering for water	Intelligent Waste Management	Automated Waste Sorting	Municipality mobile application	Connected public transport / Public Transport mobile app	Intelligent traffic management	Intelligent Parking Lot Management	Intelligent Toll-booths	National Disaster Management System	Disaster Management Training
INDICATOR 11.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 populations.											
INDICATOR 11.5.2 Direct economic loss in relation to global GDP, damage to critical infrastructure and number of disruptions to basic services, attributed to disasters.											
Target 11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels											
INDICATOR 11.b.1 Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030.											
<b>GOAL 12 Ensure sustainable consumption and production patterns</b>											
TARGET 12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.											

Digital Initiatives	Water ATMs	Smart metering for water	Intelligent Waste Management	Automated Waste Sorting	Municipality mobile application	Connected public transport / Public Transport mobile app	Intelligent traffic management	Intelligent Parking Lot Management	Intelligent Toll-booths	National Disaster Management System	Disaster Management Training
INDICATOR 12.4.1 Number of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement.											

## About Ministry of Communication and Information Technology

The Ministry of Communication and Information Technology (MoCIT) was established in the year (2049BS). The Ministry widely covers postal services, telecommunications, broadcasting, press and information, and film development. With the objective to develop and expand the information & communications sector up to rural level in the form of infrastructure for social and economic development through wide spread participation of the private sector as well with emphasis on the dissemination of information and communication technology.

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Government of Nepal  
Ministry of Communication  
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