

**YANGON UNIVERSITY OF ECONOMICS
DEPARTMENT OF APPLIED ECONOMICS
MASTER OF PUBLIC ADMINISTRATION PROGRAMME
(NAY PYI TAW)**

**A STUDY OF USERS' PERCEPTION ON
BROADBAND SERVICE IN COMPETITIVE
TELECOMMUNICATION INDUSTRY
(Case Study: Nay Pyi Taw)**

**NI NI HAN
EMPA – 28 (18th BATCH)**

MARCH, 2023

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A thesis submitted as a partial fulfillment towards the requirement for the degree of
Master of Public Administration (MPA)

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This is to certify that this thesis entitled “**A Study of Users’ Perception on Broadband Service in Competitive Telecommunication Industry**” in partial fulfillment towards the requirements for the degree of Executive Master of Public Administration (EMPA) has been accepted by the Board of Examiners.

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ABSTRACT

In enabling service providers to offer a wider range of bundled communications services (such as telephone, Web Access, email, Internet video, etc.), broadband Internet access services will also improve competition among the internet service providers. The Objectives of the study are to determine how the private sector is involved in the growth of the telecom industry and to examine how users view broadband service in a liberalized Myanmar telecom market. For this thesis, the descriptive technique was surveyed on total of 207 respondents in Nay Pyi Taw. This study found that spreading fixed broadband as well as wireless broadband (mobile broadband) is still necessary in Myanmar. Moreover, more websites and applications with Myanmar content are required. Officials should make certain how to use online activities like online banking and sales pages. Also, it's important to take the required security precautions for the internet and have awareness of newly emerging viruses and malware.

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LIST OF ABBREVIATIONS

4G	Fourth Generation Mobile
ADSL	Asymmetric Digital Subscriber Line
AAE	Asia Africa Europe
CDMA	Code Division Multiple Access
CIO	Chief Information Officer
DEDC	Digital Economy Development Committee
EDMS	Electronic Document Management System
EGDI	E-government Development Index
EPI	Electronic Participation Index
EU	European Union
FTTH	Fiber To The Home
Gbps	Giga bit per second
GPMS	Government Personal Management System
GSM	Global System for Mobile
HCI	Human Capital Index
ITU	International Telecommunication Union
ICT	Information and Communication Technology
ISP	Internet Service Provider
IOT	Internet of Things
LTE	Long Term Evolution
MOTC	Ministry of Transport and Communications
Mbps	Mega Bit per Second
NGN	Next Generation Network
OECD	Organization for Economic Co-operation and Development
PTO	Public Telecommunication Operator
PTD	Posts and Telecommunication Department
SoE	State Owned Enterprise
SEA-ME-WE	South East Asia- Middle East- West East
SIM	Subscriber Identity Mobile
TII	Telecommunication Infrastructure Index
UN	United Nations
VOIP	Voice Over Internet Protocol

CHAPTER I

INTRODUCTON

1.1 Rationale of the Study

The Globalization of corporate activities (both in the manufacturing and service sectors) has been increasing since the 1980s. A growing number of Public Telecommunication Operators (PTO) is extending their business activities either explicitly or implicitly to countries outside of their home territory. State-Owned Enterprise (SOEs) has been played a significant role in providing public goods and services such as utilities and infrastructures. It has monopolistic position in the market and have a competitive advantage Vise –Visa other private enterprises. This creates many unintended market consequences such as inefficiency, non-transparency and weak governance. Telecom sector liberalization has brought better and more innovative communication services, job growth, new ways to communicate (mobile and wireless), and a booth to overall economic growth and the runway success of the internet.

The Republic of the Union of Myanmar is one of the largest and poorest countries in the South East Asian region. A need to reform was crucial for improvements of Myanmar's telecommunications sector performance. Myanmar Telecom Sector was reformed in 2013 and liberalized to attract the foreign investment, job creation and local telecom industry market development. The Telecommunications Law No. 31/2013 (Telecoms Law) was introduced on 8 October 2013, providing a modern regulatory framework for Myanmar's telecommunications sector. The Telecoms Law regulates network facility service, network service and application service.

Before the reform process, Myanmar's mobile cellular penetration (8% of population), fixed telephone lines (1.14%), broadband fixed lines (0.014%) and mobile broadband penetration (0.51%) were amongst the lowest in the world. (Source from PTD) Over the last eight years, Myanmar telecom market has been transformed. Since 2014, Myanmar's three largest telcos, MPT, Ooredoo and ATOM (previously

named Telenor) have served in excess of 50 million mobile subscribers giving Myanmar a mobile penetration rate of close to 95%. After Mytel became the fourth telecom operator in January 2017, there are four telecom operators in Myanmar at present. Myanmar has experienced the unprecedented growth in mobile and mobile broadband services. While fixed broadband penetration remains extremely low, Myanmar's mobile market has become increasingly dynamic and competitive. The telecoms business is now a potential one when inviting further foreign investments in Myanmar.

There were 57.32 million phone numbers (Fixed and Mobile) in all, which is equivalent to 102.72% of Myanmar's 54 million people. Today, Myanmar has 52.38 million Internet users and the density has reached 93.87%. Domestic and international fiber connections have reached 68,624.35 km, and the underwater communication fiber connection are SEA-ME-WE(3); SEA-ME-WE (5) and AAE (1), totally in three undersea cable connections. As for cross-border fiber connections, Myanmar which borders Thailand, China, India and the Lao People's Republic have been connected. Internationally connected Internet bandwidth capacity has also reached 4476.62 Gbps. A total of 26,000 or more communication towers have been built throughout Myanmar. There are already 19 companies operating International Gate Way, and Myanmar's communication traffic has also been freed from being a bottleneck. The Telecommunication network coverage on Myanmar's population has reached 96% and above.

Numerous people are utilizing many cell phones, which illustrates how much better communications have impacted the people of Myanmar. In the past, owning a phone number used to be really challenging because only one MPT's SIM cards were so expensive. Myanmar's telecommunication sector was once only for a certain class people, but now it has reached a state where everyone can access it, just like the international community. SIM cards are now considerably more affordable, and the majority of people have smartphones. Access to the Internet via smartphones has become a way of life in Myanmar attributable to the 4G (LTE) phone and internet networks, particularly in Yangon, where 4G networks is available throughout much of the nation. There were 22 million people using the Internet with social media accounting for the majority of their media use.

In an effort to advance the country's digital economy, the government concentrated on fostering its development in 2019, creating the Myanmar Digital

Economy Roadmap and the Digital Economy Development Committee (DEDC). The plan calls for the government to concentrate on nine key industries, including education, health care, agriculture, fisheries and livestock, tourism, manufacturing, financial services, technology sector and startup ecosystem, digital trade, transportation and logistics sector. These industries will all have an increase in online transactions as the 4G network is developed. Online commerce will also be accepted as a way to protect the environment, lessen pollution, and lessen the demand for new construction.

Myanmar government administration had been moved to the new capital city, Nay Pyi Taw where near the city of Pyinmana and 200 miles away from the Yangon city at 2005. Nay Pyi Taw consisted of Parliament (Hluttaw) complexes buildings, more government office buildings, official resident apartments, National Museum, Zoo, luxury hotels, Nay Pyi Taw International airport, commercial banks and shopping malls. Total population in Nay Pyi Taw was totally 1,160,242 persons in 2014 census. Nay Pyi Taw has 8 townships namely Zeyarthiri, Ottarathiri, Pobbathiri, Dekkhinathiri, Zabuthiri, Tatkon, Pyinmana and Lewe Townships. Mostly populated are civil servants and their families move from Yangon and other areas. Nay Pyi Taw started radio Free zone area; there has no tower and not get radio phone access at 2006. Mostly government officers only used ADSL service for broadband internet from MPT. In 2014 and later, Nay Pyi Taw has mobile and fixed broadband (Fiber to the Home- FTTH) internet users increasing. Mobile phone services are more easily deployments than fixed broadband service deployment that needs fiber cable infrastructure and more complex right-of-way facilities for the service providers. The Broadband user chooses service based on availability, internet speed, cost, and reliability for their suitable place or organization. The Broadband service providers clearly and exactly mention their availability prices and quality of service for the customers. This study is the Broadband users' perception of awareness of internet usage, any losses or non-responsibility or non-compliment for consumer protection in a competitive telecom sector regime.

1.2 Objectives of the Study

The Objectives of the study are to identify the private sector participation in telecom sector development and to analyze the users' perception on Broadband service in telecom sector liberalization.

1.3 Method of Study

The method of the survey is descriptive method both primary data and secondary data. This research designed was used quantitative research design in collecting broadband users' data in people who live in Nay Pyi Taw. Primary data is collected by questionnaire on quality of broadband service, price, promotion, and the staff's courtesy, respondent's loyalty and perception for Broadband quality of services and customer care system.

Secondary data was collected from Posts and Telecommunications Department, Ministry of Transport and Communications, Mobile service providers namely MPT, ATOM, Ooredoo, Mytel and Fiber to the Home (FTTH) service providers namely Myanmar Net, 5BB Broadband, mm link companies where services in Nay Pyi Taw Township.

1.4 Scope and Limitations of the Study

When collecting the survey data only in Nay Pyi Taw, this study focus on mobile phone users and FTTH user to analyze their perception on the competition of telecommunication market after market liberalization. This time is very hard for every person because of COVID-19 pandemic and some political complex situations in Myanmar. Broadband service providers work hard to ensure client happiness and their deployment successfully. It mainly focus on people living at Nay Pyi Taw city of 8 townships including Zeyarthiri, Ottarathiri, Pobbathiri, Dekkhinathiri, Zabuthiri, Tatkon, Pyinmana and Lewe Townships. The study period is from August 2022 to December 2022 and a survey was conducted with the 207 respondents from local people who live in Nay Py Taw.

1.5 Organization of the Study

This study is organized into five chapters. Chapter 1 includes the rationale of the study, objectives of the study, methods of the study, scope and limitation of the study and organization of the study. Chapter 2 presents a literature review of the impact of broadband on economic growth, Data and Empirical Strategy, telecommunication sector reform in the world, the new telecom world, and availability of broadband internet access, broadband internet access penetration and review of previous studies. Chapter 3 describes the overview of the broadband usage in Myanmar's Telecommunication industry. Chapter 4 presents the analysis of survey data. Chapter 5 addressed the summary of key finding and concluded with finding and recommendation part.

CHAPTER II

LITERATURE REVIEW

2.1 Broadband Technology Definition

The development and spread of the Internet has been identified as broadband technology. Broadband technology offers tremendous speed and opens up a seemingly endless range of possibilities, while dial-up connections have limited bandwidth and internet applications. (Langdale,1997). Broadband communication is defined by International Telecommunication Union (ITU) as ITU-T I.113 speed 1.5 Mbps (or 2 Mbps) transmission capacity service. Like roads, canals, and railroads were to the 19th century, Interstate Highway System and basic telephone networks were to the 20th century, and broadband networks will be essential to the 21st century. (Copps ,2001); (OECD,2001). Also, the advances in the markets for electronic communications revolve around broadband. Broadband networks, which employ fixed line, fixed wireless, or mobile infrastructure, offer the fastest possible speed, according to Berkman Center for Internet and Society (2009).

