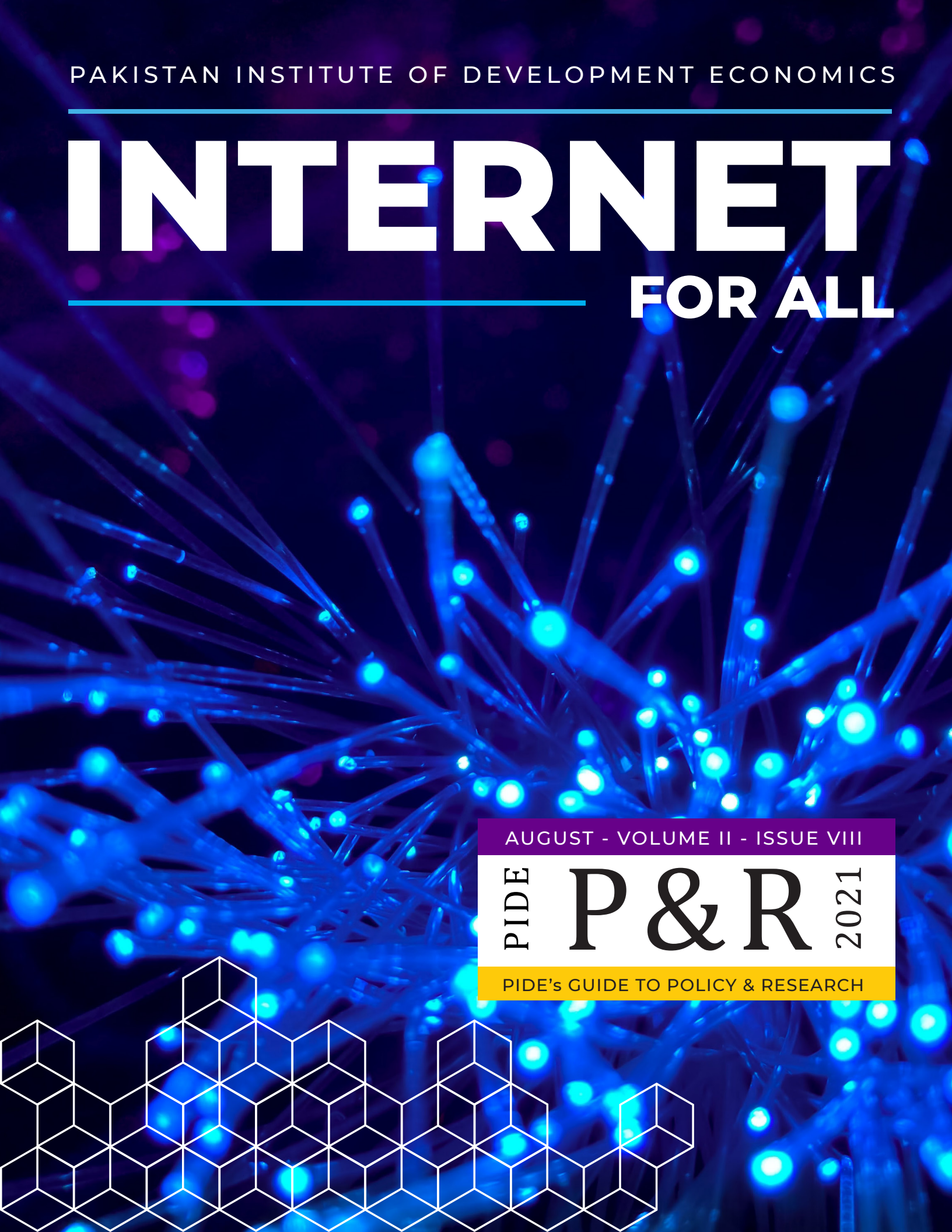


PAKISTAN INSTITUTE OF DEVELOPMENT ECONOMICS

INTERNET FOR ALL

AUGUST - VOLUME II - ISSUE VIII

PIDE P&R 2021

PIDE's GUIDE TO POLICY & RESEARCH

PIDE P&R

PIDE's GUIDE TO POLICY & RESEARCH

VOLUME II - ISSUE VIII

Pakistan Institute of Development Economics (PIDE)

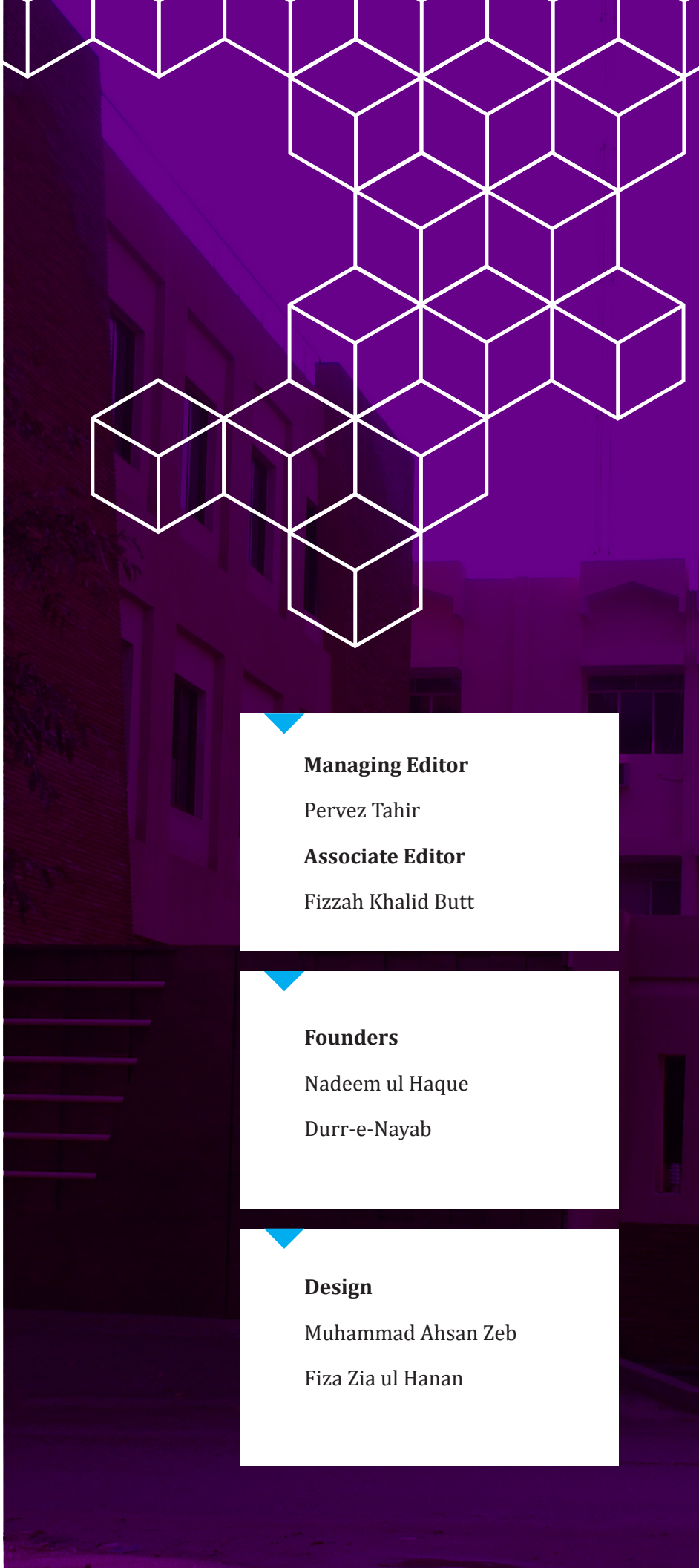
August 2021

PIDE Policy & Research is a guide to policy making and research. Each issue focuses on a particular theme, but also provides a general insight into the Pakistani economy, identifies key areas of concern for policymakers, and suggests policy action. The publication offers a quick orbit of the country's economy and is a hands-on and precise go-to document for the policymaker, businessperson, academic, researcher, or student who seeks to remain updated and informed. This issue is themed around PIDE's recent research efforts regarding the diagnostic of growth. We welcome contributions from within PIDE as well as from any external contributors.

Disclaimer:

The views expressed by the contributors do not reflect the official perspectives of PIDE.

For contributions and feedback, please reach us at **policy@pide.org.pk**



Managing Editor

Pervez Tahir

Associate Editor

Fizzah Khalid Butt

Founders

Nadeem ul Haque

Durr-e-Nayab

Design

Muhammad Ahsan Zeb

Fiza Zia ul Hanan

Table of Contents

Editorial

Nation is going to celebrate its 75th year of independence and has a lot to ponder on, the achievements, the plans, the regrets and the way forwards. The last seven decades have shown all kind of situations to the country and amidst the chaos, it is striving but standing tall, proving the resilience of this country which gives everyone a hope for a better future. Hoping to have next seven decades and all the times to come a prosperous Pakistan. Happy Independence Day and Month!!!

In the last 75 years the country has taken the road to development and making every effort to reach the destination, the example is current reforms in every field. The country has learnt to pave its way and will keep moving forward. The needs of the time to achieve the level of development desired are always changing and so the perception of the people. Over the time the world took a digital turn and to match the pace of the world we needed to adopt technology and with the pandemic Covid-19, another entity has taken the form of necessity and that's the INTERNET. Internet has provided the support to the world when everything was shut and everyone was in isolation, it became the link to learn and to connect. PIDE understands this and it is advocating that Internet is now a human right. The issue of this month is dedicated to the Internet, how it is required by everyone, we advocate and desire Internet for All!!

In the issue the readers will get the flavor of the ideas of the people regarding the need, availability and readiness of the internet in Pakistan. P&R has collaborated with PTA, Telenor, Ufone, PTCL and Mobilink Microfinance Bank Limited to take their views and their efforts to make internet, digital platforms and products available for the people of Pakistan. We're extremely thankful for their collaborations and the enthusiasm that they showed to work with us to tell their side of the story, particularly Telenor. We're excited to present this issue to you, and are hopeful that it will be an amazing reading experience for our readers. Quaid e Azam Muhammad Ali Jinnah said "we want to make this great State of Pakistan happy and prosperous we should wholly and solely concentrate on the well-being of the people, and especially of the masses and the poor. If you will work in co-operation, forgetting the past, burying the hatchet, you are bound to succeed." We believe in the equity and stand firm with the idea of availability of all the needed resources to everyone beyond caste, creed and social status. Tell us how best to beat the forces taking us to yet another inequity, the so-called **DIGITAL DIVIDE**.

Happy Reading on internet in the merged districts of KP, GB, AJK, Balochistan and places like Rajanpur in South Punjab. For feedback, write us on **policy@pide.org.pk**.

Message
Chairman PTA

We are living in a time of extraordinary technological advancements which has brought us at the cross-roads of innovation in computing and communications. New technologies such as 5G, the Internet of Things (IoTs), and Artificial Intelligence (AI) are reshaping the social and economic fabric of our society and changing our lives. In this wave of technological progress, the Pakistan Telecommunication Authority (PTA) is at the forefront of the digital revolution by supporting innovation through a transparent, collaborative and adaptive regulatory approach. Our regulatory approach is to support and stimulate innovation that benefits the citizens and the economy. We aim to improve quality and standards; promote competition and ensure that the market works effectively for consumers and enhance the overall investment environment. Protecting consumers, both people and businesses, is at the core of PTA's mandate and vision. The accessibility of mobile services and maintaining standards in service delivery is a priority for PTA so that consumers receive the best possible broadband and phone services at affordable rates.

In year 2020, over 19 Million mobile broadband users were added in our network, which is the highest in Pakistan's history in a year, clearly reflecting that our efforts towards Digital Pakistan are bearing fruit. Today, Pakistan has achieved the milestone of over 102 million broadband subscribers. This astounding achievement is a testimony to the Government's efforts in ensuring the provision of high quality ICT services to the people of Pakistan. This journey of digital transformation will continue for the realization of the "Digital Pakistan Vision" of the Government of Pakistan so as to unleash the immense potential of Pakistan driven by innovative technologies.

To provide high speed internet access for all the people of Pakistan, PTA is working on a range of regulatory and industry initiatives: ensuring the availability of spectrum and extended rollout obligations to cover unserved population; facilitating fiberization and resolving Right of Way; supporting adoption of emerging technologies; maintaining Quality of Service by enhancing benchmarks; engaging with stakeholders for safe Internet; enabling environment for local manufacturing of mobile devices through world's first open-source Device Identification, Registration and Blocking System and launching a comprehensive Mobile Manufacturing Policy and Regulations. These measure will support future digital services and benefit the wider economy.

Major General (R) Amir Azeem Bajwa

I acknowledge the trust and confidence that the leadership and the people of Pakistan have reposed on the telecom regulator and the sector. PTA will remain steadfast in its resolve to implement the government vision and policies in best possible way. The telecom consumers, sector and ancillary industries will be our priority while we make available the latest and most modern digital services and infrastructure to wider population of Pakistan. I also acknowledge the efforts and contribution of PIDE to issue a supplement on this very important sector and its related issues.

INTERNET FOR ALL

NADEEM UL HAQUE

VC, PIDE

The internet has become part of everyone's life all over the world, including Pakistan. While most of Pakistan has weak connectivity, our priority in our public investment remains building roads and brick and mortar. All this while people have limited access to devices to use the internet well.

During the pandemic, PIDE as well as other academic institutions have experienced extreme difficulty in teaching on the net due to the poor connectivity in most areas of Pakistan.

PIDE engaged in a four-month exercise on this subject, talking to CEOs of telcos, users, Silicon Valley Pakistani renowned experts as well as ecommerce developers to understand how Pakistan can get to internet connectivity for all.

PIDE has now concluded that access to the internet should be treated as a right. Our economic future depends on the availability of fast internet to all. Every possibility in the future is going to depend on the net. Pakistan has not taken advantage of the opportunities of globalization and the computer age. We should now make ourselves ready for the connected age. And we must do it on an emergency footing.

How can we get internet for all? Do we have the resources? Should the government fund it?

PIDE has learnt that we can easily and quickly get internet for all if the government gets certain aspects of the regulation right. And no, there is no need for the government to spend large amounts of money. What then is needed?

To start with, the government should allocate more spectrums for internet usage. The spectrum exists and must be used, or it disappears. The government likes to allocate a small part, keeping back large parts

– for what?

Spectrum bandwidths are auctioned to maximize revenue. Since the price is unknown and there is a suspicion of underselling, officials fix a reserve price that is too high. Often auctions are cancelled. If investors spend a lot of money on buying spectrum, they have little to spend on development. This slows down internet development and also makes the service very expensive.

Revenues can also be collected over time rather than all at once in an auction through giving the spectrum for a share of revenues over time. That would allow for faster internet development. Our students, commerce and people will be happier.

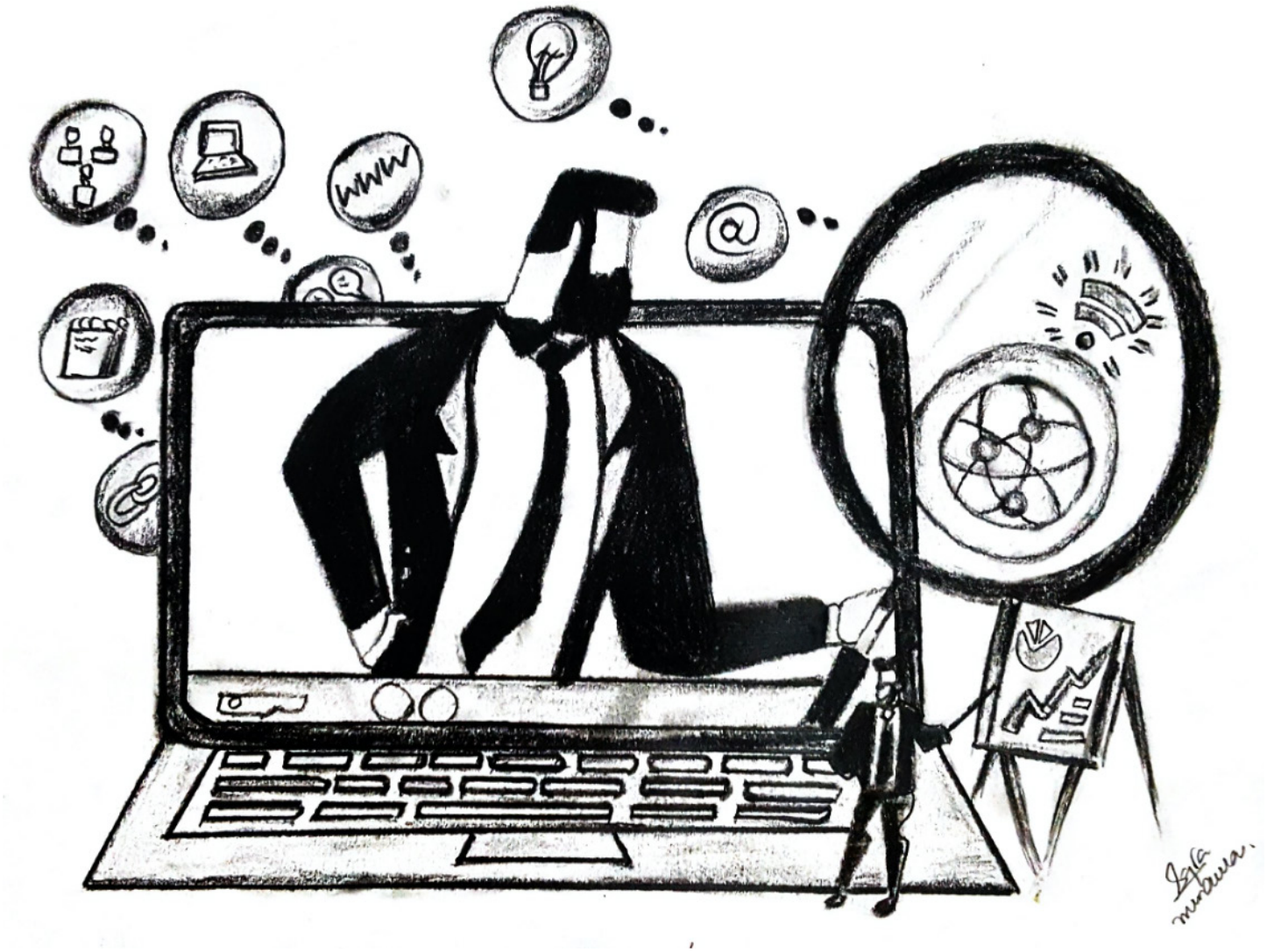
Fiber optic network is the major carrier of digital content. Barriers to the laying down of this fiber optic cable should be removed. Once again, revenue raising through taxing the laying down of cable must be stopped. All networks of cabling or piping such as for electricity and other infrastructure should include facilities for adding fiber optic.

The last mile will be 5G and we should start preparing for it. The regulatory and permission framework should be fast tracked – now. Companies should start investing in it – now.

Internet is provided through a network of fiber optic cable with towers at nodes to send out the signal. The towers and pipeline could be owned by different companies and the providers can rent their use. The government regulatory framework must allow for it. Our focus must shift to digital content provision and away from mere telephony.

Finally, there is no use providing connectivity when devices are taxed heavily. For education, telemedicine, content development and many other creative entrepreneurial activities, a good computer and a tablet and a mobile phone is a necessity. Let us not stop our people'a development merely for the collection of revenue or for facilitating the assembly of yesterday's technology.

PIDE suggests the internet is now a human right and must be a top priority of the government.



ENABLING THE DIGITAL FUTURE

IRFAN WAHAB KHAN

Today a vast majority of Pakistanis accesses the internet through their mobile phones. This device has become their gateway to the entire world, connecting families, businesses, students and so many more to one another. I believe true digitalisation is where everyone benefits from technology and solutions, and not just a select few. We have been focusing our digitalisation efforts on the same principle and made a lot of progress in the past few years in terms of policies, processes and business practices

This year and the last came with its own set of challenges for economies and businesses around the world. The onset of this pandemic severely affected national and global economies and enterprises on a diverse scale. Pakistan being an emerging economy and having a large blue-collar workforce that depends on day-to-day wages, may come to face an economic contraction. However, this year has also been a catalyst for digital adoption in the country along with many developments in the way of work in enterprises that has given a jumpstart in the right direction.

Pakistan is rightly known as the land of opportunity as it has tremendous and unmatched potential. We witnessed a surge in data usage and digital payments during the pandemic and there has been an increase in fin-techs, startups and banking institutions marching towards digitalisation; hence, signalling a boost for economy and society. The recent months following the coronavirus outbreak came as a reminder to transform businesses, innovate new operating models, bridge the digital divide, and build a digitally and financially inclusive society.

Telecom is integral for Pakistan's progression towards a digital society path. The industry is playing its role of bridging connectivity gaps, promoting inclusion and transforming several sectors. A true representation of a digital society is digital citizenship, which the GSMA defines as, interaction between government, businesses and citizens specifically in the provision and use of public services over digital channels. This is where mobile technology has been and will continue to be a vital contributor. Transforming the way individuals, businesses and governments interact. Another aspect is sectoral digitisation. In Pakistan, mobile connectivity is redefining the digital transformation of industries and facilitating the development of new solutions. We have witnessed revolutionary solutions in agriculture and banking through fintech solutions such as Easypaisa. Mobile connectivity has also been leveraged to give children their right to identity through Digital Birth Registration. The potential is insurmountable.

Technology-enabled innovation is the major spur to productive growth. Rapid advances in technology are enabling new business opportunities and disrupting current business models. For Pakistan to continue on this digital growth path, it is crucial to invest in people and prepare them for the skillset our future demands. According to an estimate, 70 per cent of new value created in the economy over the next decade will rely on digital platforms and business models e.g. digital payments and e-commerce alone are forecast to add $45 billion over the next five years to the country's GDP. This is bound to elevate the level of exports and create new jobs for the youth of the country. However, the youth needs to be prepared to embrace the new and upcoming opportunities by being equipped with skillset of the future. With digital means of education taking off in popularity, this trend should continue for our youth to keep exploring new avenues to expand and enrich their areas of expertise.

