NEPAL TELECOMMUNICATIONS AUTHORITY

Kamaladi, Kathmandu

Final Report

On

Study on Convergence of ICT/Telecom and Develop Convergence Framework

Submitted by :

Tarapunja Engineering and Research Pvt. Ltd.

Samakhusi-29, Kathmandu.

Tel: +977-01-6227904, 9841786925

July, 2021

ACKNOWLEDGEMENT

It is our pleasure and privilege to bring out this final report on Study on the Convergence of ICT/Telecom and Develop Convergence Framework. We are grateful to Mr. Purushottam Khanal, Chairman of Nepal Telecommunications Authority for entrusting our organization for this assignment. We are especially thankful to the coordinator and other officials of the Equipment Standardization Section for providing valuable suggestions, data and guidance to carry out the assignment and derive this Final Report.

We hereby would also like to thank all the personnel from different organizations for assisting in research and providing information for the study. Tarapunja Engineering and Research Pvt. Ltd. would also like to extend our gratitude to all who directly and indirectly assisted in preparation of this report.

July, 2021

Contents

List of Figures

Abbreviations

ICT: Information and Communication Technology

MOCIT: Ministry of Communication and Information Technology

GoN: Government of Nepal

GMPCS: Global Mobile Personal Communication by Satellite

RFPDC: Radio Frequency Policy Determination Committee

VSAT: Very Small Aperture Terminal

MMDS: Multichannel Multipoint Distribution Service

GSM: Global System of Mobile Communications

IPTV: Internet Protocol Television

DTTV: Digital Terrestrial Television

DTH: Direct To Home

ICANN: Internet Corporation for Assigned Names and Numbers

ccTLD: Country Code Top Level Domain

DNS: Domain Name System

APTLD: Asia Pacific Top Level Domain

CCNOG: Country Code Network Operators Group

ccNSO: Country Code Name Support Organization

IANA: Internet Assigned Numbers Authority

IP: Internet Protocol

TV: Television

FM: Frequency Modulation

Executive Summary

While 85% of the global population has already been connected by the 4G network we are in that period of time where the technology has been much advanced and adapted by the wider audience than ever. In case of Nepal as well the penetration rate of broadband access has reached 82.79% already. In this evolving scenario of technological adaptation the traditional concept of voice and data transmission has emerged into over the top services. The consolidation and integration of different technologies by a common digital transport medium for any data provided by media, broadcasting, and telecommunications has resulted in the digital convergence. The underlying use of IT has become the very fundamental feature for convergent industries. Digital Convergence covers the integration of service providers, technologies, equipment, and markets that provide data in any format for information and communications. In the case of Nepal still the regulation of Telecom, Broadcasting and ICT related services are done by multiple agencies. In this regard Nepal Telecommunications Authority is the telecom regulator which oversees the licensing of Telecom, Internet and Network services, Spectrum distribution and Management, tariff approval, numbering management, consumer rights protection, equipment quality monitoring, monitoring and evaluation. Whereas different divisions and departments of the Ministry of Communication, Information and Technology along with the Press Council, Film Development board, Press Registrar, Frequency Management and Technology Analysis Division, Advertisement board oversees different other regulations related to television, press, media, motion pictures and content regulations and the regulation of Mass media is handled by the Department of Information and Broadcasting, Ministry of Communication Information and Technology.

Along with the technological evolution/revolution, different countries have been using converged technologies for the facilitation of converged services to their valued customers in a reliable manner. Most of the telecommunication and broadcasting regulatory authorities of different countries has already steered towards the practice of converged regulatory approach. Some of the examples includes Federal Communications Commission of The United States of America(USA), OFCom of The United Kingdom (UK), Infocomm Media Development Authority of Singapore , Malaysian Communications and Multimedia Commission of Malasiya.

To meet the current dynamic demand of the consumer also guarantee the quality of service and ensure the privacy of the consumers the traditional multiple regulatory approach should be evolve into a single window policy and regulatory approach. We have already witnessed that the services and the technologies has been converged themselves one very general smart phone today has capabilities of multiple different technologies in the past. To address the current requirement of the consumer converged regulatory approach is a must.

Chapter One
Introduction

A. Background:

a. General Overview: The development of the telecommunication industry has gained a spiked development in recent years, globally 85% of the population has been covered by the 4G Network which precedents to 94.2% in the case of Asia and the pacific[1]. In the case of Nepal the mobile penetration rate has reached 130%, while the penetration rate of broadband access is 82.79%. Among that 60.34 percent of users are using mobile broadband which covers 3G, 4G, and EVDO services from different telecom providers[2]. The evolution of telecommunication started with the basic concept of telephony services. With the development of technologies to convert the analog signal to digital and vice versa at the physical and link layers, where telephone and videoconferencing and computer networks shared a common technology. As a result, the telecommunications industry made extensive use of computer and software technologies in the implementation of the configuration and control of the network. The computer industry made use of the telecommunications infrastructure to network computers, which enable networked applications. Along with this development the development of cloud-based services, implementation of optical fiber cables fostered the development of the internet which has created current scenarios of technological convergence.

In the case of Nepal, the licensing and regulation of data, voice, and broadcasting services are being carried from different entities based upon different Legacy provisions. Nepal Telecomunications Authority is the telecommunication regulatory body and the functions and duties of the Authority have been prescribed in section 13 of the Telecom Act, 2053. while MOCIT is responsible for licensing of non-Telecom i.e. broadcasting services. The Government of Nepal has introduced ambitious targets in ICT Policy, 2072 & Broadband Policy 2071. Also, the Government of Nepal has brought out the digital Nepal Framework, 2076 as one of the visionary documents for adapting the emerging technologies in major 8 sectors. The digital Nepal Framework has identified Digital Foundation as one of the key sectors to be developed. There is also the Radio Act, 2014 and Radio Communication (License) Regulation, 2049.

[1] Measuring digital development Facts and figures (2020). Retrieved 18 March 2021, from https://www.itu.int/en/ITU-D/Statistics/Documents/facts/FactsFigures2020.pdf

[2] Nepal Telecommunications Authority (2021). Retrieved 20 March 2021, from https://nta.gov.np/wp-content/uploads/2021/02/MIS-2077-Poush.pdf

b. ICT Environment in Nepal: With the rocketing ICT development across the globe Nepal is no exception with 130.94% of mobile penetration rate and 84.09% of Internet penetration rate while the internet penetration rate was 7.93% just 10 years ago[3]. Among the mobile users 61.47% of users are using the mobile broadband which notifies the massive adaptation of smartphones as well. Currently there are 127 registered Internet service providers with a total number of 25,419,325 Subscribers. Along with the increased rate of internet usage, smartphone adoption, there is also a rise in different digital services such as e-commerce, e-banking, cloud services and so on. According to Nepal Rastra Bank the e-commerce sector conducted business worth Rs1.20 billion from 168,627 transactions in one month[4]. Among other services the media sector has also adapted the use of ICT services and platforms massively. According to press council Nepal total number of 2644 Online media has been registered and are in operation.

i. **Telecommunications**: For the first time in Nepal, the telecommunication service was introduced in 1913 AD. An open-wire trunk between Kathmandu and Raxaul (Indian border town) was established in 1914. Formally telecom service was provided mainly after the establishment of Mohan Akashwani in B.S. 2005. The Telecommunication Department was established in B.S. 2016 and was converted into Telecommunications Development Board in B.S. 2026. After the enactment of Communications Corporation Act, 2028, Nepal Telecommunications Corporation was established in B.S. 2032. Later, this was also transformed into Nepal Doorsanchar Company Limited (NDCL) from Baisakh 1, 2061 B.S.. Nepal Doorsanchar Company Limited (popularly known as "Nepal Telecom") is a Limited Company registered under the Company Act 2053, with the major stake by the Government of Nepal.

   Liberal policy in the telecommunication sector adopted by the government led emergence of private sector operators in Nepal. Ncell Private Limited, erstwhile Spice Nepal Private Limited was established back in 2004 as a first private telecom operator with the name of "Mero Mobile" owned by Spice Nepal Private Ltd., which launched its operations from 2005. After being acquired by teliasonera in 2008 it was rebranded as "NCell'.' In 2002 United Telecom Limited a joint venture of Mahanagar Telephone Nigam Limited (MTNL), Telecommunications Consultants India Limited (TCIL), Tata Communications Ltd (TCL) and Nepal Ventures Private Limited (NVPL) was licensed for CDMA and is now been licensed for Unified license. In 2003 STM Telecom Sanchar was licensed for rural Telephony and is now acquired by CG Telecom and it is now Licensed under the type

[3] *Nepal Telecom Authority (2021). Retrieved 8 April 2021, from https://nta.gov.np/wp-content/uploads/2017/11/NTA_MIS_47.pdf*

[4] *Covid-19 creates job openings in the e-commerce sector. (2021). Retrieved 8 April 2021, from https://kathmandupost.com/money/2020/09/30/covid-19-creates-job-openings-in-e-commerce-sector*

Rural Telecommunication Service by NTA. In 2008 Nepal Satellite TeleCommunications and Smart Telecom Pvt. Ltd. were provided with a license for GSM rural telephony. In 2017 Nepal Telecom, Ncell and Smart Cell (Smart Telecom) launched 4G in Nepal.

ii. Mass Media:

The history of the media in Nepal starts with the launch of Gorkhapatra in 1901 as a state owned newspaper, but a major development in the media sector of Nepal can be traced after the restoration of democracy in 1990. The 1990's democracy movement was also able to push the agenda of rights and freedom of press into the constitution. The constitution of the Kingdom of Nepal (1990) formally guaranteed the freedom of press and publication[5].

After passing the two of the major acts The Broadcasting Act 1990 A. D. and Press and Publication Act 2048 (1991) paved the way for the development of the Mass media by the private sector as well. Before the Period of 1990 The mass media was dominated by the state owned media institutions which includes, 'The Rising Nepal', 'Radio Nepal' and 'Nepal Television'. The period after 1990 in Nepali mass media development is seen to be very dramatic. Within 11 years i.e. 2001 there were already 16,20 publications that were being published on a regular basis. Apart from news magazines the government owned 'Nepal Television' was the only television channel until 2002 A. D. but by the end of 2006 A. D. There were already 10 National Televisions broadcasting via both satellite and terrestrial technologies. Currently there are 116 Satellite TV, 4 Terrestrial TV and 852 cable TV licenses issued by the Department of Information and Broadcasting. Another media landscape is confined with the development of Radio and FM radios in Nepal. The first ever radio station was state-owned radio namely Radio Nepal which was established in 1950. Although the treasure history of Radio Nepal aligns with the radio transmissions of Prajatantra Nepal aired form Biratnagar by Nepali Congress Party during it's fight against the Rana autocracy and this radio was used to broadcast their activities as well as other information. Later on when the Congress party joined the government the radio was shifted to Kathmandu naming Nepal Radio which ultimately became the Radio Nepa[6]l. Radio Nepal played a monopoly role in the radio sector until 1997 when the first independent radio station namely Radio Sagarmatha began operation as a community FM radio run by the Nepal Forum of Environmental Journalists (NEFEJ). This new starting paved a way for community and private FM stations in the media landscape of Nepal. Currently there are 740 licenses has already been approved by the department of information and broadcasting.

[5] Freedom, N. (2021). Nepal Media . Retrieved 30 June 2021, from http://nepalpressfreedom.org/main/cms/2

[6] Parajulee, Shekhar. (2007). Seven Decades of Radio Listening in Nepal. Westminster Papers in Communication and Culture. 4. 10.16997/wpcc.85.

iii. **Information and Communication Technology:** The development of Information and Communication in Nepal was set to a milestone when the government of Nepal brought it's first computer back in 1971, which was used for the calculation of census. Afterwards The Internet was first introduced into Nepal in 1993 in a venture of the Royal Nepal Academy of Science and Technology (RONAST) and a private company, Mercantile Office Systems (MOS). The Indian Institute of Technology in Bombay had a UNDP-funded Internet connection through the Education and Research Network (ERNET) project, and RONAST set up a system whereby they could connect on a regular basis to ERNET in Bombay to transfer e-mail messages. The service was only for the use of RONAST's scientific community. In 1994, after RONAST ended its ERNET project, MOS acquired the technology and set up the first commercial e-mail service with a link to Australia. The MOS server connected several times a day to transfer messages. In 1995, a second company, World Link, set up a similar service connection to Canada. Their only business was providing e-mail service, whereas MOS's e-mail service was only one of many aspects of its business. From 2003 Worldlink started the Wireless Internet Service. . Along with the commercial ISPs Nepal wireless Networking project was established in 2002 by Dr. Mahabir Pun connecting the rural areas of Nepal using wireless connectivity. In 2007 General Packet Radio Service (GPRS) and 3G services were started by Nepal telecom to provide mobile Internet. As of 2008 Nepal Telecom launched Broadband ADSL service. Later on EVDO (Evolution Data Optimized) for CDMA customers was launched in 2010. By the 1st January, 2017 Nepal Telecom started 4G service for the first time, Ncell and Smart Cell followed on by launching 4G services.