2.2 Impact of Broadband on Economic Growth

The academic research contributed on infrastructure and economic expansion. Numerous studies have confirmed the significance of public infrastructure for economic growth since Aschauer (1989). Munnell (1992) discovered support for this finding. Ageing analogue-based telecommunications infrastructure has been recognized in several studies as a barrier to productivity and competitiveness in transition economies (e.g., Madden and Savage, 1998). In light of the fast global deployment of broadband infrastructure over the past thirty years, access to high-speed internet is viewed as a substantial driver to economic growth. Broadband infrastructure may be different from other types of infrastructural investment that promote economic growth because high speed internet via broadband may further facilitate economic growth at the national level by accelerating the dissemination of information, reducing transportation and transaction costs, and fostering productivity and competition. Through the creation of

new goods and procedures as well as the adoption of new business models, broadband may potentially have an impact on the economy. It studied a discrepancy in broadband utilization between urban and rural areas due to its high cost. For instance, Prieger (2003) discovered redlining evidence, whereby broadband providers avoid locations with significant percentages of low-income and minority households. Policymakers in both wealthy and developing nations have paid close attention to the so-called "digital divide." According to a World Bank study (Qiang and Rossotto, 2009), a 10% increase in broadband coverage enhances GDP growth in industrialized nations by 1.21 percentage points. That was more benefits of broadband are 1.38 percentage points stronger for low and middle-income countries. Without spending in related industries like education or health, broadband may not always have the desired result. (Rossotto and Kelly, 2012). This may have been caused by the lack of access and the difficulty of acquiring information, particularly in rural areas of developing countries. (e.g., Whitacre et al., 2014).

Broadband may help create new human capital. People in distant locations far from traditional schools or training centers may find it easier to learn new skills if they have access to information and a variety of training courses online. The comparatively low penetration levels in rural regions, broadband infrastructure might have a greater impact there if, as some writers have suggested (e.g., Datta and Agarwal, 2004), the adoption of broadband can be characterized by decreasing returns to scale. The advantages of this technology might not be completely realized because of a variety of other problems that are common in developing countries, such as weak governance, a lack of resources, a shortage of skilled labor, and so on. Areas with higher broadband penetration rates, households conduct more online product searches, use social networks more frequently, and tend to buy more goods from local vendors.

Investment in broadband communications and related infrastructures (the so-called NGN - Next Generation Networks) is receiving remarkable attention from policy makers worldwide due to the significant effects of high-speed Internet access on the whole economy and society. Broadband is a phrase used frequently to describe high-speed internet access that is always active and quicker than the more conventional dial-up internet access. There is a digital divide between nations when it comes to the use of personal computers and the Internet, according to Chinn and Fairlie's 2007 study. Broadband describes a number of high-capacity transmission methods that can send data, voice, and video quickly and over great distances. In

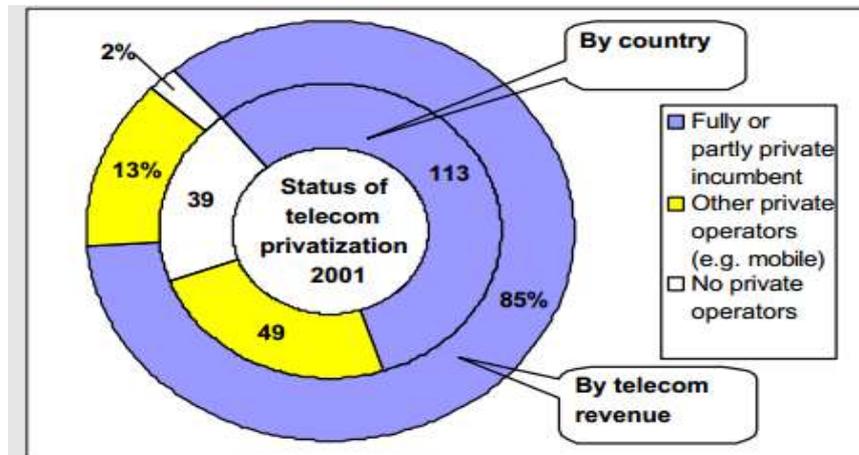
addition to digital subscriber line (DSL), cable modem, fiber optics, wireless, satellite, and broadband over Power lines (BPL), broadband also covers other high-speed transmission technologies. Its impact is wide-ranging since it enables teleconferencing, data transmission, high-quality and quick access to information, and other things in a variety of contexts like healthcare, education, and technical advancement. About 92.6 percent of Internet users worldwide use their mobile phones to access broadband. Broadband Internet connection is preferred by both end users and governments due to its obvious advantages over dial-up services. Broadband usage has grown over time. The number of people utilizing the Internet is predicted to reach 4.9 billion in 2021, up from an anticipated 4.1 billion in 2019, according to estimates from the International Telecommunication Union (ITU), the United Nations' specialized organization for information and communication technologies (ICTs). The speed of broadband is likewise increasing. The average global broadband speed is anticipated to increase to 110.4 Mbps by 2023, which is more than twice as fast as the 45.9 Mbps average speed recorded in 2018. While mobile speeds are anticipated to increase from 13.2 Mbps in 2018 to an average of 43.9 Mbps in 2023.

2.3 Global Telecom Sector Reform

Most countries have followed reform strategies to promote their telecom industries, and privatization and competition are the norm of the day. The outcomes are astounding, with the industry expanding at a never-before-seen rate, particularly since the mid-1990s. Prior to ten years ago, the only nations using Mobile Cellular Networks that were linked to the Internet were rare. A few of large national and regional operators dominated the telecommunications industry not so long ago. The industry has been swept up in fast liberalization and innovation since the early 2000s. Governments' monopolies are currently being privatized in many nations throughout the world and are up against a slew of new rivals. Most nations have started a reformation process. People are able to benefit from the positive social and economic life that the communication system provides according to communication technologies, which are also quickly evolving with the times.

2.4 The New Telecom World

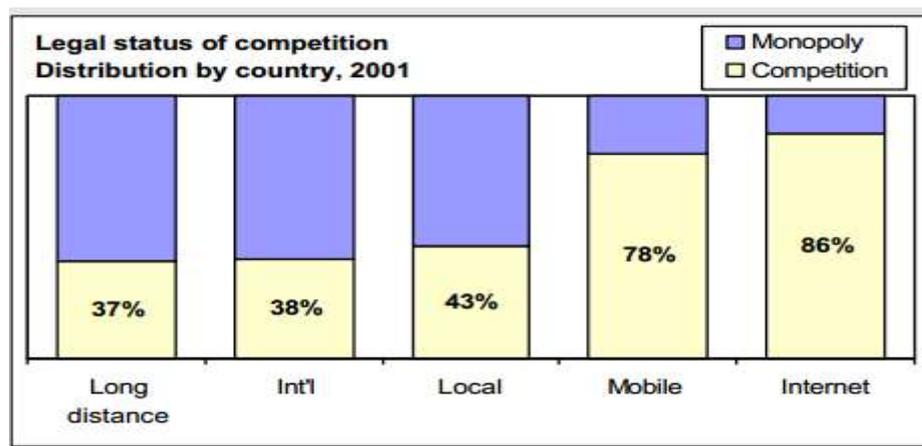
Figure (2.1): Status of Telecom Privatization in 2001



Source from: ITU, World Telecommunications Report 2002

More than half of the nations in the globe had fully or partially privatized their current telecommunications provider at the start of 2002. A privately owned incumbent operator controls 85% of the global market in terms of revenue. Only 2% of fixed and mobile lines are operated by wholly state-owned enterprise. (Figure: 2.1). Although there is now a lot of competition, most nations still have monopolies on fixed-line services including local, international and long-distance calls. (Figure: 2.2)

Figure (2.2): Legal Status of Competition



Source from: ITU, World Telecommunications Report 2002

The vast majority of nations now permit competition in the internet and mobile market segments, which are gradually replacing fixed-line voice service. Competition is introduced when a competitor to the incumbent offers mobile service,

and many developing nations currently have more mobile users than fixed subscribers. The delivery of telecommunication services using radio waves as opposed to a fixed line network makes them more mobile. Website updates and real-time video broadcasts from numerous sources across the world will be delivered to mobile devices.

Three methods exist in which globalization has impacted the telecommunications industry. First, several big telecom operators operate on a global scale and possess operator licenses in various countries. Second, the government is increasingly choosing to include commitments at the treaty level in their efforts to liberalize the market. Third, new international services allow users to continue using the service while they are outside of their home country. These services include mobile cellular roaming, the global satellite system, calling cards, and others.

2.5 Availability of Broadband Internet Access

The rise of mobile services is outpacing that of fixed-line services, and the Internet is beginning to supplant voice as the mainstay of commerce, upending traditional market places. With this expansion, telecommunications infrastructure and new users have been added more quickly than previously. However, the global acceleration of telecom growth rates reversed in 2001, especially in significant industry sectors like mobile and Internet. The telecommunications industry has remade itself, moving away from data (the telegraph) to voice as the engine of growth back and forth between voice (telephone) and data (the Internet).

Broadband Internet access services will improve competition among current physical infrastructure providers and allow service providers to offer a greater range of packaged communications services (such as telephone, Web Access, email, Internet video, etc.). The ways to get Broadband Internet are listed in the table (2.1) below, and getting through Satellite is the most expensive. Developed countries tend to use fiber and wireless systems.

Table (2.1): Availability of Broadband Internet Access

	xDSL	Cable Modern	Fiber	Wireless	Satellite	Broadband over power line (BPL)
Infra-structure	Wire line facilities of incumbent local telecom operator, perhaps leased by enhanced service providers	Cable distribution plant of cable operator	-Fiber cable to the home or customer business	-Wireless fixed point -Wireless Local Area Network -Mobile wireless Broadband	Satellite spectrum of direct satellite service provider	-Low and medium voltage electrical power distribution - very limited area
Band-width	- Asymmetric - usually capable of 1Mb uplink and more downstream	-Symmetric - Asymmetric -Ethernet LAN shared - high peak rate	-100 Gbps	- spectrum license require	- Asymmetric -Narrow band uplink -high downstream peak rate	- up to 100 MHz to 1Gbps
Develop-ment Cost	-Small scale economies on network side upgrade to existing network	- Large fixed costs to upgrade hub	-Large Scale to initial costs	-large scale to initial cost	-very Large fixed costs to established satellite uplink/ downlink	- very Large

Source: Twenty-Seventh Annual Telecommunications Policy Research Conference, 1997

2.6 Broadband Internet Access Penetration

The role of the Internet in communications network and as a venue for electronic commerce is only going to get more significant. Over 26% of American customers already have access to the Internet from their homes, and Internet services and applications are constantly developing and expanding into new markets currently served by other media like telephony and radio. According to the studied from the University of Texas, related firms generate \$301.4 billion in revenue and 1.2 million jobs as a result of the Internet. (Barua, Pinnell, Shutter, and Whinston ,1999)

Denmark, the United Arab Emirates, and Ireland currently hold the top three spots in the list of nations with the greatest internet penetration rates, with each registering 99 percent of its people using the internet. Internet penetration rates of 98 percent were reported for South Korea, the UK, Saudi Arabia, and Switzerland, with

Canada is becoming in second at 97 percent. By the end of July 2022, 63.1 percent of the world's population was using the internet.

Source from: (<https://www.statista.com/statistics/227082/countries-with-the-highest-internet-penetration-rate/>)

2.7 Global Broadband Policy Adoption

2.7.1 EU Broadband Policy

The European Union is a political and economic union made up of 27 member states founded at 1993 that have ratified its founding treaties and hence are subject to its duties. Broadband policy orientations are outlined in the EC's proposed strategic framework, i2010—the European Information Society 2010 (EU, 2005). It emphasizes ICT as a driver of inclusiveness and quality of life while promoting a free and open digital economy. i2010, the EU will work to integrate its policies on the information society and audio-visual media. The following are the three priorities the EC suggests for the information society in Europe and media policy:

- The creation of a single European information space, which supports a free and vibrant media and information industry within of Europe.
- Increasing innovation and spending on ICT research to support growth and the creation of more and better jobs
- Realizing an inclusive information society in Europe that prioritizes better public services and quality of life while supporting job creation and growth in a way that is consistent with sustainable development.