COVID allowed us to fast pace the digital adoption in a few months for plans that were made for the next five years. To keep driving such growth in the country, new technological solutions will have to be brought in to support and develop smart solutions such as integration of Internet of Things (IoT) to real-time monitoring, computing, and establishment of smart factories. The digital world continues to evolve and grow. The digital future is built on collaborative efforts to nurture strong and strategic partnerships to co-create and develop innovative solutions. When the organisations and institutions offer solutions collectively, they benefit the masses exponentially by bridging the digital divide and offering solutions to current problems.

A fundamental pillar of our responsible business approach is the inclusion of the digitally excluded and our commitment to ensuring digital access for all. The pandemic has heightened the importance of reducing inequalities when it comes to mobile services and connectivity. The ability of people to access essential services, stay safe online, and acquire the skills necessary to succeed in the new normal are more imperative than ever before. We have a wide range of initiatives aimed at reducing the connectivity gap, building digital skills, and promoting diversity and inclusion. We have invested our efforts in creating more impact, enterprising innovation led possibilities and empowering Pakistanis. I believe our key services – mobile connectivity and internet – are the great equalisers of our day. Widespread and affordable access to digital services and skills is a game-changer for millions.

Interview

IRFAN WAHAB
CEO TELENOR PAKISTAN

telenor

Q.1 How has the internet become such a necessity in today's world and what is its significance in the micro and macro environment?

In today's world, we are experiencing immense growth and expansion of digital ecosystem; yet it'll never be this slow again! The digital revolution is impacting economies, societies, and governance. Today, technology is presenting the biggest opportunity to contribute towards how we live, interact and work. The internet has brought the world closer, with information about everything just a few taps away. This ease of access to information and connectivity was never available before, and the opportunities that emerge from such resources are immense.

Digitalisation is touching all walks of life. On a larger scale, it is enabling e-governance structures that help in building trust between governments and citizens by ensuring transparency. It also, creates efficiency in processes and makes them cost effective. Social media has become a bridge between people and the public sector, for example appeals for information and reporting of incidents to the police or, in context of the pandemic, NCOC being able to share timely updates and information. Law enforcement agencies, government bodies and companies are now integrating internet of things (IoT) into their daily routines, for example fleet management purposes, enabling citizen data centers and many more. Internet is also being integrated into many other governance structures in Pakistan such as enabling digital payments for fee collection, traffic challans and digitalising the citizen portal for quick processes.

If we do a quick recap of life as it was a decade and half ago, we were still using dial up internet, digital cameras had recently started taking over film cameras and the primary source of shopping used to be through physical retail outlets. Today, the internet is providing massive opportunities to budding entrepreneurs to reach out to their target audience faster without incurring high costs. It is also providing opportunities to freelancers to reach out to the global market and earn a living from home. Education and health sectors have also transitioned to online mediums

and the pandemic only accelerated digital adoption of these by masses. Agriculture being the backbone of Pakistan's economy has huge potential through digital interventions. Telenor Pakistan's Khushaal Zamindaar is such an initiative that enables the rural community with key information regarding their crops and livestock along with providing insurance options and medical consultations.

Over the past years, technology has been integrated into the lifestyles of people and today, we cannot imagine our lives without connecting with our friends and family based abroad or ordering food online or booking a ride through ride hailing apps. With the fast pace of technological solutions being introduced, smart cities and smart homes are also becoming a reality with IoT. Our future is digital, it has already started transforming the world as we knew it and this is just the beginning.

Q.2 How does access to internet in Pakistan compare to regional neighbors and what can be done to improve access to internet in the country?

Pakistan has immense potential and demand for digital adoption. Currently, Pakistan ranks 90th on the inclusive internet index with India, Bangladesh and Nepal ranking at 49, 82 and 83 respectively. There are multiple factors that contribute to internet adoption in the country including smartphone penetration, literacy and availability of services.

Telecom sector in Pakistan covers over 85% of Pakistan's population however, of the 184 million cellular subscribers, only 100 million are data subscribers. This represents the digital gap where people even with access to internet services are not benefitting from the opportunities. Pakistan ranks 91st on smartphone cost and 34th on mobile phone tariffs which justifies the digital gap in the country.

With a need for digital connectivity, the pace of provision of services in underserved areas can be further accelerated by USF and simultaneously, the USF fund can also be used to temporarily subsidize the provision of smartphones till the local production catches up with the demand. Also, in view of the increasing demand for data in the country, it is important to make telecom infrastructure available at fair prices which also includes spectrum and development of a spectrum roadmap for future demand. The Right of Way (RoW) policy was approved earlier this year to improve internet access as it allows for widespread fiberisation for high-speed connectivity. As a next step, its implementation is crucial for greater penetration of telecom and digital services across the country.

Q.3 What can be done to improve financial inclusion in the country and what is the economic impact of mobile wallets like Easypaisa in Pakistan?

Financial inclusion goes beyond commercial banks and microfinance institutions. The solution for financial inclusion is Fintech which is based on digital channels to reduce infrastructure and geographical barriers. A decade ago, only 10% of the population in Pakistan had access to any form of financial inclusion. Easypaisa was introduced in Pakistan in 2009 and following its footsteps came other mobile wallets and traditional banks integrating digital payment solutions. Today, 22.9% of the population in the country has access to financial services.

To accelerate the uptake of financial services, it is essential for unconventional and technology driven institutions to continue innovating. Alibaba's Alipay is an example of a non-traditional player that capitalized the digital evolution in China. The key to success is to never stop innovating and adapting to consumers growing needs and that is what Alipay did. Not only did Alipay provide payment solutions for the booming e-commerce in China, after its launch in 2004, it also transformed consumer's payment habits.
With a highly unbanked population, strong mobile penetration, along with a high cash-to-GDP ratio, Pakistan represents an ideal environment for cashless payment platforms to thrive, and Easypaisa has been at the forefront of making this a reality. With a portfolio of payments, remittances, lending, insurance, disbursements coupled with over 1200 partnerships across sectors, we're transforming Pakistan into a cashless and inclusive society. With a massive annual throughput of PKR 1.8 trillion and over 8 million active users, 3.6 million active app users, the highest number for any financial app in the country, Easypaisa is creating a transparent economy that Pakistanis participate in to earn a livelihood, empower lives and remove barriers.

The ambition of financial inclusion cannot be achieved by solely brick-and-mortar banking infrastructure. Low-cost delivery channels such as retail shopkeepers serving as financial agents has proven to cost-effectively provide meaningful benefits to masses. The underserved face unique obstacles and have unique financial needs. There should be ease in the regulatory framework to encourage innovative solutions while ensuring access to affordable smartphones resulting in increased penetration of financial inclusion; which has also been identified as an enabler for 8 of the 17 UN SDGs .

Q.4 How can the telecom sector contribute towards internet for all?

The telecom sector is the backbone of a digital economy and lays the foundations required for the digital ecosystem to thrive. Connectivity is no longer a luxury – it has become a fundamental right! Connectivity tariffs are the lowest in Pakistan in the region and it is also amongst countries with lowest tariffs in the world . Pakistan has close to 100 million mobile internet users and only 2.8 million broadband and fixed internet users. This explains the impact that telecom sector has in relaying the benefits of digital opportunities to masses in the country.

Telecom sector is not only providing ease of access by heavy infrastructural investment in the country, but it is also providing platforms for growth and value added services through applications and partnerships in the form of e-education, M-Agri, e-health, entertainment, business solutions and many more. Besides the efforts from the industry to ensure connectivity services, we work closely with USF, a private-public partnership, to reach remote areas.

About two decades ago, the cost of acquiring a basic voice sim and paying call charges was a lot more than it is today. While enabling the society with all the mentioned benefits, mobile and data services are connecting masses in Pakistan. To continue reaching the underserved for digital connectivity, it is important to have telecom infrastructure including spectrum, affordable smartphones, and implementation of Right of Way policy for fiberisation.

Q.5 What support does telecom sector need from the government in realizing the dream of the internet for all?

In this increasingly connected world, we do not want anyone to be left behind from accessing opportunities that the new era connectivity brings. The Government is an important stakeholder in enabling the digital ecosystem in the country. Telecom is a sector enabling other sectors and it is the backbone of the Digital Pakistan ambition. Currently, Pakistan is one of the lowest spectrum assigned countries in the region with only Nepal behind us. According to a World Bank study, the total allocation of spectrum in Pakistan equals spectrum allocation to a single operator in Australia. There is a significant gap in anticipating present and future connectivity needs. Spectrum should be made available at fair prices and there should be a spectrum roadmap to identify and proactively take measures to fulfill future connectivity needs. To improve affordability, penetration and access, telecom services should be subjected to rational and harmonised taxation regimes. Also, the approved Right of Way policy and industry status should be implemented which is instrumental in increasing access internet.

Q.5 What support does telecom sector need from the government in realizing the dream of the internet for all?

As highlighted by GSMA's Gender Gap Report 2021, in Pakistan, there is a gender gap of 34% in mobile phone ownership and this gap increases to 43% in usage of mobile internet. To bridge the digital gender divide, it is important to provide access to digital services, have readily available and affordable handsets and create awareness of how to make the most of opportunities provided through the internet.

To bridge the digital gender divide, it is important to have significant female representation in economic contribution and this can be accelerated by online business models. In partnership with World Bank's Girls Learn Women Earn (GLWE) initiative, Telenor Create, the design academy at Telenor Pakistan, developed a comprehensive curriculum to train and enable aspiring women entrepreneurs on digital skills. Under this initiative, Telenor Pakistan trained over a thousand women in digital skills including solving the right problems and upskilling females in utilizing digital tools to help scale their business. Besides this, I am also an active member of Male Champions of Change initiative on behalf of Telenor Pakistan. This initiative includes active members who work within and across their organisations to focus and lead on gender equality, diversity, and women's empowerment in the society as a whole. This has had a significant impact on how we see diversity & inclusion in our business sectors. Telenor Pakistan also has a dedicated initiative, Naya Aghaaz, to help transition women into the work-life after a career break.

STARTUP AND DIGITALISATION OUTLOOK IN POST-PANDEMIC PAKISTAN

TELENOR PAKISTAN

Last year's global outbreak of the coronavirus changed the way businesses around the world operate. It was challenging for startups and small businesses that rely on human interaction for operational sustainability. But, with no choice, the world adopted the digital way of working and living.

The new way of working enormously affected startups and small businesses worldwide, and many had to halt their operations, implement pay cuts, or even let staff go. The World Health Organisation reported that 196 out of 251 countries were severely affected by Covid-19, making up 80% of the world's population. While 10% of the world's intermediate goods trade originates from China, it reported a 17.2% decline in exports with a grim outlook on the future with the pandemic outbreak. These declines and delays in exports from China resulted in production and manufacturing disasters in countries worldwide that depend on Chinese trade. Considering the uncertainties faced by factories globally because of the shortage of parts and raw materials, the need for digitalisation in the modern way of doing business became even more apparent.

In Pakistan's circumstances, the race to digitalise the economy is laden with obstacles that threaten the existence of modern small businesses. There is a strong need for increased government support in keeping startups afloat during the recurring pandemic this year. It's important to remember that the pandemic will subside, but today's digitalisation will lay the groundwork for tomorrow's progress.

A recent report by Invest 2 Innovate revealed that Pakistan's startup ecosystem was experiencing rapid growth before the global pandemic. It had raised more than USD 32 million in 2019 compared to USD 24.5 million in the year before. In addition, the report detailed the effects of the pandemic on local businesses as they either pause operations or shut down entirely because of the uncertainty in the country's macroeconomic climate.

The need for social distancing and isolation allowed startups that operate in the fintech, EdTech, e-commerce and health tech sectors. These are the only industries witnessing growth thanks to increased demand from the locked-down populations around the country. They can fill a gap that traditional services can no longer cover with Pakistan's population confined to their homes.

One such startup is Sehat Kahani – currently part of Telenor Velocity that provides telemedicine services through e-clinics and a mobile application. The company is a supporter of the government's Digital Pakistan initiative and offers professional consultations through video calls for added peace of mind. Through Telenor's direct operator billing business model, scheduled for September this year, Sehat Kahani can tap into more customers and offer them customised services.

With COVID-19, almost 1.2 billion children were out of the classroom, with schools shut across the world. As a result, education changed dramatically, giving rise to e-learning. EdTech startups offered the increasingly popular options for study at home students and out-of-school children around the country. The increasing need for remote and digital learning requires at-home alternatives to make up for the lack of school attendance. The Higher Education Commission ordered educational institutions to deliver online lessons, highlighting profound inequalities that affect students all over the country, especially those from lower-income families.

Startups in this sector should take this as an opportunity to create better distance learning solutions and make education accessible to everyone in Pakistan, irrespective of background or social standing. Edkasa is an alumnus of Telenor Velocity that offers an exam preparation app that helps high school students prepare for their standardised exams. It is offering a digital alternative to private tuitions. It also provides a vast library of YouTube classes for free. The relevance of the service offered by the app triggered its success and allowed the startup to raise a funding of USD 320,000.

E-commerce startups also saw immense growth in some areas while suffering in other categories. For example, consumers worldwide downloaded grocery

delivery apps in large numbers, starting a new trend in e-commerce that had not existed before. In addition, E-commerce was stretching out to include essential items, such as groceries and medicine too. So, to cater to the changing consumer needs, many e-commerce businesses began dealing with necessary things to stay ahead of the curve.

To sustain the ongoing shift towards digitalisation and to expand IT in Pakistan, there needs to be a focus on five different areas to make Digital Pakistan a prosperous reality for tomorrow's startups - improved access to connectivity, digital infrastructure, e-governance, digital skills and literacy, and finally, innovation and entrepreneurship. With clear key performance indicators for each area, Pakistani startups can take digitalisation to the next level.

There is an enormous amount of potential in the digital services sector of Pakistan, especially considering the vast and young talent pool that can lead the country's digital transformation from the forefront. With a strong digital focus in leadership, startups, businesses and government departments can welcome citizens to a Digital Pakistan that leaves no one behind.

About Author

Khurrum Ashfaque

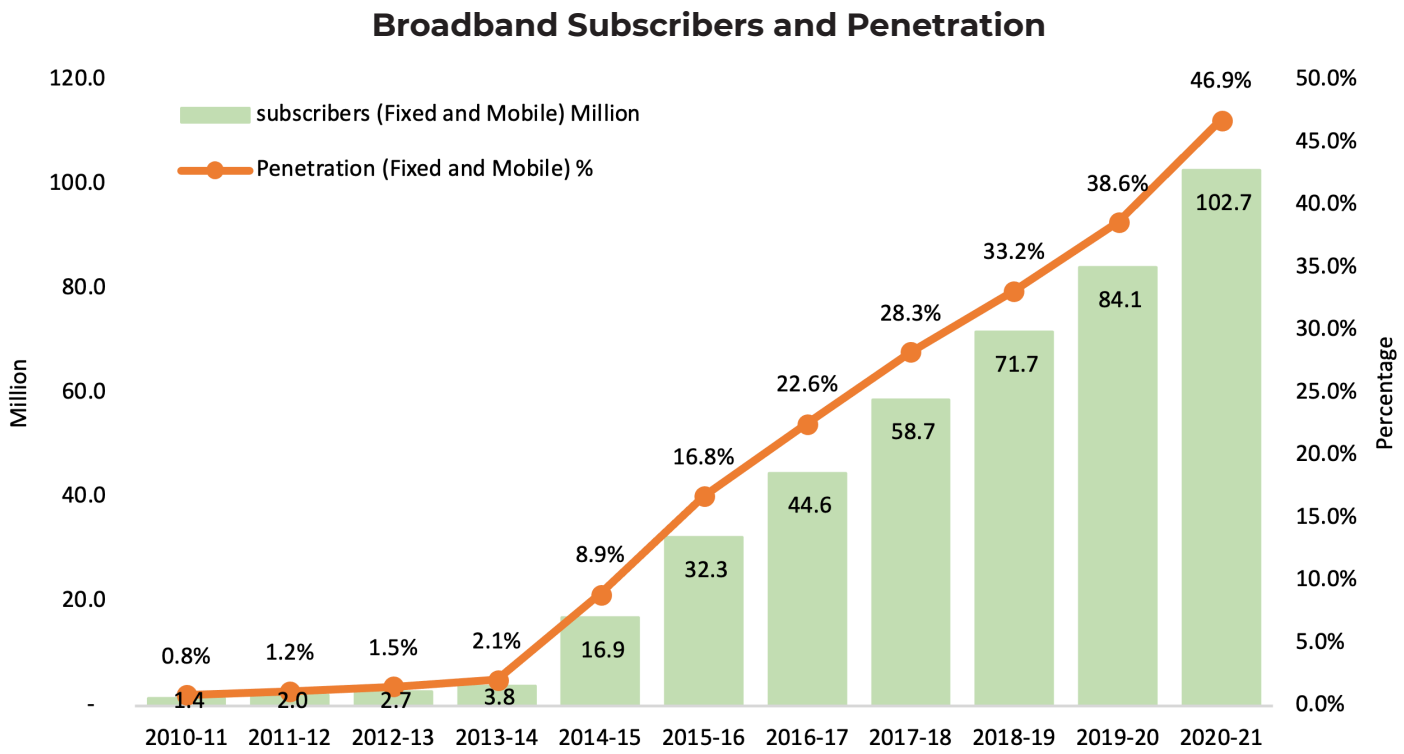
With 29 years of international and local technical experience as the Chief Operating Officer, Khurrum Ashfaque heads the Digital & Technology divisions at Telenor Pakistan. He is currently also the Chief Technology Officer (CTO) of Telenor's Emerging Asia markets and has been associated with Telenor Pakistan for over 15 years. He has academic and professional qualifications from NED University Karachi, Carleton University, INSEAD, and Harvard Business School.

BROADBAND FOR ALL – PERCEPTION AND REALITY

VC, PIDE

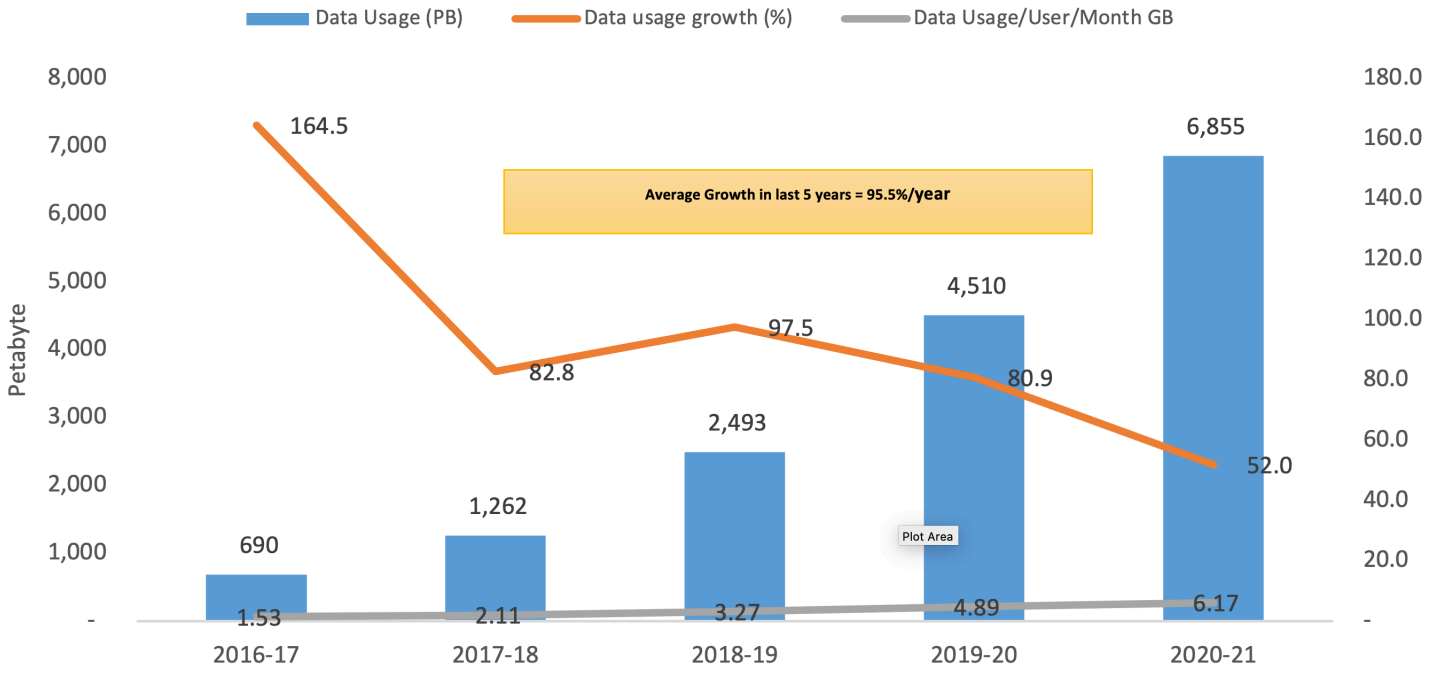
Broadband has become an absolute essential for people to participate in socio-economic activities. A decade ago there was a debate on digital divide between the ones who have internet and the ones who don't. Today with over 60% of the global population using the internet, the focus is now towards the quality and speed. The economic shift caused by the broadband across the globe is a testament of broadband revolution. The ITU research revealed that in least developed and landlocked countries, an increase of 10% in mobile broadband penetration yields an increase of 2.5-2.8% in GDP per capita, whereas an increase of 10% in fixed line broadband penetration contributes to an increase of 2-2.3% to GDP per capita.