B. Objective: The objective of this assignment is to carry out a study on the existing national scenario associated with ICT/Telecom technologies and services on converged services and technologies. Along with that study about the best international trends and practices on converged regulatory framework. Utilizing the findings of the study developed a Convergence regulatory framework in the context of Nepal to deploy and facilitate the converged services and associated technologies for the benefit of the public.

C. Methodology: A blend of approach and methodologies are carried out which comprises Preliminary desk study, Field survey and Data Collection, Consultation meetings to prepare the report on convergence regulatory framework incorporating existing national scenarios with associated ICT and telecom technologies and services on converged services. A comprehensive details about Milestones to be carried out are outlined below:

Milestone Number	Milestone Activity
Milestone 1	Study, explore and analyze the current scenario of Telecom and broadcasting regulatory approach. Also study about existing regulations, acts and policies related to ICT and telecom.
Milestone 2	Study and explore about International trends and practices in regard to converged regulatory frameworks, Due to technological evolution/revolution, different countries have been using converged technologies for the facilitation of converged services to their valued customers in a reliable manner. There are many countries that have already adapted the converged regulatory approach: the Info-Comm Media Development Authority adapted by Singapore, **Federal Communications Commissions** (FCC) Adapted by USA, Ofcom Adapted by UK are some of the examples of that.
Milestone 3	Study and Analyze about the current status of different Telecom and broadcasting services and technologies.
Milestone 4	Create insights from the documentations and survey responses collected from the field. Portray the current status of licensing.
Milestone 5	Collect the information about different existing stakeholders along with their duties, roles and responsibilities.
Milestone 6	Formulate convergence regulatory framework Based on the desk study and case study, the convergence regulatory framework in relation to licensing and regulation of converged technologies/ services will be developed in close coordination with the stakeholders and NTA officials.
Milestone 7	Preparation and Submission of Draft Report After the completion of the above-mentioned assignments, a Draft report covering cover text, table, picture based on the findings of the desk study, case study, and stakeholder discussion

	will be prepared and submitted within the two and half months of submission and approval of the contract. A discussion meeting will be conducted with the NTA officials and other stakeholders as applicable.
Milestone 8	Submission of Final Report Based on the prior comments and feedback from NTA, the consultant will prepare and submit the final report and submit the same to NTA.

D. Research Team:

1. Experts:
   i. Team Leader: Mr. Prabhakar Adhikari Kshetry
   ii. Legal Expert: Mr. Babu Ram Aryal
   iii. Telecom Expert: Mr. PrabinSapkota

2. Non-KeyExperts:
   i. Project Coordinator: Mr. Sandeep Chataut
   ii. Research Associate: Mr. Ananda Gautam

E. Profile of the Firm:

Tarapunja Engineering and Research Pvt. Ltd. was established in 2069/06/29 at Samakhusi-29, Kathmandu. This consultancy is dedicated towards providing quality engineering services to meet customized individual and corporate needs. In recent times, Tarapunja Engineering and Research Pvt. Ltd. have developed into a multi-dimensional organization with experts from engineering and management fields to perform diverse projects of its undertaking throughout the country. We have been instilling our presence in many districts of Nepal offering our services to different multi-objective businesses. Our team of technical personnel has prior experience in construction, civil works designs, supervision works and Information Technology (IT) related works. The Consultancy comprises a team of highly qualified and experienced individuals from various backgrounds like Civil/Computer/Mechanical/Telecommunication/Electrical & Electronics / Geomatics / Information Technology (IT)/Architecture and Survey engineering.

The mission of Tarapunja Engineering and Research is to make a positive difference in people's lives- by providing accurate services with provision of technical solutions in different Engineering services. We understand that approval of stable projects can mean positive gains not only to the involved organizations but to the overall development of the community and the country as a whole. Therefore, we are committed to provide technical excellence and service to our clients and the communities involved, building life-long partnerships.

Chapter Two:
Regulatory Regime in Nepal

The regulation of Telecom, broadcasting and other ICT services in Nepal is currently regulated by multiple agencies. Among them Nepal telecom authority is the telecom regulator of Nepal which oversees the licensing of Telecom, Internet and Network services, Spectrum distribution and Management, tariff approval, numbering management, consumer rights protection, equipment quality monitoring, monitoring and evaluation. Whereas different divisions and departments of the Ministry of Communication, Information and Technology along with the Press Council, Film Development board, Press Registrar, Advertisement board oversees different other regulations related to television, press, media, motion pictures and content regulations.

Telecommunications Regulatory Regime: Regulating the telecom sector in Nepal goes back to 1962 when the Telecommunications Act came into effect. With the end of the party less active monarchy and rise of multiparty democracy the development of National Communication Policy 1992 encouraged the private sector to provide telecommunication services to the public. After the development of telecommunication Act 1997 it enforced the establishment of Nepal Telecommunication Authority as a sole independent telecom regulator until Nepal Telecommunications Corporation was the combination of regulator and operator.

Nepal Telecommunications Authority is the principal regulator for Telecommunication services in Nepal. Nepal Telecommunications Authority was established on 4th March, 1998 vide the decision of the Government of Nepal under the Section 3 of the Telecommunications Act, 1997. Section 3 has the provision that a Nepal Telecommunications Authority is established with a view to managing and regularizing the Telecommunications Service and making it reliable and easily available to the public. Under the Section 4 of this Act, NTA Authority shall be an autonomous and corporate body with perpetual succession.

1. Telecommunications Policies:

- **Telecommunication Policy 2004 A. D.**

In Nepal, National Communication Policy formulated in 1992 after the political change of 1990. Later in 1999, a dedicated Telecommunication Policy came in 1999. Telecommunication Policy, 1999 A.D.led the open market initiatives at a further level. Based on this, the new Telecommunications Act, 1997 and its rule came into effect. In 2003, the Government adopted a long term Policy of Information and Communication Sector 2003.

This long term policy on the Information and Communication sector was launched. Major objectives of the policy were as follows:

- To have development and expansion of telecommunications means competitively in such a manner as to maintain regional balance.

- To extend local telecommunications service and reliable trunk service in important places in the Kingdom of Nepal in a manner also to contribute to economic development, and extend the telecommunications service to the rural level with a goal of 15 telephone lines per hundred people by the end of the Twelfth Plan.
- To develop this sector as an infrastructure of the overall social and economic development by emphasizing the research, use and expansion of the information communications technology.

Again in 2004, the Government came with the Telecommunications Policy, 2004 that led to big reform in the telecommunications sector in Nepal. The main objective of the Telecommunication Policy was to create a favorable environment in order to make the telecommunication service reliable and accessible to all people at a reasonable cost throughout the country in collaboration with the private sector and others in order to support the social and economic development of the country.

Some of major strategy adopted by the policy were as follows:

1. Universal Access to the Telecommunication Service:
2. Universal Service Obligation:
3. Development of Corporate Service:
4. Liberalization of the Telecommunication Sector:
5. Open Licensing Regime to Be Applied:
6. Private Sector's Participation to Be Encouraged:
7. To Enter into Information Society:
8. Commercialization of the Nepal Telecommunication Corporation
9. Institutional Development of Implementation of Policy
10. Economic Efficiency of the Telecommunication Sector

- **Spectrum Policy 2013 A. D.**

The Spectrum Policy, 2013 (Amendment, 2016), strategizes to form a 'Procedure for frequency policy determining committee' to process a plan, redistribute frequency, in a more transparent, objective, and business effective manner. When the Spectrum Policy was issued in 2013, 2100 MHz was identified for 3G and 700 MHz, BWA 2300 MHZ and 2600 MHz were identified for 4G and were supposed to be called for auction. For both the band, 900 MHz and 1800 MHz have become more useful now. But, these frequencies are not available as they are already allotted. Considering the changed importance and utility of the 900 MHz, 1800 MHz and 2300 MHz bands, the Spectrum Policy was also amended in 2016. It was also realized to identify the range, minimum and maximum Bandwidth and the 2016 amendment settles these issues.

- **Broadband Policy 2015 A. D.**

With the vision of achieving affordable, secure, reliable and ubiquitous broadband for socio-economic transformation of Nepal, the first dedicated Broadband Policy came into force in 2015. The National Broadband Policy, 2015 embraces the following key objectives and will be geared towards achieving the following specific targets:

Objective 1: To provide secure, meaningful, affordable and reliable broadband services on demand in urban areas and universal access to broadband services in rural, unserved and underserved areas of Nepal. To achieve this objective following targets were set out:

- Broadband access will be expanded across the country with the goal of achieving a broadband Internet user penetration rate of 30% at a minimum of 512kbps and making available at least 10 Mbps download speed on demand in urban areas by 2018.
- By 2018, 45% of households in Nepal will have broadband Internet coverage
- Urban broadband users in Nepal will have a choice of at least three broadband suppliers by the end of 2015
- All 75 district headquarters will be connected by optical fibre backbone links by 2015.
- Broadband connection based on the combination of both OFC/wireline and wireless technologies will be expanded to 70% of the Village Development Committees within the next 3 years.
- Community service centres with broadband connections will be established using international best practice models in 600 VDC's by 2018
- Villages beyond the reach of commercial broadband services will be identified as the basis for a targeted subsidy program to support service extensions to commence by 2016.
- The spectrum bands as identified by World RadioCommunication Conferences (WRCs) for IMT and IMT advanced technologies will be allocated and assigned on a priority basis for the roll out of a range of wireless broadband technologies and services by 2018. Along these lines at least 200 MHz of spectrum will be made available for IMT services by the year 2017.
- Entry level broadband prices will be brought to 3.5% or less of GNI per capita by 2018.

Objective 2: To promote broadband take-up by early and influential users including government and business users, socially important users such as the education and health sectors as well as to stimulate demand and content creation and build user capacity. To achieve this objective following targets were set out:

- 20% of public secondary schools will have at least 1Mbps broadband connection and use it for educational purposes as well as pedagogical tools by 2018.
- All government hospitals and at least 15% of health posts will have a broadband connection by 2018.
- All government agencies up to the district level will have a broadband connection, an informative web site, responsive email access and will offer basic citizen facing on-line services by 2018.

- **Satellite Policy 2020**

Nepal Government has recently approved (June, 20) adopted Satellite policy 2020 which aims at its own Satellite by 2022. It is also aimed to ensure broadband connectivity to rural and remote geographical locations and provide effective services for national security, disaster management and navigation, and increase the contribution of digital media in GDP by 2024.

2. Telecommunication Laws:

- **Telecommunication Act 1997**

The Telecommunication Act, 1997 is the enabling Act, which came into effect in 1997. This Act replaced the Telecommunications Act, 1962. This Act came after the government's liberal approach of opening the sector for private players as well. This Act established the Nepal Telecommunications Authority (NTA) and paved the way for new private operators. Along with the establishment of the NTA, this Act makes major provisions on the infrastructure sharing, quality of service, licensing of operators, consumer protections, universal service fund (Rural Telecommunications Development Funds).

- **ISP Service related Bylaw 2020**

Nepal Telecommunication Authority has prepared ISP service related bylaw to regulate the Internet and email service providers in accordance with the development in time. The major parts of the bylaws includes:

1. The capital should be at least 40 million Nepali rupees
2. Fellow chartered accountant should approve minimum property of 40 million owned by the Service provider
3. Detailed business plan should be submitted
4. Service providers should submit the projected income, expenses, net profit and loss, pay back pairing, number of customers, market share, quality of service for upto 5 years.
5. Service provider should also mention about the tentative starting date of the services
6. For the operation of the services service provider must have Executive director with at least 7 years of experience, Proposed human resource along with organizational structure, In case of more than 1 business owners the partnership agreement shall be submitted

7. The quality of equipments required for service operation, model number, manufacturer name, country of origin, the place where the equipments will be used shall be informed
8. In case of frequency requirements the amount of frequency and its usage should be mentioned
9. IN case of bandwidth contract with Network Service Provider should be submitted

Cyber Security Bylaw 2020

Nepal Telecommunications Authority in exercise of the powers conferred by Section 62 of the Telecommunication Act, 2053 (1997) has implemented the cyber security Bylaws, 2020. Cyber security bylaws is a mandatory provision for all Telecom providers and Internet service providers in Nepal. The bylaw covers different provisions related to cyber security as below:

1. General Security Standards and Practices
2. Infrastructure/Network Security
3. Core System Security
4. Application Security
5. Data Security/Privacy
6. Information System (IS) Audit
7. Cloud Security
8. CERT/Incident Response
9. Security Operations Centre (SOC)
10. Cyber Security Awareness & Capacity Building

With all these provisions all Telecoms and Internet Service providers are bound to

- Implement DDos detection and mitigation mechanisms
- secure network using VPN and Vlans
- Deploy Mutually Agreed Norms for Routing Security
- Use OTP for two factor authentication
- Implement ssl in web applications
- Perform regular network / System / Critical infrastructure audit every 6 months
- Perform penetration testing and vulnerability assessment in every three (3) months and perform required rectifications
- Perform annual Information System (IS) audit
- Form Incident Response team/CERT,
- Have dedicated in-house Security Unit/Operation Centre
- Deploy Security Information and Event Management (SIEM)
- Conduct security awareness programs for its employees and relevant stakeholders

There is also provision for proper handling of social media and the bylaw has provided a detailed Information System (IS) Audit checklist in the annex to be followed.