2.7.2 OECD Broadband Policy

Founded in 1961, the Organization for Economic Co-operation and Development – OECD (2009) is a multilateral organization with 38 member nations. Members come from all over the world, including Europe, Asia-Pacific, and North and South America. According to the OECD, decision-makers should weigh the advantages and disadvantages of any public investment in telecommunications infrastructure. Hence, OECD ought to support initiatives that can result in both powerful short-term effects on overall demand and powerful long-term implications on overall supply. Governments in the OECD's member nations have progressively supported market-driven innovation and investment in the ICT sector during the past

three decades. Governments also realized the need of competitive broadband communication networks for fostering social and economic advancement.

2.7.3 Japan Broadband Policy

Japan's broadband service is among the fastest in the world because of increased government funding (DOGC, 2009). Recent expenditures have gone toward the installation of (optic) FTTH networks, which has led to broadband speeds of up to 1 Gbps. In addition to being quick and dependable, FTTH in Japan is also one of the most cost-effective options available. Additionally, in order to advance Japan to the forefront of the rapidly expanding global digital economy, the Japanese government periodically offers subsidies of up to 33% for the maintenance and upkeep of the whole network infrastructure. The new "zero broadband areas eradication" program, which the Japanese government just unveiled, would bring broadband access across the entire nation within two years. With over 30 million individuals connected to high-speed networks, Japan continues to lead the globe in the number of residences connected to optical fiber networks.

2.7.4 Korea Broadband Policy

In order to convert the domestic wired, wireless, and broadcasting communication into an internet networks, the Korea Communications Commission (KCC, 2009) has announced that approximately 34.1 trillion won (which is composed of approximately 32.8 trillion won of private funds and approximately 1.3 trillion won of government funds) will be invested. With a promised speed of 1 Gbps for wired networks and 10 Mbps for wireless networks, KCC intend to create the best convergent infrastructure in the world for wired, wireless, and broadcasting systems. Also, people will be able to use interactive and high-quality services including tutoring, healthcare, civil affairs solutions, and online shopping.

2.7.5 Singapore Broadband Policy

The Singaporean government has ordered that the switch and router operation company and the new national broadband network infrastructure be structurally separated (IDA,2009). The network would get up to 750 million Singapore Dollars in support from the Singaporean government. A Network Company will be chosen to design, build, and operate Layer 1 passive infrastructure that will carry NGN traffic,

which is anticipated to range between 100 Mbps and 1 Gbps to the end user, with a minimum upload speed of 50 Mbps, according to the Singapore government's Request for Proposals for the passive infrastructure. A different Layer 2/3 switches and routers will be used by the operating business to control traffic on the passive infrastructure. The same entity will provide downstream retail service providers with wholesale broadband connectivity.

2.8 Review of Previous Studies

Nwe Zin Nyunt (2018) has researched and analyzed on "the demand side of public sector reform". Her research revealed that MPT had a 100% market dominance position in Myanmar prior to the country's telecommunications reform and that it currently holds a market share of more than 40%. She advised that in order for an enterprise's reform to be successful, certain conditions must be met. These conditions include that employees have a clear understanding of the reform process, that the process is transparent and accountable, that senior management has committed to the reform, that there is regular training for employees on change management, and that the reform has been properly planned for. Her research sought to ascertain the justification for the government's desire to restructure the telecommunications industry during the current MPT restructuring stages as well as to assess how loyal and satisfied customers were with the service plans, prices, procedures, and quality of services offered by MPT following the reform. MPT has been competing with other operators to provide better service to customers with the changed of communication reform requirements.

Nyo Nyo Seint, a candidate of Myanmar, recently conducted a survey on "Customer Satisfaction on MPT Internet Service" in 2014. Her research sought to examine how MPT now offers internet services and to evaluate how satisfied customers in Yangon were with those services. According to the study, respondents used the internet mostly to access up-to-date information both locally and globally. Making social networks was cited as the second motivation for utilizing the internet by respondents. She also discovered that the majority of internet subscribers in Myanmar began doing so in 2012 and 2013. According to Nyo Nyo Seint's analysis, there was a negative gap in all aspects of the MPT service quality. The researcher advised MPT to strengthen the staff' communication and service delivery skills as well as to close the gap between all customers' expectations and perceptions.

Khin Swe Htay (2017) has researched and studied on “the readiness of e-Government in Myanmar”. Her research shows that by studying other developed countries, Myanmar can catch up to other developing countries in terms of development. The residents of Myanmar can benefit from e-Government projects by implementing them successfully across all sectors. Since mobile phone subscriptions make up the bulk of phone subscriptions in Myanmar, merchants and service providers must work to improve mobile applications rather than fixed-line subscriptions, and the government must support the spread of these services throughout the nation. According to the researcher, the development of online services is related to the expansion of high-speed internet networks like fiber to the home (FTTH). Encouragement should be given to mobile and network operators in Myanmar to expand their high-speed internet networks throughout the country, not just in urban areas. Ministries must offer ICT training to government officials, notably chief information officers (CIO), in order to raise the human capital index (HCI). Finally, several in Myanmar e-Commerce solutions, cyber security measures linked to specific e-Government systems are also strongly advised.

CHAPTER III

OVERVIEW OF THE BROADBAND USAGE IN MYANMAR'S TELECOMMUNICATION INDUSTRY

3.1 Telecommunication Sector Background

In Myanmar, Ministry of Transport, Posts, and Telecommunications was founded in 1948 during the post-independence era. Four crossbar switches Exchanged were installed as part of the Yangon Automation project, which MPT began in 1956 and finished in 1962. The Posts and Telegraphs Department was created in January 1960 by combining the two prior major departments. By the end of 1962, there were 14,754 telephone lines and 80 exchanges nationwide, including 4 crossbar automated exchanges in Yangon. The number of telephones reached 21,444 in 1967 and has kept increasing ever since. In 1960, the delta area saw the introduction of the first low capacity microwave transmission system for long-distance communication. At that time, there were also open wire carrier systems with 3 and 12 channels for long-distance communication. At that time, high frequency (H.F.) radio communication was primarily employed for both international telephone and telex services. MPT operated with roughly 143 exchanges in Yangon up to the early 1970s. Six of them included automatic exchanges. At that time, there were around 17,400 telephones in Yangon and 22,000 nationally. The Ministry became the Ministry of Transport and Communications during the socialist era, especially in 1972. The Posts and Telegraphs Department was reformed as the Posts and Telecommunications Corporation on March 15, 1972, in accordance with the Revolutionary Council's general directive to conduct business profitably in the state economic sector.

The primary duties of the telecommunications sector in Myanmar are to provide the country's citizens with public communication services, establish communication centers and routers in accordance with standards, grant licenses to all communications businesses, collect license fees from interested parties, monitor communication services in accordance with laws, rules, and regulations, manage radio frequency resources, and assess the standard and quality of communication services.

After 1988, Myanmar started making improvements in the communication sector. Myanma Posts and Telecommunications (MPT) Enterprise was founded in March 1989 under the Ministry of Transport and Communications followed the implementation of market-oriented reforms.

In Yangon and Mandalay, the first data project known as Packet Switching Exchange was set up in 1996. Telex Exchange was the data transmission service in use prior to this project. Following this initiative, MPT established the Data Communication Department. Later, the name of this division was changed to Information and Technology Department. The second project was the internet service delivery initiative that MPT started in 1998, making it the country's first Internet Service Provider (ISP) and the second was Yatanarpon Teleport (Formerly name: Bagan Cyber Tech). The first Wi-Max Internet service provider in Myanmar was Redlink Company Limited.

According to notification 10/92 issued by the State Law and Order Restoration Council on January 29, 1992, the Ministry of Transport and Communications had been reorganized and restructured into three separate Ministries, namely the Ministry of Transport, the Ministry of Rail Transportation, and the Ministry of Communications, Posts, and Telegraphs. This restructuring process' major goal is to achieve efficient and effective development in economic, nation-building, and transportation and communication initiatives, as well as their corresponding tasks. The Ministry of Communications, Posts and Telegraphs (MCPT) was subsequently established on February 3, 1992, and it consisted of three main divisions. They were the Departments of Posts and Telecommunications Departments, Myanma Posts and Telecommunications, and Meteorology and Hydrology Departments. On August 20, 1999, the Meteorology and Hydrology Department was moved under the Ministry of Transport for a better and more efficient execution of its duties. With the new arrangement, the Ministry of Communications, Posts and Telegraphs (MCPT) will have control over both MPT (the government operator) and PTD (the regulator). According to notification (83/2012) issued by the President Office of the Republic of Union of Myanmar on November 9, 2012, MCPT was renamed the Ministry of Communications and Information Technology (MCIT). President Office issued the Order No. (3/2016) merged On March 30, 2016, the Ministries of Transport and Communications with the Ministries of Communications and Information Technology, Ministry of Transport and Ministry of Railway.

3.2 Telecom Regulator

The regulator of telecommunications in Myanmar is the Posts and Telecommunications Department (PTD) which has the responsibility of supervision on telecommunication sector development on rules and regulations. Posts and Telecommunications Department is the only international contact point and the frequency authorization. Under the Ministry of Transportation and Communications, Department of Telegraphs and Department of Posts were the two departments that existed till 1960. On January 25, 1960, it was established as the Department of Posts and Telegraphs. It was divided into the Posts and Telecommunications Department and the Telecommunications Corporation, or Myanmar Posts and telecommunications, on March 15, 1972. The Government declared that the foundation for Nationwide Comprehensive Development was the growth of the communications and information technology industry. And, the Ministry of Transport and Communications is enhancing the local development of the communications and information technology sector, including the establishing of communications networks, the provision of services of the highest caliber through the use of contemporary technologies, and local and international cooperation programs in the ICT Sector.

Following the Myanmar's independence, there were two businesses: distinct Postal Services and Telegraphs Services. In 1960, these two businesses were transformed into departments with the names of Department of Posts and Department of Telegraphs. Under the direction of the Ministry of Transportation and Communications, Communications Sectors was put into operation. At that time, the Director of Posts and the Director of Telegraphs promoted respectively as department managed by Director General and were responsible for implementing post services in 11 divisions, wireless communications in 2 divisions, and telegraphs in 3 divisions. The Ministry of Transportation and Communications was divided into two organizations as the Posts and Telecommunications Department (which regulated and supervised with local and international laws and rules, instructions in ICT sectors) and Telecommunications Corporation by the new administrative system put into place by Revolutionary Council on the 15th March 1962. (which carried out Telecommunication services such as postal, telegraph and telephones).

Posts and Telecommunications Department regulates the ICT industries and telecom services accordance with the laws, rules, and regulations, in Myanmar. It also represents for Myanmar to take part in international conferences and meetings. Posts

and Telecommunications Department was established as a Grade (3) department in March 1972 with (9) officials, (40) employees, and a total of (49) employees. With the consent of the Cabinet meeting (7/99), the Posts and Telecommunications Department was reformed on February 11th, 1999, with (16) officials, (61) staff members, and a total of (77) staff members as a Grade (2) department. The Union of Myanmar's Cabinet approved the transformation of the Posts and Telecommunications Department, which had total of (819) employees and 196 officials, into a Grade (1) department on January 17, 2013. Posts and Telecommunications Department was reorganized on January 15th, 2015, with the agreement of the Union of Myanmar's Cabinet meeting (2/2015), and now has (163) officials, (566) staff members, and a total of (729) staff members as Grade (1) department.