Pakistan started its journey into internet availability in 1990s and today stand as high speed broadband enabled country. We successfully passed through the early phases of digital era when global digital revolution was setting in. A shift from basic internet to high speed robust broadband in Pakistan in the last couple of years emphasized its significance in creating a knowledge-based economy by generating job opportunities and raising productivity.



The last ten years were phenomenal in terms of increased broadband penetration and subscriber base which showed almost 68% average annual growth rate over last ten years. Today we have a total broadband subscriber base of over 102 million with broadband penetration crossing 46%. The surge in subscriber base was witnessed right after the introduction of 3G services in 2014 when the subscribers grew by almost 350% in one year. The data usage also grew tremendously. The average annual growth in last 5 years was 95.5% and during FY 2021 data usage reached at 6,855 PB. This shows a sharp rise in the data usage per subscriber which was around 1 GB per subscriber in 2017 and today stands at over 5 GB per subscriber. The operators have been investing in expansion of networks not only in urban area but the far flung under privileged areas have also been provided with the facility through Universal Service Fund. Today we have over 43,637 cell sites that are broadband enabled, five years ago there were less than 28,000 cell sites. Mobile broadband is available at lowest possible prices across the country.

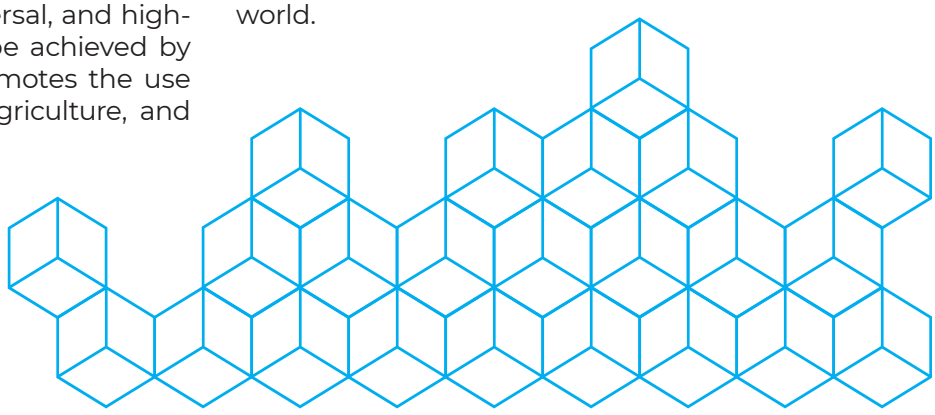
Data Usage, Growth and Data Usage/User/Month



According to the 'ICT Price Trends 2019' report of ITU 1.5 GB mobile data is being offered in Pakistan @US$ 0.99 which is far lower than regional peers. Moreover, mobile data prices in Pakistan achieved the UN Broadband commission target, which recommends that prices should be less than 2% of the GNI per capita. In case of Pakistan, mobile data prices are only 0.70% of GNI per capita. Although Mobile broadband is growing immensely over a period of time, there is a lag in fixed broadband penetration in Pakistan which is around 1.5% and needs consideration. In Pakistan broadband usage is increasing tremendously, people from all segments of the society are now making use of the internet for social, economic and all other needs. Presence of Pakistani users on the social media platform is significant, whereby all channels are being used. Facebook, twitter, Instagram and Youtube are the most popular social platforms and only Facebook has over 50 million users in Pakistan.

Government of Pakistan through the Digital Policy of Pakistan envisions "to improve its citizens' quality of life and economic well-being by ensuring availability of accessible, affordable, reliable, universal, and high-quality ICT services." This vision can be achieved by creating a digital ecosystem that promotes the use of technology in education, health, agriculture, and other key socioeconomic sectors. To this end, PTA is sparing no efforts to ensure the availability of quality ICT infrastructure and broadband services across the country at affordable rates. Ensuring that Pakistani users enjoy the best broadband experience at fastest speeds the regulator is all set to carryout spectrum auction for LTE & VoLTE this year and 5 G services by 2023. Issuance of Right of Way Policy is another major step towards enhanced broadband proliferation in the country which will be instrumental in increasing the fixed broadband penetration and improved backhaul network for mobile broadband services. PTA is actively pursuing the government of Pakistan and tax authorities to reduce the tax burden on telecom services in order to improve affordability and expansion /up-gradation in networks. Similarly the regulator is also working on active network sharing and national roaming so that broadband proliferation can be improved.

With enhanced broadband services, PTA will continue its efforts towards a digitally progressive Pakistan and make this country a preferred digital market in the world.



INTERNET FOR ALL

IDREES KHAWAJA

SENIOR RESEARCH FELLOW

What benefits will accrue to the country, if the government provides access to high-speed internet to our entire population? Here are some illustrations.

A person suspected of having contracted Covid-19 residing in a remote village travels 600 kilometres to a city to get tested. The lab tells him to come the next day to collect the report. The person has two options, both of them costly — to stay overnight in a hotel or go back home and come again the next day to collect the report. If he had internet access in his village, the lab would share the report over WhatsApp — imagine the time and money saved at the national level and the alternative uses of such saving. Putting time and money saved to other uses means more income for the individual and a higher GDP for the country.

In fact, a significant proportion of the population faces health issues but does not have access to good healthcare services. Telemedicine can ensure good medical advice for residents of remote rural areas and smaller towns — some medical issues will be resolved online while others would need a visit to the doctor. Sound professional advice would motivate people to visit a doctor — many fatalities and health hazards will be avoided. The time and money saved would benefit everyone.

Thanks to Covid-19, we have discovered that imparting education online is possible. Some sources say that around 20 million children are out of school. The reasons include distantly located schools, poverty and child labour to name a few. The provision of internet facilities to such children, and the time flexibility that online education allows, will give working children time to educate themselves. Properly implemented programmes would even educate adults — the dream of 100 per cent literacy could come true.

We are trying to establish universities in every nook and corner of the country. Even if we gather the financial resources to put up the infrastructure, we cannot have enough good teachers. This scarcity can be made up by teaching online from good universities in the main cities. Again, high-speed internet is required.

The largest share of the final price that the consumer of agricultural commodities like wheat pays, goes to the infamous middleman. Can we eliminate the role of the middleman? Yes! With access to internet and using a well-designed app, farmers can directly strike a deal with wholesalers and retailers based in towns, circumventing the exploitations of the middleman. Higher profit margins will motivate farmers to produce even more — thus contributing to poverty alleviation.

One of the few activities that have flourished during Covid is e-commerce. However, its benefits have accrued to only a small fraction of the population — those who have access to the internet. Like farmers, other rural women and men, who manufacture handicrafts, do not get a fair return on their skill and effort due to lack of access to markets. Access to the internet will allow such skilled people to directly approach wholesalers and retailers of handicrafts based in cities.

Pakistanis are already making a mark in freelancing and therefore IT-related exports are rapidly increasing. With high-speed internet available to more people at home in smaller towns and remote areas, this activity and hence IT exports will increase significantly.

For more than seven decades, we have spent enough taxpayer money on brick-and-mortar projects with low returns — on school buildings that house cows not students, on hospitals that do not have doctors and on roads that do not see traffic. Provision of high-speed internet to all would be an investment with very high returns. The disruptions of AI having just begun, we can't predict all the benefits at this stage.

The PIDE Reform Agenda recommends 'internet for all' in the near future. To fulfil this aim, if the government has to sell spectrum (ie frequency) to mobile phone operators at a nominal price, this should be done. If this requires having 5G, that should become priority number one. If access requires bringing in more mobile phone operators, this should be ensured. The focus of all such efforts should be 'internet for all' and not revenue generation through selling spectrum at exorbitant prices.

Those who can afford to pay for the internet should be required to pay; those who cannot can be offered targeted subsidy. In the initial period, access to provision will call for expenditure — but this would yield returns, in the near and distant future, in forms known and unknown as yet.

Interview

MOHAMMAD ALI IBRAHIM

HEAD OF MARKETING & COMMUNICATIONS, MMBL

What is the role of telecommunication in providing internet facilities and where do we stand currently?

Given my background in the telecom industry and owing to my current role in the financial sector, I believe connectivity is the key right now as the demand for technology is growing more with each passing day. The ongoing pandemic brought life to a standstill and the only way to continue going on was adapting to digital technologies. We saw many companies going through a complete digital transformation for sustaining themselves. The ever-increasing role of telecommunication and connectivity under such circumstances cannot be undermined as it is only going to further increase in the times to come. Internet usage across Pakistan surged by 15% as soon as the first lockdown was imposed. Moreover, as per the latest statistics from PTA, Pakistan has over 185 million cellular subscribers, out of which 100 million use 3G/4G. This shows the huge potential that the telecom sector has to offer and the vastly growing expansion of the sector speaks volumes about the benefits it is providing to the masses.

How is the microfinance sector empowering people? How is Mobilink Microfinance

Let me give you a brief background about the financial landscape in Pakistan. The country is home to over 220 million people and out of them, only 29% are banked. This means that a vast majority comprising of over 70% is still waiting to be served by financial institutions and banks. A country cannot progress or succeed unless its masses are truly empowered by placing everyone into the fold of financial inclusion.

Communities that were previously completely at the mercy of loan sharks who would charge exorbitantly high interest rates and enslave generations after generations through financial bondage, now have the chance to use microfinance to stand on their own, independent and free. The incredible role being played by the central bank and the microfinance sector under its guidance in uplifting the marginalized segments of the economy should not be negated or buried.

Our services are different because we are trying to lessen the hardcore paperwork and facilitating people with easy loan applications that they can effortlessly understand and submit. MMBL is the largest digital bank of Pakistan with over 34 million registered users, and we have set ourselves the goal of empowering maximum people going forward, including the ones in far-flung areas, to promote financial

empowerment for all.

We have very recently launched our new digital banking app, Dost-powered by MMBL, which is offering convenient banking on the go and will make the onboarding and loan-seeking process even more efficient for our users.

What is your focus as a microfinance bank?

We are predominantly focusing on the rural areas of Pakistan as they constitute a major portion of Pakistan's population and out of our 100 branches nationwide, 85 are placed in such areas. Moreover, MMBL has a prime focus on financially empowering Small and Medium Enterprises (SMEs), women-led businesses, and providing housing finance to individuals. SMEs and MSMEs are critical players that enable the entrepreneurial infrastructure and help strengthen the national economy with their contribution to the Gross Domestic Product (GDP). In Pakistan, around 99% of economic establishments are SMEs that jointly contribute 40% to GDP and 26% to the exports from the manufacturing sector.

Are the microfinance bank and a telecommunication company a good combination?

Absolutely. Telecommunications, the internet, and digital banking go hand in hand. Jazz, the largest telecom operator in Pakistan, and MMBL, the largest digital bank are sister concerns of each other and our parent company, VEON, is based in Netherlands, Amsterdam. Moreover, the name 'Mobilink' has itself built a trust factor and credibility amongst the masses over time. The combination is particularly useful as we have the largest number of m-wallets and a digital wallet cannot be used without a cell phone or cellular connection.

How, in your opinion, is MMBL different from the commercial banks on the digital banking front?

Microfinance is relatively a young, yet booming sector in Pakistan, with its fair share of hurdles. It is individual-focused and provides money to needy individuals or small businesses that lack access to conventional resources. Microfinance also has lower costs of capital relative to risk, limited collateral, convenient terms and conditions, and greater leverage than traditional banks. Commercial banks have a major share of depositors in rural areas and facilitate lending in the urban whereas microfinance banks aid lending in the rural communities due to ease of the process while having more depositors in metropolitan cities. Furthermore, microfinance banks are people-focused and sustain community engagement/ relationships.

We also offer nano-lending via our mobile wallet services, which can be as low as PKR 1000 and is easily availed through just a few taps on your phone. There is, of course, an AI-based algorithm developed by our data scientists which keeps track of the user's expenditure and usage patterns to identify whether you qualify for the loan or not. It considers aspects like your major expenditure areas, and whether you are timely fulfilling your financial obligations such as utility bill payments, etc.

What is your way forward from here on? Any particular plans in mind. Suppose we expand the internet access in the country and increasing is connectivity everywhere.

The future is digital. The coming years will witness substantial growth in fintech and this trend will be taken up swiftly by microfinance banks, as evident from the sector's performance through the recent global pandemic. A growing number of the population is using cell phones and a vast majority of them have 3G/4G connections (approximately 45.6%) in Pakistan and this significantly indicates the inclination of people towards a more digitized world. To keep up with this progress, it will be vital for MFIs and banks to expand their operations through the implementation of more technology-oriented customer services and improved digital financial ecosystems.

At MMBL, customers are at the heart of everything that we do and we are constantly striving towards transforming our products and services as per their ever-evolving needs. We recently launched the Bint-e-Hawa deposit and loan account, which is specifically aimed at empowering women from all fields and backgrounds as it is a key strategic priority for MMBL. Also, Commercial Vehicle loan is one of our top-performing products. Other loans include Karobar loan, School loan, and Khushhal Kissan Loan, which are significantly improving the lives of our borrowers and creating success stories, that positively impact communities around. We aim at further fostering financial inclusion for all by introducing more digital products and services, with increased ease of access. We are putting great focus on digitalizing the overall banking experience of our customers that would ultimately help reduce our operational costs as well as increase our outreach, all across the country.

CAN WE HAVE INTERNET FOR ALL?

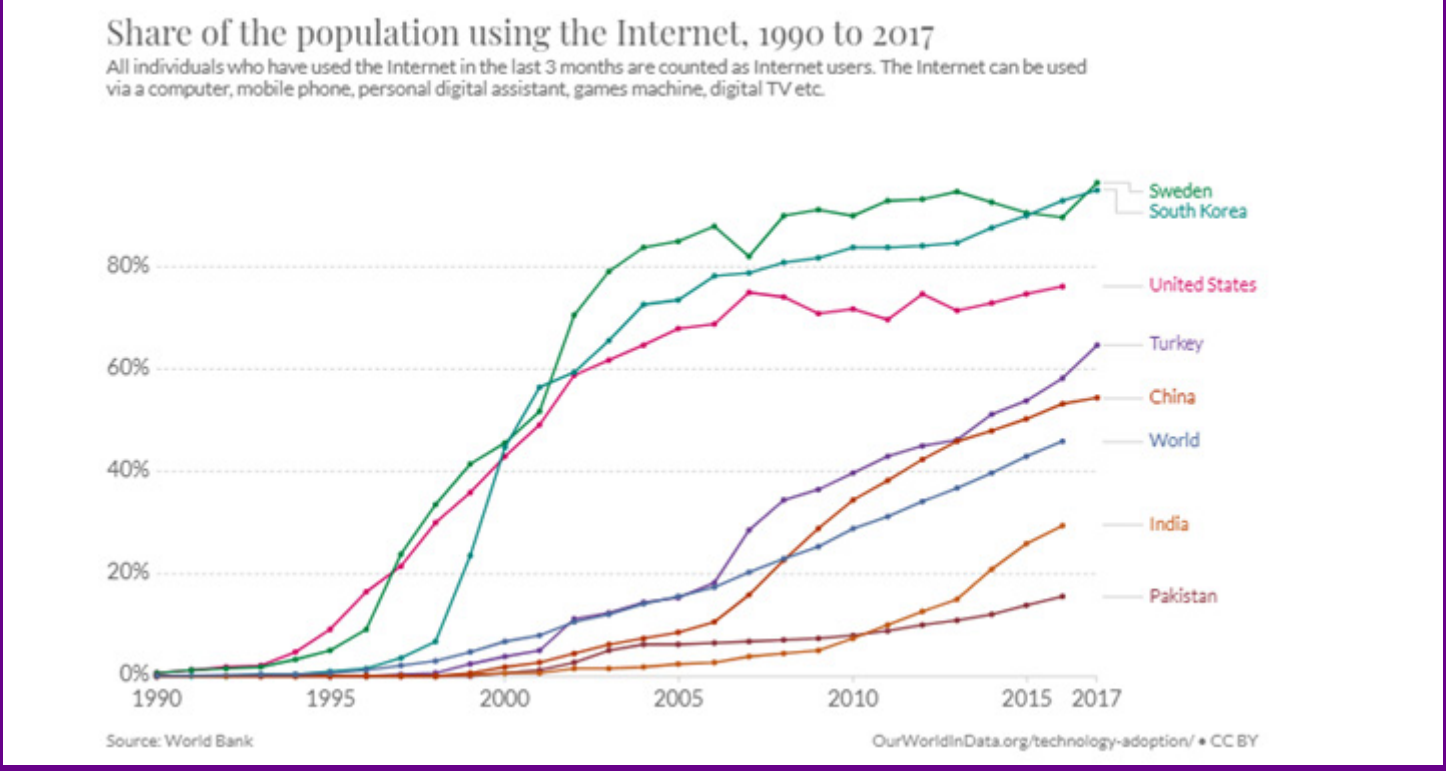
HAFSA HINA

ASSISTANT PROFESSOR, PIDE

COVID-19's spread poses a threat to humankind, as the pandemic has forced many worldwide activities, especially educational activities, to shut down or change drastically. Education institutions have had to adapt to e-learning to use existing educational platforms to slow the spread of the virus. Digital learning is challenging at many levels, with limited or no-access to the internet has been one of the biggest challenges. If a student doesn't have a device to connect with in the first place, finding a stable internet may be the least of their concerns. And often, they have no option but to share with other family members who are also engaged in online classes or are working from home.

According to UNESCO, only around half of the world's households (55 percent) have access to the internet. In the developed world, 87 percent of people are online, compared to 47 percent in developing countries and only 19 percent in least developed countries. In Pakistan, only 7 percent of individuals have computer devices available, and only 67 percent of those have computers at home.

Figure 1: Internet Usage Across the World (1990-2017)

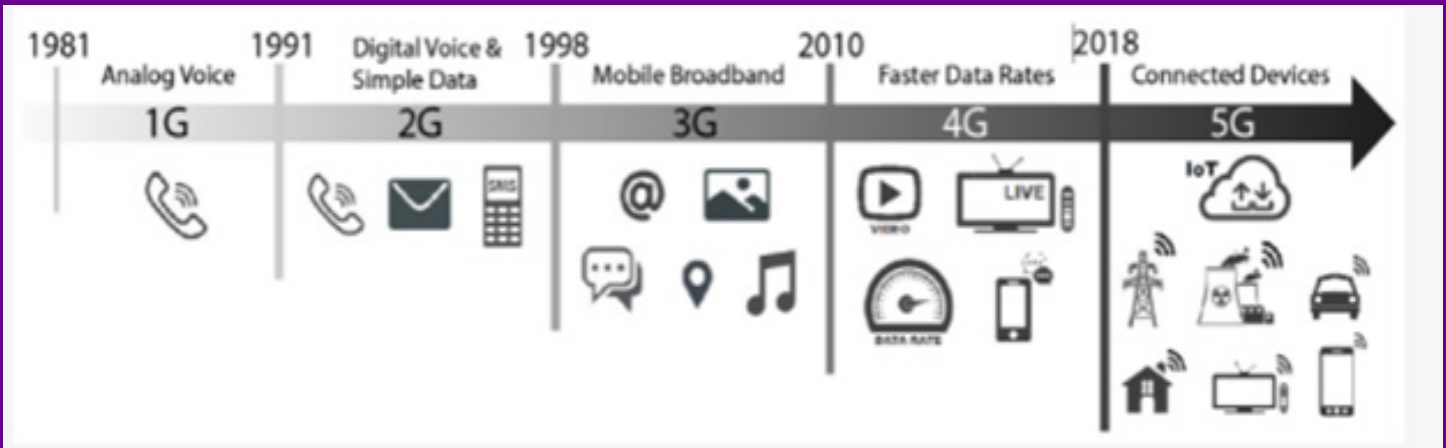


Countries that wish to stay competitive in the global economy are speeding up their adoption of 5G technology. South Korea, China, and the United States are leading the world in developing and deploying 5G technology. Sweden, Turkey, and Estonia, for example, have taken major steps to make 5G networks commercially available to their residents. Because of a lack of enabling environment (current regulatory structure, finance) and the unaffordability of smart devices, the Pakistani market is lagging in adopting 5G technology. Major advantages of 5G are greater speed of data transmissions, lower latency. These make it essential for technology-controlled businesses like the autonomous car industry and remote surgeries.

Our market isn't ready for such businesses because Pakistan is still battling to penetrate 4G, which again suffers from a lack of smart devices and smartphones. Nearly half of the subscribers use 2G technology with a less expensive mobile phone (clearly we are content with '90s technology while the rest of the world enjoys the 21st century, see Figure 2). But why is this so? Well, affordability of the devices is one of the biggest impediments. Pakistan cannot capitalize fully on 4G

and users don't have 4G devices. Clearly then, it is suboptimal to divert to 5G – we need to first assess our abilities, infrastructure, and technology to adapt to 5G. We need to develop an entire ecosystem to leapfrog because service providers alone cannot ensure the availability of 5G.

Figure 2: Evolution of Mobile Communication with Main Features, from 1G to 5G. Source: Guevara, L.; Auat Cheein, F. The Role of 5G Technologies: Challenges in Smart Cities and Intelligent Transportation Systems. Sustainability 2020, 12, 6469.



The PIDE Reform Agenda for Accelerated and Sustained Growth clarifies that Pakistan's future development will depend on the provision of internet to all. PIDE also recently organized a series of "Internet for all" webinars and invited CEOs of telecommunication companies to discuss and debate: (1) the major challenges faced by telecom companies (2) the financial resources required to make high-speed internet accessible to all? and (3) can the State incur this expenditure?