3. Regulatory Approach:

a. Regulatory Functions

i. Inspection and investigation on the affairs of the telecom operators and Internet Service Providers
ii. Settle disputes between the Licensees or between the Licensee and the Customer relating to the Telecommunications Service
iii. Determine the quality and standard of the machine, equipment and facilities relating to the Telecommunications and the Telecommunications Service
iv. Licensing of Telecom operators and Internet Service providers
v. Approval of tariffs for telecom services, fixed tariffs, maximum tariffs and non-regulated tariffs

Following is the list of different telecom service providers along with the no. of licenses issued from NTA.

S.N	Licensee	No of operators
1	Basic Telephone Service	2
2	GSM Cellular Mobile	2
3	Basic Telecommunication Service	1
4	VSAT User	9
5	Rural VSAT User	26
6	Network Service Provider	17
7	International Trunk Telephone	1
8	Rural ISP	3
9	Internet with email	127

10	GMPCS	2
11	Rural Telecommunication Service	1

a. Mass Media Regulatory Regime: The regulation of Mass media is handled by the Department of Information and Broadcasting, Ministry of Communication Information and Technology. The inception of the Department of Information and Broadcasting dates back to the ruling period of Rana Prime Minister Mohan Shumsher in 2005 B.S. Two of the major acts The Broadcasting Act 1990 A. D. and Press and Publication Act 1991 A. D. were passed to facilitate and legislate the development of media in Nepal. Paving the way towards the collection and dissemination of government information, record keeping of press and media, providing certificates to press representatives, capacity building of journalists, organizing press meets. Along with these duties the department has also been working as the press registrar.

1. Policies

a. National Mass Communication Policy, 2073

In order to develop a dignified, responsible, and accountable mass media sector The Government of Nepal issued the National Mass Media Policy As per the recommendation of the High Level committee on Information and Communication. The major emphasis of this policy is to establish:

- Freedom of expression and full press freedom
- Information and communication system to build an foundation for egalitarian society
- Convergence of technologies and services being integrated such as print, radio, television, online and other services as well as facilities
- the quality of journalism and professional development of journalists
- public self-regulation and self-assessment Editorial Policy

- the laws related to information and mass media to institutionalize and adapt the changes
- development of healthy and dignified journalism
- National Mass Media Authority for regulation of television signal distribution as well as monitoring
- Press council as an independent and autonomous body

2. Laws

a. Radio Act,

In order to address the issues of the holding, making and using of radio machines in Nepal, King Mahindra enacted the Radio Act, 2014. After the formulation of this act it has been amended for 6 times and the recent amendment was made in 2057 BS. This act provision for the licensing on holding, making and using radio machines which includes all kinds of satellite, receiving systems disc antennas, all the machines of frequency ranging from 30 KHZ to 3000 GHZ, Cordless microphone, radio control devices, television receiver, video monitor and other machines specified as the radio machine by government of Nepal by publishing a notification in Nepal gazette. This act has also specified Chief District officers with rights to issue search warrants in the particular jurisdiction.

b. National Broadcasting Act

The National Broadcasting Act was commenced in 1993 A.D. with the aim of protecting and promoting the freedom of expression and the right to be informed as guaranteed to the citizens by the constitution of Nepal. The latest amendment of this act was on 21st Jan 2010 A.D. This act prohibits anyone from broadcasting rights without license. Any person or body corporate who intends to broadcast any Programme by way of satellite, cable or other means of communication in any place within Nepal shall submit to the Government of Nepal an application in such format and accompanied by such fee as prescribed. As per the provision of this act Taking into account the nation and national interest, Government of Nepal may, by a notification published in the Nepal Gazette, prevent any Programme pertaining to any particular subject, event or area from being broadcast by a broadcasting institution, for aperiod not exceeding six months at a time. In accordance withthis act, the Government of Nepal can also cancel the license of broadcasting institution If, any broadcasting institution broadcasts any Programme in contravention of this Act or the Rules framed by the act.

c. **Press and Publication Act:** In order to make the provisions related to press and publication and maintain cordial relations between the people of different classes and regions King Birendra Bir Bikram Shah on the recommendation of the council of ministers formulated the Press and Publication Act, 2048. After the formulation of the act it has total of 4 amendments, the last amendment on this act was made on 2066 BS. The provisions of these acts enabled the registration of press, publications and magazines. In regards to censorship of publication, press and magazines it is prohibited for the publication of any content that undermines the sovereignty and integrity of Nepal; disrupt security, peace and order in Nepal; create enmity among the people of the various castes, tribes, religions, classes, regions, communities and spreading communal disharmony; and hurt decency, morals and social honour of the people generally. In addition to that, the Government of Nepal may exhibit the prohibition by publishing notification in the Nepal gazette or issue an order prohibiting the publication of any news, information or other reading material relating to any specific subject, event or area until the period specified in the notification.

d. **Motion Picture (Production, Exhibition and Distribution) Act, 2026 (1969):**
In order to handle the production, exhibition and distribution of motion pictures in the jurisdiction of Nepal King Mahendra Bir Bikram Shah formulated the Motion Picture Act, 2026 in recommendation of the Rastriya Panchayat. After the formulation of this act it has been amended for 5 times; the recent amendment was made in 2057. This act provisions for the requirement of license for production, distribution and exhibition of motion pictures (video films), Provision for license for cinema halls and also the formation of Film censor board and Film development board. This act also provisions the right to inspection of cinema halls by the chief District Officer for the assurance of health, safety and convenience of the audience. In regards to the censorship if ny motion picture or any part thereof is found or jeopardizing security, law and order or harmonious relation consisting between Nepal and a friendly states or between peoples of various castes or tribes or which may cause negative impact to the public interest, descent behaviour or morality or defame any person or contempt of court or incitement to commit any offence the film censor board exhibits the rights for not permitting the motion picture for exhibition. In

addition to that Nepal government may also stop the exhibition of any motion picture or modification if Nepal Government finds it to be prejudicial as mentioned above or it thinks necessary to do so for the security of Nepal or public peace or order.

e. Press Council Act 2048 (1992):

In order to address the issues of development and promotion of a healthy, independent and responsible Journalism Press Council Act, 2048 was enacted by the parliament. This act provisions for the establishment of an autonomous and corporate body "Press Council" which is responsible to enforce code of conduct for journalism, and provide suggestions to the government regarding development of journalism. In accordance with this act it has mandated the "Press Council" for creation of an appropriate atmosphere for the development of healthy journalism, maintain cordial relations between press and government of Nepal, maintain public morality and dignity of the citizens and prohibit the interference on freedom of press and journalism.

3. Regulatory mechanism

a. Regulatory Functions

i. Ministry Of Communication and Technology

1. Communication Division

- Formulation and implementation of laws and policies relating to press and mass communication
- Regulation of online media
- Coordinate the work related to the right to communication and right to information
- Grant permission for the shooting of foreign documentaries/films
- Censorship and screening of films
- Examination of films
-

2. Frequency Management and Technology Analysis Division

- Formulation national plans for the required system, policy and rules for spectrum management based on ITU Radio Regulation.
- Make necessary arrangements for Nepal's Orbital Slot Allocation
- Prepare and maintain national frequency allocation table and central archive of frequency

- Regulation of the radio frequency licensing being intact with Radio act and regulations
- refine the technical standard, appropriate technology and system of radio equipment and system
- Maintain and coordinate with international and regional organizations like ITU, ICAD, INTELSAT, APT, APSCC, ABU regarding use of radio frequency
- Monitoring of use of radio frequencies along with monitoring of unauthorized use of radio frequency
- Maintain the technical standard concerning radio monitoring determined by ITU

3. Information Technology Division

- Periodic analysis and timely review of information and communication policies
- Standardize the information technology systems of the federal, provincial and local governments
- Prepare necessary standards and guidelines to ensure interoperability of technologies
- Prepare and implement necessary standards for cyber security and information security
-

4. Department of Information and Broadcasting

- Licensing of all radio equipments in accordance to Radio Act, 2014 and The Radio Communication (License) Rules, 2049
- Broadcast permit to all kind of broadcasting agencies in accordance to National broadcasting act, 2049 and National broadcasting regulations
- To issue and renew press representative certificate and identity card to the representatives of domestic and foreign media
- Recommendation for registration of Temporary and permanent magazine
- Online media registration
- Journalists and management related disputes resolution

ii. Press Council

- Prepare and implement the code of conduct for journalists
- Advise the government on matters relating to the development of healthy and credible journalism in the country

- Record Keeping of all registered Press, Media and Journalist
- Monitor and regulate the content of both online and Press Media

iii. Press Registrar

- Approval for the issuance of permanent certificate of magazines
- Keep records of all details of magazines registered obtained from the local authority
- advice to the Government of Nepal on the facilities to be provided to magazines

iv. Advertisement Board

- Develop policies related to advertisement and recommend to line ministry
- Develop criteria to examine the advertisements on media
- Develop code of conduct for advertisement creation, transmission and distribution
- Regulation of advertisement creator, producer, distributor or administrator
- Monitoring advertisement for false message broadcasting or any other things restricted by the code of conduct
- Monitor the broadcasting of advertisement on national and foreign channels
- Capacity development of advertisement sector

v. Film Development Board

- Licensing for production, distribution and exhibition of films
- Licensing for operation of cinema hall
- Advise government on formation of policies or the development and promotion of motion pictures
- Conduct research for the development of film sector
- Organize film festivals and awards ceremonies

Following is the list of different types of broadcasting service along with the no of the licensee

S. No	Service Type		No. Of Licensee
1	FM Radio		740
2	TV Transmission	Satellite TV	116
		Terrestrial TV	4
		Cable TV	852
3	TV Distributer	Cable TV	876
		IPTV	4

Regulator	Regulatory Functions
Nepal Telecommunications Authority	1. Inspection and investigation on the affairs of the telecom operators and Internet Service Providers 2. Settle disputes between the Licensees or between the Licensee and the Customer relating to the Telecommunications Service 3. Determine the quality and standard of the machine, equipment and facilities relating to the Telecommunications and the Telecommunications Service 4. Licensing of Telecom operators and Internet Service providers 5. Approval of tariffs for telecom services, fixed tariffs, maximum tariffs and non-regulated tariffs
Ministry Of Communication and Technology (Communication Division)	1. Grant permission for the shooting of foreign documentaries/films 2. Censorship and screening of films
Ministry Of Communication and Technology (Frequency Management and Technology Analysis Division)	1. Formulation national plans for the required system, policy and rules for spectrum management based on ITU Radio Regulation. 2. Make necessary arrangements for Nepal's Orbital Slot Allocation 3. Prepare and maintain national frequency allocation table and central archive of frequency 4. Regulation of the radio frequency licensing being intact with Radio act and regulations 5. Define the technical standard, appropriate technology and system of radio equipment and system 6. Monitoring of use of radio frequencies along with monitoring of unauthorized use of radio frequency 7. Maintain and coordinate with international and regional organizations like ITU, ICAD, INTELSAT, APT, APSCC, ABU regarding use of radio frequency 8. Maintain the technical standard concerning radio monitoring determined by ITU

Ministry Of Communication and Technology (Information Technology Division)	1. Periodic analysis and timely review of information and communication policies 2. Standardize the information technology systems of the federal, provincial and local governments 3. Prepare necessary standards and guidelines to ensure interoperability of technologies 4. Prepare and implement necessary standards for cyber security and information security
Ministry Of Communication and Technology (Department of Information and Broadcasting)	1. Licensing of all radio equipment in accordance to Radio Act, 2014 and The Radio Communication (License) Rules, 2049 2. Broadcast permit to all kind of broadcasting agencies in accordance to National broadcasting act, 2049 and National broadcasting regulations 3. To issue and renew press representative certificate and identity card to the representatives of domestic and foreign media 4. Recommendation for registration of Temporary and permanent magazine 5. Online media registration 6. Journalists and management related disputes resolution
Press Council	1. Prepare and implement the code of conduct for journalists 2. Monitor and regulate the content of both online and Press Media 3. Advise the government on matters relating to the development of healthy and credible journalism in the country 4. Record Keeping of all registered Press, Media and Journalist
Press Registrar	1. Approval for the issuance of permanent certificate of magazines 2. Keep records of all details of magazines registered obtained from the local authority advice to the Government of Nepal on the facilities to be provided to magazine
Advertisement Board	1. Develop policies related to advertisement and recommend to line ministry 2. Develop criteria to examine the advertisements on media 3. Develop code of conduct for advertisement creation, transmission and distribution 4. Regulation of advertisement creator, producer, distributor or administrator