Table (3.1): Promulgated Telecom Laws and Rules in Myanmar

No.	Law & Rules	Date
1.	The Telecommunication Law	8-10-2013
2.	Licensing Rules	14-10-2014
3.	Electronic Transaction Law	9-6-2015
4.	The amendment of the Electronic Transaction Law (1 st)	3-12-2015
5.	Numbering Rules	3-12-2015
6.	Access and Interconnection Rules	9-6-2015
7.	Competition Rules	3-12-2015
8.	Spectrum Rules	7-3-2016
9.	The amendment of Telecommunication Law	29-8-2017
10.	The amendment of the Electronic Transaction Law (2 nd)	15-2-2021

Source: Post and Telecommunications Department

In the past, there were Myanmar Telegraph Act 1885 and Myanmar Wireless Telegraph Act, 1934. Only these two laws were the laws supervised by the Post and Telecommunications Department. The department has been making efforts to enact for aged to new laws in accordance with the rapid changing of communication technologies. In 2002, with the help of the International Telecommunication Union - ITU, the current communication law was drafted and approved in 2013. As the Post and Communications Department, the telecommunications sector is governed by (2)

communications laws as shown in the table below. It is being managed in balanced way with (5) rules. (Table: 3.1) The State Administration Council has further amended the Electronic Transaction Law in order to regulate it in the interim period before the upcoming cyber security law in 2021. The advantage of developed countries in terms of communication; being able to study the weaknesses and establish the right policies is evidenced by the public's witnessing and feeling of the successful development of the communication sector in Myanmar.

3.3 Wireless Broadband Master Plan for Myanmar

The Myanmar government is dedicated to ensuring that all citizens have access to reliable wireless broadband services and to fostering an environment rich in content that will support a burgeoning online community. Therefore, Myanmar's wireless Broadband Master Plan was developed in 2012 with the help of International Telecommunication Union (ITU). Myanmar poses a special set of difficulties for the development of wireless broadband. The least developed telecommunications market was found in Myanmar (the other selected countries being, Nepal, Samoa, and Viet Nam). The requirements for the country's policies were therefore based on these variables, which include its population of almost 60 million people and its tremendously diversified landscape. In addition to the frequency of MPT currently used in Myanmar, the allocation of frequency is assigned for the new entry operators under the new telecommunications law. And this master plan recommended wireless technologies are suitable for Myanmar. Myanmar's wireless broadband master plan are concentrated on maximizing benefits in terms of coverage and making sure that the delivery of quick and efficient broadband services can be done in a timely manner. In order to offer inexpensive services, it should be encouraged to deploy the most effective technology currently accessible. For the support of high-speed wireless broadband services, early LTE deployment is feasible. While allocating spectrum for wireless broadband for national interest, the Myanmar Government, PTD, agreed to implement the ITU Global Symposium for Regulators 2005 Best Practice Guidelines for Spectrum Management to Promote Broadband Access. Myanmar intended to start with a fast and easy-to-build Wireless Broadband system for access to fast broadband internet like other countries.

3.4 Competition of Telecom Industry

In Myanmar, prior to 2014, Myanmar's telecommunications sector operated as a monopoly business under the existing State-Owned Enterprise law. As for the Myanmar citizens, regarding the telecommunication service, only use for the MPT telephone service of the Myanmar Post and Telecommunications, although the price is high and the quality is no good. In the mobile communication sector, before 2013, the cellular system (1G), CDMA system (2.5G), Mobile systems such as GSM system (2G) were only available in Yangon and Mandalay city areas only, and they were only allowed to use Voice and Short Message Service (SMS) services, and could not use broadband internet communication. Since the earliest Internet connections were established in 2000, Myanmar has had access to the Internet from September 2011.

Around the year 2000, in cooperation with Myanma Post and Telecommunications (MPT) and Bagan Cybertech communication service provided Broadband internet service through Thailand's IPStar satellite network. Myanmar citizen could get broadband internet access from DSL or Cybercafe shops (Public Access Center - PAC) which were used applications such as Gmail, Yahoo mail, Gtalk, VZO, etc., either internationally. However, after Bagancyber Tech took action, Myanmar's broadband communication has been disrupted again. Having to pay about 1500,000 Myanmar kyats (US\$ 1150 estimated) for a SIM card, this was not available to everyone in Myanmar. Government was able to change from a private good that was owned by a group of people used to a public good that can be used by the public.

Since 2010, the national economic reformed along with the changes in the telecommunications sector, after 2013, the emergence of mobile operators who can buy and use the quality at low prices, and broadband communications have become available. Government ran a competitive licensing process in June 2013. With the launch of faster mobile 3G internet by international telecommunications providers Atom Myanmar (Formally Telenor Myanmar –TML from Norway country) and Ooredoo Myanmar (OML) from Qatar country. Ooredoo launched commercial services on August 15, 2014 and Telenor on September 27, 2014 and later joined by national Myanmar Post and Telecommunications (MPT-KSGM joint operation with Japan country) and Myanmar Telecom International (Mytel) joint with Viettel from the Vietnam country entered into market in 2017, internet usage significantly grew to 12.6% in 2015.

Myanmar government arranged mobile phone market to make it available for one thousand five hundred (1,500) Myanmar kyats (US\$1.5 estimated) for one SIM card, which can be used by any class, and everybody can choose the operator they want, and everybody can choose the price and quality as they want. The telecom industry in Myanmar is growing more competitive. With 20 million subscribers, MPT currently leads the market share, followed by ATOM Myanmar (14 million), Ooredoo Myanmar (12 million), and Mytel Myanmar (10 million), for a total of 56 million mobile subscribers in the country. As mobile operators, the SIM card price is the same but the service quality is different. They compete by attracting users with their networking capabilities. (source from Post and telecommunications department)

According to licensing framework, Network Facility Service license (individual), Network Facility Services License (Class) and other telecommunications service licenses namely Network Service license and Application Service license were also allocated depending on the type of service to be provided. Post and Telecommunication Department under the Ministry of Transport and Communications allowed four Nationwide Telecommunications Licenses, number of Network Facilities Service (Individual) License (87), Network Service License (23), Network Facilities Service (Class) License (72), and Application Service License (53) at 1st Feb 2023. A total number of (239) licenses verified in accordance with the law and regulations. Licensed telecommunications operators also compete freely in accordance with the law. In Myanmar, the usage of the Internet through mobile phones is increasing, as well as FTTH services.

Since 2015, there have been a significant number of new Internet service providers, and mobile data usage fees have reduced to 1 MB for 5 Kyat (US\$0.0035), with FTTH monthly fees beginning at 20,000 Kyat (US\$14.19 estimated) for 10 Mbit/s. Prior to the deregulation of the telecom sector, Myanmar had some of the lowest rates of mobile broadband penetration (0.51 percent), fixed telephone lines (1.14 percent), fixed broadband lines (0.014 percent), and mobile cellular penetration (8 percent of the population). (Source from PTD). The evolution of the telecommunications sector before and after the reform is gradually increased and the citizens of Myanmar have access to modern digital literacy and business opportunities.

3.5 Broadband Telecom Services in Myanmar

The value of broadband to a market's economic expansion and citizen interaction is now almost universally acknowledged. While broadband connectivity is just a way to obtain and provide data as quickly as feasible, its role has been identified as being of sufficient importance for it to be described as a human right. Broadband networks may deliver a variety of applications and services including E-commerce, E-banking, E-government, E-education, Paperless work, Social Media and Telemedicine / e-health, etc.

3.5.1 e-Commerce in Myanmar

Individuals in Myanmar are comfortable with shopping and selling online due to easy access to the Internet nowadays. According to data provided by the government, there were 68 million phone numbers in total, or 126% of Myanmar's 54 million people. Many people are utilizing many cell phones, which illustrates how much better communications have impacted the people of Myanmar. Access to the Internet via smartphones has become a way of life in Myanmar because to the country's 4G phones user and internet networks development, particularly in Yangon, where 4G is available in 80% of the cities in Myanmar and ranks in ASEAN's top four after Thailand, Singapore, and Indonesia. The number of fixed broadband subscriptions in Myanmar was estimated to be 893039 in 2021, based on data gathered by the World Bank from reputable sources. In addition the top four websites that Myanmar-based business owners and retailers use to market and sell their goods online are as follows:

- One of Myanmar's leading e-commerce sites from the Alibaba Group uses cutting-edge technologies. The 2012-launched app promises 30,000 vendors, more than 500 brands, more than 2 million products, and 5 million users. It offers a variety of payment options, such as cash on delivery and weekly customer promotions.
- Spree.com.mm established in 2015, claims to be an all-in-one application with features that is easy to use, convenient, quick, and secure for both buyers and sellers. To grow its business throughout Southeast Asia, the company has offices in Thailand and Singapore.
- Barlolo 2016 launch of 3KO Ventures. This website has been created to meet the demands of locals while enabling local business owners to offer free sales

of their wares. Almost 1,000 Myanmar sellers and 50,000 visitors frequent the website each month.

- Metro, a German online wholesale company, offers customers a virtually "one-stop" comfortable shopping experience and specializes in fresh food, processed food products, and kitchenware. The business hit the market in mid-March 2019 with a contemporary warehouse measuring 5,800 square meters that is situated in the Thilawa Special Economic Zone after expanding to more than 36 nations globally. The business is highly known for its cutting-edge logistics and storage equipment.

3.5.2 e-Banking in Myanmar

Early in 2016, state-controlled banks held about 48 percent of banking assets, while privately owned banks held about 52 percent. Also, the loan books of privately owned banks are far bigger than those of their state-controlled counterparts. Loans made up an estimated 61 percent of the assets held by privately owned banks in the beginning of 2016, compared to 15 percent for state-controlled banks. One of the newest services provided by banks in Myanmar, banking services have started to spread widely via mobile. There are numerous advantages to building a mobile banking business model in Myanmar. The Internet has integrated completely into modern life. Many consumers utilize mobile banking in place of traditional commerce to make purchases or pay bills.

One of the business developments in every nation is mobile banking. To simplify consumer transactions, banks produce financial products employing mobile and internet technology. A number of banks are offering their customers mobile financial services in the area, including balance checks, fund transfers, beneficiary payments, and currency exchange rates (Tun, 2019). The Internet has integrated completely into modern life. Many consumers utilize mobile banking in place of traditional commerce to make purchases or pay bills. In Myanmar, there are 49 foreign bank representative offices, 13 foreign bank branches, 9 semi-governmental banks, 14 private banks, and 4 state-owned banks. Due to the numerous banks that are rapidly expanding, Myanmar's banks must compete with other financial institutions by implementing new technologies like mobile banking, internet payments, and other apps. (Kyawt Shinn et al, 2020). By 2025, it is estimated that 710 million more individuals would have signed up for mobile services, with half of these new users

expected to reside in Asia. In Myanmar, mobile banking has only recently emerged and is still expanding and innovating to meet client demands for economic growth. The mobile providers are playing increasingly significant roles in providing their customers with financial services via mobile banking. The fact because Myanmar is still a cash-based society and that it is developing in a way that is appropriate for mobile banking and electronic banking on business development is important in order to expand Myanmar's mobile banking industry.