Telecommunication companies face a key issue in the government auction of spectrum release. Pakistan has released the smallest amount of spectrum in the world, and we do not release new spectrum every year. The government hoarding of the spectrum is a short-term money-making activity to fund its budget deficit. It creates an artificial scarcity of spectrum, forcing service providers to pay high costs for new spectrum release. Many countries have experienced high spectrum prices in the early stages of telecom development. However, they quickly identified and addressed these mistakes. We must understand that companies overspending on a spectrum means they have fewer resources left for business activities. They will be unable to improve quality or coverage, putting their long-term growth at risk. Pakistan must learn from other countries' experiences and overcome spectrum concerns to provide faster services in the long run.

Both optical fiber and internet penetration are low in Pakistan, with only 10 percent of mobile towers having optical fiber connections. Optical fiber firms face similar challenges in the absence of a unified strategy or framework. Civic authorities see this as a money-making opportunity to collect a fee for laying optic fiber cables. We can lay service corridors for optic fibers along the side of highways. Companies interested in laying optic fiber can avail those services and pay a fee to the government for utilization.

Funding should not be an issue as we have a Universal Service Fund (USF) and Ignite-National Technology Fund (Ignite). These two key funds, that are generated by telecom firms and controlled by the government. We must use these funds wisely to ensure that everyone has access to cheap internet and gadgets. These finances are sufficient, so the government does not need to incur extra expenditure.

We have learned from the pandemic that life without the internet is very difficult. The internet has become a divider rather than an equalizer by providing services to selected segments only. The earlier gains being made towards achieving SDG goal of primary school education may be wiped out. This is a cause for alarm for all of us. Children from poor families lacking devices and/or internet connectivity are more likely to be denied education. This will further increase the existing educational disparities. The hardships of life will continue for a lifetime because careers, wealth, and health are closely linked to educational attainment.

The telecommunication sector must be recognized as a sector that requires a sustainable framework to develop. With shifting market dynamics, this sector stimulates and helps other sectors, such as education, commerce, health thrive in the economy. We must redefine our goals with evolution of technology. We must ensure internet for all is a sustainable way to achieve economic growth.

WILL 5G BE A GAME CHANGER FOR PAKISTAN - ARE WE READY?

UNBREEN QAYYUM AND SABA ANWAR

What 5G is?

5G, the fifth-generation cellular network is the latest development in the field of IT that provides a whole range of new experiences. This novel global wireless standard is meant to deliver multi-Gbps peak data enabling a network that can connect multiple devices including machines. For consumers, 5G will ensure better user capability through low latency, high speed, and more reliable connectivity. 5G is expected to increase speed by 20 times, lower latency by 10 times, and increase the density of devices connected per square kilometer by 10 times in comparison with 4G (Figure 1).

5G will not only be a game-changer in the telecommunication sector but it will enhance the productivity of the whole economy as well. It will bring new experiences for the network ecosystem with massive upscaling in connectivity, bandwidth, and data transfer. The impact of this upscaling will ultimately lead to momentous effects on all the other sectors of the economy. Especially in the ones that are rapidly adopting smart digitized processes and have different network requirements. The enhanced mobile broadband and low latency communication will bring about limitless opportunities and possibilities for vital sectors that require instant decisions like traffic control, health, manufacturing, agriculture, energy, transportation, education, and tourism, among others. International Telecommunication Union (ITU) has already identified three broad categories of use cases (Figure 2)

- Enhanced Mobile Broadband (eMBB)
- Ultra-reliable and Low-latency Communications (uRLLC)
- Massive Machine Type Communications (mMTC).

Figure 1
Source: International Telecommunication Union (ITU).

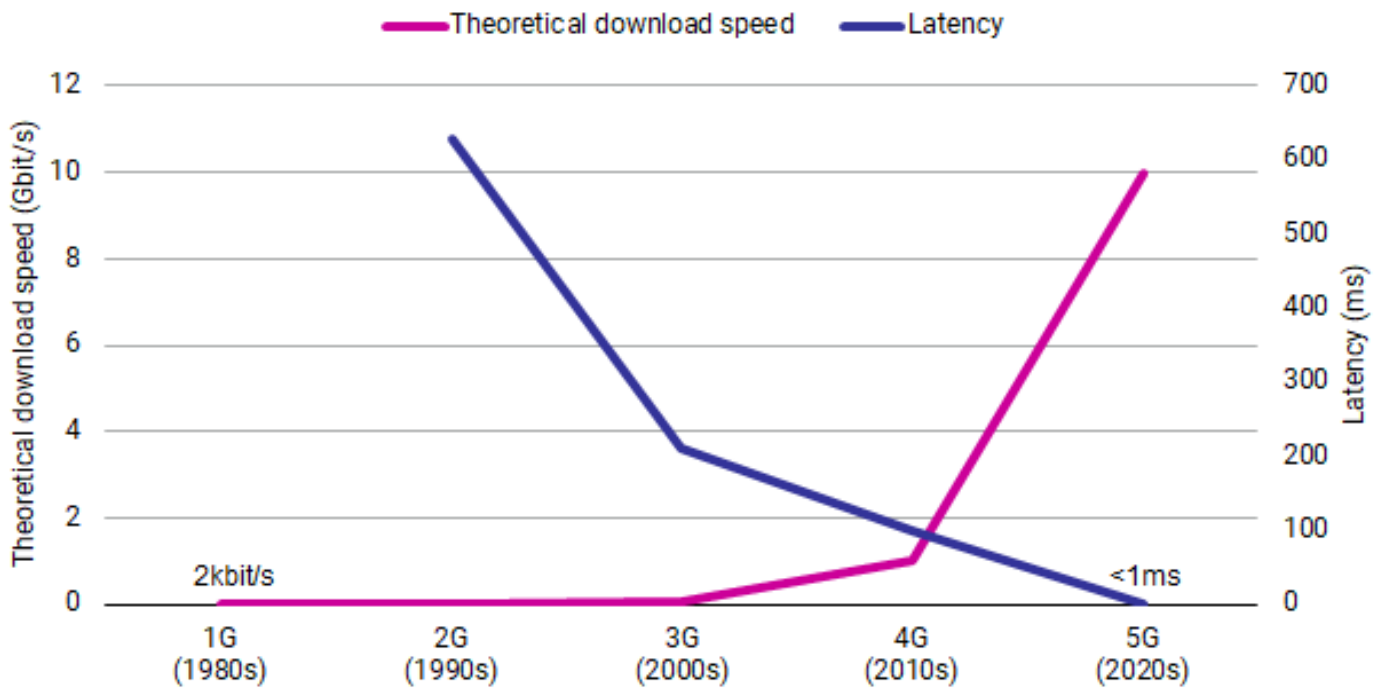
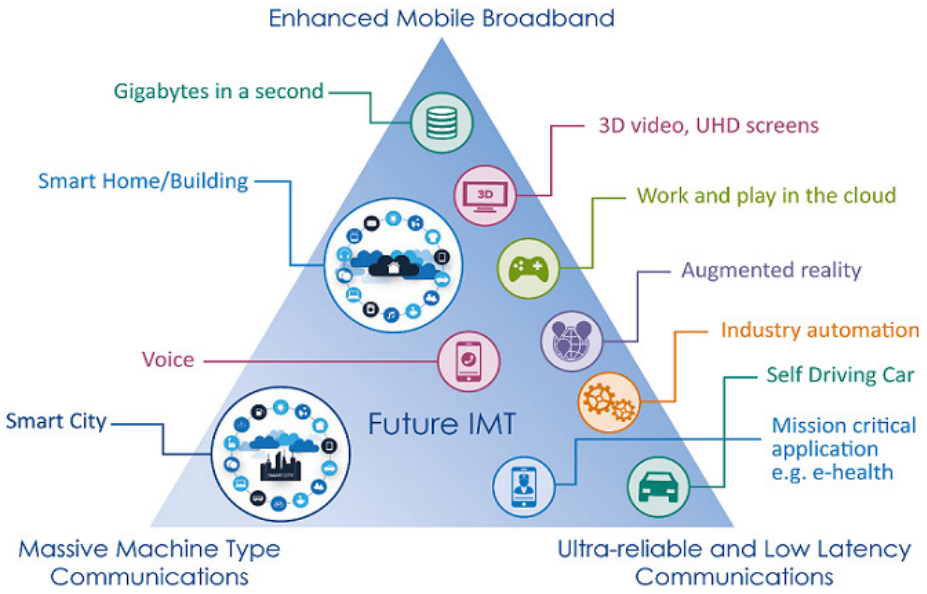


Figure 2
Source: International Telecommunication Union (ITU).



Box 1
Wake-up call

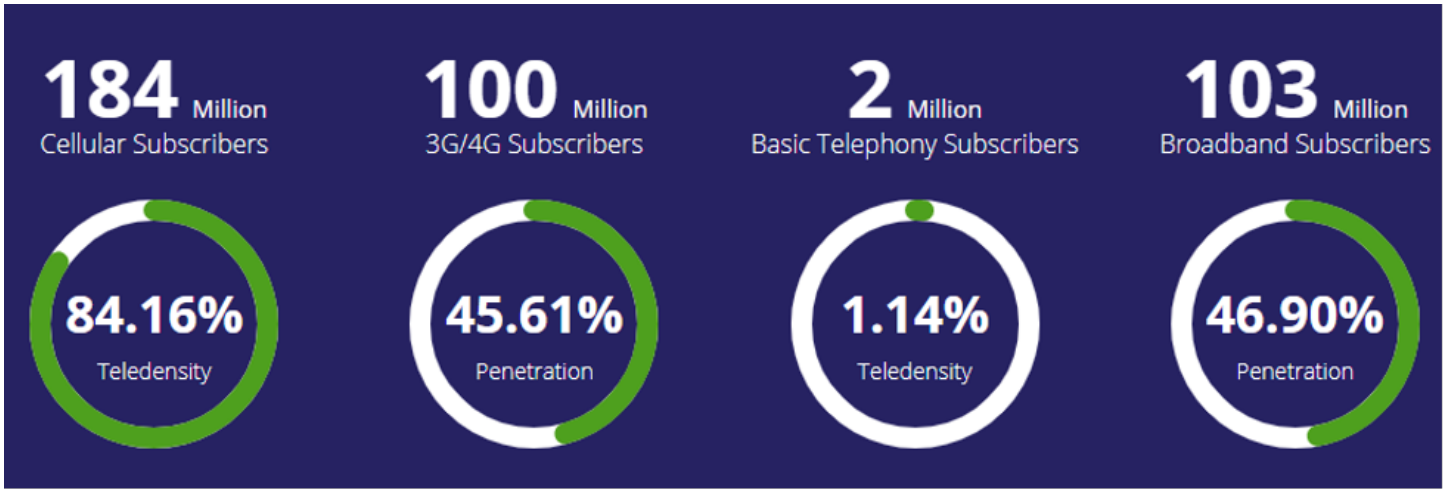
- 89% of the population in Pakistan cannot afford internet, IMF
- Pakistan has been ranked 90th out of 120 countries on the Inclusive Internet Index 2021 by the Economist Intelligent Unit (EIU).
- Pakistan falls into the last quartile of the Global Internet Index countries overall & it ranks 24th out of 26 Asian countries.
- World Bank data (International Telecommunication Union and World Telecommunication/ICT Indicators Database) shows that 17% of Individuals in Pakistan used the Internet in 2019.
- The number of internet users in Pakistan increased by 11 million (+21%) between 2020 and 2021.
- Internet penetration in Pakistan stood at 27.5% as of January 2021.
- The internet is supplied by 6 submarine optical fibers and four operators in Pakistan. The internet coverage through mobiles is 85% + population but there are approximately 35% of people that have no access to any signal no 2G, 3G, 4G, 5G. The voice for better internet at an affordable price is surging.

State of Pakistan Economy

- The download speed during the 5G trial in Pakistan was reported to be 1.685 gigabits per second.
- 5G will help the digitalization of Pakistan by connecting people with robust purpose-built technology opening up opportunities for industries as well as individuals. They are expected to benefit from future innovations in distance learning, public safety, manufacturing, transportation, and health, etc.
- The introduction of e-governance will enhance the enabling role of the government and bring about transparency and efficiency in processes.

5G will increase the demand for fiber as each building needs a fiber connection and a small antenna/ base station for a cellular company. It will increase demand for mobiles that are compatible with 5G technology and we also need new devices to operationalize 5G in our country. In the case of Pakistan, we are yet to capitalize on our investment in 4G. We should opt for a technology that is relevant to the country. Korea went for 5G when they had an 80% penetration of 4G handsets. In our country, around 60% of the users do not have the 4G devices; the 4G was introduced 10 years back. We need another 3-4 years to get used to 4G. To develop a fully compatible ecosystem with 5G we require an up-gradation to the latest technology from both customers and operators. Even if the Spectrum is available in our country, 5G will be more expensive as the companies will need to upgrade their apparatus. This will put pressure on existing companies. The four operators provide 4G but 50% of our Sims sold today are 2G and 50% of our handsets are sold in the market can hardly support 2G. The benefit of utility comes in when the number of users is high. Providing 5 G to a small privileged community will be suboptimal while investment in 4G will improve service quality many times.

Figure 3
Source: International Telecommunication Union (ITU).



Source: PTA website.

With the existing infrastructure, a lot is going on like vehicle tracking, driver behavior, app economy, and weather and pricing information to farmers, etc. that has increased their productivity. Instead of 5G, we need to more focus on e-commerce that is more valuable for the economy of Pakistan. Easy paisa is working exceptionally well but still, we face issues in online payments. People are not comfortable with online or digital payment even now and there is a natural evolution and adoption of the latest technology so let the market decide. One strategy could be to move gradually up the ladder.

Box 2
Wake-up call

Challenges

- 30% higher tax on broadband compared to luxury products
- 50% of customers still using 2 G
- 90% of handsets made in Pakistan are feature phones.
- High Taxes on smartphones.

On the one side we are promoting 5G technology but on the other side producing phones for 2G technology and this creates huge problems in the adoption of latest technologies. We close internet devices/cell phone signals in any political event for security reasons and it affects business. The latest orders by the Punjab government to block SIMs if anyone refused vaccination are very alarming. Which business plan will be viable in this situation? We should think about why investment is coming in India but not in Pakistan by major investors like Google and Facebook.

Box 3
Wake-up call

Advocacy and support for a digital Pakistan:
Improve internet access: Review taxation on broadband and devices
Eliminate Cash: Preference to digital payments through tax incentives
Value Chain Enhancement: Internalize digitalization agenda within the private sector
Stop Cell phone Blockages: for security reasons.

Global Positioning

- Pakistan has been ranked 90th out of 120 countries on the inclusive internet index 2021 by the Economist Intelligent Unit and it stands well behind India, Bangladesh, Nepal, and Sri Lanka.
- In-network readiness index, UNCTAD's e-commerce index, Pakistan comes after Bangladesh, India, Sri Lanka, Iran, Thailand, and Malaysia.
- In the UN department of economic and social sciences, e-government development index, Pakistan ranked below Myanmar, Nepal, Bangladesh, and India.
- In the telecommunication infrastructure index of UNDESA, Pakistan is behind India, Bangladesh, Nepal, and Myanmar.
- In the world economic forum index of 141 countries, Pakistan is at 110th, again behind Nepal, Bangladesh on Sri Lanka, and India. In the ICT development index from September 2019, Pakistan is behind Bangladesh, Nepal, Myanmar, and India.

Way Forward

Digital communication has a major role to play in economic development and growth both in developed and developing countries. The poor connectivity and accessibility hampers the productivity of the businesses and creates further divides in the economy. There is a common consensus in the developed countries that we need greater coverage and consistent accessibility rather than high-speed data transfers. The universal coverage should be taken up either as a basic right addressing the divides in the society or industrial policy of the developing countries.

According to a World Bank study, the cost of reaching universal access by 4G in developed countries requires 1.6 trillion USD which amounts to 0.6 % of the GDP. In Pakistan, like other developing countries, the budget is severely constrained by major challenges of debt servicing, poverty eradication, universal health, and education. Amidst all the challenges, Pakistan has allocated 0.83 % of its PSDP to science and information technology for the FY2022. This has no comparison with the amount required for universal access of 4G.

Based on the existing GDP per capita and population density, we need to determine the most suitable technology for Pakistan's digital landscape rather than leapfrogging to 5G. The mix of two technologies can be the best policy option also. The policymakers can then ensure the efficiency of the "best suitable technology or technologies" via timely investment incentives and a favorable regulatory framework. This would reduce financial pressure both on the government and the cellular companies.

The 5G is in an embryonic stage of development in most of the countries, yet the discussion is intensifying over the cost-effective rollout of the technology in Pakistan which is the new global wireless standard. This is very challenging for the governments of developing countries. The factors that have contributed to the cost-effective rollout of the 5G technology amounts to standardization of LTE, enhanced spectrum efficiency, and allocation of additional spectrum. Pakistan though believing in digitization as a pillar of growth has yet to materialize on 4G LTE and existing spectrum auction. The 5G seems to be a distant reality.

A highly competitive and open market without undue regulatory duties for smartphones and devices is required that would enhance the penetration of 5G. The "Suzuki mobile" plan needs to be revisited. The restrictions on internationally standardized mobiles and devices to protect local production leads to inherent inefficiencies as per experiences in the automobile sector.

HOW DIGITAL WE ARE?

HAFSA HINA

ASSISTANT PROFESSOR, PIDE

COVID-19 and Digitization

COVID-19 has changed a lot and digitalized us. In this lockdown, peoples are doing everything from education to office work online at home. But do we know how many of us have access to the internet? And can we gauge the person's backwardness by whether they have a computer, smart phone and internet? Let us estimate from the data of Household Integrated Income and Expenditure Survey (HIES) 2018-19 on ICT indicators.

Province	Household Count
Khyber Pakhtunkhwa (KPK)	3,800
Punjab	8,484
Sindh	4,551
Balochistan (BA)	1,978
TOTAL	18,813

According to this dataset (see Table 1), only 7% of the individuals[1] have the availability of computers and only 67% of them have computers at home. But don't worry too much about the 7% because people in developing countries are sharing luxury commodities with each other. Therefore, 17% of household[2] have computers. Interestingly, those who do not have a device say that the major reason is that they do not know how to use it, and 25% say they use a smart phone instead. According to this data, only 14% of individuals have a smartphone.

Table 1: ICT Indicators from HIES 2018-19
Source: Calculations are based on HIES 2018-19

ICT Indicators		Province				
		KPK	Punjab	Sindh	BA	Pakistan
Availability of Computer (Desktop, Laptop, Tablet) at individual level		7%	9%	7%	3%	7%
Availability of Computer at household level		17%	18%	14%	7%	16%
Availability of Computer at home		70%	69%	62%	65%	67%
Not using computer due to	Don't know how to use	71%	52%	45%	54%	54%
	cultural reasons	13%	29%	26%	25%	24%
	Affordability	8%	15%	19%	14%	14%
	Privacy Concerns	1%	1%	0%	0%	1%
	Use substitutes like smart phone	5%	6%	9%	4%	25%
	Other	2%	2%	2%	0%	5%
Use of internet in last 12 months		15%	17%	17%	7%	16%
Location of use of internet	Home	80%	84%	76%	85%	81%
	Work	4%	3%	3%	4%	3%
	Place of Education	2%	1%	1%	2%	1%
	Other	13%	2%	4%	1%	3%
Purpose of using Internet	Email, chatting, Facebook, Voice and Video calls on - Skype, whats App, Downloading /watching movies, dramas etc..	87%	86%	86%	89%	87%
	Education and research	4%	5%	4%	5%	4%
	Information seeking (news,health, Govt., etc.)	1%	1%	2%	1%	2%
	Business Purpose	0%	1%	0%	0%	1%
	Downloading software, programs	0%	0%	0%	0%	0%
	Online shopping/banking	2%	1%	1%	1%	1%
	Doing All of Above Activities	6%	6%	6%	3%	6%
Not using internet due to	Do not need	54%	51%	45%	51%	50%
	Do not know its use	20%	36%	31%	16%	29%
	Cost of Internet is too high	2%	2%	7%	3%	3%
	Don't know what Internet is	10%	5%	8%	22%	9%
	Not allowed to use the Internet	8%	5%	5%	4%	5%
	other	6%	1%	4%	5%	3%

Internet Facility Availability

If we look at the availability of internet facility, we find that only 16% of individuals have used internet in last 12 months and about 80% use it at home. 87% individuals are using internet for entertainment and only 4% for research and education. Again what is interesting is the reason why they don't use internet. The major reason cited is not cost, but the belief that they don't need it and don't know how to use it.

If we look at this information for the provinces, Balochistan is the most backward in terms of digitalization having low availability of computers, smart phone and internet. And perhaps unsurprisingly, Punjab leads in digitalization.

Digital Inequality

As information, services and resources move online, digital inequality comes as a form of social inequality and will be the greatest challenge. Now we move to measure the use of internet depending upon the socioeconomic conditions of the individual. An index[3] which measures the socioeconomic condition of an individual which includes availability of durable goods, per capita expenditure (as a measure of per capita income) and average education of individual aged 18 or over of each household. Then define disadvantage individual are those belonging to the 30% of the lowest value of the index and advantage individuals saturating in 30% highest index. In Table 2, we see only 1% of disadvantaged individuals and 28%

Table 2: Internet Usage based on Socioeconomic Conditions
Source: Calculations are based on HIES 2018-19

	Use Internet	Do not use Internet
Disadvantage	1%	99%
Advantage	28%	72%

Based on this information we can easily find the socioeconomic digital segregation by using D-index[4]. According to the D-index, the socioeconomic digital segregation among the disadvantage and advantage group is 0.498 or approximately 0.50, which indicates the hyper segregation.