	5. Monitoring advertisement for false message broadcasting or any other things restricted by the code of conduct 6. Monitor the broadcasting of advertisement on national and foreign channels Capacity development of advertisement sector
Film Development Board	1. Licensing for production, distribution and exhibition of films 2. Licensing for operation of cinema hall 3. Advise government on formation of policies or the development and promotion of motion pictures 4. Conduct research for the development of film sector 5. Organize film festivals and awards ceremonies

Chapter Three
International Practice of Convergence

A. Meaning and Definitions:

Technological convergence generally refers to the tendency where two or more independent technologies overlap the character over the period of time. For example in the past the Internet and television used to be carried through different technologies, but coming today a single fiber can carry both tv and internet signals altogether, similarly the smartphone today is capable of being a camera, a music player, a computer, a telephone altogether in a single device. While these new technologies tend to converge they get very challenging to be regulated using old policies. The rapid development and the adaptation of the internet has acquired so many capabilities that it can be used to carry out different operations collectively such as: audio video and data transport, file-system management, electronic payments, other e-commerce activities, and many other over the top services. As new technologies are evolved they bring in many elements when we talk about the internet today technologies Artificial Intelligence, Internet of Things, BlockChain come Together. The telecommunication was introduced to connect people With the introduction of technologies like 5G internet is now capable of connecting homes, cars, shoes, , cities, smart factories, telemedicine seamlessly and gradually everything around us[7]. Technical limitations previously held back these advancements. With a whole lot of services being converged within a technology makes it really challenging in regulatory jurisdiction. As a result of this many countries around the world have adopted converged regulatory approaches such as FCC in the USA, Ofcom in the UK, Infocom in Singapore, and so on.

B. International Practice of Convergence Regulatory:

a) Historical Development:

The historical development of convergence regulatory dates back to late 90's of 19th century. One of the pioneer development in adaptation of convergent regulator stands with the establishment of the Federal Communications Commission (FCC) in the USA which represents the oldest regulator to regulate across telecommunications, mead and broadcasting services. Afterwards in 2001 the Communication Regulatory Agency (IMC) was formed in Bosnia and Herzegovina, accordingly Canadian Radio-Television and Telecommunications Commission was also formed in Canada, to make the convergence the topic of discussion EU also launched EU Green Paper on Convergence of the Telecommunications, media and Information technology sectors, and the Implications for Regulation in 1997. According to ITU nearly 30 countries already adapted converged regulatory approach in the period of 2000-07. Among the pioneer countries includes UK, Australia, Finland, Italy, Malaysia, South Africa and Singapore. And just by 2009 more than 150 countries adapted independent regulatory bodies. Since the mid-1990's the policy agenda of convergence was dominant in EU and the OECD policy

[7]Hattendorf, H. (2020). Telecom, Technology Convergence, and Connected Everything. Retrieved 20 March 2021, from https://www.automationanywhere.com/company/blog/rpa-thought-leadership/telecom-technology-convergence-and-connected-everything

debates. In the present context most of the developed and developing countries seem to have adapted convergent regulator leaving the odds. The trends of the international practice will be discussed in upcoming section. Due to technological evolution/revolution, different countries have been using converged technologies for the facilitation of converged services to their valued customers in a reliable manner. A number of other countries also like Malaysia, Tanzania, Botswana, Papua New Guinea, Hong Kong, Bhutan and Brazil have converged regulators – i.e. a regulator whose responsibilities cover both – telecommunications and broadcasting. Following are some of the telecommunication regulatory authorities of different countries along with their functions.

Regulator Functions	Institutional Mechanism
Federal Communications Commission: United States of America (USA) Federal Communications Commission (FCC) is an independent U.S. government agency overseen by Congress, the commission is the United States' primary authority for communications law, regulation and technological innovation. IT regulates: 1. Interstate and international communications in all 50 states, the District of Columbia and U.S. territories by a. Radio b. Television c. Wire d. Satellite and cable	1. Directed by five commissioners appointed by the President of the United States and confirmed by the U.S. Senate 2. One of the commissioners serves as chairman 3. Only three commissioners can be of the same political party at any given time. 4. Have five-Year terms **The commission is organized into bureaus and offices, based on function** **Bureaus:** 1. The Consumer & Governmental Affairs Bureau 2. The Enforcement Bureau 3. The International Bureau 4. The Media Bureau 5. The Public Safety & Homeland Security Bureau 6. The Wireless Telecommunications Bureau 7. The Wireline Competition Bureau **Offices:** 1. The Office of Administrative Law Judges 2. The Office of Communications Business Opportunities 3. The Office of Economics and Analytics 4. The Office of Engineering and Technology 5. The Office of the General Counsel 6. The Office of the Inspector General 7. The Office of Legislative Affairs 8. The Office of the Managing Director 9. The Office of Media Relations 10. The Office of Workplace Diversity

OfCom: United Kingdom

Ofcom is the regulator and competition authority for the UK communications industries. It is independent of both Government and the companies it regulates.

It regulates:

1. Broadband and Mobile telecoms
2. Television
3. Radio
4. video-on-demand services
5. Postal Services
6. Security and resilience of telecom networks and services.
7. Ensure that the radio spectrum is used in the most effective way

The Ofcom Board

The Ofcom Board has a central governance function, with oversight over the fulfilment of Ofcom's general duties and specific statutory responsibilities, as well as its adherence to the ethos of a public service organization. The Board is responsible for ensuring leadership through effective oversight and review. Supported by the Board Committees – the Content Board, Risk and Audit, Remuneration and Nomination (the latter two of which have been replaced with a new People Committee after the reporting period) – the Board sets the Group's strategic direction.

The Chairman and Non-Executive Members of the Board are appointed by the Secretary of State for Digital, Culture, Media & Sport (DCMS), for periods of three to four years. The Scotland Member and the Wales Member are appointed by Scottish Ministers and the Welsh Government, respectively, following consultation with the Secretary of State for DCMS. Executive Members of the Board are appointed by the Chairman and all of the NonExecutive Members, with the Chief Executive's appointment requiring approval by the Secretary of State for DCMS.

Board Committees

In the exercising of its powers under the Office of Communications Act 2002, the Ofcom Board delegates certain of its responsibilities to the Executives within Ofcom and certain responsibilities to Board Committees with clearly defined authority and terms of reference. The different committees of Ofcom board are as follows:

1. The Nominations Committee
2. The Remuneration Committee
3. The People Committee
4. Risk and Audit Committee
5. The Content Board
6. Policy and Management Board and Operations Board

	7. The Election Committee 8. Nations Advisory Committee 9. The Ofcom Spectrum Advisory Board 10. The Advisory Committee on Older and Disabled People 11. The Communications Consumer Panel 12. The Community Radio Fund Panel **Senior Management Team** Senior Management Team comprises of Ofcom most senior leaders and they head up different groups within offcom and form the policy and management board. The senior management team has the following positions[8] : 1. Chief Executive 2. Chief Operating Officer 3. General Counsel 4. Director of Broadcasting and Online Content Group 5. Director of Networks and Communications Group 6. Director of Spectrum Group 7. Director of Strategy 8. Director of Technology Group 9. Director of Legal Group 10. Director of corporate Group
Infocomm Development Authority (IMDA): Singapore The Infocomm Development Authority of Singapore is a statutory board of the Singapore Government which operates under the Ministry of Information, Communications and The	**a. Board of Directors** The infocomm development Authority Board of Directors consists of at least 6 and not more than 20 members, among the members one of them is the chief executive who is not in the position of chairperson or deputy chairperson. The chairperson

[8] OFCOM, F. (2021). *Organisation chart*. Bakom.admin.ch. Retrieved 30 March 2021, from https://www.bakom.admin.ch/bakom/en/homepage/ofcom/organisation/organisation-chart.html.

Arts. As a converged regulator Infocomm Development Authority is responsible for the regulation of the following. 1. Broadcasting 2. Electronic Transactions: Electronic records, signatures, and contracts 3. Films and Media 4. Newspaper and Printing Press 5. Personal/Consumer Data Protection 6. Postal Services 7. Telecommunications 8. Domain Names	and vice chairperson is appointed by the minister. The chief executive cannot be appointed as Chair or vice chair. All the appointed members have terms of 3 years[9]. **b. Senior Management** 1. Chief Executive 2. Deputy Chief Executive 3. Director-General, International Affairs 4. Deputy Chief Executive, Policy, Regulations and Competition Development 5. Director-General, Telecoms & Post 6. Assistant Chief Executive, Media and Innovation 7. Assistant Chief Executive, Sectoral Transformation 8. Assistant Chief Executive, Digital Industry and Talent 9. Assistant Chief Executive, Planning 10. Assistant Chief Executive, Technology and Infrastructure, Resilience and Cybersecurity 11. Assistant Chief Executive, International and Corporate 12. Assistant Chief Executive, Data Innovation and Protection **c. IMDA Advisory Committees** 1. Advisory Committee for Chinese Programmes (ACCESS) 2. Advisory Council on the Ethical Use of AI and Data 3. Arts Consultative Panel (ACP) 4. Broadcast, Publications and Arts Appeal Committee (BPAAC) 5. Data Protection Advisory Committee (DPAC) 6. Films Appeal Committee (FAC) 7. Films Consultative Panel (FCP) 8. Indian Programmes Advisory Committee (IPAC) 9. IT Standards Committee (ITSC)

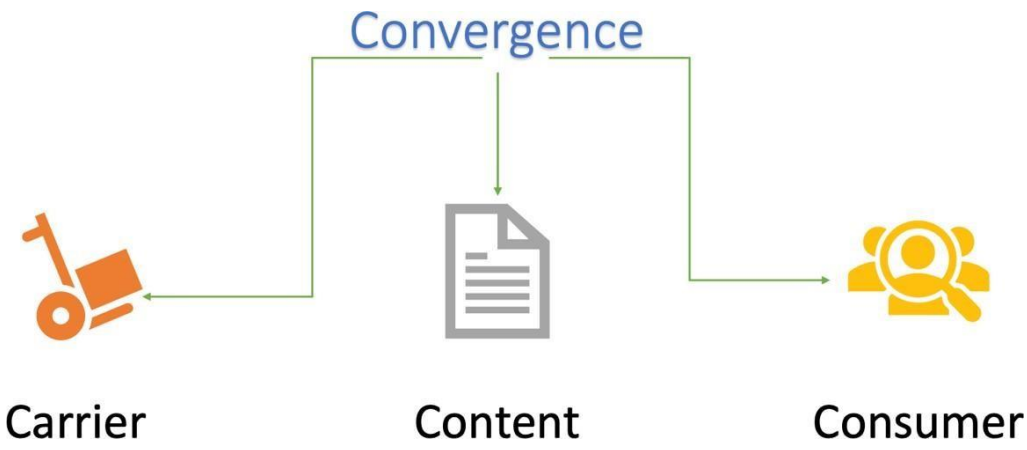
[9] Imda.gov.sg. (2021). Retrieved 30 March 2021, from https://www.imda.gov.sg/-/media/Imda/Files/About/Resources/Corporate-Publications/Annual-Report/IMDA-Annual-Report-FY2019-2020.pdf.