3.5.3 e-Government in Myanmar

By using ICT as a helpful tool, the e-Government system helps government agencies and enterprises to deliver efficient services. Also, the government implementing e-Government is seen as a wise government, one that cares about sustainability, the welfare of future generations, and so on. Actually, a government's citizens are those who actively employ its public services. With the cooperation of government organizations, ministries, businesses, research teams, agencies, local and international ICT/ e-Government specialists, as well as analytical research on related international experiences, Ministry of Transport and Communication (previous name: Ministry of Communication and Information Technology) began developing the Myanmar e-Governance Master Plan in 2014.

At the beginning, it's crucial for departments carrying out e-Government processes across the nation for the delivery of public services to implement shared applications by integrating and sharing among the activities of a similar kind. Better departmental cooperation and job completion can result from the usage of shared applications that facilitate information flow between various government agencies. For instance, the National Government Portal, the Human Resource Management System, the Document Management System, and the Identity Management System for the Civil Service. As Ministry specific applications such as the Vehicle Registration Management System, Custom Electronic Data Exchange, Crime and Criminal Tracking Systems, and Consumer Protection Platform., some applications are designed to be used in providing particular services in a particular government department. If the Myanmar e-Governance Master Plan's implementation is carried out as planned, Myanmar's e-Government process will advance greatly and its UN e-Government Development Index will rise (EDGI).

Table (3.2): United Nation E-Government Survey for Myanmar

Year	EPI Rank	EGDI Rank	TII	Percentage of individual using internet	Fixed Broadband subscriptions per 100 inhabitants	Active Mobile (Wireless) Broadband subscriptions per 100 inhabitants
2014	172	175	0.0084	1.07	0.01	0.03
2016	170	169	0.0655	49.47	0.27	1.0
2018	181	157	0.2565	25.07	0.17	56.3
2020	168	146	0.5234	30.68	0.24	92.69
2022	-	134	0.6082	35.1	1.27	120

Source: UN e-Government survey (2014, 2016, 2018, 2020, 2022)

The UN e-Government study, which is conducted every two years by the department of economic and social affairs, includes Myanmar as one of the 193 UN members. According to the answers in the table (3.2), the e-participation index (EPI) increased from 172 in 2014 to 168 in 2020. Similarly, the e-Government development index (EGDI) also improved from 175 in 2014 to 134 in 2022. The growth of telecommunication infrastructure index (TII) also increased from 0.0084 in 2014 to 0.6082 in 2022. In addition, the growth of internet access has also increased from 1.07 in 2014 to 35.1 in 2022. In addition, Fixed Broadband access and Mobile Broadband access will also increase significantly between 2014 to 2022 due to the opening of the telecommunications market and the free competition of operators. In addition, during the covid-19 pandemic, the employees were also greatly assisted in working from home by using broadband internet to comply with the covid-19 regulations. A well-rounded strategy and policies to achieve the goal of the e-Government system; Process frameworks and action plans are being systematically formulated and implemented in Myanmar. The Myanmar e-Governance Master Plan (2021-2030) is under construction to be able to continue to develop. In addition, the GPMS (Government Personal Management System), EDMS (Electronic Document Management System) and Government web portals service that can manage government employees and operations, which is the process of e-Government; are also being planned. When employee resumes using GPMS system, appointment and service history; leave record course information; employee evaluation records

information such as staff strength and department structures can be stored securely in various servers and can be easily processed.

3.5.4 e-Education in Myanmar

Technology's advantages have made it possible for higher education to innovate. The universities in the developing countries are also attempting to incorporate e-learning into their conventional educational system due to its affordability, flexibility, and availability. Before implementing e-learning, businesses must first conduct a readiness assessment as a crucial step. At the present, e-learning, as a new paradigm, transforms higher education from instructor-centered to learner-centered and improves teaching and learning by incorporating ICT and internet technologies. The government of Myanmar wants to make sure that every student who graduates from school is comfortable with computers and has a solid understanding of science.

By implementing e-learning in the classroom, universities and schools are encouraged to support their students and improve their learning prospects. Moreover, colleges and universities are setting up computer training centers, electronic resource centers, and IT learning centers. Additionally, as e-learning offers the advantages of being inexpensive, user-friendly, intensely motivating, and widely accessible, it has sparked an increase in demand from developing countries' higher education systems even though they are struggling with a lack of qualified instructors, a lack of updated textbooks, and a lack of adequate teaching resources. ICT-based education will be a key component of Myanmar's higher education reform because, like other nations, Myanmar recognizes that traditional education cannot meet all of the demands of higher education. (Tint, 2012; Po, 2015; Yin, 2016).

Myanmar has some blackout issues in institutions that are recognizing the obstacles caused by e-learning readiness motivate universities need to focus on the right e-learning strategies and preparation. In Myanmar, private schools and universities have been working on e-education since the Covid-19 pandemic period. Moreover, searching and downloading for research thesis papers related to education, academic supporting books, online reading, and study can be done with broadband internet. However, with broadband internet in Myanmar, young people are spending a lot of time on social media and online games which is necessary to carry out appropriate awareness activities.

3.5.5 Paperless Work in Myanmar

As the evolving global village, the ICT sector and human creativity that are easier and smarter social lives are developing depending on technology support. In order to be able to change that, with the Internet of Things (IOT) devices produced based on the Internet, more convenient devices such as being able to view the CCTV camera remotely from one's home are available. The utility of cloud based applications such as Microsoft's office 360 has led to paper less work. Using an EDMS (Electronic Document Management System) eliminates the need for documentation. The information can be sent securely to the relevant person. Email services that can send and communicate safely and save time and effort than sending letters from post offices. Regarding trade issues, the Ministry of Commerce has been conducting trade facilitation through paperless online. The Myanmar Passport Issuing Office also operates an online booking system to facilitate the application of passports for Myanmar nationals to travel abroad. The Myanmar Passport Issuing Office also operates an online booking system to facilitate the application of passports for Myanmar nationals to travel abroad. The Directorate of Investment and Company Registration can also register in Myanmar company online (Myco) application and it is possible to search information of companies all over Myanmar online.

3.5.6 Social Media in Myanmar

In Southeast Asian nation, Myanmar has a population of about 54 million people. People in Myanmar often utilize social media, with Facebook, Instagram, tiktok and LinkedIn being the most widely used platforms. In 2022, there were over 25 million social media users in Myanmar, or about 46% of the population, according to a report by "We Are Social" and "Hootsuite." The number of people in Myanmar who have access to the internet and social media is anticipated to increase during the next few years. Social media is utilized in Myanmar for many different things, such as keeping in touch with loved ones, disseminating news, and meeting people who share common interests. Businesses and organizations often utilize it as a marketing tool to promote their goods and services to a larger audience. Despite the fact that social media is widely used in Myanmar, there are worries about its possible negative effects, such as the dissemination of false information and the possibility for abuse by dishonest people or organizations. Users should be mindful of these concerns and behave appropriately when using social media. Some unscrupulous people use social

media to spread hate speech, financial fraud, hacking someone else's account and stealing information is happening. Therefore, it is necessary for Social Media users to know the negative and positive effects and use broadband internet effectively.

3.5.7 Telemedicine / e-health in Myanmar

Globally, telemedicine is still on the rise, particularly because COVID-19 is still a major issue in most developed nation. Even as immunization rates rise, many people still option to use telemedicine services for their medical needs. By 2028, it is anticipated that the global telemedicine industry will be worth US\$ 636 billion, driven by rising use in online consultation, behavioral health, cardiology, and radiology. Also, more entrepreneurs in the industry are fostering worldwide expansion. Demand for digital telemedicine and tele-health systems is rising throughout the Asia Pacific area as well. Telemedicine services are in higher demand in Myanmar as well. Despite the fact that there are many providers on the market, the large number of instances opened up prospects for other telemedicine providers. In Myanmar, there is a shortage of doctors during the Covid-19 period. Due to the need to avoid patient physical contact, e-Health services have expanded from virtual image communication. However, there is still a need for telemedicine issues to properly maintain information about patients' medical examinations record in hospitals and to connect with other hospitals.

CHAPTER IV

SURVEY ANALYSIS

4.1 Survey Profile

Nay Pyi Taw City has been built in central Myanmar since 2005 and is composed of 8 townships with an area of 2724.748 square miles and a total population of 1114310 (Table - 4.1). Nay Pyi Taw is a capital city where the government headquarters are located, and most of the government employees and employees' families live there. Especially, government employees and their families are living in Thiri five townships. After the establishment of Nay Pyi Taw city, the residents of Pyinmana, Lewe and Tatkon come to work as government employees. There are more than 50 office buildings and the total population according to the October 2022 census data was more than 1.3 million people living in a total area. Mobile Broadband has reached over 96% coverage of the 4G systems of 4 operators, MPT, ATOM, Ooredoo and Mytel. Government offices have been equipped with fiber optic cables and have been connected to Broadband internet access for e-Government process.

Table (4.1) Population in Nay Pyi Taw Townships

No	Township	Square Miles	Population
1.	Dat khi Na thiri	60.28	30810
2.	Lewe	872.248	296598
3.	Oke Ta Ra Thi Ri	320.97	62136
4.	Poke pa Thi Ri	93.14	111040
5.	Pyinmana	425.78	176554
6.	Tatkon	695.88	230547
7.	Zay yar Thire	230.75	107008
8.	Za Bu Thi Ri	25.7	99617
		2724.748	1114310

Source: General Administration Department data 2019

About 500,000 people in Nay Pyi Taw have started using mobile broadband internet after the establishment of Nay Pyi Taw New City and as the emergence of mobile operators such as MPT, ATOM, Ooredoo and Mytel, most of them use at least 2 SIM cards per person. Additionally, after 2021, residents of Nay Pyi Taw who use broadband internet service are able to purchase Fiber to the Home (FTTH) services from providers like MPT, ATOM, OML, Mytel, 5BB, Myanmar Net, mmlink, etc. in addition to mobile communication services. There are pay-as-you-go plans available for mobile internet tariff. Operators have begun to competition so that customers can select and utilize different plans based on their internet and phone conversation usage. Post-paid to Prepaid systems are being adopted for the convenience of mobile phone customers, and bill-filling activities can also be simply purchased and topped-up with refill card systems. It is convenient in mobile banking systems to easily fill up for the payment of voice and data.

According to the data obtained from the Posts and Telecommunication Department, in the below table (4.2) shows 1,891,047 Mobile Broadband users in 2019, 2,060,409 Mobile Broadband users in 2020 and 1,715,010 Broadband users in 2021. In 2021, there were 1688710 (Mobile) and 26300 (Fixed) Broadband User in Nay Pyi Taw Township. Mobile service providers are also providing FTTH services. Fixed Broadband was launched in Nay Pyi Taw in 2021, but the total number of users is lower than in 2020, which may be due to the economic downturn during the Covid-19 pandemic. Mobile broadband service is available with a mobile phone, which is very convenient for Myanmar citizens, but fixed broadband service still needs to be developed a lot in the figure.

Fixed Broadband service is more expensive to set up and difficult to set up than Mobile Broadband, but it offers better usage in data speed and availability. In order to obtain Fixed Broadband internet deployment, telecommunications companies must expand their telecommunications infrastructures, which require coordination and cooperation with relevant state and district local governments' authorities, including the Road and Bridge Department, local municipalities, the Department of Electricity, and relevant Right of Way landowners. The Telecommunications Law, technical standards, and other associated departments' regulations must therefore be followed by all telecommunication licensees.