Government Steps

In the view of this segregation, an effective step of the government is to launch a first educational channel on TV called teleschool. It is delivering content for grades 1 to 12 from 8 am to 5 pm every day. How many people can benefit from it? It depends on whether their children are going to government school and have a TV. According to PSLM 18-19, 51% of households have TV. A teleschool is a stop-gap policy measure and only effective in the short-run. Why? Because its only objective is to provide education according to the curriculum of government education. Assessment of the student is not the goal, so there is no way to determine how much the student has absorbed or learned.

In our case, the student fails unless he memorizes the lesson. Many people do not know about this channel because their children are going to private school. So public school education is not a concern for them at all. As per PSLM 18-19 (see Table 3), 56% of students are going to government schools and only 49% of these students have a TV at home. Therefore, this program is not effective in reaching the majority of students, the remaining 71%.

Table 3: Students in Private and Public Institutes
Source: Calculations are based on PSLM 2018-19

Grade	Type of school/institution currently attending			
	Government	Private	Other	Total
Class KG-intermediate	22572	12835	2476	37883
Diploma	194	80	15	289
Bachelor level	856	264	131	1251
Master level	192	49	58	299
Professional Degrees	185	137	6	328
Total	23999	13365	2686	40050

Final Thoughts

The majority of our private schools and universities are taking online classes, but internet access for students and faculty alike remains a key challenge. In terms of digitalization and access to information communication technology, Pakistan lags far behind other countries. In the Digital Evolution Index 2017, Pakistan was ranked 56th out of 60 countries. It is in the low trust equilibrium zone where users tend to be less engaged and less patient with frictions online. To make Pakistan digital brings more challenges which need to be addressed both in policy making and implementation.

1. **ICT indicators are for individual 10 years and above. 115632 are total individuals and among them 23668 belongs to KPK, 50493 belongs to Punjab, 28394 from Sindh and 13077 from Baluchistan.**

2. **24809 households are in the sample.**

3. **Principal Component Analysis is used for index calculation**

$$D = 0.5 \sum_{i=}^{n} \left| \frac{internet\ user_i}{Total\ internet\ user} - \frac{Non\ internet\ user_i}{Total\ Non\ internet\ user} \right|$$

It ranges between [0:1], where 0 represent a complete even distribution and 1 represent an absolute uneven distribution. If this index exceeds 0.5, it is consider as hyper segregation. It is calculated by , where i represent the disadvantage and advantage group.

COLLABORATIVE REGULATIONS FOR DIGITAL PAKISTAN

SHAHBAZ NASIR, PTA

IT and Telecom sector is the backbone for digital economy. Fostering this economy requires extended collaboration across the sector: a fundamental shift in the way regulation is executed and the stakeholders that it brings together - from cross-sector regulators to market players. Pakistan Telecommunication Authority (PTA), being a progressive regulator of telecom sector, is endeavouring to facilitate digital transformation in Pakistan through such collaboration, consultation and conciliation. PTA continuously evolve its regulatory practices and frameworks through holistic approaches and consultative processes involving all the relevant stakeholders. The International Telecommunication Union (ITU) has also appreciated PTA's regulatory practices by ranking PTA as 4th Generation Regulator (G4), thus placing Pakistan among the top five regulators in the Asia-Pacific region and the only G4 regulator in South Asia.

ITU's recognition of PTA as G4 Regulator is a testimony to the rapid evolution of ICT regulations in Pakistan and a move towards collaborative regulations. PTA is working with different sectoral regulators and ministries because new innovations have a larger spread across different sectors like banking, education, commerce, health, agriculture etc. In this regard, PTA had an active collaboration with the financial regulator "the State Bank of Pakistan (SBP)" to promote proliferation of Digital Financial Services (DFS) across the country. Towards this end, both the regulators have signed MoU and issued joint regulatory framework for the technical implementation and interoperability of mobile banking services. The financial and telecom regulators have also actively worked on the implementation of National Financial Inclusion Strategy as well as fostering of digital payments in the country. The widespread availability of biometrically verified SIMs has greatly helped in the fast uptake of DFS in far flung areas of the country. PTA also developed CNIC-mobile pairing verification mechanism through the collaboration of Pakistan Mobile Portability Database (PMD), mobile operators & banks to enable remote/digital on boarding of customers, helping banks to fulfill their KYC requirements.

PTA also bagged the distinction of implementing the world's first open-source, full-fledged Device Identification, Registration and Blocking System (DIRBS) in collaboration with Federal Board of Revenue (FBR), and the same has internationally been recognized by ITU as a flagship project. DIRBS has had a positive impact on the economy in terms of an exponential increase of 125% in the commercial import of mobile devices since 2018. Furthermore, successful implementation of DIRBS has also facilitated exploration of the opportunity for local manufacturing of mobile handsets. The provision of a level playing field has resulted in the authorization of more than 26 local assembly plants and production of over 42.7 million local mobile handsets till June 2021. Through collaborative regulations, PTA is also facilitating the regulatory framework for local manufacturing in coordination with the Ministry of Industries and Production.

Opting a modern regulatory sand-box approach, PTA has already provided 5G tests/trials framework and authorization for 5G tests in Pakistan, allowing operators to conduct limited trials on non-commercial basis so that the operators can experiment with new technologies in environments that foster innovation. Going forward, commercial launch of 5G Technologies in the country demands even higher level of cross-sectoral engagements to develop the required eco-system and use cases for the deployment of such cutting edge technologies in the country.

PTA believes in integrated regulations aligned with economic and social policy goals that culminate into globally recognized growth trends. Receptive to changing global trends, PTA now focuses on a collaborative approach governed by principle-based inclusive regulation and decision-making. In future, PTA will continue to strive for ITU's G5 regulator status by focusing on collaborative and cross-sector regulations that leverage digital transformation for the benefit of the people of Pakistan with a guiding vision of "Digital Pakistan".

INTERNET EVOLUTION IN PAKISTAN

PTCL/UFONE

"Internet has become a lifeline in the new normal„

It was necessary even before the pandemic, but now it has surely become a necessary part of our lives that is catering to our daily routines such as online education, e-Health, work from home, entertainment, e-shopping and a lot more. Particularly in a country like Pakistan that is striving to achieve digital transformation, the significance of having seamless internet service cannot be overlooked. In fact, we find the positive impact of the internet in every aspect of life, for example, availing e-Bill facility instead of opting for paper bills. This will boost digitization and make our environment friendly, along with providing convenience to pay bills from the safety of our homes with just a few clicks.

Lockdown during Covid-19 pandemic has greatly impacted economic activities; however, leading telecommunication companies have played a pivotal role in ensuring availability of essential services like communication and connectivity. Pandemic put a spotlight on the true potential of broadband services, transforming and shaping how people lived their lives entailing day to day activities. Education, healthcare and businesses were quick to adapt virtually and digitalized, creating a huge nationwide demand for telecom services. Being the national telecom companies in Pakistan, PTCL ensured connectivity and network resilience even in testing times and ensures availability of broadband services 24x7 for smooth operations across Pakistan.

PTCL also introduced e-billing system through its website and TouchApp, whereas Ufone launched UPaisa for customer convenience. These initiatives not only provide people with option of getting their bills online and save paper for environmental cause, but also encourages people to go digital and stay home & safe.

In its efforts to redefine the paradigms of communication, PTCL has continually empowered businesses, education systems, and customers with seamless connectivity. Quite recently, PTCL launched its Fiber-to-the-home (FTTH) service called Flash Fiber, which is the fastest internet in town yet and delivers data to the customers with a blazing speed of up to 100Mbps. Unlike other internet and television service providers, this company's cutting-edge technology of Flash Fiber allows users to have access to unlimited downloads with a reliable and affordable service.

Broadband fiber-optics use optical fibers to carry information at the speed of light. What affects the data speed is the way these little pulses of light are encoded at one end and decoded at the other end. Digital Pakistan vision is reshaping the country rapidly as it is transforming everything from the way government and citizens interact to market behavior and how consumers shop online and pay their bills through apps. It is not only boosting industrial and agricultural productivity across the country, but revolutionizing healthcare, and enables young men and women with fruitful opportunities.

During these uncertain times, companies and organizations are moving towards digital transformation to adapt to the current circumstances and ensure growth for not only the company but their employees as well, along with better customer experience. This, however, is a challenge as staying ahead of the competition through innovation in technology has become the need of the hour.

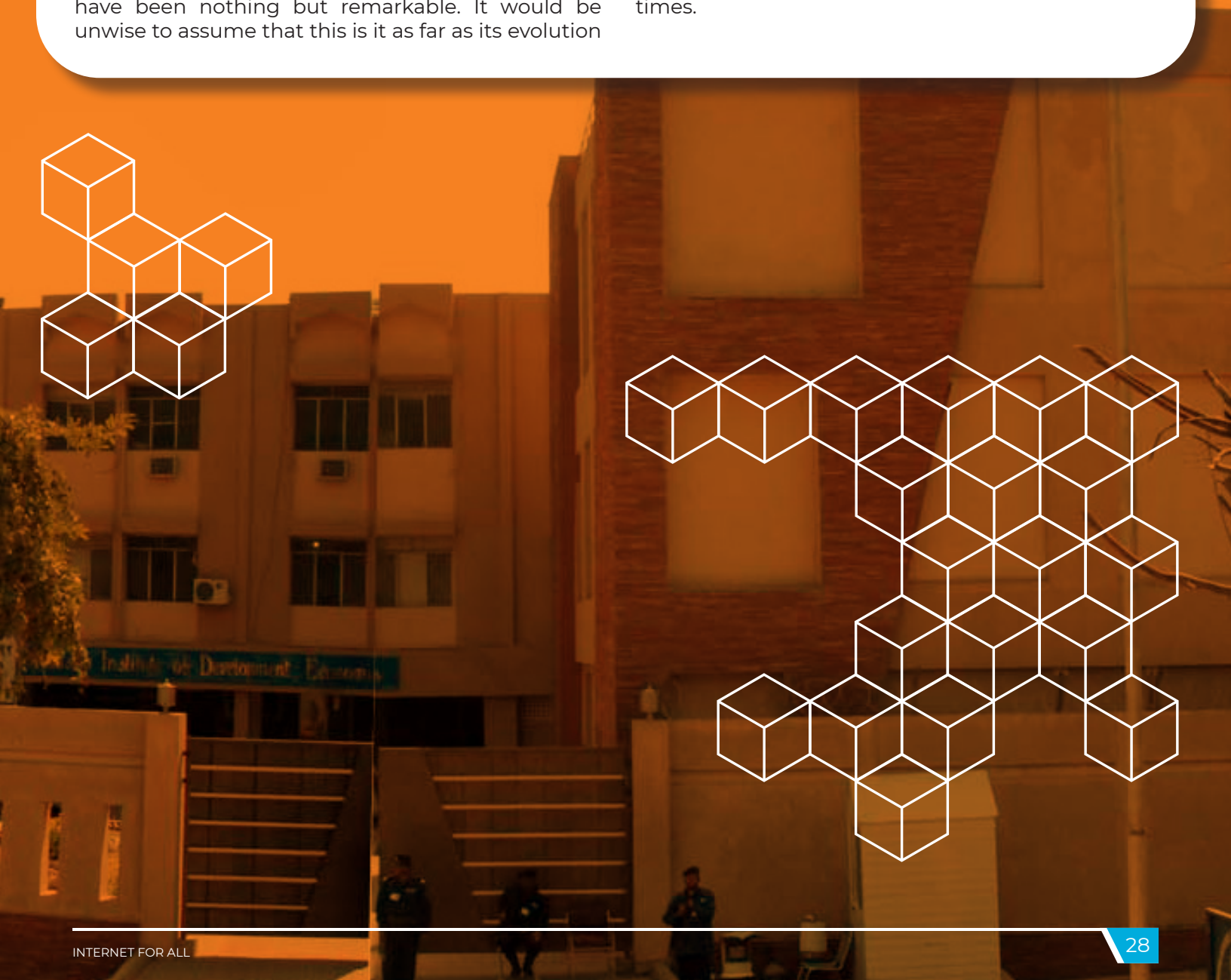
With uncertainty comes opportunities as companies are taking an out-of-the-box approach, with creative

strategies that will ensure business continuity, progress, better customer experience and yield positive results.

To say that the future is digital is an understatement as the future is digital. We, as a nation, need to be in a place to enable Pakistan to grow while facing the challenges of the digital world. The need of the hour is to innovate, modernize our infrastructure, develop IT skills & technical education, think out-of-the-box for businesses to be more creative and embrace change to shine and progress to take Pakistan to the next level of growth.

The conception, survival, and evolution of the internet have been nothing but remarkable. It would be unwise to assume that this is it as far as its evolution goes. It has, will, and must continue to evolve as we move forward into a future where services such as real-time transport and space travel will become a norm in the lives of common people.

Telecom sector has played a key role to provide best services and remove the obstacles in communication and data exchange, we see companies like PTCL that has worked tirelessly to ensure seamless connectivity across the country, better communication, increased access & convenience, easier networking and entertainment & recreation, thus ensuring productivity and morale of people in lockdown through internet. PTCL has been connecting the nation and continues to support even in these trying times.



JIO'S INTERNET REVOLUTION IN INDIA

MOHAMMAD SHAAF NAJIB

Reliance Jio Infocomm Limited, commonly referred to as Jio, a subsidiary of Jio platforms and owned by Reliance Industries is an Indian telecommunications company launched in December 2015 and became publicly available in September 2016. India is now the second largest telecommunications market in the world with the telecom subscriber base reaching 1.15 billion by the end of year 2020, as per a report by Statista in February 2020. India has also become the world's second largest internet consuming country with the average data consumption of 9.8 GB as the country's internet subscriber base has now increased from 250 million to 550 million in just three years. Reliance Jio's contribution to this surge in India's telecommunication and internet market has been pivotal. To comprehend the upswing of Jio Platforms it is important to understand the rise of Reliance Industries.

Reliance was founded in 1966 by Dhirubhai Ambani as a trading business, which over the span of nearly four decades expanded into the manufacturing sector, petrochemicals and oil, gas, and petroleum industries. As a result, Reliance from a small trading business became an industrial powerhouse despite India's restrictive policies during the period of fantasizing socialism. Following Dhirubhai Ambani's death in 2002, the Reliance industry was under major threat due to the power struggle between Mukesh and Anil, Dhirubhai's sons. In 2005, Mukesh Ambani and Anil Ambani reached an agreement to split the group as per which Mukesh Ambani got the ownership of the core petrochemicals business, Reliance Industries Ltd while Anil Ambani took over Reliance Communications, the telecom arm of the group which had been established recently along with bunch of other entities and thus forming the Reliance-Anil Dhirubhai Ambani Group.

The brothers signed a non-compete agreement for a decade, but it fell apart mid-way. This paved the way for Mukesh Ambani's Reliance Industries Limited to enter the telecom sector. This evolution of RIL following the non-compete agreement break up would go on to become the reason of India's internet revolution a decade later.

The Journey towards Jio Platforms

In 2010, India decided to take the next step forward in the development of its telecommunications sector. The government started auctioning the high-speed data access 3G and 4G spectrums. Multiple telecom companies were operating in India at this time, focusing their efforts around upgrading their infrastructure and services only to the 3G spectrum, and thus did not buy the 4G spectrum. Instead, the 4G, also referred to as the Broadband wireless-access (BWA) auction was swept by a completely unknown company named Infotel Broadband Services Limited having just $32,000 in revenues and a single subscriber. The very next day, RIL announced having acquired Infotel, marking the return of Mukesh Ambani into the telecommunications sector

Box 1:
What makes LTE so desirable?

Long-Term Evolution, commonly referred to as LTE is the fourth generation or 4G wireless standard aimed at increasing network capacity and cellular devices speed. LTE is the technology used for wireless broadband communication between cellular devices and data terminals, making use of GSM and UMTS technologies.

LTE offers a higher peak data transfer as compared to the 3G technology, with reduced latency, stable bandwidth capacity and backward compatibility with existing technologies being used in cellular devices. LTE also has an active role in the development of 5G technology. Summing, LTE can be referred to as the technology being employed in 4G telephone services.

Voice over LTE (VoLTE) is an upgrade on the LTE technology, as it uses a much more standardized system, especially for making high-definition voice calls. As a result, users can make voice calls while using data services at high speed without changing the voice quality in the call. On the contrary, the LTE technology carriers have introduced a circuit-switched fallback mechanism as per which cellular devices using LTE technology fall back to 2G or 3G networks for the duration of the call.

following losing his dream project Reliance Infocomm to brother Anil Ambani in the 2005 demerger. RIL also put its energies in establishing a base for high-speed optical fiber 4G network across the country.

The Wall Street Journal penned down RIL having established itself as the sole owner of 4G spectrum in India as: "By the time Mukesh Ambani builds a 4G wireless business, rivals will have had the chance to sign up millions of customers for 3G services, leaving a smaller pool of potential broadband subscribers. Also, 4G technologies are still being fine-tuned, whereas 3G networks have been up and running for years in other parts of the world. And 4G devices will likely be more expensive than 3G ones in the initial stages due to there being a smaller universe of manufacturers."

Time has shown, RIL's investment in the 4G infrastructure was as fruitful as it could be. In September 2016, RIL's new telecom service called Jio was formally launched, with special focus on high-speed data instead of just voice and messaging services. Jio offered customers 4G internet with data plans amounting to 1GB per day at a time when all other telecom operators were offering 1GB data per month. Moreover, they set the price during the initial days at just INR 05 per GB while other companies offered in the range of INR 250-300 per GB. Jio also became the first network in India to provide 4G LTE services and VoLTE services. All the prime members were offered free voice calling and 100 free SMS per day by RIL. This proved to be quite a miracle in India's price sensitive telecom industry. Jio at the time of its launch was already covering 18,000 cities and towns along with over 200,000 villages in India, aiming to make Jio's services accessible to 90% of Indian population in not more than six months. Mukesh Ambani was vocal about his objective to gain 100 million customers as soon as possible, and Jio, whose entry into India's telecom sector has been nothing but revolutionary, by mid-2020 had gained about 388 million customers while also carrying 70% of 4G traffic in India during the year 2019. Consequently, India's average data consumption rose to 12GB per month in 2019, up from 90MB in 2014.

Box 2:
Why Swim Against the Tide?

When the Indian government started auctioning spectrum for 3G and 4G, all telecom companies at the time put their money on 3G, while 4G was bought by a small sized firm called Infotel Broadband Services Limited. RIL bought that company and started its journey in the field of telecommunications. The real question is: At a time when all established Indian telecommunication companies were focusing on 3G, why did RIL become so interested in investing the 4G segment?

In 2011, when Isha Ambani – daughter of Mukesh Ambani – was a student at Yale and had come back to her home in India for vacations. She was, however, unable to properly submit her coursework due to poor internet connectivity. This was when Mukesh Ambani, the head of RIL realized that the problem being faced by her daughter was not an isolated experience, but a shared problem in all of India. Alongside poor internet connectivity, Indian population was faced by overpriced data charges, making internet unaffordable for a significantly large number of people.

Instead of just trying to install a better internet connection at his residence, Mukesh Ambani initiated his plans of working on the Jio Platforms to provide high speed internet facility to all of India at affordable rates.

A simple realization from a father that the problem faced by my daughter is a problem faced by every Indian national became the basis of India's telecom and internet revolution.

More than just a Telecommunication Service Provider

Jio was launched as a telecommunication service provider, focusing primarily on Broadband Wireless Access (BWA) - commonly referred to as the 4G LTE and VoLTE services. Over the following few years, Jio widened its artillery by offering multiple products and services.

In 2016, Jio launched its first smartphone device through RIL's electronic retail outlets, Reliance Retail. Till now, Jio has launched three different mobile series targeting different segments of the society. These mobile phone series have been named as LYF, JioPhone and JioPhone 2. Another series of phone called as the JioPhone Next, co-developed with Google is expected to be launched in September 2021.

JioNet Wi-Fi is the free Wi-Fi hotspot service that the company provides in cities throughout the country. JioNet was started even before the Jio cellular services were available to all of India. This way,

Jio managed to make a mark in the market for itself even before it had fully operationalized its cellular services. As part of JioNet Wi-Fi, Jio was able to provide free wi-fi facility to spectators in six cricket stadiums across India hosting the 2016 World T20 cricket championship.

Jio has also launched multiple mobile phone applications. These include a web browsing app for android phones, instant messaging and video calling applications, entertainment apps, online payments app and a few others focusing on various services for the users.

JioFiber is the initiative by Jio Platforms to connect all of India with high-speed broadband internet through fiber optic cables. Since 2015, the company has been expanding its fiber optic cable network and began testing the service in 2018. It has been given the name Jio GigaFiber.

Box 3:
FTTX- What is the all the hype?

Fiber to the X (FTTH), is the term used for internet services where broadband internet is provided to a home, building, residential area, organization etc., referred to in the name as X, through optical fiber cable. The optical fiber cable can carry a much larger quantity of data at higher speeds as compared to not only the conventional copper wires used in older broadband systems, but also in comparison with the telecommunication service providers.

It is capable of transferring data at speeds of 1Gbit/s, or Gigabits per second, to a much farther range of area, even as far as tens of kilometers. This is not only quick as compared to all other available data transfer technologies, but over long distances also prove to be more economical. As a result, FTTX is now being preferred by all major communication providers globally in cases.

With rising fame of high-definition, on-demand video streaming applications as well as following the onset of pandemic the realization of cost-effectiveness and efficiencies in online or work from home set ups, FTTX is the go-to technology for high quality internet provision.

Courtesy of Jio's quick expansion not only of its cellular services but also of the Jio GigaFiber initiatives, India is now well seated at the foothills of an internet revolution and in coming years will reap the fruits of these initiatives by Reliance Jio.