	10. Malay Programmes Advisory Committee (MPAC) 11. Media Literacy Council (MLC) 12. Programme Advisory Committee for English Programmes (PACE) 13. PSB Contestable Fund Scheme (PCFS) Evaluation Panel 14. Publications Consultative Panel (PCP) 15. Political Films Consultative Committee (PFCC) 16. Stamp Advisory Committee (SAC) 17. Singapore Film Commission (SFC) Advisory Committee 18. Singapore Media Festival (SMF) Advisory Board 19. Telecommunications Standards Advisory Committee (TSAC)[10]
Malaysian Communications and Multimedia Commission (MMC): Malaysia Malaysian Communications and Multimedia Commission of Malaysia is a converged regulatory body which Regulates: 1. Telecommunications 2. Broadcast 3. Internet services 4. Postal and courier services 5. Multimedia industry and 6. Digital certification	The Multimedia Commission is comprised of the chairman, members of the commission, committees and a chief executive of the commission. 1. The members of the commission are appointed by the minister 2. Among the appointed member one of them is Chairman, and Three members will be representing the government 3. The chairman of the commission is the chief executive 4. 2 to 5 additional members can be appointed **Organizational structure** 1. Chairman's Office 2. Financial & Strategy Cluster a. Finance Division b. Risk Management Department c. Strategic Communications & Industry Relations Division d. Corporate& International i. MCMC Academy Division ii. Procurement Division

[10] Imda.gov.sg. (2021). Retrieved 03 April 2021, from https://www.imda.gov.sg/-/media/Imda/Files/About/Resources/Corporate-Publications/Annual-Report/IMDA-Annual-Report-FY2019-2020.pdf.

	iii. Strategic Planning Division iv. Property & Admin Division e. Technology and Innovation i. New generation Technology & Standards Division ii. Strategic Information Technology Department iii. Digital Services & Data Platform Division iv. Industry Research & Data Analytics Division 3. Operation Cluster a. Development i. Infrastructure Division ii. Postal, Courier, E-commerce Services Division iii. Universal Service Provision Division iv. Spectrum Planning Division b. Regulatory i. Quality Monitoring Division ii. Consumer & Industry Affairs Division iii. Network Security Division iv. Market Regulation Division v. Licensing & Assignment Division vi. Enforcement Division 4. Legal a. Legal & Secretariat Division b. Prosecution Department c. Parliamentary affairs Department

C. Aspects of Convergence Regulatory Framework:



Carrier

The network infrastructure/Technology that manages and distributes various forms of material is referred as carrier. When telecommunications and information networks were combined, the convergence of carrier became significant; it became commonplace when mobile cellular communications incorporated internet access and made it widely available. We can take example of Today's cable companies which are able to process voice, video, and data on a single network and frequently and they sell their services as a bundled package (e.g., phone, television, and internet services). Similarly, cellular networks are also now able process voice, video, and data as they distribute information to and from mobile devices and fixed platforms.

Content

Content in context of convergence is a content that can now be available variety of forms and formats. As analog communication means became computerized, the convergence of contents also exploded. The contents of a newspaper, for example, were once solely available in print. The same content can now be available in print and digital formats, as text, visual, and/or audio files, and can now be accessed from variety of devices and platforms, including social media.

Consumer

Consumer is the end user and it includes the devices and system that are used to access the content irrespective of the platform it is available on and the carrier that it has to be traveled. In the context of convergence when the functions of different technologies are integrated and work together as a whole, Composite devices (end users) are able to access several

types of media regardless of the carrier and platforms. For example, users interact with embedded devices such as smart TVs (TVs) to access content distributed over networks. Smart TVs combine the capabilities of traditional TVs, computers, and many other devices that previously served a specific purpose. In addition to watching TV channels wirelessly, users can surf the Internet, view photos taken on their smartphones and stored in the cloud, view images from surveillance cameras connected to their homes, and much more. Click Smart TV News to enable video conferencing. Sends playing music and notifies users of incoming calls. These end devices can handle different media formats and perform different functions.

Scope of Convergence:-

Digital convergence generally refers to the trend or phenomenon where multiple independent technologies are integrated to form a new one[11]. While discussing the convergence of technology 3 major associated convergence are taken together i.e. technological convergence, media convergence and network convergence. When the term "Technology convergence" came into the hype the discussion of technological convergence without media convergence and network convergence was incomplete. While these three convergence are interdependent they also possess subtle differences and often all these convergence are nested under term digital convergence. The following figure illustrates the relationship between the technological, media and network convergence and whole ecosystem of digital convergence

[11] *Technological Convergence: Regulatory, Digital Privacy, and Data Security Issues. (2019). Retrieved 8 April 2021, from https://www.everycrsreport.com/reports/R45746.html*

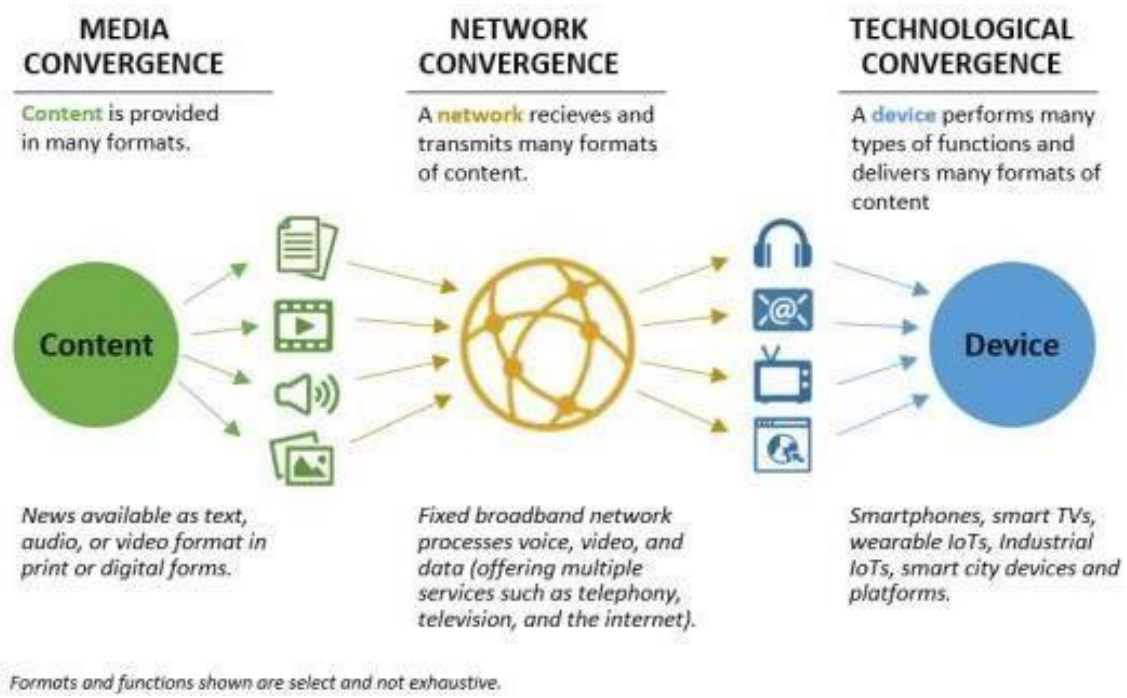


Figure 3.3: Technological, Media, and Network Convergences

Source: **Congressional Research Service**

D. Digital convergence in Telecommunication Sector:

(i) Broadcasting & Telecommunication Convergence: Traditionally, broadcasting and telecommunication ser- vices were quite distinct. They are now increasingly integrated (see Figure 2). For example, cable operators are providing a range of telecommunications services, including voice telephony (VoIP) and broadband internet access. Telecommunication companies provide IPTV services using their IP network. The development of webcasting and podcasting makes it more and more difficult to delineate the concept of "broadcasting."

(ii) Computing & Communication Convergence: The merger of IT with C to yield the integrated world of ICT is at the core of all convergence trends. The processing power and storage capacity of integrated circuits have been multiplying endlessly, while becoming deeply interwoven with the exponentially growing trans- mission capabilities of global telecommunication networks (Blackman and Srivastava, 2011).

(iii) Voice & Data Convergence: Once distinct services and even networks, there is now virtually no distinction as to how most voice and data signals are carried from end-to end throughout telecommunication links. Not only do nearly all networks now ubiquitously employ digital switching and transmission, but voice calls are also increasingly processed over IP packets-switched systems (Blackman and Srivastava, 2011).

(iv) Fixed & Mobile Convergence: Fixed-line and mobile networks remain separate in only limited ways; most services involve some combination of both. Users often prefer cordless handsets attached to fixed-line public switched networks, as well as in-home or corporate WiFi local area data networks.

Another way of understanding the scope of digital convergence is to classify it into the following four categories:

(i) Network Convergence: The interconnection and interoperability among networks are increasing. Network convergence includes convergence between voice & data network, fixed & mobile network, broadcasting & telecommunication network, etc.

(ii) Services/Market Convergence: Consumers are provided with similar services by firms that operated in separate markets/industries before. Nowadays, the emergence of innovative services with multi-characteristics (e.g., smart TV, internet broadcasting) are truly remarkable.

(iii) Business/Industry Convergence: Firms coordinate business sectors through M&A, joint venture, and/or strategic alliances to meet the opportunity and challenges of new markets due to convergence. As a result, both within countries and across national boundaries, media and network ownership is heavily concentrated among a core of mega-corporations. Such a rise of global media groups is noteworthy. Globalization through business expansion and strategic partnership has created a new competition landscape.

(iv) Law/Institution Convergence: This corresponds to the final stage of convergence we consider. Integration of law, institution, and regulatory body should be considered in response to the progress of digital convergence occurring in the market. The importance of improving the legal system and institution cannot be over-emphasized so as to encourage further development of new technologies and innovative services in the convergence era.

E. Need/Demand of a Converged Regulator: As described in previous chapters the regulation of telecom services and other services used to be on separate mediums in the earlier days telecom used to be dealing with telephone and phone calls while broadcasting used to be dealing with broadcasting of voice and videos. The regulation of both telecom and broadcasting used to be focused on making sure that the consumer has access to the services. Afterwards there came the affordability and then the quality of service. With the evolution of the technologies when convergence reached any content, any medium, any device kind of polarization there arose different challenges in case of Nepal the major challenges are discussed in the upcoming sections.

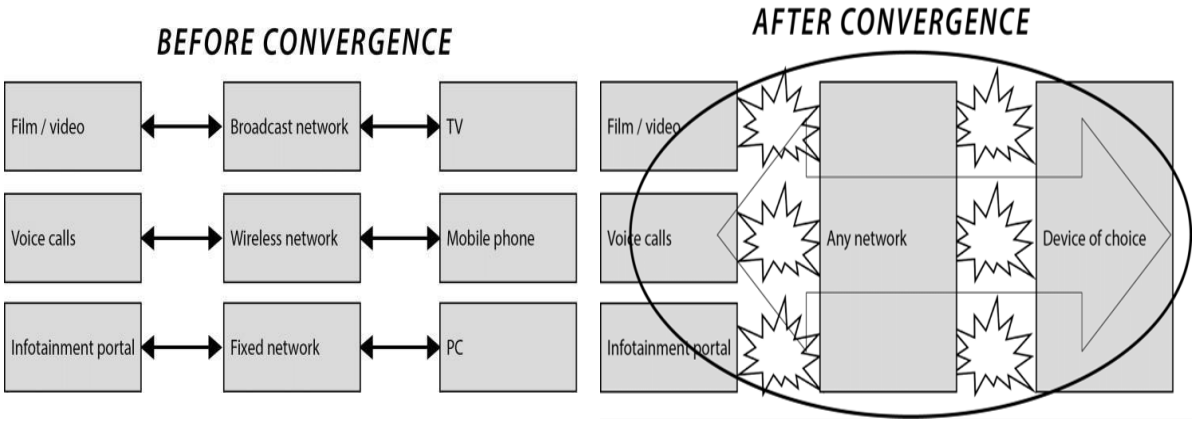


Figure 3.4 Need of a converged regulator

1. **Emergence of New Services and Applications:** The application of technologies are increasing day by day and this has also posed a challenge in both regulation and facilitation. Just for example generally to be a Media it should be licensed and follow the code of conduct in today's scenario what will happen if someone runs the media just using social media such as YouTube, Facebook, TikTok because they don't require any license to operate utilizing those applications how do we ensure the code of conduct and other hindrances. Similar difficulties might be there while regulating the Internet of Things (IoT) which also utilize different frequencies to operate and no legal provisions have been made for its operation. Although they are now utilizing unlicensed spectrum due to legal hurdles, while these scale it will not be possible to operate just utilizing the unlicensed spectrum. The introduction of the Internet of Things possesses different characteristics which can pose challenges to convergence due to its multiple functions, data collection capabilities and ubiquitous functions.