Table (4.2): Broadband Internet Users in Nay Pyi Taw

No.	Operator Name	2019 Customers	2020 Customers	2021 Customers
1	MPT (Mobile)	584521	559255	494712
2	MPT (FTTH)	-	-	2685
3	ATOM(Mobile)	540000	432000	419000
4	ATOM (FTTH)	-	-	419
5	Ooredoo (Mobile)	312526	594154	389998
6	Ooredoo (FTTH)	-	-	3255
7	Mytel(Mobile)	454000	475000	385000
8	Mytel (FTTH)	-	-	1850
9	Mmlink (FTTH)	-	-	3850
10	MyanmarNet (FTTH)	-	-	14046
11	5BB Internet(FTTH)	-	-	195
	Total Broadband User	1891047	2060409	1715010
		Only (mobile)		(Mobile + Fixed)

Source: from Posts and Telecommunications Department

4.2 Survey Design

A quantitative case study technique was used in this survey to better understand how broadband users feel about competition and private sector involvement in the telecommunications sector. To arrive at the desired sample size, random sampling is performed. The questionnaire used for the survey gathered primary data. The survey questions specifically addressed Nay Pyi Taw's broadband internet users and made reference to earlier studies in the field. During the period of the COVID -19 pandemic and the unstable conditions of the country, the research paper was conducted with a Google survey forms and the survey link was distributed to Broadband users in Nay Pyi Taw via email or Viber application. Regarding the research paper, it was explained simply in Myanmar language so that the respondents could easily understand and answer. In some questions, respondents were allowed to choose more than one answer because users used more than one. The respondents only had to do it for a maximum time of 5 minutes, and it was done in a way that they had to easily choose.

The survey questionnaire consists of five sections. In the first segment, demographic information about a person's gender, age, level of education and income status were collected. The availability of broadband internet, the type of broadband service use, the amount of time spent using it, its speed, information on phone ownership, and the choice of service providers were all covered in the second section. The third section was about the issue of using internet experience on respondents. The fourth section was the user perception on how satisfaction with Internet Service Providers and the fifth section was also user knowledge of internet security issue on Myanmar.

4.3 Survey Finding

4.3.1 User's Personal Information

As a result of table (4.3) conducting research on user data, there were 207 respondents answered the questionnaire survey. This study is conducted with the percentage of respondents in the gender, marital status, family member, age, literacy skill, occupation and income. The information of 207 respondents from the Nay Pyi Taw survey, there are 125 women and the percentage is 60.40 percent. There are 82 male respondents and the percentage is 39.60 percent. When examining the marital status of the respondents, 36.7 percent of the respondents were unmarried. There are 59.4 percent of married people and 3.9 percent of those who don't want to answer. The respondents of family members are examining 15.5 percent of the respondents had less than 2 family members. 26.6 percent of 3 family members; 26.1 percent have 4 family members and 31.9 percent have more than 5 family members.

Regarding the Broadband Survey shows the age range of the respondents which have 1% of the respondents were under the age of 16, 8.2% between the ages of 16 and 25, 20.8% between the ages of 26 and 35, 33.8% between the ages of 36 and 45, and 36.2% over the age of 46. Therefore, it was found that the majority of adults in Nay Pyi Taw use Broadband Internet.

The percentage of respondent's literacy skill was with high school education and less than high school education is 5.3%. The percentage of out-of-school education is 2.4%, 34.8% of those with a degree, 17.4% of graduates/diploma and 40.1% of masters/PHD. Therefore, people who responded were highly educated.

Under the occupation of the respondents, the number of dependence/ housewife is 4.3%. The number of students in the studying is 1% and 3.9% of respondents is still looking for the job. The number of government employees is 72.9%. The number of company staff is 12.1%. The person who operates its own business is 5.8%. The area where the research paper was collected is Nay Pyi Taw, which is where most of the government employees and their families live.

In survey of the respondent's income status were shown, 9.18% of respondents were no income stage because of the dependent/ housewife, still looking for job and student. 0.48% of those with an income of 100,000 kyats or less, 4.83% of those who earn from 100,001 kyats to 200,000 kyats, 21.74% of those who earn from 200,001 kyats to 300,000 kyats, 40.60% of those who earn from 300,001 kyats to 400,000 kyats, 7.25% of those who earn between 400,001 Kyats and 500,000 kyats and 15.94% of those with an income above 500,001 kyats. The respondent's income status shows the broadband internet user can be affordable to use with their income. Although there is no income, it is seen that the broadband internet can be used either by using the internet for free at the start of use from mobile service providers, or by using the FTTH service installed at home by the family or from places with Public Free Wifi areas (for example - schools, temples, airports, etc.).

Table (4.3): Personal Information of the Respondents

Subject	Description	Respondents	Percent
Gender	Male	82	39.60%
	Female	125	60.40%
Marital Status	Single	76	36.70%
	Married	123	59.40%
	Not Answer	8	3.90%
Family Member	Under 2 persons	32	15.50%
	3 persons	55	26.50%
	4 persons	54	26.10%
	5 persons and above	66	31.90%
Age	Under 16 years	2	1%
	16 years to 25 years	17	8.20%
	26 years to 35 years	43	20.80%
	36 years to 45 years	70	33.80%
	46 years to above	75	36.20%

Table (4.3): Personal Information of the Respondents (Continued)

Subject	Description	Respondents	Percent
Literacy Skill	Higher education and lower than	11	5.30%
	Out of school education	5	2.40%
	Graduate	72	34.80%
	Post Graduate/Diploma	36	17.40%
Occupation	Dependent / housewife	9	4.30%
	Student	2	1%
	Still looking for a job	8	3.90%
	Government Staff	151	72.90%
	Company Staff	25	12.10%
	Self-employed	12	5.80%
Income (One Month Salary)	No Income	19	9.18%
	100000 Kyat and lower	1	0.48%
	100001 Kyat to 200000 Kyat	10	4.83%
	200001 Kyat to 300000 Kyat	45	21.74%
	300001 Kyat to 400000 Kyat	84	40.60%
	400001 Kyat to 500000 Kyat	15	7.25%
	500001 Kyat and above	33	15.94%

Source: Survey data 2022, December

4.3.2 Status of Broadband Internet Availability

According to the survey result in table (4.4), these questions were allowed to answer more than one of their choices because respondents were used more than one. 168 numbers of the respondents in 81.2% percent were using from the MPT mobile service providers. There are 62 numbers of the respondents in 30% percent from ATOM mobile service provider. There are 59 numbers of the respondents in 28.5% percent from Ooredoo mobile service provider. There are total numbers of 44 respondents with a percentage of 21.3% from Mytel mobile service provider. In Myanmar, MPT mobile phones were used first, and there were other operators that appeared later, but most of them continue to use MPT phones royalty and using some other phones as a backup, so the frequency is high.

In terms of behavior of Internet users, they used the Internet in 53.60% of mobile phones users and the 69.60% of users used WiFi network. There are a few

1.90% numbers of ADSL users still in Nay Pyi Taw. There are 14.50% Fiber to the Home (FTTH) users and both Mobile & FTTH users have 37.20% in the survey result.

Mobile phone users can use it without having to set up internet access permission from mobile operators, but depending on the devices they use, such as 2G, 3G, 4G, and Android / IOS handsets, etc., the ease and convenience of using broadband internet may differ. It has 3.40% users of Keypad Phone/Feature mobile phone usage. There are 75.40% of Smart Phone (Android Application) users. Apple Phone (IOS Application) users are 27.10%. According to the answers, it is showed that broadband Internet user mostly used on Smart Phone (Android Application) other than feature phone and Apple Phone.

According to the responses, 11.1% of users access on broadband internet speed of 1 Mbps ~ 3 Mbps; 3 Mbps ~ 5 Mbps speed users 15.5%; 5 Mbps ~ 10 Mbps internet speed users in 17.9%; 10 Mbps ~ 20 Mbps internet speed users in 32.9%; 20 Mbps ~ 30 Mbps internet speed users in 15.5% and 30 Mbps & Above internet speed users are 7.2%. According to the table of the respondents, it can be seen that 10 Mbps ~ 20 Mbps speed is mostly used, and 3 Mbps ~ 5 Mbps speed user is the middle level.

According to the table of the respondents, the study of the time using in the internet per day is 8.7% in below 1 hour. 23.7% user is used in 1 Hour to 2 Hour. 19.8% user is accessed in 2 Hour to 3 Hour, 15.5% users used in 3 Hour to 4 Hour and 32.4% user accessed in above 4 Hour per day. It is seen that the respondents mostly used broadband internet in above 4 hours and the least internet using time per day is below 1 hour.

There are many users who depend on the presence of free WiFi network access, and both mobile and FTTH users are discovered to coexist depending on their work situation and their income status. Most of the Internet users used mobile Internet if they need to use it on the way while they are traveling, and used FTTH when they reach their home or residence.

Table (4.4): Status of Broadband Internet Availability

Subject	Description	Frequency	Percent
Mobile Service Provider	MPT	168	81.20%
	ATOM	62	30%
	Ooredoo	59	28.50%
	Mytel	44	21.30%
Types of Using Internet	Mobile Phone	111	53.60%
	Wifi / Hot spot	144	69.60%
	ADSL	4	1.90%
	Fiber Cable, FTTH	30	14.50%
	Both Mobile & FTTH	77	37.20%
Types of Using Phone	Keypad Phone/ Feature Phone	7	3.40%
	Smart Phone (Android)	156	75.40%
	I Phone (IOS)	56	27.10%
Internet Speed	1 Mbps ~ 3 Mbps	23	11.1%
	3 Mbps ~ 5 Mbps	32	15.5%
	5 Mbps ~ 10 Mbps	37	17.9%
	10 Mbps ~ 20 Mbps	68	32.9%
	20 Mbps ~ 30 Mbps	32	15.5%
	30 Mbps & Above	15	7.2%
Using Internet Hour (per day)	Below 1 Hour	18	8.7%
	1 Hour to 2 Hour	49	23.7%
	2 Hour to 3 Hour	41	19.8%
	3 Hour to 4 Hour	32	15.5%
	Above 4 Hour	67	32.4%

Source: Survey data 2022, December

4.3.3 Issue of the Internet Usage

In this questionnaire were allowed to participate in more than one answer of their choice and mostly used of internet application by the respondents. According to the table (4.5) show the percentage of people who used the e-mail is 61.8%. The percentage of social media used is 82.6%. There is 49.3% percentage used of knowledge searching by searching engine application. Online conferencing and

education percentage used are 43%. There are 23.7% of talking with voice over Internet protocol (VOIP) and chatting with other. The percentage of online banking users is 21.3% and the percentage of 18.4% user used in online shopping. 32.4% users used an online entertainment application (such as YouTube), online stream movies, online music and online radio, etc.

The percentage of people who play online games individually or in groups is 11.6%. 7.7% of the percentage of remote monitoring recorded by connecting CCTV online and 3.4 % used accessing the other Internet service. Therefore, the used of social media (Facebook, Instagram, Twitter, Tiktok, etc..) is the highest in the survey and the secondly usage was email communication with each other. Thirdly, online searching and online meeting / online education which are widely used because of Covid -19 pandemic time.