Reliance Jio, India's Telecom Sector, and the Economy

Jio's rise in Indian telecom sector has changed the dynamics of the industry in the country. High quality and affordable telecom services especially internet across India is no longer a dream, but a rapidly materializing reality. Jio has positively impacted the telecom users in India and managed to radically alter the dynamics of the industry. Ignoring predatory prices and making use of consumer-friendly pricing in a price sensitive industry played a major role in people's adoption of the new service provider. This has not only significantly reduced the profits of other telecom sector competitors, but also forced small network operators to shut down as they failed to reach the standards now set by Jio. Gupta, Raghav, & Dhakad (2019) analyze the impact of Reliance Jio's introduction on the telecom sector and consumers well-being. Gupta et. al (2019) reached to the conclusion that Jio successfully managed to completely disrupt the telecom market of India forcing established network operators to either exit the market or merge with other firms. On the other hand, the consumers have responded positively to the new entrant and thus the market witnessed a significant shift from other operators to Jio by the consumers. Madhavan and Chirputkar (2020) focus on the various ways in which Jio's sudden rise has impacted the Indian economy. They concluded that despite the world coming to a standstill due to the pandemic, Jio never halted. Instead, Jio has managed to exploit the situation and become the flagbearer of digitalization in India as the company focuses on achieving its long-term goal of enabling home automation in all of India's households. Noorul (2017) and Mukherjee (2018) also analyze the disruptions caused by Jio in the telecom sector of India and how that changed the dynamics of the industry.

Lesson for Pakistan from Jio's Success

Realization, Opportunity, Boldness: three words that are key to the success of Jio in India. Mukesh Ambani's realization that the problem faced by his daughter is the problem of every household in India formed the basis of the revolution that came next. In that, Mukesh Ambani's Reliance Industries Limited saw the opportunity of an untapped market of internet in India, and especially the 4G standard. While all other well-established companies focused on 3G technology, RIL made the bold move of investing all its money and energies in establishing a network of 4G data transfer in India prior to its launch in 2015.

While some critics of RIL claim that this was possible due to the close ties of Mukesh Ambani with the Indian government, others argue that the government is responsible for acting as a facilitator in all the markets in the country instead of creating hurdles.

Currently, Pakistan employs 3G and 4G technologies in major parts of the country where internet access is available. The internet quality, however, remains severely constrained in major cities even today. The 3G and 4G internet facility remains restricted to limited regions in the country, while optical fiber connections to homes are scarce even in the few major cities of the country.

It is time for Pakistan to learn from India's Jio experience and realize the need for a high-speed quality internet across the country. The government must step forward and not only facilitate the private sector telecommunication companies to increase internet access in the country but also encourage them to expand their service areas.

Internet for all is not just a need in today's times, but considering the manner in which the post-pandemic world is evolving, Internet is slowly evolving into a fundamental right of every individual across the globe. This is the perfect time for Pakistan to take the necessary steps to realize the dream of Internet for All, else we might not be able to catch the train once it has left the station.

Lesson for Pakistan from Jio's Success

A. Gupta, K. Raghav, & P. Dhakad, (2019) "The Effect on the Telecom Industry and Consumers after the Introduction of Reliance Jio," International Journal of Engineering and Management Research, vol. 9, no. 3, pp. 118–137, 2019.

1. Madhavan, P. & Chirputkar, A. (2020) Analysis of the impact of Reliance Jio Infocomm Ltd on Indian Economy: A Case Study

2. Mukherjee R. (2018) Jio sparks Disruption 2.0: infrastructural imaginaries and platform ecosystems in 'Digital India.' Media, Culture & Society. 2019;41(2):175-195. doi:10.1177/0163443718818383

3. N. Haq, (2017) "Impact of Reliance JIO on the Indian telecom industry," International Journal of Engineering and Management Research, vol. 7 no. 3, pp. 259-263, 2017.

4. Ben Lutkevich "Fiber to the Home (FTTH)" Jul-2020 [Online]. Available: https://searchnetworking.techtarget.com/definition/fiber-to-the-home

5. Dan Jones "LTE (Long-Term Evolution)". Apr-2021 [Online]. Available: https://searchmobilecomputing.techtarget.com/definition/Long-Term-Evolution-LTE

6. Mallika Rangaiah "The Rise of Jio Amidst Lockdown" 30-Jul-2020 [Online]. Available: https://www.analyticssteps.com/blogs/rise-reliance-jio-amidst-lockdown

7. Pankaj "Difference between LTE and VoLTE". 12-Jun-2020 [Online]. Available: https://www.geeksforgeeks.org/difference-between-lte-and-volte/

8. Rishabh Rathi "Reliance Jio Story - 1st network to provide 4G LTE services" 03-May-2021 [Online]. Available: https://startuptalky.com/jio-success-story/

9. SignalBoosters.com "LTE vs 4G: What's the Difference?" 20-Mar-2020 [Online]. Available: https://www.signalboosters.com/blog/lte-vs-4g-whats-the-difference/

10. Vedica Kant "How Jio Became the Darling of Silicon Valley" 03-Aug-2020 [Online]. Available: https://marker.medium.com/how-jio-became-the-darling-of-silicon-valley-4ad5aab7949f

DEVICE IDENTIFICATION REGISTRATION AND BLOCKING SYSTEM - PROMOTING LOCAL HANDSET MANUFACTURING INDUSTRY

NAUMAN KHALID, PTA

International organizations such as the International Telecommunications Union (ITU), GSM Association (GSMA), Mobile Manufacturers Forum (MMF), Intellectual Property Owners Organization (IPO), the Organization for Economic Cooperation and Development (OECD), the World Customs Organization (WCO) and other entities have been working to confront the menace of the grey market for mobile devices and its negative impact on the mobile ecosystem.

Pakistan has the distinction of implementing the world's first open-source, full-fledged Device Identification, Registration and Blocking System (DIRBS). This system has the ability to identify all the IMEIs latched on Pakistan's mobile network and categorize them based on their compliant status. Implementation of DIRBS has resulted in removing illegal devices from the local market. It has also enabled a level playing field for all commercial entities to do mobile device business as well as created confidence for consumer on device being purchased by them is a standard device imported via legal channels. Successful implementation of DIRBS in Pakistan has been internationally recognized by ITU as a flagship project.

DIRBS comprises of a comprehensive core analysis system that is combined with subsystems including Device Verification System (DVS), Secure File System, Device Registration System, Device Pairing System and Stolen-Lost Management System. The analysis done through DIRBS allows for the identification and tracking of non-standard/informally imported mobile devices and generates three lists that mobile operators implement on their Equipment Identity Registers (EIRs).

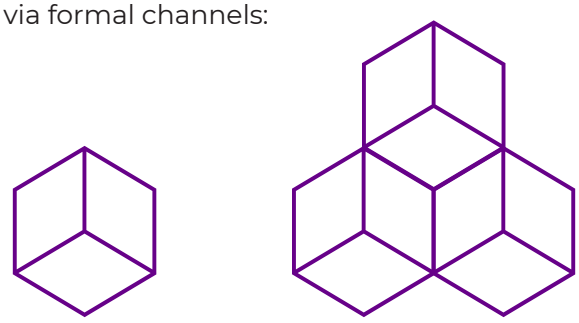
The impact of DIRBS started to surface as the project came to fruition, the PTA gained a better understanding of the mobile device landscape; businesses became aware of commercial models for the future, and consumers realized the value of a legal mobile phone. Resultantly, there has been a sharp rise in legally imported mobile devices via formal channels resulting in enhancing the custom duties proceeds of mobile phones.

Recognizing this healthy trend, which owes it to the implementation of DIRBS, GoP decided to introduce a comprehensive mobile manufacturing policy to encourage and attract mobile manufacturing entrepreneurs and companies to establish their units in Pakistan. The Federal Cabinet approved the Policy on June 2, 2020. Accordingly, PTA introduced Mobile Device Manufacturing (MDM) Regulations 2021 on 28th January, 2021. Till date, a total of 26 companies have applied and been issued MDM Authorization enabling them to manufacture mobile devices in Pakistan. These companies includes both local and international players bringing in renowned brands e.g. Samsung, Nokia, Oppo, Vivo, Alcatel, Techno, Infinix, QMobile, Vgotel etc. helping in creating new jobs within this filed as well as bring about affordability for consumers.

Following figures reflect impact of DIRBS implementation on mobile device eco system as well as mobile device industry:

Commercial Imports Trends

Year wise analysis of commercial category **(Imported and Locally Manufactured Devices)** shows increase in import via formal channels:



Calendar Year	**Commercial Import Quantity**	DIRBS Impact	Revenue Collected by FBR (FY)
2016	21.6 Million		Not available
2017	19.8 Million		Not available
2018	17.2 Million		PRK 22 Billion
2019	28.02 Million	Increase by 62% from 2018	PKR 54 Billion
2020	38.06 Million	Increase by 125% from 2018	PKR 29.2 Billion (July-Nov 2020)
2021 (upto 28th July)	19.46 Million		Not available from FBR

Local Assembly/Manufacturing Trends

DIRBS has created level playing field for all entities, resulting is establishment of local assembly plants. Seeing the successful development of this industry, PTA issued Mobile Device Manufacturing Regulations (MDM) 2021 which enables companies to obtain Mobile Device Manufacturing Authorization for 10 years.

Devices Locally Assembled by Companies within Pakistan			
Calendar Year	Local Manufacturing Quantity	DIRBS Impact	Job Creation (approx)
2016	0.29 Million		200
2017	1.72 Million		600
2018	5.2 Million		3000
2019	11.74 Million	Increase by 125% from 2018	8000
2020	13.08 Million	2.16 Million 4G Smart Phones assembled in Pakistan	600
2021 (30th June)	11.87 Million	4.40 Million 4G Smart Phones Manufactured in Pakistan	1200

Individual Category Import Trends

Prior to DIRBS, individual import in personal baggage was an untapped area which has now been formalized as a result fo implementation of DIRBS.

Context		Remarks
Custom Duties Collected in Individual Import Category	18.26 Billion PKR	From 15th Jan 2019- 29th July 2021

Other Impacts of DIRBS

a. Issuance of 10 Year Mobile Device Manufacturing Authorization by PTA to 26 companies till date, who have setup plants and will manufacture mobile devices including 4G smart phones.

b. Availability of locally assembled affordable smart phones to consumers contributing towards the mission of 'Digital Pakistan'

c. 18.62 Billion PKR custom duties revenue collected under individual category (15th January 2019 to 29th July, 2021). Prior to system implementation, this was an untapped area and no revenue in this category was being collected.

d. PTA has blocked 175 thousand devices IMEI reported as stolen through DIRBS.

e. System has also identified and blocked 26.03 Million fake/replica mobile devices

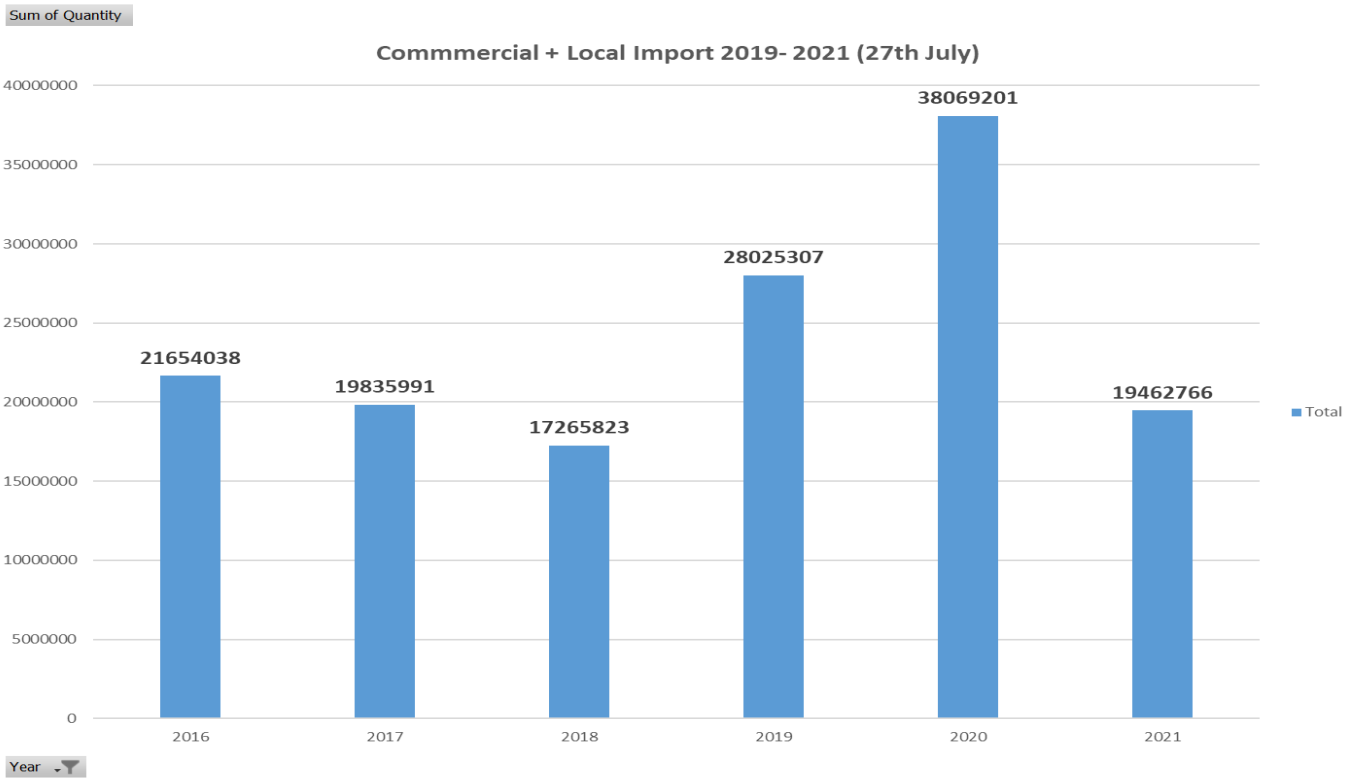
f. DIRBS identified & blocked cloned IMEI, whereby 880,780 IMEI were cloned/duplicated against 5.28 Million MSISDN.

Prospects of Export of Mobile Devices

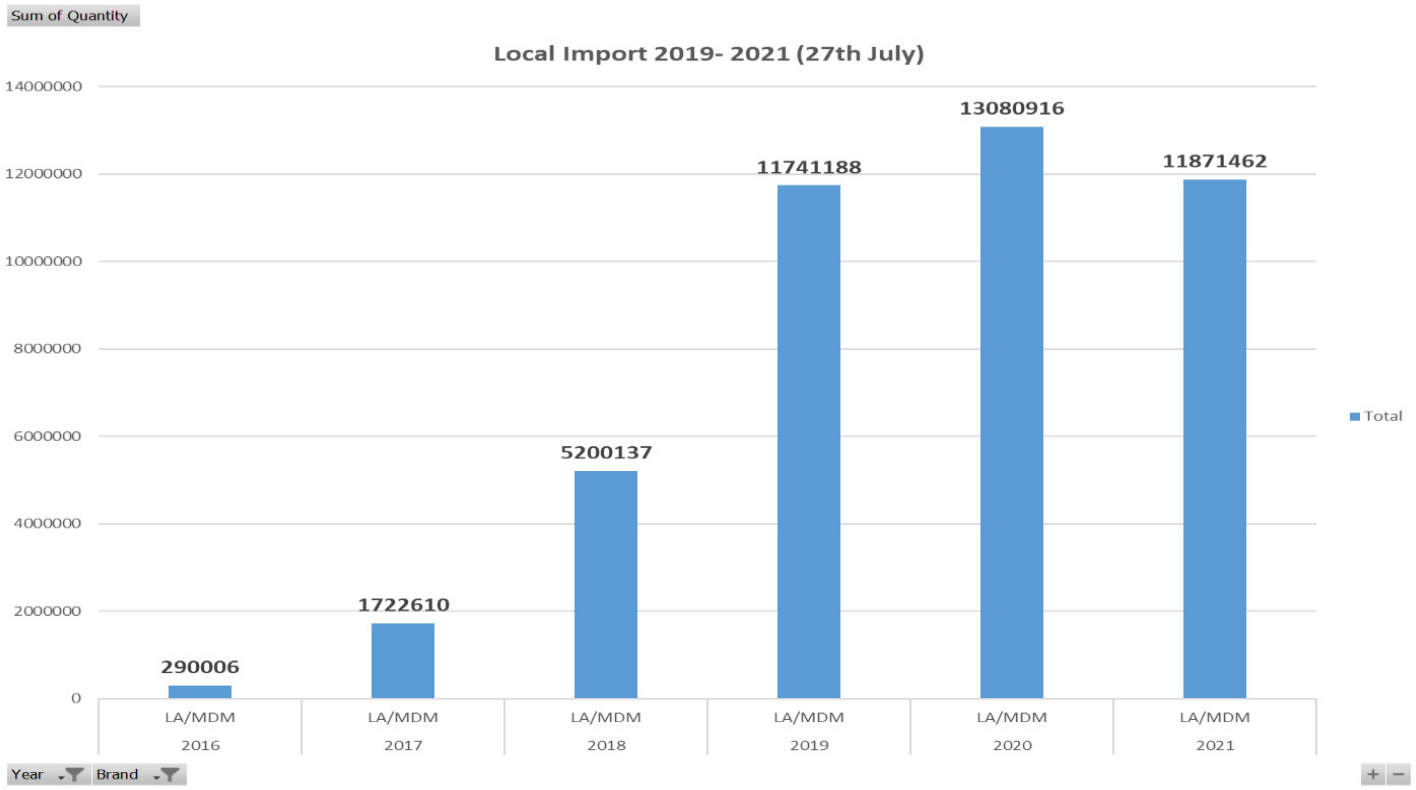
Successful implementation of DIRBS and conducive GoP Policies have opened up avenues for export of mobile handsets manufactured in Pakistan. It is expected that very soon Pakistan assembled handsets of reputed international brands will be exported, earning Pakistan much needed foreign exchange and also putting Pakistan into the mobile phone exporter list.

Annex

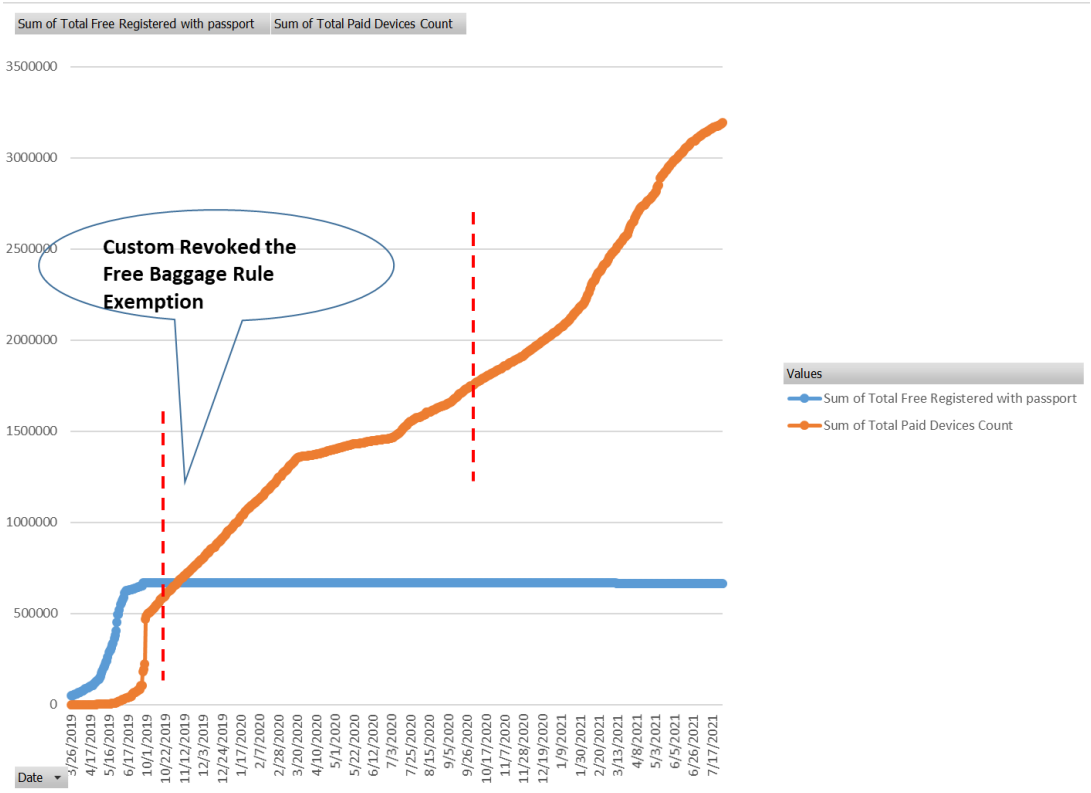
Graphical Trends
Commercial + Local Manufactured Import up to 27th July, 2021



Local Manufactured Devices Trend up to 27th July, 2021



Individual Category Registered Devices 15th Jan, 2019 to 29th July 2021




پاکستان اپنی رہ میں آنے والی ہر رکاوٹ کا آزادانہ طور پر سامنا
کر سکتا ہے اگر پاکستان ہمیشہ اسی طرح بہادروں اور محنت
کشوں کی سرزمین کے طور پر جانا جائے
یوم آزادی مبارک
aptma
ALL PAKISTAN
TEXTILE MILLS ASSOCIATION

THE FUTURE OF MICROFINANCE: DIGITAL

MARYAM KAMAL

MOBILINK MICROFINANCE BANK LIMITED

The advent of the 21st century fostered increased internet connectivity across the globe, with internet usage gaining momentum every successive year; today it has turned into one of the most powerful and pervasive tools in the science and technological history of mankind. The indispensability of the internet as a communication medium for different utilities received a great boost by the recent pandemic which further accelerated the technological transformation across various sectors and made the 'digital' phenomenon truly omnipresent. The digital era knows no bounds and thus, adapting to the new normal, sooner than later, is the need of the hour for nations and enterprises across the globe.