2. **Multiple Regulatory Approach:** Another challenge is the multiple regulatory practice it has also been portrayed previously there are two major regulators i.e. Nepal Telecom Authority and another is the Ministry itself. The major roles of Nepal Telecommunications Authority are :

1. Inspection and investigation on the affairs of the telecom operators and Internet Service Providers
2. Settle disputes between the Licensees or between the Licensee and the Customer relating to the Telecommunications Service
3. Determine the quality and standard of the machine, equipment and facilities relating to the Telecommunications and the Telecommunications Service
4. Licensing of Telecom operators and Internet Service providers
5. Approval of tariffs for telecom services, fixed tariffs, maximum tariffs and non-regulated tariffs

The functions of Ministry Of Communication and Technology (Frequency Management and Technology Analysis Division) are:

1. Formulation national plans for the required system, policy and rules for spectrum management based on ITU Radio Regulation.
2. Make necessary arrangements for Nepal's Orbital Slot Allocation
3. Prepare and maintain national frequency allocation table and central archive of frequency
4. Regulation of the radio frequency licensing being intact with Radio act and regulations
5. Define the technical standard, appropriate technology and system of radio equipment and system
6. Monitoring of use of radio frequencies along with monitoring of unauthorized use of radio frequency
7. Maintain and coordinate with international and regional organizations like ITU, ICAD, INTELSAT, APT, APSCC, ABU regarding use of radio frequency
8. Maintain the technical standard concerning radio monitoring determined by ITU

The functions of Ministry Of Communication and Technology (Information Technology Division) are:

1. Periodic analysis and timely review of information and communication policies
2. Standardize the information technology systems of the federal, provincial and local governments
3. Prepare necessary standards and guidelines to ensure interoperability of technologies
4. Prepare and implement necessary standards for cyber security and information security

The functions of Ministry Of Communication and Technology (Department of Information and Broadcasting) are:

1. Licensing of all radio equipment in accordance to Radio Act, 2014 and The Radio Communication (License) Rules, 2049
2. Broadcast permit to all kind of broadcasting agencies in accordance to National broadcasting act, 2049 and National broadcasting regulations
3. To issue and renew press representative certificate and identity card to the representatives of domestic and foreign media
4. Recommendation for registration of Temporary and permanent magazine
5. Online media registration

6. Journalists and management related disputes resolution

The functions of Ministry Of Communication and Technology (Communication division) are:

1. Approval for the issuance of permanent certificate of magazines
2. Keep records of all details of magazines registered obtained from the local authority advice to the Government of Nepal on the facilities to be provided to magazine

The functions of Press Council are:

1. Prepare and implement the code of conduct for journalists
2. Advise the government on matters relating to the development of healthy and credible journalism in the country
3. Record Keeping of all registered Press, Media and Journalist
4. Monitor and regulate the content of both online and Press Media

The functions of Press Registrar are:

1. Approval for the issuance of permanent certificate of magazines
2. Keep records of all details of magazines registered obtained from the local authority
3. advice to the Government of Nepal on the facilities to be provided to magazines

The functions of Advertisement Board are:

1. Develop policies related to advertisement and recommend to line ministry
2. Develop criteria to examine the advertisements on media
3. Develop code of conduct for advertisement creation, transmission and distribution
4. Regulation of advertisement creator, producer, distributor or administrator
5. Monitoring advertisement for false message broadcasting or any other things restricted by the code of conduct
6. Monitor the broadcasting of advertisement on national and foreign channels
7. Capacity development of advertisement sector

The functions of Film Development Board are:

1. Licensing for production, distribution and exhibition of films
2. Licensing for operation of cinema hall
3. Advise government on formation of policies or the development and promotion of motion pictures
4. Conduct research for the development of film sector
5. Organize film festivals and awards ceremonies

F. Regime Change: From Vertical to Horizontal Regulation Framework

The progress of digital convergence also raises questions on the validity of prevalent regulatory framework. In the past days, communication services were quite distinct - broadcasting, voice telephony and on-line computer services. They operated on different networks and used different "platforms": TV sets, telephones and computers.

The traditional, “vertical (silo) regulation” framework has been developed based on such a clear distinction among services for each network. That is, under the vertical regulation framework, regulation is differentiated due to services classified by technological features of physical network.

However, such a vertical regulation loses its validity in the convergence era, raising the issue of consistency, fairness and regulatory overlap/vacuum. With the progress of digital convergence, functionally the same services can be delivered via different networks. Also, multiple services can be delivered via one network. When applying the vertical regulation, however, the same service delivered over different networks could face different regulations. These undermine the principle of regulatory consistency. Also, it is hard to respond to the emerging new media and converging services. New services (e.g., VoIP, IPTV) are under more than one regulatory system, raising the issue of fairness and the possibility of regulatory overlap/vacuum.

1) Issues/Challenges of Digital Convergence

Having a sole regulator, converged from separate regulatory agencies, has many advantages such as economy of scale that has made it easier for broadcasting and telecommunication to work together in a merged environment, management of electromagnetic spectrum and having various functions of line communication, wireless communication, broadcasting, and broadband communication together under one roof. But at the same time the issues that comes with a converged regulatory approached must be addressed in seamless manner. Some of the issues are discussed below:

a) Regulatory Issues

Merging and integrating multiple technologies from distinct functional categories into one converged technology pose challenges to regulatory policies and responsibilities. Convergence is heading towards the direction where a user using the Information Communication and Technology as a service as well as infrastructure can communicate with any other user, anywhere and at anytime. While this innovation of technology is making all this possible the regulatory framework are still sector and equipment based. Operators that are affected by the digital convergence are utilizing the opportunities provided by technological advances to enhance their services by adding new valued services . Telecommunications, media and Information Technology sectors are providing cross-platform services. As a regulator it demands for the new cross-sector and technology-neutral regulatory approach. The regulators are also facing the structural limitations in effective regulation in this evolving either they are government departments, or the agencies of government or combination of both which are subject to obstructions from the political interferences. Rather to this the relationship between the ministry and the regulator should be based on complementary and supplementary role.

b) Content Regulation

With the emergence of digital convergence the content has been a integral part of the regulatory aspect. The broadcast content has been regulated in line with the Government's policies of pluralism, culture preservation and protection of certain social groups that are vulnerable (e.g. children). With convergence, the content providers may be located in any part of the world, and distribute their content via the Internet. Governments and regulators are faced with the difficult task of regulating such content[16]. While some of these policy objectives can be met through self-regulation, content providers may be subjected to certain regulation of their content to implement the Government's policies.

c) Uncertainty of Evolving Technologies

While the technological advancement is in the rocketing speed it is very difficult to benchmark the evolving technologies within a single category as they provide multiple services at a instance. Same uncertainty happens with the jurisdiction in regulating the companies that provides the converged services. Right now the Internet service providers are providing both internet and Television services while the licensing for broadcasting the television and Internet services are different and handled by different regulators in case of Nepal. When it comes to regulation of the evolving technologies clear jurisdictions for present and near future technologies should be kept in mind.

d) Spectrum Management

The frequency spectrum is an important asset, one that is scarce due to an increase in technologies and users. The deregulation of the telecommunications industry, and convergence, competition and a high demand for access to services and applications, have led to the development of new technologies, which have created more demand forspectrum. It is the responsibility of the regulator to ensure technical and economic efficiency of spectrum usage. The regulator is faced with the task of adopting a more flexible spectrum management framework to accommodate the new technologies. With the development Internet of Things to make everything smart also challenges this situation. The variety of IoT devices being used might demand spectrum usage along with other traditional technologies. Some adaptations of using new technologies for nearfield connection might be one of the solution for this such as using technologies like: Ultra WideBand (UAB), Mesh Wireless Networks. Along with this re using the old reserved frequencies might be another way such as using the TV white space frequency and other spectrum band that were allocated to traditional technologies but no longer used. The spectrum management if handled correctly the single regulator might be able to accommodate the need of the evolving technologies.

[16] Muhoro, Daniel & Kennedy, Ian. (2005). Convergence and emerging technologies : issues faced by the regulator.

Chapter Four
Regulatory Framework on Convergence

4.1. Background

Convergence is the consolidation and integration of different technologies by a common digital transport medium for any data provided by media, broadcasting, and telecommunications. The underlying use of IT is a common feature for convergent industries. Convergence covers the integration of service providers, technologies, equipment, and markets that provide data in any format for information and communications. Since Digital convergence opens up new business opportunities and has great potential as a new growth engine for the national economy, the whole process of convergence (involving network convergence, service convergence, market convergence, and, finally, regulatory convergence) can be facilitated depending on the regulatory environment surrounding it. Convergence is a cross-disciplinary agenda and integrates the following areas:

- The integration of customer end terminal equipment/access devices such as the telephone, Television and personal computer.
- The provision of various communication services like text, data, image, multimedia and video over the existing infrastructure or over a single transmission medium.
- The capability of the same technology (infrastructure) to offer various services.
- The provision of different services under a converged licensing regime.
- The convergence (substitution) of fixed and wireless technologies/services.

4.2 Objective

The main objectives of convergence are:

- To facilitate development of a national communications / ICT infrastructure for an information based society, and to enable equitable, non-discriminatory access thereto;
- To provide plurality, diversity and a wide choice of services at high quality to consumers with a view to promoting plurality of news, views and information and that communication services are made available at affordable cost to all, especially uncovered areas including the rural, and remote areas;
- To establish a framework for carriage and content of electronic communications that addresses the convergence of technologies,
- To define the powers, roles, procedures and functions of the respective regulatory body and licensing authority for broadcasting, telecommunications, data-communication, and multimedia and other related technologies and services;
- To establish a framework for the development of the ICT sector in a transparent, competitive environment towards economic development supporting the principle of a level playing field for all operators and service providers, including an open licensing policy;
- To encourage the introduction of new technologies, investment in services and infrastructure and maximization of communication facilities and services.

4.3 Key Principles of Convergence Regulation:

The followings are the key principles to be taken into account for Convergence Regulation:

a. **Technology and service neutrality**: The new regulatory arrangement shall facilitate the provision of various services over a number of different platforms. Additionally, the arrangement framework shall allow service providers to offer multiple services

b. **Content**: Regulatory authorities shall ensure that the handling, distribution, and provision of content is regulated homogeneously irrespectively of the underlying media. In a convergent industry, content shall be treated the same way in all market segments

The country's legal framework shall contain the necessary legislation to support an ICT environment, including, but not limited to intellectual property laws, computer crime, electronic transactions, data privacy and security. This, however, does not have to be organized in one common legislation but can be distributed over several laws and pieces of legislation. The promotion of converged content applications and platforms shall contribute to a development of relevant and valuable applications to encourage the deployment and utilization of Telecommunication/ICT across all socio-economic sectors in order to improve efficiency and productivity

c. **Institutions:** There needs first to be an assessment of how the local environment would be best adaptable to the new structure in order to in the best possible way exploit the industrial opportunities in creating a new dynamic ICT sector encompassing hitherto all other affected sectors.

The framework and the organizational setup need to be able to tackle the issue of convergence in an interdisciplinary and cross functional manner. A multisectoral regulatory authority may exist for telecommunications, broadcasting, postal issues, energy, railways and water, however, this does not require that also the legislation merges into one piece. Therefore, convergence analyzed in this policy document looks predominantly at telecommunications and broadcasting, but the converged regulator can also cover additional sectors with separate pieces of legislation.

4.4 Generic Approach of Convergence

1. The GoN/NTA shall develop the suitable provision to cope with the **Regime Change: From Vertical to Horizontal Regulation Framework** through Legal, Institutional reform.

2. It requires a regime shift from a vertical to a horizontal regulatory structure. The new horizontal (layer) regulation framework is to be structured around the regulation of similar

activities. It applies the same regulation for services in the same layer. By doing so, the horizontal approach to regulation is more likely to ensure that regulations are technology-neutral and provider-neutral that they impact on similar services in a consistent manner.

3. Since Digital convergence opens up new business opportunities and has great potential as a new growth engine for the national economy, the whole process of convergence (involving network convergence, service convergence, market convergence, and, finally, regulatory convergence) can be facilitated depending on the regulatory environment surrounding it.

4.5 The scope of digital convergence

The scope of digital convergence may be classified into the following four categories:

(i) **Network Convergence**: The interconnection and interoperability among networks are increasing. Network convergence includes convergence between voice & data network, fixed & mobile network, broadcasting & telecommunication network, etc.

(ii) **Services/Market Convergence:** Consumers are provided with similar services by firms that operated in separate markets/industries before. Nowadays, emergence of innovative services with multi-characteristics (e.g., smart TV, internet broadcasting) are truly remarkable.

(iii) **Business/Industry Convergence**: Firms coordinate business sectors through M&A, joint venture, and/or strategic alliances to meet the opportunity and challenges of new markets due to convergence. As a result, both within countries and across national boundaries, media and network ownership is heavily concentrated among a core of mega-corporations. Globalization through business expansion and strategic partnership has created a new competition landscape.

(iv) **Law/Institution Convergence**: This corresponds to the final stage of convergence. Integration of law, institution, and regulatory body should be considered in response to the progress of digital convergence occurred in the market. The importance of improving legal

system and institution cannot be over-emphasized so as to encourage further development of new technologies and innovative services in the convergence era.

4.6 6 Acts and Policies Convergence

With the cohesion of technologies and services at some points there arises conflict of regulation, as technologies are blended for example 2 different licenses are required to operate internet and television service according to legislation. In regard to technology utilizing a single infrastructure service provider can provide both of the services and this scenario **demands for a single license provision**. Similarly, there are many other hassles which also collide for press and online media which are not yet defined clearly in the legislation and need to be addressed for proper operation and legalization. To address the demand of current technological advancement and also address near future advancements, the policies, acts and regulations related to technologies that have already blended need to be converged.