Table (4.5): Purpose of Using Internet Application

No.	Description	Frequency	Percent
1	Using Email	128	61.80
2	Social Media (Facebook, Instagram, Twitter, Tiktok, etc..)	171	82.60
3	Searching for Education, Health, business, Research, etc.)	102	49.30
4	Online Education/ meeting (Zoom meeting, Microsoft Team, Webinars, etc.)	89	43
5	VOIP (Viber, Messenger, Line, Whatapp, telegram, Wechat, etc.)	49	23.70
6	Online Banking System	44	21.30
7	Online Shopping	38	18.40
8	Entertainment (Youtube, Movie app, Smart TV, Radio, Music, etc.)	67	32.40
9	Playing Game	24	11.60
10	Using CCTV	16	7.70
11	Other	7	3.40

Source: Survey data, 2022 December

The study of 207 respondents table (4.6) answered that the user experience on the broadband internet using in Nay Pyi Taw. The respondents scale which is 3.3 agreed found the lots of knowledge gain from Ministry websites. Most of the respondents, 3.4 are agreed on much Myanmar language on web pages written has been found. And the respondents, average scale 2.6 agreed of arrival of unsolicited advertisement in their email. The average scale of 3 on social sites such as your face book page being visited by people who was you did not know them. Using social network as marketing posts was 3.4 scales. The respondents of average scale which is 2.3 disagreed on hate speech in the social network and highest scale which is 4.5 in strongly agreed on real time information get from internet as a globally.

Table (4.6): Users' Experiences in Broadband Internet

No.	Description	Mean	Standard Deviation
a.	Much Myanmar language on web pages writing has been found.	3.4	0.851091
b.	Lots of knowledge on ministry websites found.	3.3	1.026249
c.	The arrival of unsolicited advertisements in your e-mail	2.6	1.200953
d.	On social sites such as your Face book page being visited by people you doesn't know	3	1.278583
e.	Using social networks as marketing posts	3.4	1.077308
f.	Hate speech on social networks	2.3	1.344142
g.	Real-time information like global village availability of hands.	4.5	0.629393

Source: Survey data 2022, December

Regarding table (4.7), according to 207 respondents answered on knowledge of the benefits and disadvantage of internet usage in their daily lives. Highest scale 4.5 is strongly agreed on being able to find what they want to know at any time with the internet and on being able to study online. 4.3 scales strongly agreed on ability to search and learn the weather or other useful information that they want to know through the internet and online shopping using the Internet; phone bill & meter bill Saving time and effort by using online banking systems. 3.5 scales of the respondents

agreed on ability to play online game in groups and 4.2 scales also agreed making friends on the internet and being able to speak with online talk like Messenger talk, Viber talk, Gtalk and Whatsapp, etc. The respondents agreed knowing the usefulness of IOT devices (including wireless sensors, software, actuators, computer devices and more) on 3.7 scales and used in their surroundings of offices and home.

According to the result, 2.2 scales disagree on use of the Internet with inappropriate pornography, viewing images/issues and distribution. This is an important factor to comply with the morals of the human rights in the community. Moreover, most respondents answered that the user have a lot of knowledge and awareness on the benefit / disadvantage of internet environment and social being lives.

Table (4.7): Benefits and Disadvantage of Internet

No.	Description	Mean	Standard Deviation
a.	Being able to find what you want to know at any time with the Internet.	4.5	0.674604
b.	Being able to study online through the Internet.	4.5	0.644161
c.	Ability to play online games in groups over the Internet.	3.5	1.181681
d.	Making friends on the internet and being able to speak.	4.2	0.765993
e.	Ability to search and learn the weather that you want to know through the Internet; knowledge news the film, music and agriculture.	4.3	0.73183
f.	Home with Internet-enabled Internet of Thing (IoT) devices on Office, lighting, Air conditioner etc. from a distance being able to control.	3.7	0.983614
g.	Use of the Internet and inappropriate pornography, viewing images/issues, Distribution.	2.2	1.239808
h.	Online shopping using the Internet; phone bill & meter bill Saving time and effort by using online banking systems.	4.3	0.73391

Source: Survey data 2022, December

As in the table (4.8), the highest scales strongly agreed the important of broadband access to the nation. The respondent answered which is average scale 4 strongly agreed on a lot of internet access is a country's GDP improve. If the country uses ICT with broadband internet and employment opportunities are favorable, the country's manufacturing GDP will increase. 3.9 agreed in car services (such as Grab, Ubar, etc) which use the internet manage system in Taxi services. Customer satisfied the correct price which is according to the distance traveled. This car service is able to call the nearest car service through the Internet. For the safety of the passenger, the car service information, including the driver and routing, can be recorded, so that factors such as reliability can be obtained. The average scale 4.3 strongly agreed on used of the internet mapping system to search for a route make it easy. In addition, using the internet road map system, user will be able to reach unknown places easily in short time.

The average scales which are 4.5 and 4.6 strongly agreed on developing country which needs the electronic government system implemented when broadband internet is available. And when the Internet system is excellent condition, it will become Smart Government activities and the whole countries systems, including Smart City, will be managed smartly. This survey views on the country's digital system development need the broadband internet system.

Table (4.8) How broadband usage is important to the country?

No.	Description	Mean	Standard Deviation
a.	A lot of internet access is a country's GDP to improve.	4	0.820736
b.	Use of Grab / Ubar taxi; using internet navigation system in having regular satisfaction.	3.9	0.777238
c.	Use the internet mapping system to search for a route make it easy.	4.3	0.668949
d.	In developing the country's electronic government system Internet access is required.	4.5	0.666631
e.	Smart government to make the country's living system in smart and to be a smart city, which must have a good internet system.	4.5	0.637611
f.	Internet for digital development of the country and communication (broadband) needs to be improved.	4.6	0.582566

Source: Survey data 2022, December

4.3.4 Satisfaction with Internet Service Providers

In this survey, table (4.9) show the respondents are chosen their experience and satisfaction on using internet service. The average scale 2.7 and 3 agreed the slow internet connection while using internet and not getting full Mbps of purchased speed. 2.4 disagreed on long time disconnection of internet and cut off their unused bill. For Internet users, to get full Mbps service that is worth the price of the package they purchased and uninterrupted internet.

Moreover, the respondents answer that they don't want the money to be cut off because they don't have to spend it. The respondent's answer which is 3 agreed on internet usage costs highly. It can be observed that the internet charges should be lower than the normal price and to be affordable for the people in the whole of Myanmar.

Table (4.9): Satisfaction on Internet Service Provider's Quality of Service

No.	Description	Mean	Standard Deviation Score
a.	Slow internet connection while using.	2.7	1.407032
b.	Long time disconnect internet.	2.4	1.192782
c.	Not getting full Mbps of purchased speed.	2.7	1.368263
d.	High usage costs.	3	1.289304
e.	Cut off your unused bill.	2.4	1.297373

Source: Survey data 2022, December

Regarding in the table (4.10), the highest scale 4.2 strongly agreed on choose the operator they want to use availability of usability. And 3.7 agreed on easy to inquire their service provider if they don't know and understand for using the internet service plan. Respondent's scales 3.5 and 3.4 scales agreed on the operator compensation for re wrongful charge deductions and giving replacement for remedy on internet outage time. Respondents answered 3.2 scales agreed on fully refund for unused internet package.

Most of the answers appear to be the responsibility of the operator. Operators look at the needs of users and find that they are satisfying. According to the responses of the respondents, compensation for the mistakes made by the operators, Outage replacements have been found, so it is known that there is consumer protection.

Table (4.10): Consumer Protection for Internet User

No.	Description	Mean	Standard Deviation Score
a.	Full refund If you don't want to use the purchased packages	3.2	1.328876
b.	Choose the operator you want to use availability of usability	4.2	0.846865
c.	Re: Wrongful Charge Deductions, Compensation	3.5	1.350564
d.	Remedy on internet outage time, giving Replacement	3.4	1.392978
e.	Easy to inquire if you don't know or understand.	3.7	1.113278

Source: Survey data 2022, December

4.3.5 Internet Security Issues

According to the table (4.11), most respondents 4.4 scales on strongly agreed the security password used on devices that using the internet. Also, 4.6 and 4 scales on strongly agreed the internet must be quick and safe as the nation's electronic government system is being developed and while connecting to the internet using the necessary device had licensed antivirus and need to be malware software updated.

As a result 3.9 scales agreed on website passwords are regularly changed in a systematic manner. 2.7 scales answered agreed on not having faith in the security of internet banking systems to protect their money. Result of 2.9 and 2.6 scales agreed on online social network usage strategies leak, infected with a virus on their computer or phone. The respondent 2.3 scales disagreed on stealing distribution, forcing appointment, and collecting online users' personal data and 2.4 scales disagreed on internet marketing posts that commit fraud. The most answered point is Internet users have knowledge about the online and are aware of the security of the devices they are using, but it has been found that there are scans on virus infections, and online insecurity.

Table (4.11): Awareness of Internet Security

No.	Description	Mean	Standard Deviation
a.	Security password on devices that use the Internet.	4.4	0.773518
b.	Systematically the password of the websites uses frequent change of use.	3.9	0.970606
c.	Secrets to using social networks online leaks being barked at.	2.9	1.361287
d.	Virus infection on your computer / phone.	2.6	1.432518
e.	Not trusting the security of your money from online banking systems.	2.7	1.228406
f.	Stealing distribution; Forced appointment, Personal information of others using the Internet.	2.3	1.363576
g.	Fraud from online marketing posts.	2.4	1.378968
h.	In developing the country's electronic government system, the internet needs to be fast and secure.	4.6	0.72069
i.	In the equipment used to connect to the internet, Update antivirus and malware software, Use with license.	4	0.945045

Source: Survey data 2022, December

CHAPTER V

CONCLUSION

The efficient participation of individuals, businesses, and organizations in today's economic environment depends on broadband infrastructure. The fastest method to employ available scientific and technology resources to boost economic growth is to provide quick access to useful information. The exchange of knowledge and information has an impact on political and economic systems in addition to people's daily lives. The foundation of e-business, e-business procedures (methods of implementing business operations using ICT) and e-commerce transactions are the three primary pillars of the digital economy (sales via the Internet).

As the countries of the world are making policies for broadband internet access development, Myanmar also has policies that will be consistent with its own country in compliance with laws and regulations. Broadband internet service providers also need to be ethical in the market and provide services to the public at fair prices and good quality in accordance with regulations. If there has an effective competition in telecommunications market, the quality of service will be good and the price will be affordable. To make this happen, government officials need to properly regulate telecommunication service providers.

5.1 Findings

This research studies the users' perception on Broadband service in competitive telecommunication industry. Mobile broadband service is available with a mobile phone, which is very convenient for Myanmar citizens, but fixed broadband service still needs to be developed a lot in the survey. There were 207 respondents with more female respondents than male respondents. The marital status of the respondents also shows that the number of married people is more and the number of family members is 3 to 5. In the age range of the respondents, majorities were over 30 years old and less minority were under 16 years old. The literacy rate of the respondents was also found with a fair proportion of simple bachelor's and master's

degrees and those who only had high school education were small number. Since Nay Pyi Taw is also a place of employment there are many government employees and the proportion of self-employed and company employees were fair. Majority of respondents were with the earnings in 300,000 kyats to 400,000 kyats, and followed by the earning in 200,000 kyats to 300,000 kyats. Therefore, it can be found that respondents are well educated and most of them have a middle income.

This study found that MPT phone users were in a large number, while the rest were in use of other operators (ATOM, Ooredoo and Mytel) in balance. There could be seen that a large number of Internet users had been using mobile phones and Wifi Hotspot users, and FTTH users have been started using FTTH since 2022 in the Nay Pyi Taw. The largest number of internet users was mobile smart phones, the second was IOS, and a small number of keypad phone users were found there. Most answers of usage for Internet speed was between 10 Mbps ~ 20 Mbps and many respondents use it for more than 4 hours a day.