With the start of the global pandemic, internet consumption grew exponentially during lockdowns as businesses and institutions started shifting to online work models in a bid to continue operations while trying to control the spread of COVID-19 in 2020. Internet usage across Pakistan surged by 15% as soon as the first lockdown was implemented. After that, we have witnessed a remarkable digital revolution in various fields including health, education, banking, telecom, and many more.

Agility and innovative thinking define proactive organizations in the modern digital landscape, and the microfinance sector is no different. The COVID-19 pandemic has accelerated the banking sector's digital transformation, locally as well as globally, and increased inclination towards digital/mobile transactions, as the physical world came to a complete standstill over the last year and a half. In 2020, internet usage in Pakistan recorded its highest growth to date at a whopping 89% in the last quarter of the year. Government institutions and the State Bank of Pakistan (SBP) have played a pivotal role in actively encouraging and facilitating the use of digital communications and payment channels. The SBP's latest data shows that the total number of branchless banking accounts (also known as mobile wallets, or m-wallets, for short) stood at 62.7 million as of December 2020, grown from 46.1 million accounts at the end of 2019, signifying a notable growth of 36%. At the end of 2020, the number of active m-wallets grew to 59%, with the preceding year ending at 53%.

Moreover, the findings from one of the first digital banking experience surveys in Pakistan- Banking in the Digital Age: Exploring Pakistan's Potential, conducted by A.F. Ferguson & Co. (A member of the PwC Network), re-affirm the increasing customer inclination towards convenience & personalized banking made possible through digitization. The survey highlights that 82% of all consumers visit their physical bank branches once in a few months or only visit them once to open their accounts. Additionally, 67% & 55% of all consumers prefer to use mobile and internet banking respectively to fulfill their banking needs.

The new five-year National Financial Inclusion Strategy (NFIS) action plan has set new targets to be achieved by 2023, which include increasing the usage of digital payments to achieve 65 million active digital transaction accounts, attain deposits to the GDP ratio of 55%, and serve six million farmers through digital solutions.

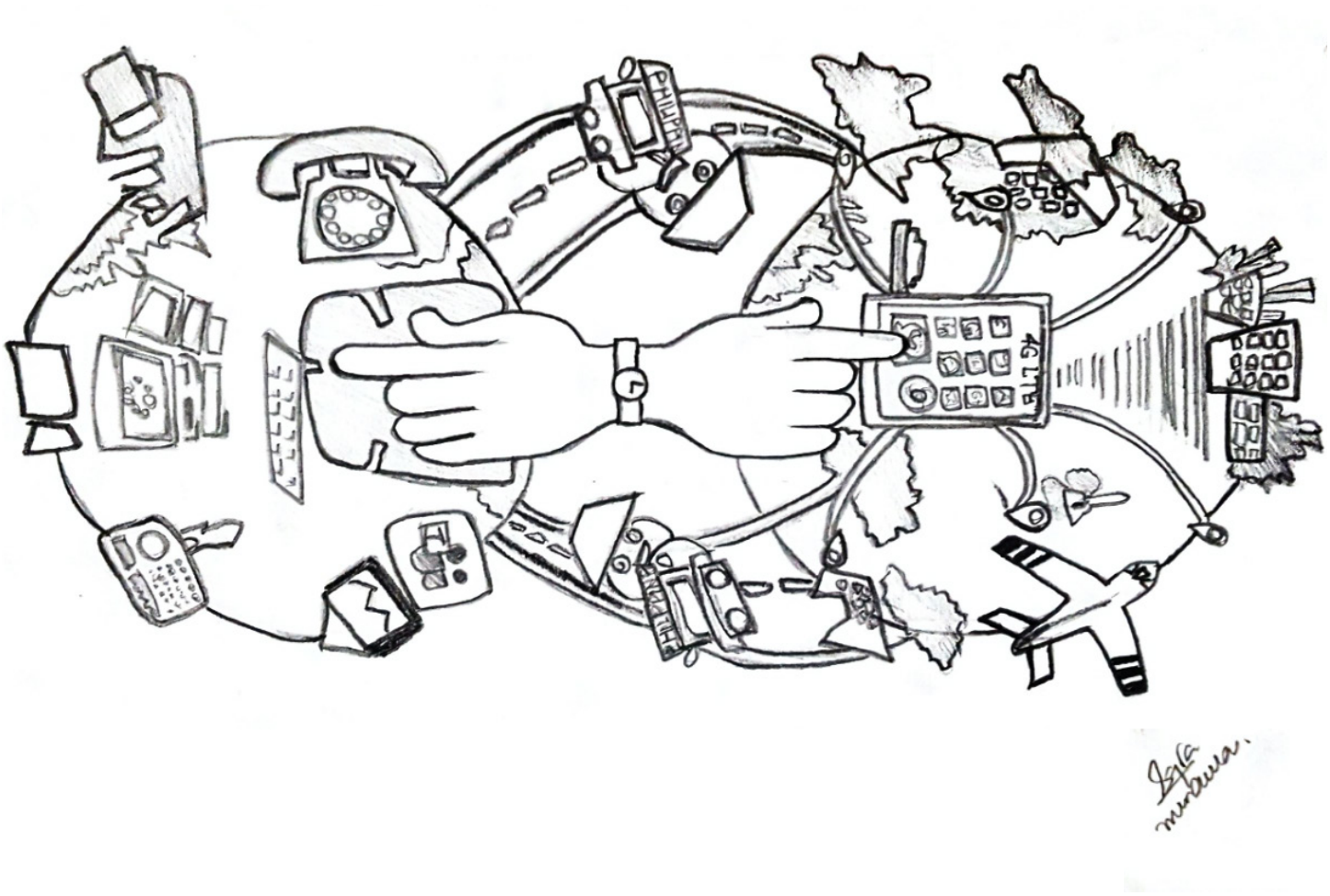
In 2020, nearly three in ten adults (29%) reported using a full-service financial institution, compared to 21% of the same in 2017. Access to banks increased from 11% of adults in 2017 to 17% in 2020. These circumstances are conducive to interventions from microfinance institutions through enhanced digital financial services which can sustainably enable over 70% of the population and include them in the financial landscape of Pakistan, and Mobilink Microfinance Bank Limited (MMBL) is one of the frontrunners in aiding this financial empowerment of the masses.

Moreover, access to fast and affordable internet for all will not only help empower the citizens but also boost economic productivity on a national scale. Pakistan is among the top five freelancing countries in the world and has generated a significant calculated amount of $0.5 billion entirely from freelancing. The country is home to 9% of total freelancers across the globe and this number can grow considerably if internet

accessibility is enhanced to cater to the entire population of Pakistan.

For developing nations such as Pakistan, where women constitute almost half of the population, microfinance institutions have a major role to play in ensuring financial inclusion for all, particularly the underserved ones. UN Women has found that there is a stark contrast between men and women with access to financial institutions and mobile-money-service providers; the ratio is 34.6% for men and 7% for women. Moreover, women in Pakistan are 38% less likely than men to own a mobile phone and 49% less likely to use mobile internet. These metrics highlight the vast untapped potential of Pakistan which can be utilized efficiently through joint interventions by the microfinance and telecom sectors – both of which can significantly empower the masses through enhanced accessibility and the provision of seamless digital financial solutions – fostering a sustainably digital Pakistan for all and creating this Pakistan is one of the core missions for MMBL.

As a major contributor to holistic economic growth, financial inclusion holds prime importance, particularly in countries like Pakistan where the majority of the population lives below the poverty line and remains unbanked. As the largest digital bank of Pakistan, MMBL is committed to financially empowering these millions of Pakistanis through its expansive digital financial ecosystem, so that no one is left behind and the masses are sustainably enabled to take charge of their own economic prosperity while contributing to the country's economic growth. MMBL's diverse portfolio of products and services not only serves the customized needs of individual clients seeking finance to start their businesses or facilitate housing constructions but also enables Small and Medium Enterprises (SMEs)/organizations by providing exclusive offerings such as school loan, commercial vehicle loan, tractor loan, SME loan, agriculture loan and women-centric loans such as Bint-e-Hawa, which is aimed at empowering women from all fields and walks of life.



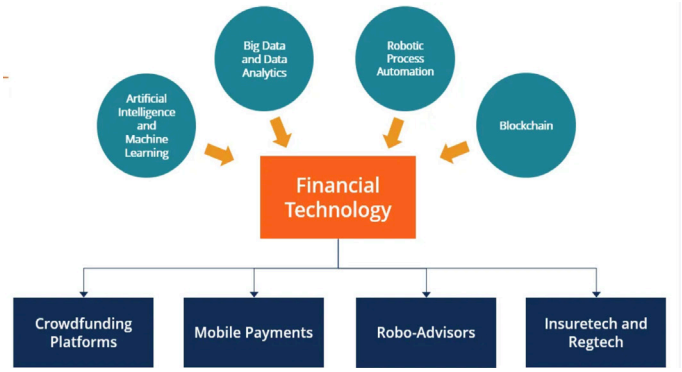
FINTECH IN PAKISTAN[5]

AHMAD FRAZ AND AHSAN UL HAQ

Traditional banks are playing key role in the financial industry but the rapid technological development in financial sector has evolved the world economy to shift to digital channels gradually. Financial technology (FinTech) is a revolutionary contribution to fasten the pace of financial services. There is no doubt that the Internet is the main enabler for the FinTech industry. Leong and Sung (2018)[6] defines FinTech as "any innovative ideas that improve financial service processes by proposing technology solutions according to different business situations". Thus FinTech is the segment of industries consisting of technology-focused companies with innovative products and services, traditionally provided by the financial services industry. To date there are six FinTech business models: insurance services, crowdfunding, payment, lending, wealth management, and capital markets. Overall FinTech developments have impacted financial planning, financial well-being and economic inequality (Frame, Wall, and White 2019)[7].

Globally, FinTech market is continuously evolving and expanding with an increasing diversity of funding sources, scope of business and geographic spread. Improved financial and other (technological, political health, environmental) literacies enable individuals to better engage with artificial intelligence. The role of financial institutions, corporations and entrepreneurs is important for the formation of supply-side solutions which enhance financial literacy and reduce inequalities across groups in society. There are four main technologies that contribute to FinTech i.e., Artificial Intelligence and Machine Learning, Big data and data analytics, Robotic process automation and Blockchain. The following five applications are widely used for FinTech, Crowdfunding platforms, Mobile payments, Robo-advisors, Insuretech and Regtech.

There are four broad categories of users for FinTech: [1]) B²B for banks and [2]) their business clients, and [3]) B²C for small businesses and [4]) consumers. However, FinTech developments may also damage financial well-being by triggering impulsive consumer behavior while interacting with financial technologies and platforms. For example, mobile apps could attract impulsive and unsophisticated individuals, who lack the necessary skills to forecast future preferences. As such, mobile apps can lead to individuals making faulty decisions in 'hot' states or under sales pressure. In such cases, the reduced time between the purchase and ultimate consumption of financial services is likely to be detrimental to consumer welfare.



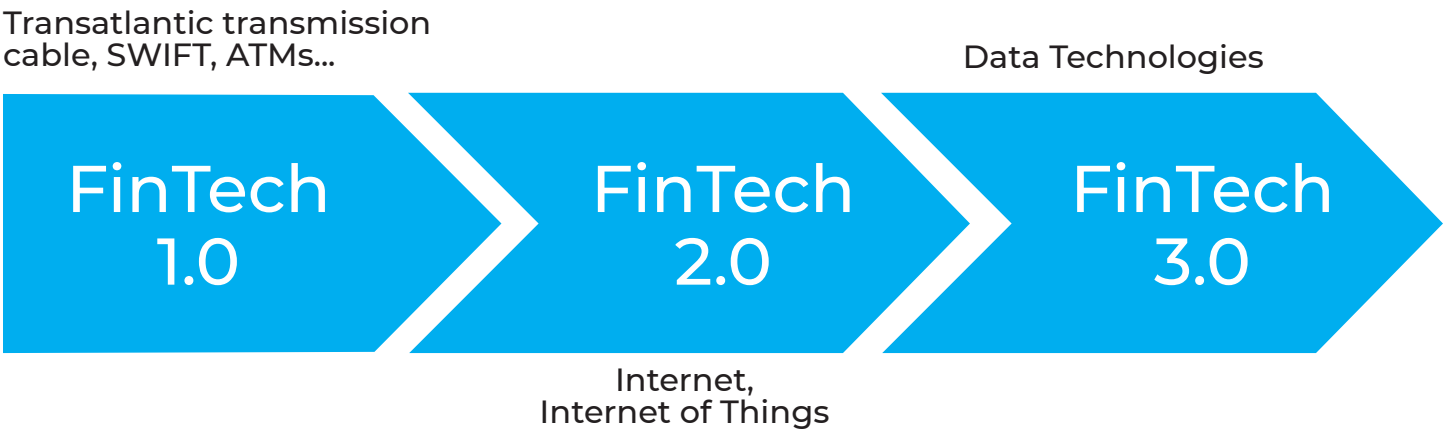


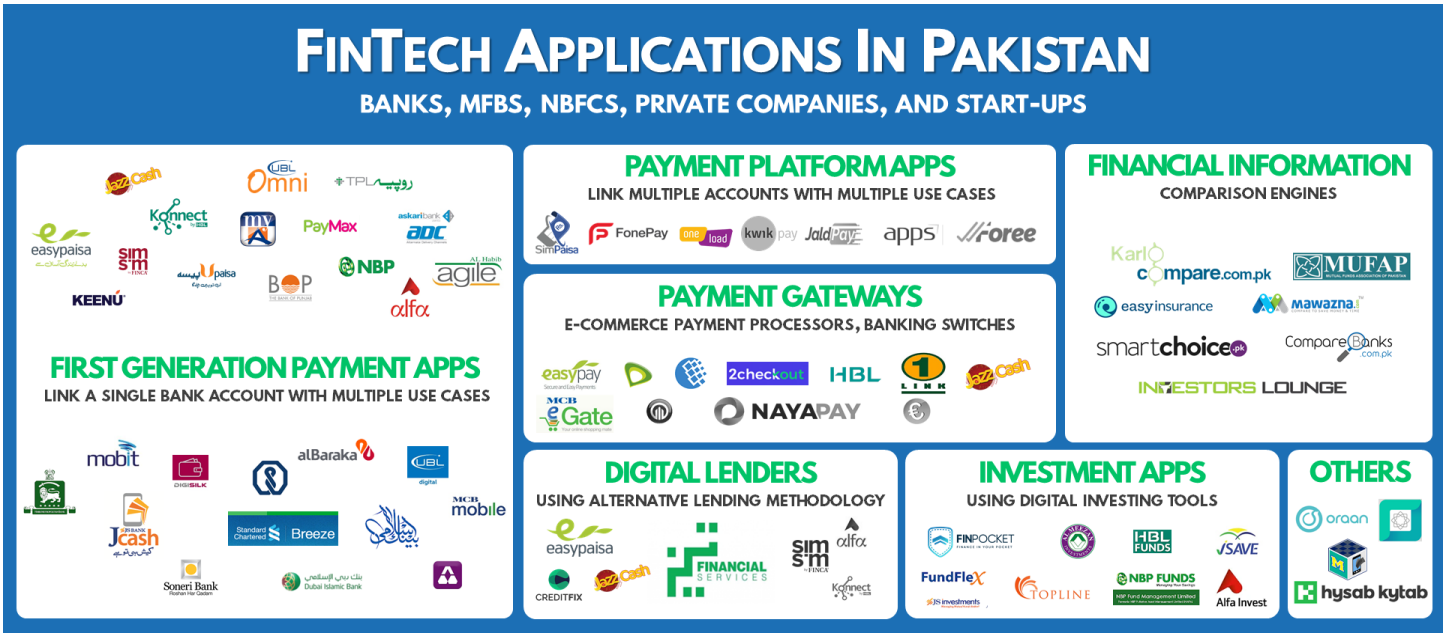
Table 1: The Evolution Of Fintech Industry

1860	The Pantelegraph was Invented
1880	Using Charge Plates and Charge Coins For Credit
1918 -1970	The Invention of Fedwire
1919	An Important Book Was Published Linking Finance and Technology
1950	Diner'S Club Introduced a Credit Card
1958	American Express Introduced Their Credit Card
1960	Quotron Allowed Stock Market Quotes to be Shown on a Screen
1966	Telegraph Replaced by the Telex Network
1967	First ATM Installed By Barclays Bank
1971	NASDAQ Established
1982 -1983	Evolution of E – Trade and Online Banking
2009	Release of Bitcoin
2011	Google Pay Send Developed (Google Wallet)
2017	"Smile To Pay" Services Introduced by Alibaba

Source: www.getsmarter.com

Now when we consider Pakistan; being the world's sixth most populated country, is still a cash-based economy with 85 percent of its population being financially excluded. Along with that, high banking infrastructure costs act as a barrier to the diffusion of financial services beyond a small fraction of the population. At present, only a few FinTechs operate in the country, and those are primarily in the developed cities of Lahore, Karachi, and Islamabad. However, Pakistan possesses the potential to be an attractive market for FinTechs growth, owing to the increasing youth population, disruptive internet and smartphone penetration, consumer preference for mobile phones and social media, a booming e-commerce market facilitating digital payments and an overall financial system having the absorption capacity for innovation.

According to Pakistan Telecommunication Authority, a whopping 101 million people use internet in Pakistan, 46% has access to broadband services and 85% of Pakistan's population has mobile connections that account to 183 million mobile subscriptions, a high penetration in the population. The Economist's Global Microscope 2018 report ranked Pakistan at 21st place out of 55 countries surveyed for an enabling regulatory environment for financial inclusion and rapid growth of mobile financial transactions.



Source: https://www.tezfinancialservices.pk/tfs/FinTech.php

FinTech industry in Pakistan faces several hurdles including a lack of larger organization's support, unfavorable regulatory environment, etc. The major challenges are the unwelcoming attitudes of big players, complex regulations, lack of funding from venture capital firms, no data security mechanisms, difficult to get registration of your businesses, no protection of intellectual property, and lack of funding opportunities for follow up capital and lack of retentions of talent staff.

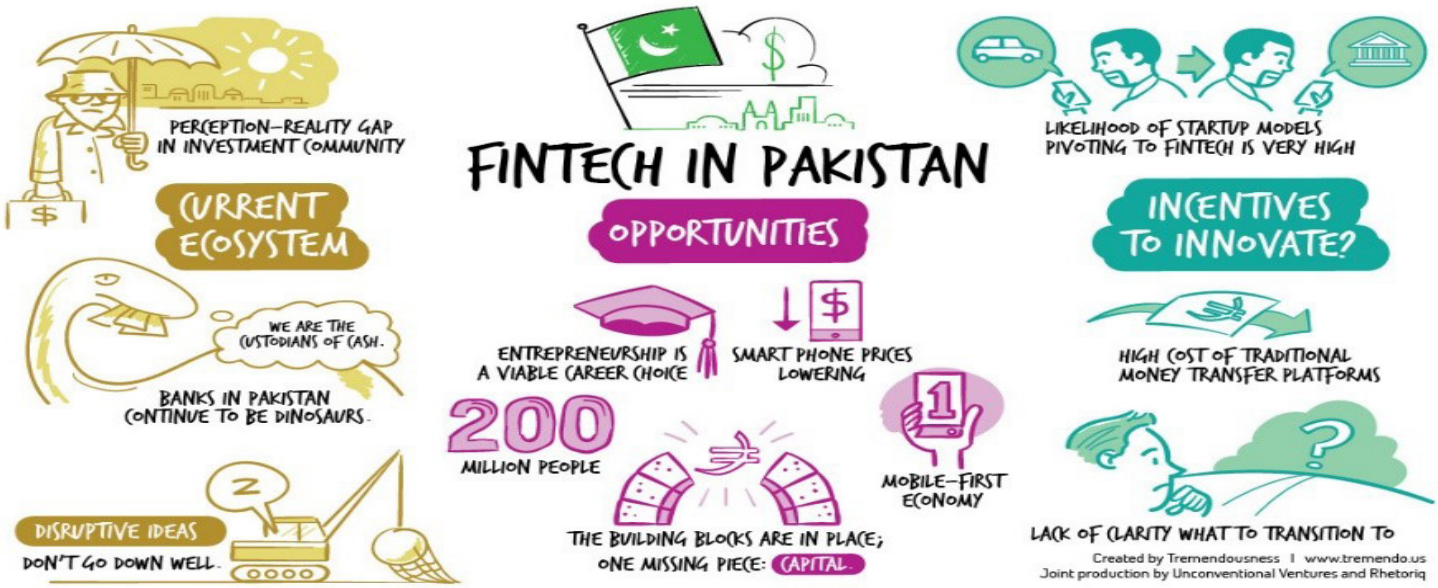
From the prudential regulations perspective, financial services are among the most heavily regulated sectors in the world. Not surprisingly, regulation has emerged as the number one concern among governments as FinTechs companies take off. On the positive side regulatory framework for financial services is fairly strong in Pakistan, with laws such as Payment System Operators (PSOs), Payment Service Providers (PSPs) and Branchless Banking regulations issued by the State Bank of Pakistan (SBP). There are a number of regulators who are most proximate to FinTechs operating in Pakistan as well as enabling uses of FinTech and related technologies:

- State Bank of Pakistan
- Securities Exchange Commission of Pakistan
- Pakistan Telecommunications Authority
- National Database and Registration Authority
- Ministry of Information Technology and Telecommunications
- Competition Commission of Pakistan (CCP)

All of these could act as platforms for carefully controlled and regulated FinTech-led growth. Nonetheless, stringent regulations should not be viewed only as a support, as it might also become a threat for the emerging FinTechs industry (Sludge), which is still in its infancy stage. As technology is integrated into financial services processes, regulatory problems for such companies have multiplied. In some instances, the problems are a function of technology itself. In others, they are a reflection of the tech industry's impatience to disrupt finance. For example, automation of processes and digitization of data makes FinTech systems

vulnerable to attacks from hackers. The most important questions for consumers in such cases will pertain to the responsibility for such attacks as well as misuse of personal information and important financial data.