4.7 7 Converged Regulator

4.7.1 The Creation of a Consolidated Regulator- Restructuring:

If the Regulator of Telecommunications & Broadcasting be integrated to handle the convergence of broadcasting and Telecommunications then there would be paradigm shift in regulation. It is necessary for the restructure of the associated Institution and the scope of work as well to proactively respond to the phenomenon of convergence between broadcasting and telecommunications, guarantee the freedom, the public nature and the public interest of broadcasting, and promote the balanced growth of broadcasting and telecommunications for greater international competitiveness and also to effectively contribute to the advancement of broadcasting, communications and related convergence fields and to the enhancement of public welfare. The approach of changing the roles and duties within existing regulatory institutions to respond to the needs is created by the convergence of industries. The single integrated regulatory regime would preside over all sectors of information, communication, and broadcast technologies. It is necessary for restructuring of current Regulator/s. The roles of the converged Regulatory shall carry out the following activities as applicable below:

- Establishing policies to guide the process of convergence between broadcasting and telecommunications as

well as policies for promoting converged digital services and developing related technologies
- Establishing spectrum-related policies and managing spectrum resources
- Establishing broadcasting and telecommunication policies
- Developing pro-competition policies for the broadcasting and telecommunications market
- Upgrading broadcasting and telecommunications networks
- Preventing undesirable effects of broadcasting and telecommunications
- Establishing policies for protecting broadcasting and telecommunications service users
- Investigating unfair practices by broadcasting and communications businesses and mediating industry disputes and business-consumer disputes

4.7.2 Rationale for a converged Regulator:

The rationales to integrate the existing institutions into a single regulatory body are as follows:
A single regulatory umbrella could take a broad view of the converging sectors, respond flexibly to emerging new services, and ensure a consistent approach to the regulation of related activities. It could prove to be most effective for organizations that straddle multiple convergent sectors.

The government should have the initiative to develop ICT industries as well as to accelerate their growth. To secure professionalism, a new regulatory regime should eliminate the circulation of positions, resulting in the accumulation of expertise and experience. Furthermore, it is necessary to have a converged Regulator to assure the regime of autonomy from political influences.
After restructuring current organizations, Nepal should be in a better position to pursue the integration of legal laws related to broadcasting and telecommunication.

While the converged regulator should have powers of tariff regulation, interconnection as well as laying down quality of service standards for broadcasting and telecommunication sectors, *the power of issuing unified (converged) licenses should remain with the Converged Regulator*. A converged regulatory regime is essential to deal with various issues arising out of convergence of technologies and services. However, the division of powers/ roles/ functions between the regulators, the Government should address broadly the existing lines. The Telecommunication Act

would be the logical starting point but several changes would be required in the draft to reflect the existing division of powers as well to take into account the experience of regulation in the last five years.

4.7.3 Separate Regulation of Carriage & Content:

It will be appropriate for separation of the Regulation of carriage and content.

4.8 8 Spectrum related issues

Increasingly spectrum could be used to cover a range of services that could cover both – telecommunications as commonly understood as well as Broadcasting. Theoretically if an operator finds a telecom service to be not profitable and wishes to provide broadcasting services, which he finds more profitable, the existing Spectrum allocation rules will stand in his/her way. The way out is to either club potential services at the time of bidding or to generally permit change of use of spectrum. This would mean that ***there has to be convergence on spectrum use charges for different applications as well as a system for generalized or more flexible use of spectrum.***

Such flexibility in the use of spectrum is necessary to ensure that this scarce resource is always put to the best use. With the possibilities of convergence, the same spectrum could be used for alternative applications depending on developments in technology and in the market.

It is therefore reiterated that Unified Licensing may be implemented and spectrum allocation should also be technology and service neutral to the extent possible.

There should be flexibility in spectrum allocation to take full advantage of new services and new technologies for existing services that may evolve with time. Clubbing of services and the flexibility should be specified before bidding/assignment and not after these processes are over.

Spectrum allocation should be technology and service neutral to the extent possible so as to avail the full benefits of a converged licensing regime.

Spectrum management should continue with the Policy from the RFPDC.

4 .9 Privacy and Security

Converged technologies often collect and use personal information and machine data as they directly interface with end-users. Our laws protect certain types of data pertaining to privacy by specifying collection, storage, use, and dissemination practices. As converged technologies generate and innovatively leverage more types and volumes of data that can identify, locate, or track a person, consumer concerns for protecting digital privacy may intensify. Technological convergence facilitates increased consumption and collection of data, posing potential digital privacy concerns for consumers. Data collection and usage are tied to digital privacy issues because a piece or aggregation of information could identify an individual or reveal patterns in their activities. Converged technologies leverage large volumes of data to try to improve the user experience by generating more tailored and anticipatory results. However, such data can potentially identify, locate, track, and monitor an individual without the person's knowledge. As the use of converged technologies continues to propagate, digital privacy issues will likely remain central.

4.10 Rationalization of Differential Custom Duty Regime

The broadcasting industry and the telecom industry are vastly different in terms of their size, entry fees and technology. However wherever they are performing similar services both should be treated as far as practicable identically. Accordingly, ***the changes in customs duties should be made to promote effective competition amongst telecom and broadcasting operators***. At present there are several items which perform the same function , but are classified under one head for the cable broadcasting industry and under another head for the telecom industry and accordingly are charged different duties. Therefore for all equipment where the same function is performed, either by a broadcasting system or by a telecom system, the duty structure should be the same.

Rationalization of Customs Duty to ensure a level playing field so that that Customs Duty and other relaxations should be uniform across industry and equally applicable to operators with the same set of conditions .

4.11 Infrastructure Sharing

The infrastructure sharing shall be allowed for the convergence of telecom and broadcasting service which will result for minimization of unnecessary duplication of infrastructure resulting the lower tariff applicable to consumers as well as the environmental protection.

4.12 Right of Way

The permission for right of way for the installation/rollout of converged digital infrastructure shall be managed expeditiously.

4.13 Converged Licensing Regime

A licensing regime shall be established to enable a licensee to provide any or all telecom services including broadcasting services by acquiring a single license. A licensing regime that recognizes convergence has to be taken to have a greater scope of individual licenses to provide for multiple applications, services and technologies.

4.14 Promotion of IPTV as a Convergence Service

The IPTV service shall be regulated and managed as mentioned hereunder:

Market entry regulation: A license is required to provide a "real-time broadcasting" IPTV service.

a. **Accounting separation**: When an IPTV service provider also runs other businesses (e.g., telecommunications businesses), an accounting of IPTV business should be separated from other business units.

b. **Equal access to network facilities**: IPTV service providers should not decline other candidate service providers' request for access to essential network facilities unless there are reasonable and fair justifications.

- Equal access to TV content rule: Popular IPTV programming, which is decided by the regulatory authority, should be offered without discrimination at a fair and reasonable price to all IPTV service providers.
- **Assessment of Market Competition**: The Steering committee established pursuant to this Regulatory Framework shall assess assessment of the status of fair competition in the relevant market.

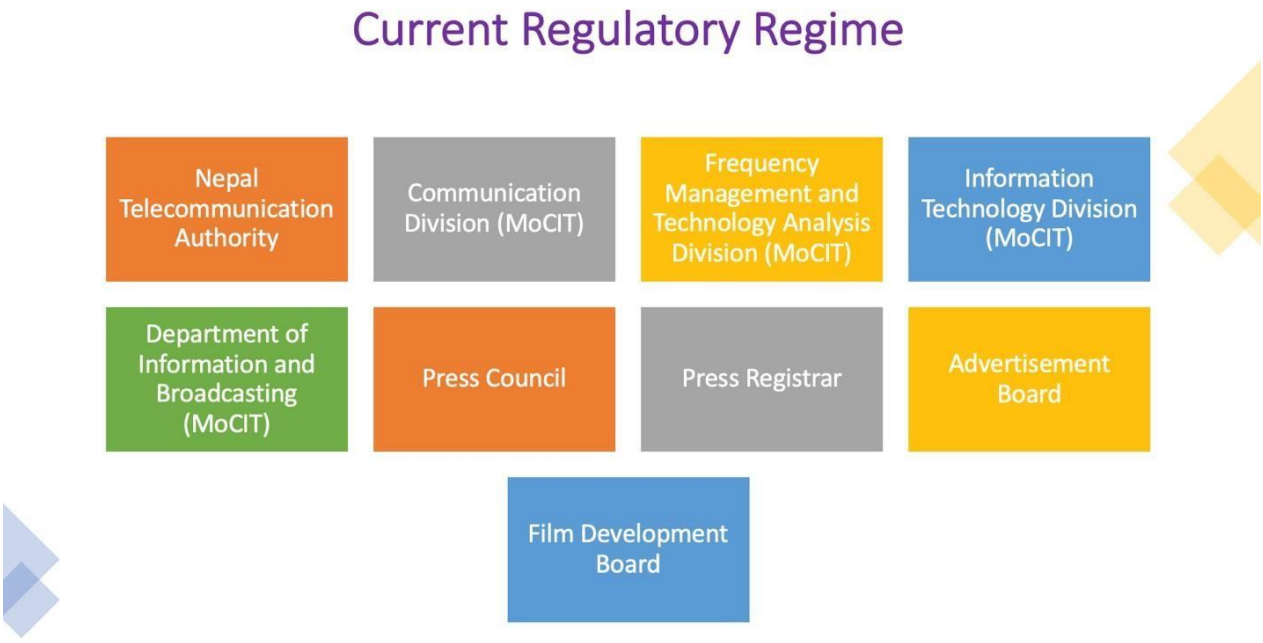
4.15 Steering Committee for Facilitation of Convergence

Although the formation of a single regulatory might take a while in the meantime a federal steering committee can be formed which will act as the board of both regulators (Telecom & Broadcasting) and facilitate in licensing and other required operations. The steering committee can have representative from NTA, MOCIT, Press Council and other stakeholder organizations.

The scope of the committee shall also be defined to facilitate and also monitor the activities of the services of the concerned operator having the permit of operation of converged services i.e Telecommunication, and broadcasting service until the establishment of a converged Regulator in order to ensure fair competition.

4.16 Recommendations

In the previous chapters we have discussed about the background, historical development, International practices, various aspects and the challenges that are brought along with a convergent regulator. If we see the international trends of convergence most countries, including Australia, Canada, Finland, Iceland, Italy, Japan, Luxembourg, the United Kingdom, and the United States, have demonstrated that digital convergence often includes integrating telecommunication and content regulation. There are some cases such as if we take the UK case it is one of the most converged regulator which was formed merging five existing regulators. In case of Nepal we are in the phase of multiple regulatory approach.



The regulatory landscape shows that the regulatory institutions are based on the acts that were enacted more than decade earlier and in the current fast paced development of technologies and services there are the grey areas which fundamentally doesn't belong to jurisdiction of any regulators but multiple regulators are trying to regulate those areas. In this kind of scenarios the creation of new convergent regulator might be challenging. If we take the case of UK it took several years to form a convergent regulator, UK started the proposal of convergent regulator in 1996, by 2000 white paper on the future of communications was brought and by 2003 only the Ofcom was established. With respect to the current scenarios the proposal of convergent regulator in case of Nepal might go through two parts:

1. Immediate: coordinated regulatory approach
2. Long-term: Single Independent Regulator

4.16.1 Immediate Roadmap

We are in the situation where the originally independently operated technologies and services has been merged. We have witnessed that the communication networks were designed to carry different types of information independently likewise, radios were designed for audio and television were designed for video. Coming today the telecommunications technology permits the manipulation of information, voice, video and data over a single network.

We have discussed in earlier chapters about the currently regulatory regime and the policy provisions. Reflecting it on short note In case of Nepal we have multiple regulators which can be listed as below:

1. Nepal Telecommunications Authority
2. Ministry Of Communication and Technology
    a. Communication Division
    b. Frequency Management and Technology Analysis Division
    c. Information Technology Division
    d. Department of Information and Broadcasting
3. Press Council
4. Press Registrar
5. Advertisement Board
6. Film Development Board

In addition to the multiple regulators the legislations and policies that guide the jurisdiction of these regulators were enacted a long time ago and doesn't address the spiked development of ICT technologies and services associated with it. During the consultation and study of convergence in regards to Nepal and International Practices we came to realize that the transformation from Multiple Regulatory Regime to a single regulatory approach might take a lot of background work and at least a couple of years. In the mean time to immediately address the issues that are being faced by the users and other industry stakeholders we need to came up with immediate action plans as well.