Survey found the issue of using internet on the application. The answer of respondents in sending an email through the Internet working was most agreed and social networking and other searching engine were also agreed. Despite the economic decline during the Covid-19 period, online shopping and online meetings have been increased and Internet usage has been increased. Respondents agreed on the disclosure of important and useful information on governments' websites. It was also strongly agreed about the usefulness of the Internet as a global village.

Disagree was with the hate speech on Internet. Timely availability of information you want to search on the Internet and online shopping, online banking like a global village were answer with strongly agreed. However, the distribution of obscene images inappropriate to Myanmar culture and the display were disagreed. In addition, making friends online, chatting, Gaming and IOT device usability were agreed upon. With the efficient use of internet access, per capita income will increase and the country's GDP will increase. Internet-based transportation, road map system and the way finding ability were answered with mostly agreed. It was also found that strongly agree of broadband internet was important in the areas of smart government and digital development.

Regarding the respondents perceptive on their satisfaction of internet service show that most responses were disagreed on the internet connection slow, disconnection time so long, not getting the full Mbps speed and cutoff bill not used.

But they answered agreed on internet usage cost highly. In the consumer protection point have the respondents were agreed on compensation and outage time replacement from the service provider. And there was strongly agreed on choice of the operator they like and easy to enquiry for information. The majority of the answers mentioned that the operators' responsibility was discovered. As a result of the reforms in the telecommunications sector, users have the right to choose, and operators do not neglect the perception of users, and value of quality.

This survey focus on the user awareness on the internet security, the majority of respondent was strongly agreed in favor of security passwords for internet-connected gadgets. As the country's electronic government system is being created, while connecting to the internet, using the essential gadget which had licensed antivirus and malware software were needed to be updated. Therefore, that was strongly concur the internet must be swift and safe. As a result, the respondents were routinely and methodically update passwords for the websites.

The respondents did not agreed in the security of online banking systems to secure their money received with a neutral response. The respondents disagreed with the fraud online marketing post in their cyberspace. Infection with a virus on their computer or phone, distribution of stolen goods, coercion of appointments, collection of personal information about online users, and internet marketing messages that engage in fraud are all outcomes of severely disagreeing with online social network usage techniques. Previously, the majority of computers in Myanmar were used for recreational purposes, and users rarely employ the security or virus protection built into their machines. However, in this survey, it was discovered that currently used in virus protection for the safety of internet.

5.2 Recommendations

In this research, due to time constraints and only studies at Nay Pyi Taw region, countrywide thorough investigation cannot be conducted. Moreover, compared to other countries' broadband policies, it was found that there are still many things needed to be done. However, in Myanmar, there has already basic Broadband Infrastructure started and knowing the pros and cons of using the Internet. It is necessary to constantly analyze survey of the perception of broadband users for the whole country.

In Myanmar, there is still a need to spread not only wireless broadband (mobile broadband) but also fixed broadband. It was found that even in Nay Pyi Taw, where the government is located, fixed broadband has just been started to use after 2021. As internet service providers, they need to act ethically in order to satisfy their customers. For the need of customer satisfaction, Internet Service Provider should maintain their commitment of Service Level Agreement (SLA), complaints related to Quality of Service (QoS) and customers need to be dealt with carefully. It is needed to be done for establishing policies and ensuring that services are not provided without a license, avoiding the leaking money or sensitive information online as it. It is necessary to protect the security of users' information, compliance with laws and regulations required by relevant ministries and government departments.

By saying hate speech, race, Religion and culture can cause hostility towards each other, which can affect the social economy of the country, so it is necessary to be careful and protect it. Government should make activities to promote awareness on not making online hate speeches and not misusing the internet. Encouraging for government department websites must always be dynamic and government/department are also to be able to operate online properly. It is also necessary to increase the number of content websites and applications written in Myanmar language. Officials need to supervise the use of online activities, such as sales pages and online banking, to prevent users from being cheated. Moreover, it is needed to take necessary precautions for internet security and awareness of constant emerging viruses and malware and to make software licenses for widely accessible to everyone.

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APPENDIX

" A STUDY OF USERS' PERCEPTION ON BROADBAND SERVICE IN COMPETITIVE TELECOMMUNICATION INDUSTRY"

(Case Study: Nay Pyi Taw)

(Conducting a survey for the thesis)

As a requirement for the Master of Public Administration (MPA) degree, a bibliography must be compiled, so I would like to collect the necessary information for Thesis research. The information obtained from this survey will be used only for education and research and will not be used for any other purpose and will be kept confidential.

I. Personal User's Information

1. Sex (gender)

- Male
- Female

2. Marital status

- Single
- Married
- Not Mention

3. Family Members

- Under 2 persons
- 3 persons
- 4 persons
- 5 persons and above

4. Age

- Under 16 years
- 16 years to 25 years
- 26 years to 35 years
- 36 years to 45 years
- 46 years to above

5. Literacy Skill

- Higher education and lower than Higher education
- Out of school education
- Graduate
- Post Graduate/Diploma
- Master/ PHD

6. Occupation

- Dependent / housewife
- Student
- Still looking for a job
- Government Staff
- Company Staff
- Self-employed

7. Income (One Month Salary)

- No income
- 100000 Kyat and lower
- 100001 Kyat to 200000 Kyat
- 200001 Kyat to 300000 Kyat
- 300001 Kyat to 400000 Kyat
- 400001 Kyat to 500000 Kyat
- 500001 Kyat and above

II. Status of Broadband Internet Availability

8. What type of mobile SIM card do you use? (You can answer more than one)

- MPT 2G/ 3G/ 4G
- ATOM 2G/ 3G/4G
- Ooredoo 2G/ 3G/4G
- Mytel 2G/ 4G

9. Which type of internet service do you use? (more than one can be answered)

- Mobile Phone
- Wifi / Hot spot

- ADSL
- Fiber Cable, FTTH
- Both Mobile & FTTH

10. What type of phone do you use? (You can answer more than one)

- Keypad Phone/ Feature Phone
- Smart Phone (Android Application)
- I Phone (IOS Application)

11. What type of equipment do you spend a long time using the Internet? (You can answer more than one type)

- Mobile Phone
- Tablet/ iPad
- Desktop/ Laptop

12. What internet speed are you using?

- 1 Mbps ~ 3 Mbps
- 3 Mbps ~ 5 Mbps
- 5 Mbps ~ 10 Mbps
- 10 Mbps ~ 20 Mbps
- 20 Mbps ~ 30 Mbps
- 30 Mbps & Above

13. How many hour do you use the internet per day?

- 1 Hour and below
- 1 Hour to 2 Hour
- 2 Hour to 3 Hour
- 3 Hour to 4 Hour
- 4 Hour to above

III. Issue of using the Internet

14. You can select the application that uses the most time for internet (more than one answer).

- Using Email
- Social Media (Facebook, Instagram, Twitter, Tiktok, etc..)

- searching for Education, Health, business, Research, etc.)
- Online Education/ meeting (Zoom meeting, Microsoft tem meeting, Webinars meeting, etc.)
- VOIP (Viber, Messenger, Line, Whatapp, telegram, Wechat, etc.)
- Online Banking System
- Online Shopping
- Entertainment (Youtube, Movie app, Smart TV, Radio, Music, etc.)
- Playing Game
- Using CCTV

15. Please choose the following experiences when using the Internet (1) Strongly Disagree (2) Disagree (3) Neutral (4) Agree (5) Strongly Agree.

a.	Much Myanmar language on web pages writing has been found.	1	2	3	4	5
b.	Lots of knowledge on ministry websites found.	1	2	3	4	5
c.	The arrival of unsolicited advertisements in your e-mail	1	2	3	4	5
d.	On social sites such as your Face book page being visited by people you doesn't know	1	2	3	4	5
e.	Using social networks as marketing posts	1	2	3	4	5
f.	Hate speech on social networks	1	2	3	4	5
g.	Real-time information like global village availability of hands.	1	2	3	4	5

16. The benefits/disadvantages of using the internet on (1) Strongly Disagree (2) Disagree (3) Neutral (4) Agree (5) Strongly Agree.

a.	Being able to find what you want to know at any time with the Internet.	1	2	3	4	5
b.	Being able to study online through the Internet.	1	2	3	4	5
c.	Ability to play online games in groups over the Internet.	1	2	3	4	5
d.	Making friends on the internet and being able to speak.	1	2	3	4	5
e.	Ability to search and learn the weather that you want to know through the Internet; knowledge news the film, music and agriculture.	1	2	3	4	5
f.	Home with Internet-enabled Internet of Thing (IoT) devices on Office, lighting, Air conditioner etc. from a distance being able to control.	1	2	3	4	5
g.	Use of the Internet and inappropriate pornography, viewing images/issues, Distribution.	1	2	3	4	5
h.	Online shopping using the Internet; phone bill & meter bill Saving time and effort by using online banking systems.	1	2	3	4	5

17. Internet in the following circumstances/conditions (1) Strongly Disagree (2) Disagree (3) Neutral (4) Agree (5) Strongly Agree.

a.	A lot of internet access is a country's GDP to improve.	1	2	3	4	5
b.	Use of Grab / Ubar taxi; using internet navigation system In having regular satisfaction.	1	2	3	4	5
c.	Use the internet mapping system to search for a route make it easy.	1	2	3	4	5
d.	In developing the country's electronic government system Internet access is required.	1	2	3	4	5
e.	Smart government to make the country's living system in smart and to be a smart city, which must have a good internet system.	1	2	3	4	5
f.	Internet for digital development of the country and communication (broadband) needs to be improved.	1	2	3	4	5

IV. Satisfaction with Internet Service Providers

18. Regarding the following quality on the operator who provides the service and when using the Internet. (1) Strongly Disagree (2) Disagree (3) Neutral (4) Agree (5) Strongly Agree.

a.	Slow internet connection while using.	1	2	3	4	5
b.	Long time disconnect internet.	1	2	3	4	5
c.	Not getting full Mbps of purchased speed.	1	2	3	4	5
d.	High usage costs.	1	2	3	4	5
e.	Cut off your unused bill.	1	2	3	4	5

19. Are you satisfied with the services you are using? (1) Strongly Disagree (2) Disagree (3) Neutral (4) Agree (5) Strongly Agree.

a.	Full refund If you don't want to use the purchased packages	1	2	3	4	5
b.	Choose the operator you want to use availability of usability	1	2	3	4	5
c.	Re: Wrongful Charge Deductions, Compensation	1	2	3	4	5
d.	Remedy on internet outage time, giving Replacement	1	2	3	4	5
e.	Easy to inquire if you don't know or understand.	1	2	3	4	5

V. Internet security issues

20. Following Internet security issues on (1) Strongly Disagree (2) Disagree (3) Neutral (4) Agree (5) Strongly Agree

a.	Security password on devices that use the Internet.	1	2	3	4	5
b.	Systematically the password of the websites uses frequent change of use.	1	2	3	4	5
c.	Secrets to using social networks online leaks being barked at.	1	2	3	4	5
d.	Virus infection on your computer / phone.	1	2	3	4	5
e.	Not trusting the security of your money from online banking systems.	1	2	3	4	5
f.	Stealing distribution; Forced appointment, Personal information of others using the Internet.	1	2	3	4	5
g.	Fraud from online marketing posts.	1	2	3	4	5
h.	In developing the country's electronic government system, the internet needs to be fast and secure.	1	2	3	4	5
i.	In the equipment used to connect to the internet, Update antivirus and malware software, Use with license.	1	2	3	4	5