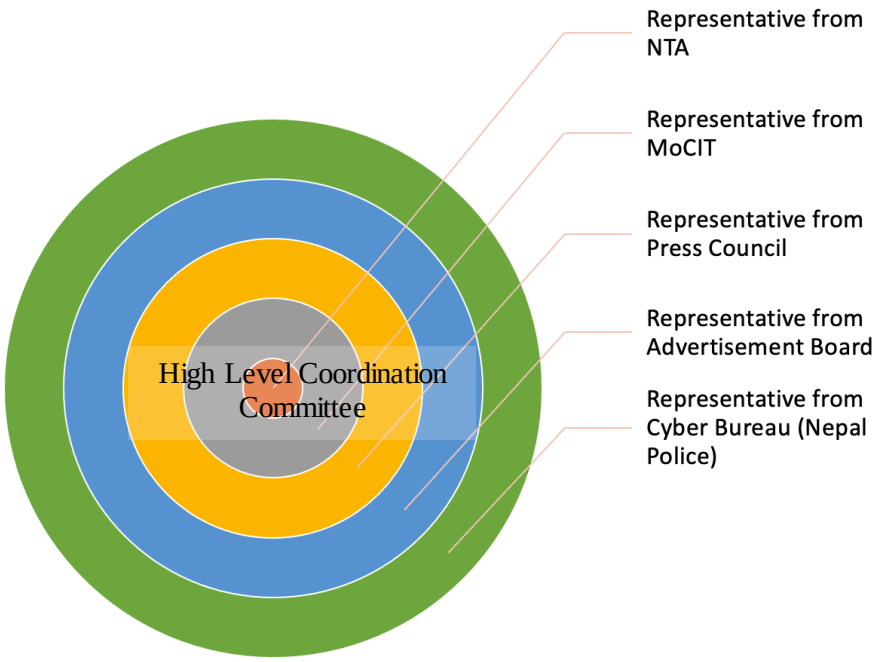
Although there is policy provision for the convergence of Telecom/ICT services, The Clause 5, 7,10 and 12 of The Broadband Policy, 2071 mentions that, to accommodate the convergence of services on digital platforms and the development of open competition and allow providers to choose among the most appropriate technologies, the telecommunication regulatory framework will be further modernized and liberalized with a simplified, unified, and technology-neutral licensing regime. Despite the policy provisions there is no concrete Legal and regulatory provision has been yet formulated for the implication of a converged regulatory approach in the practice of Nepal.

Thus to address the convergence issues appropriately during the period the intact legal and regulatory approach is provisioned we suggest for the following:

1. Formation of High level coordination committee
   We have already witnessed that there are multiple regulators which have jurisdictions to regulate different entities of current ICT technologies, services and other underlying aspects such as content, moralities and ethics. To address the convergence issues that are either cross cutting or do not fall within the jurisdiction of any regulators we suggest to form a high level coordination committee. That Includes representative from each regulator and

some related law enforcement representative as well. The structure of the High level coordination committee should also be assisted by a government representative serving as a member secretary who would handle all underlying operations on behalf of the coordination committee.

1. Representative from NTA
2. Representative from MoCIT
3. Representative from Press Council
4. Representative from Press Registrar
5. Representative from Advertisement Board
6. Representative from Cyber Bureau (Nepal Police)
7. A government representative (Member Secretary)



The Underlying functions of the committee would be the following:

1. Identification of the regulatory issues in the present context
2. Formulation of coordination mechanism to resolve the identified issues
3. Meet on regular (Monthly) basis to discuss about the long term resolution of the aroused issues
4. Discuss with stakeholders and experts
5. Purpose government an resolution for long-term resolution of issues.

The coordination committee will be very helpful to formulate a long term roadmap and resolution for resolving the issues of convergence. The structure of the committee can also be expanded to include some other stakeholders as well such as DoIT, ISPAN, Mercantile Communications (Country Code Top Level Domain Manager) and other stakeholders as required.

4.16.2 Long Term Roadmap

In the previous chapters we have discussed much about the different aspects of convergent regulator besides having the multiple regulatory approach some of our existing policies have quoted to address the convergence in the policy, legal, regulatory and institutional mechanism in Telecom, ICT and broadcasting sector.

The following provisions have been made in Broadband Policy, 2071 in relation to Convergence:

Clause 10.1.5: *Telecommunication regulatory framework will be further modernized and liberalized with simplified, unified and technology-neutral licencing regime to accommodate the convergence of services on digital platforms and the development of open competition enabling providers to choose among the most appropriate technologies.*

The following provisions have been made in ICT Policy, 2072 in relation to Convergence:

Clause 5.6: *This policy shall be supported by appropriate legislation/directives aimed at effective separation of roles and responsibilities for policy formulation/guidance, regulation and operation in order to ensure transparent and effective regulatory functions based on emerging trends of convergence and establish institutional mechanisms for policy implementation.*

Clause 7.8.1: *Steps would be taken to ensure convergence in the policy, legal, regulatory and institutional mechanism in the telecommunications/ICT and broadcasting sectors.*

Clause 12.8.1: *Appropriate measures including the formulation of Convergence Policy will be taken to to facilitates the provision of different services over different platforms.*

Clause 12.8.2: *Existing regulatory and institutional frameworks will be modified to address convergence*

Clause 12.8.3: *Steps will be taken to ensure that the country's legal framework contains necessary legislation to support ICT environment created by convergence*

Again taking the context of the UK regulatory approach of Ofcom we have to be patient that while dealing with convergence of multiple regulator already in practice. We also have to accept that before adapting a sole independent convergent regulator a lot of discussions, debates, multi-stakeholder

consultations followed it's legislation and institutionalization. While development of the Communication Act of UK which is the provisioning act for the formation of Ofcom

- 26 commons standing committee sessions were organized
- More than 300 industry submissions were made
- More than 500 amendments were tabled
- More than 17 days of debate happened in the parliament
- Resulted to formulate 263 statutory duties

Purposed Regulatory Approach

Current Regulatory Approach	Purposed Regulatory Approach
Nepal Telecommunications Authority (NTA) 1. Licensing of Telecom operators and Internet Service providers 2. Approval of tariffs for telecom services, fixed tariffs, maximum tariffs and non-regulated tariffs 3. Operators Dispute Resolution 4. Spectrum Management	Information, Media and Technology Authority (Independent Regulator) Licensing Directorate 1. Licensing of Telecom operators and Internet Service providers 2. Licensing of all radio equipment 3. Licensing of Online Media 4. Licensing of Broadcasters Operations and Monitoring Directorate 1. Administrative Functions 2. Formulation of licensing and other procedures 3. Formulation of Policies 4. Monitoring and regulation of radio frequency 5. Monitoring and regulation of broadcast permit 6. Monitoring and regulation of Online Content Spectrum Management Directorate 1. Proper allocation of spectrum Technology and Innovation Directorate 1. Research for the adaptation of new technologies 2. Standardization of existing technologies in national scenarios 3. Promotion of innovative technologies Consumer Protection Directorate 1. Ensure the privacy and Data Security 2. Ensure the end to end encryption 3. Ensure Child Protection Online 4. Ensure Quality of Service
Ministry Of Communication and Technology **Communication Division:** 1. Grant permission for the shooting of foreign documentaries/films 2. Censorship and screening of films **Frequency Management and Technology Analysis Division:** 1. Arrangements for Nepal's Orbital Slot Allocation 2. Regulation of the radio frequency licensing 3. Standardization of radio technology and equipment 4. Monitoring of radio frequencies **Information Technology Division** 1. Standarization of Information technology systems of all 3 level governments 2. Standardization or Cyber security and Information Security protocols **Department of Information and Broadcasting** 1. Licensing of all radio equipment 2. Provide broadcast permit to broadcasting agencies 3. Issuance and renewal of press representative certificate 4. Online Media registration	
Press Council 1. Prepare and implement the code of conduct for journalists 2. Monitor and regulate the content of both online and Press Media	
Press Registrar 1. Approval for the issuance of permanent certificate of magazines 2. Keep records of all details of magazines registered obtained from the local authority	
Advertisement Board	

1. Regulation of advertisement creator, producer, distributor or administrator 2. Monitoring advertisement for false message broadcasting or any other things restricted by the code of conduct 3. Monitoring of the broadcasting of advertisement on national and foreign channels	
Film Development Board 1. Licensing for production, distribution and exhibition of films 2. Licensing for operation of cinema hall	

In addition to the above fundamental scopes some of the international practices shows that Convergent regulators have some additional scopes in case of the new converged regulator it might also broaden the scope with the following.

1. Postal Service
2. Domain Names
3. Films
4. Digital Certificates

The Regulatory Principles to be Adapted:

1. Equal accessibility in telecom services
2. Infrastructure Sharing
3. Net Neutrality
4. Universal Service
5. Consumer Privacy Protection
6. Proper Spectrum Management
7. Protection of freedom of expression and diversity of opinion
8. Separation of broadcaster from political control and manipulation
9. Transparent and competitive licensing procedure

ANNEX

ORGANIZATION AND STAFFING

The Organization chart, work schedule have been made to concur with the requirements of the proposed approach and methodology. In order to fulfill the tasks described in the methodology of work in a timely and efficient manner, proposed services of the consultant demand careful planning and management of activities; adherence to strict organization principles (well-defined function, careful selection of staff, clear line of command and control, well-defined reporting, feedback and evaluation arrangements, etc.) deployment of adequate resources on time and quality of work, and maintaining proper cooperation and liaison with the project and other stakeholders involved in this project as shown in Figure below.

The organization structure consists of the following members.
Team Leader -01
Legal Expert -01
Engineer-01

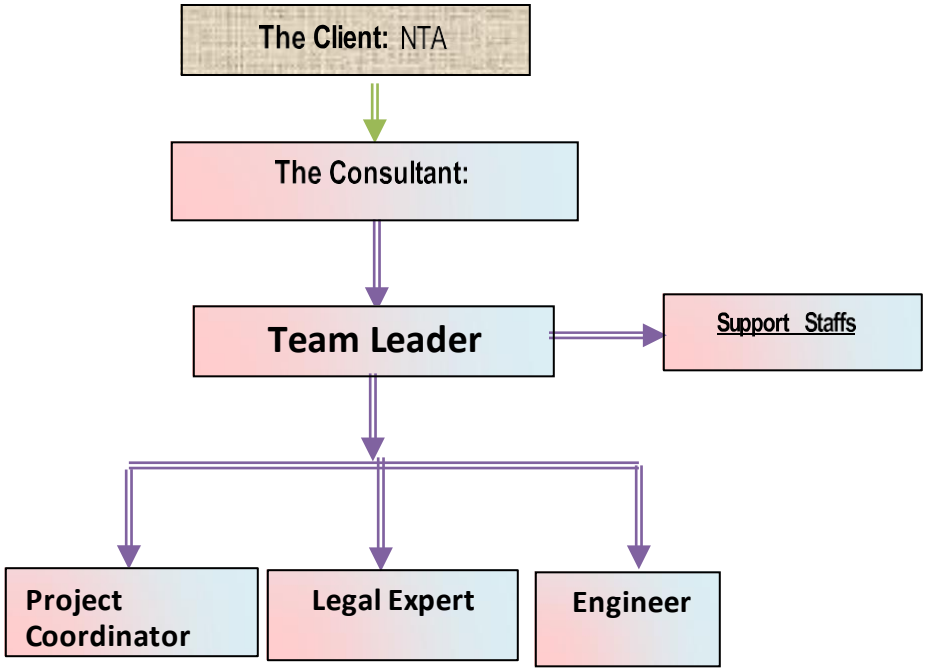


***Figure**: Consultant's project organization structure and staffing*

Thus, it is expected that the Project will be benefited much from the rich experience and knowledge of the proposed experts. The requirements of the Project and the tasks have been fully discussed with the team members and each is fully committed to participating in the Project. The detailed tasks to be performed by individual staff as indicated below Table are also presented in their respective Curriculum Vitae. The team of the proposed personnel has been developed considering the input requirements for the successful completion of the project. Other required support technicians and administrative support staff shall be provided by the firm. The strength of the

manpower of consultants has been described on the company profile.

Following team members are proposed for the study along with their responsibilities.

SN	Name	Proposed position	Responsibility
1	PrabhakerAdhikari Kshetry	Team Leader	• Team coordination • Study and analyze the current status of different Telecom and broadcasting services and technologies and also the licensing and regulatory regime. • Study the trends and practices in relation to ICT converged technologies and services and the converged regulation • Explore international approach towards converged technologies. • Discussion with stakeholders • Report preparation
2	PravinSapkota	Telecom Expert	• Study the trends and practices in relation to ICT converged technologies and services and the converged regulation • Explore international approach towards converged technologies. • Discussion with stakeholders • Report preparation
3	Babu Ram Aryal	Legal Expert	• Study and explore the national/ international trends and practices • Study of the data collected • Preparation of regulatory framework
4	Sandeep Chataut	Non-Key expert (Project coordinator)	• Desk study • Data collection • Preparation of report • Office helps
5	Ananda Gautam	Research Associate	• Desk study • Research based on the national/ international trends and practices