On the positive side poor financial inclusion, along with accelerating mobile phone and internet penetration, evolving consumer needs in favor of digitization and online commerce, biometric verification of mobile SIMs and a supportive regulatory environment all serve as opportunities for FinTechs to step in and provide financial products at low costs. The rapid growth in the mobile phone users in Pakistan is considered a big opportunity to technology based businesses. The use of smart phones for banking transactions are growing with each passing day. In the context of FinTech Pakistan has a huge potential of growth. However, there is a need to provide internet access to everyone in Pakistan, which will reduce the cost of branch less banking for banking transactions. PIDE growth commission report suggested that "Currently, most E-commerce is relying on Cash on Delivery. The real breakthrough will come when online payment becomes easier"[8]. Digital payment infrastructure and no cash distribution infrastructure will lead the transition to the new age of financial products and services. It is the need of the hour to not only invest and support the local upcoming FinTechs in the country but to create an environment conducive to the growth of FinTechs in Pakistan.



[5] Special thanks to Dr. Mahmood Khalid for suggestions and improvements

[6] Leong, K., & Sung, A. (2018). FinTech (Financial Technology): what is it and how to use technologies to create business value in fintech way?. *International Journal of Innovation, Management and Technology, 9*(2), 74-78.

[7] Frame, W. S., L. Wall, and L. J. White. 2019. "Technological Change and Financial Innovation in Banking: Some Implications for FinTech." *In Oxford Handbook of Banking*, 3rd ed., edited by A. Berger, P. Molyneux, and J. O. S. Wilson. 262–284. Oxford: Oxford University Press.

WHY SHOULD WE NOT RUSH FOR 5G?

AYAZ AHMED, HENNA AHSAN

The prevailing Covid-19 situation has revealed how internet access has become a basic necessity of our life. As per stats available on PTA website, there are 100 Million 3G/4G subscribers in the country and 103 Million broadband subscribers. These are quite encouraging numbers but a lot more needs to be done to extend internet coverage to all especially to unserved and underserved and most deprived areas of the country.

All mobile operators working in the country have rolled out their network infrastructure to maximum limits and again as per PTA stats we have achieved 84% of the cellular Teledensity. Therefore, two prime and immediate goals of the government and the concerned institutions are proposed: to achieve hundred percent Teledensity and to ensure hundred percent 3G/4G coverage on all installed cell sites. Mobile operators do have their own motives to immediately catch on to latest developing technologies but it is the regulators and government's role to make sure that things are being implemented in the best interest of both mobile operators and the people of Pakistan.

Challenges Regarding 5G:

Indeed 5G is the technology to which we have to switch ultimately in future but we shouldn't rush for that as currently even the developed countries are not fully ready for this and are facing great challenges regarding its deployment. To mention a few there has to be massive changes in current allocated spectrum, deployment of small cells due to higher frequency bands against 5G will be requiring massive deployment of new cell sites and last but not least smooth and easy availability of cheap 5G capable handsets in the country. So there is a long road to travel to reach 5G for a country like Pakistan.

Way Forward:

Therefore instead of joining the race with developed countries to achieve 5G deployment goal our all energies should be focused on taking leverage of already deployed telecom infrastructure to extend internet reach to general populace. We have 46,950 cell sites in the country collectively installed by all CMOs and out of these 3G is deployed on about 42000 sites i.e. 3G is deployed on almost 90% sites which is quite a good number. However when we analyze subscribers data we see there only 100 million 3G/4G subscribers against 184 million total subscribers i.e. 54%. So a considerable amount of high intensity effort is needed in order to tap into this high potential of remaining 84 million subscribers to bring them into the mainstream and help them access the benefits of high speed internet. This will enable the government to realize its dream of internet for all in minimum possible time.

Policy Recommendations:

There are certain actions and initiatives which need to be taken by the government to make above all happen in minimum possible time.

- Government needs to lower duties on the import of smart phones and also new policies and initiatives need to be introduced to encourage local manufacturing and assembling of these smart phones as it could significantly lower the prices.
- Facilitating and expediting existing and new fiber deployments as these are inevitable to carry high data traffics associated with 3G/4G.
- Extending CMOs presence to remote and unserved areas through forums like universal Service Fund USF and other community support programs.
- Persuading mobile operators to have lower 3G/4G tariffs in poor and deprived areas.
- 3G was launched in Pakistan in year 2014 however in AJ&K and Gilgit Baltistan it remained unavailable till 2020. So government needs to remove hurdles in 3G spectrum allocation to all operators in AJ&K and Gilgit Baltistan to have a healthy competition and speedy rollout of 3G/4G services.
- We have more than 85000 km of optical fiber network for national connectivity so we must take advantage of this huge network by offering new licenses to the operators in FTTH (Fiber to the Home) and GPON (Gigabit Passive Optical Network) domains.
- And last but not least expediting work on dams and other under progress power generation projects so CMOs have lower maintenance cost on cell sites.

INTERNET FOR ALL – REALITY OR PIPE DREAM?

OBAID KHAN

Around the globe, conventional jobs are being replaced by technology-related jobs. As most of these jobs employ cutting-edge technologies such as AI, 3-D printing, drones, big data and blockchain etc. they rely heavily on the provision of reliable internet access. The telecommunications sector, arguably the most dependent sector on the internet, has the potential of creating an enabling environment which gives people access to health, education, agritech, e-commerce, fintech, etc., creating jobs in the process. The scope of the Pakistani economy to create such jobs will be limited if the country fails to provide widespread and reliable internet access, in terms of speed and quality, to its people. In this essay, I will highlight some of the challenges faced by Pakistan in providing internet access to its citizens as well as briefly suggest possible solutions to these problems.

Although the internet was perceived to be a social equaliser, providing a levelling field to everyone through equal access to opportunities, in Pakistan, it has worsened the class divide. While the rich continue to enjoy facilities such as the provision of internet access, according to the IMF, 89% of the population in Pakistan cannot afford internet (Jamal, 2018). Moreover, by January 2021, there were only 61.34 million internet users in Pakistan and the internet penetration rate stood at an abysmal 27.5% (Kemp, 2021). These statistics have become even more problematic during the COVID-19 pandemic where a shift to remote work and learning has been accelerated with businesses and organisations vaulting forward 5 years in terms of technology adoption (Baig, Jenkins, Lamarre & McCarthy, 2020). However, in Pakistan, this shift to online learning was deemed unfeasible due to a dearth of internet access in poor regions of the country. This can have a detrimental impact on the future economic prospects of a country where 64% of the total population is under 29 (Farhan, 2021). This lack of access to internet to the wider population in the country can be partly attributed to internet being perceived as a luxury rather than a necessity. This perception is further augmented by the imposition of taxes; the Government of Pakistan imposes a 32% tax on internet users, rendering it unaffordable for most people (Hasan, 2021).

Pakistan is significantly cheaper in terms of a gigabyte of data availability compared to India, Egypt, and Bangladesh (Anwar & Qayyum, 2021). This is partly due to healthy competition between internet providers. However, the devices needed to access internet services are not affordable by most people as nearly 50% of the internet users use 2G technology via relatively cheap mobile phones (Hasan, 2021). Furthermore, the utilisation of optical fibre cables by mobile towers in Pakistan continues to be an issue. Approximately only 10% of mobile towers in Pakistan utilise optical fibre cables, whereas in Thailand, Malaysia, India, and Bangladesh, 90%, 40%, 30% and 27% of mobile towers utilise optical fibre cables, respectively (Anwar & Qayyum, 2021).

Spectrum, the medium for transmitting internet signals between two points, is released under the authorisation of the Government of Pakistan through auction. Unlike other countries, the Government of Pakistan hoards spectrum to create artificial scarcity to inflate prices and gain higher upfront fees. Spectrum released in Pakistan is one third that of Bangladesh and India, and one fourth that of Turkey (Hasan, 2021). No spectrum has been released after 2014 in Pakistan (Anwar & Qayyum, 2021). This drip-feed release of spectrum can be explained by the Government's preference for short-term budget balancing rather than providing internet access to all as a basic human right (Hina, 2021). This strategy in the long-run is less beneficial for tax collection purposes as it hampers the growth of sectors dependent on the availability of the internet. A case in point is China which has waived 5G spectrum fees (KPMG, 2019).

The average revenue per user of spectrum in Pakistan is around 1 USD whereas in the USA, it is over 30 USD (Hasan, 2021). Since internet providers get a relatively low return in Pakistan, investment is deterred in this sector. In addition to spectrum fee, additional license fee needs to be paid to relevant government authorities which when accumulated, form a significant part of capital expenditure required by internet providers when undertaking the expansion of their services. As a result, internet providers are forced to face a trade-off between improving the quality of internet access or purchasing spectrum and increasing internet penetration. To avoid this, a pay-as-you-go model could be utilised as distributing spectrum without upfront license fee could lead to a potential faster rollout.

In addition to the Government of Pakistan's short-termism, internet service providers also need to become more operationally efficient. Historically, in Pakistan, internet providers have treated their towers as their competitive advantage and have been reluctant on sharing them with their competitors. Currently, 48,000 towers in Pakistan are independently owned by the 4 largest internet providers (Siddiqui, 2020). In the USA, however, American Tower manages over 42,000 common transmission towers, resulting in greater internet coverage (American Tower, 2021). Given their advantages to both the firms and the public, common transmission towers are now being set up in Pakistan. Unfortunately, the same cannot be said about optical fibre cables. These assets are currently not shared between service providers in the country and the consolidation of telecom companies could result in these firms improving their margins through economies of scale as well as building a robust infrastructure to provide the public with improved internet access. One way of pushing firms to be more efficient would be through encouraging disruptive competition in the sector such as SpaceX's Starlink which will provide low-cost internet to remote areas around the world (The Express Tribune, 2021).

By focusing on expanding 4G services and ignoring 5G technology, Pakistan risks lagging behind other countries in the years to come. To circumvent this, it could emulate the UK and its drive for improving the provision of internet facilities. In the UK, as part of 'Project Gigabit', the Government plans to invest in internet-related infrastructure and provide a subsidy to internet providers with the goal of delivering gigabit-speed broadband to 85% households by 2025 (Cellan-Jones, 2021). Similar measures in Pakistan, supervised by top-level management, could help boost economic growth. Although the role of the State should not be understated, the private sector too has a role to play in providing internet access to people. In India in 2015, Mukesh Ambani launched Reliance Jio which connected over 80% of the country and provided them with internet access (Riley & Arora, 2016).

To conclude, the Government of Pakistan needs to avoid short-termism and utilise a pay-as-you-go policy for spectrum which will encourage the provision of internet services to a wider audience, especially to those in remote areas. Furthermore, it needs to invest directly in infrastructure. The private sector will also play an important role in improving internet access such as seen in the case of Reliance Jio. A combination of these factors can result in greater tax revenue for the Government as well as facilitate economic growth by creating additional jobs and prevent Pakistan from playing technological catch-up in the coming years.

Bibliography

American Tower 2021, Towers, American Tower, viewed 21 July 2021, https://www.americantower.com/us/solutions/towers/.

Anwar, S & Qayyum, U 2021, Internet For All, PIDE Policy Viewpoint: 26 2021, PIDE, viewed 23 July 2021, https://www.pide.org.pk/pdf/PolicyViewPoint/Policy-Viewpoint-26.pdf.

Baig, A, Jenkins, P, Lamarre, E & McCarthy, B 2020, The COVID-19 recovery will be digital: A plan for the first 90 days, McKinsey, viewed 20 July 2021, https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/the-covid-19-recovery-will-be-digital-a-plan-for-the-first-90-days.

Cellan-Jones, R 2021, Gigabit broadband: First areas to benefit announced, BBC, viewed 23 July 2021, https://www.bbc.com/news/technology-56414966.

Farhan, F 2021, E-commerce: economic solution for our youth? The Express Tribune, viewed 23 July 2021, https://tribune.com.pk/story/2309314/e-commerce-economic-solution-for-our-youth.

Hasan, Z 2021, Internet for all, Webinar Brief: 47 2021, PIDE, viewed 17 July 2021, https://pide.org.pk/pdf/brief/Internet-for-All-Webinar-Brief-47.pdf.

Hina, H 2021, Can We Have Internet For All? PIDE, viewed 15 July 2021, https://pide.org.pk/blog/can-we-have-internet-for-all/.

Jamal, M 2018, 89% of the population in Pakistan cannot afford internet, IMF, TechJuice, viewed 15 July 2021, https://www.techjuice.pk/89-of-the-population-in-pakistan-cannot-afford-internet-imf/.

Kemp, S 2021, Digital 2021: Pakistan, Datareportal, viewed 23 July 2021, https://datareportal.com/reports/digital-2021-pakistan.

KPMG 2019, Encouraging 5G Investment: lessons learnt from around the world, KPMG, viewed 22 July 2021, https://assets.kpmg/content/dam/kpmg/uk/pdf/2019/12/encouraging-5g-investment.pdf.

Riley, C & Arora, M 2016, India's richest man offers free 4G to one billion people, CNN, viewed 23 July 2021, https://money.cnn.com/2016/09/06/technology/india-reliance-jio-4g-internet/index.html.

Siddiqui, S 2020, Pakistan boosts work on transmission towers, The Express Tribune, viewed 21 July 2021, https://tribune.com.pk/story/2274806/pakistan-boosts-work-on-transmission-towers.

The Express Tribune 2021, Jazz CEO sees Elon Musk's Starlink as healthy competition, The Express Tribune, viewed 23 July 2021, https://tribune.com.pk/story/2303957/jazz-ceo-sees-elon-musks-starlink-as-healthy-competition.

INTERNET AND ECONOMIC GROWTH

SHAHID MAHMOOD

In 2017, Facebook's founder Mark Zuckerberg published a manifesto about the future, where he argued that connecting everyone to the internet is necessary for building an informed community. His thoughts echo the thoughts of many others who have argued that access to the internet is necessary for solving the most pressing socio-economic problems of our times.

Originally initiated as a DARPA project to improve the communication system for American forces, the internet is now an integral part of our lives. From landline phones that could take substantial time to connect to the net, it's now just a click away. Still, a substantial portion of people around the globe don't have either access to it, or the access is uneven, slow, and bothersome. Realizing the importance of access to the internet, substantial sums of money have been invested in projects all around the world to expand internet's access. For e-g, a new initiative labeled 'LOON' has come with an innovative idea of expanding internet's access through stratospheric balloons. Since the height of traditional antennas is limited and it might not be able to set them up in many areas due to various reasons (like security) , balloons can facilitate access in such areas without the need for towers.

What kind of effect can this critical technology have on economic growth? To contemplate the question, we have to understand the nature of such technologies.

It is what experts would label as 'general-purpose technology'. Muhleisen (2018) terms such technology as the 'one that has the power to continually transform itself, progressively branching out and boosting productivity across all sectors and industries'. The changes wrought by them tend to bring enormous long-term benefits but are highly disruptive too. Historically, there are only three known examples of such phenomenon, namely the steam engine, the electricity generator, and the printing press.

The change that this technology has wrought has been tremendous in its magnitude. The examples are too many to cite in one place or one article. A 2017 report by McKinsey calculated that about 50 million jobs in the US would be transformed completely due to digitization. 'Smartphone' was unheard of at the turn of the 21st century. Now, an estimated 5 billion people have them! More importantly, the pace of transformation continues to accelerate. From quantum communications to 3D printing, the world is in a constant flux that has tremendous implications for the economy. Unlike the previous global pandemics (like the Spanish Influenza of 1918) that completely upended the working of economies, a substantial amount of COVID-19s economic devastation has been spared due to the availability of the internet which has allowed work-from-home, thus keeping the engine of the global economy running (albeit at a slower pace). Thus, the availability of the internet has become critical in today's economy, a fact that has led Dr. Nadeem Haq, VC PIDE, to call for internet to be treated as a right!

But does the availability of the internet automatically transform into an increase in per capita and aggregate income? Whatever transformation that has taken place, has it happened by accident or by design?

As Muhleisen points out, many benefits of general-purpose technologies like the internet come not merely by adopting it, but by adapting to it. He gives the example of ridesharing firm Uber that uses digital technology to deliver better services. Similar sentiments have been shared by other observers of note. One of the most famous quotes related to technologies like computers and internet comes from the famous Nobel-Prize winning economist, Robert Solow. In 1987, when personal computers and internet started assuming cult proportion and the US's economic growth began to be put down to this technology, he famously quipped that 'computer age is everywhere, except in productivity statistics. This became known as the 'Solow Paradox'. Simply put, Solow opined that the mere presence of computers and internet is no guarantee of income and productivity growth.

In the context of the above-stated, what can we state about the process of internet and economic growth? Specifically, does it hold any lessons for Pakistan? We can take a simple example to understand where we stand and how the process can benefit the economy and society. Pakistani government started adopting computers for public sector organizations in the early 90s. This was complemented by training in

various programs (like Microsoft Office package). This should, ideally, have led to a substantial lessening of paper-based work. But files and papers are still a massive part of government administrative business, with the expense on them increasing since that time. Similarly, the digitization of land records in Punjab should have led to an end to the patwari's role. Yet, they continue to be as strong and influential as they have ever been. On the opposite side of the spectrum, we have the example of NCOC using technology effectively to implement smart lockdowns!

This brings us to what Muhleisen emphasized: it's not just about adopting, but more importantly, it's about adapting! Those who have adapted well and tailored their system as per the technological trends wrought by the internet (private or public sector), they've realized plentiful bounty. Amazon, Facebook, AliBaba, and eBay are just a few examples of how the availability of a disruptive, universal technology brought in benefits worth billions of dollars. Of course, even more critical was the fact that people like Jeff Bezos had a plan about optimizing upon it!

Thus, for countries like Pakistan, it might not just be enough to have universal access, but to have a plan for optimizing its presence. Otherwise, violent organizations like TTP have also benefited tremendously from the presence of the internet, helping them effectively spread propaganda.

For the moment, there is no such plan and Pakistan is a bit of a Solow Paradox!

References

1. 'Expanding internet connectivity with stratospheric balloons' (2021). X-Company
2. Haq, Nadeem (2021). Internet for all. The NEWS
3. Muhleisen, Martin (2018). The Long and Short of the Digital Revolution. Finance and Development, Vol. 55, No. 2, IMF
4. 'Technology, jobs and the future of work' (2017). McKinsey Global Institute

[9] Recently, Pakistan army soldiers as well as laborers lost their lives in Kurram district (formerly Kurram agency) where the laborers were trying to erect a mobile and internet tower.

INTERNET AND THE RIGHT TO INFORMATION

RAJA RAFIULLAH

During the first half of the 21st Century, we have witnessed proliferation of ever-evolving information and communication technologies at an unprecedented rate. The result has been that people around the world are more interconnected with each other and have access to information at levels unthinkable throughout most of past human history. This interconnectedness and access to information, however, is far from being equal from one person to another.

Internet Accessibility in Pakistan

If we were to start by looking within our own country, only about one-third of households have access to the internet according to the latest Pakistan Social and Living Measurements (PSLM) survey *(see figure 1)*.

The situation of internet accessibility is bleaker in rural areas as compared to urban areas as only 23 percent of rural households *(See Figure 2)* The situation regarding the limited accessibility of internet to an overwhelming majority of the population is a rather alarming fact. But before we move any further, it is important to point out that this non-availability of internet is not fully reflective of the level of connectedness within the population. The same PSLM 2019-20 survey reports that 93 percent of households have access to either a mobile or a smartphone, suggesting that the population is at least up to date with the basics of modern information and communication technology and its usage. However, when it comes to computer and other related devices' ownership only 12 percent of households report that they have access to either a computer, tablet or laptop.

Fig 1:
Internet Accessibility in Pakistan (% of Households)

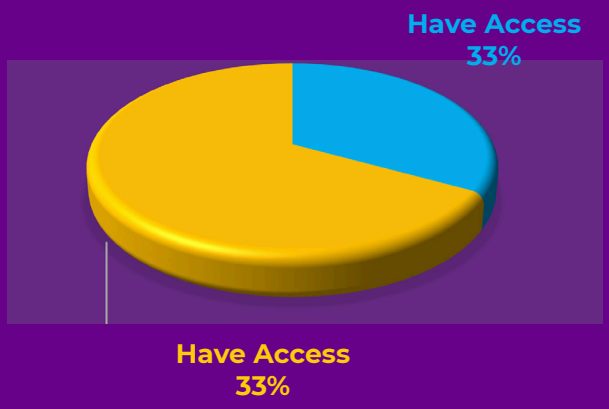
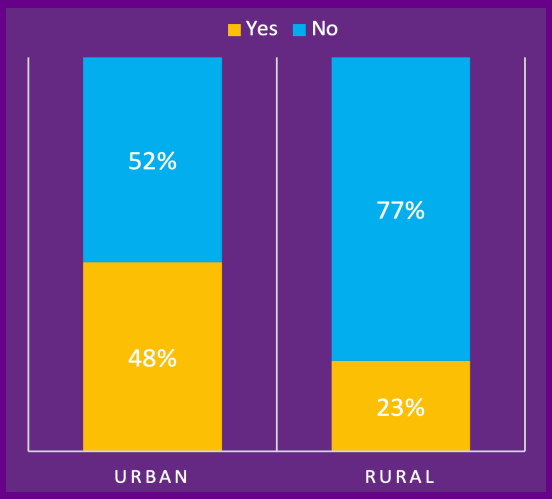
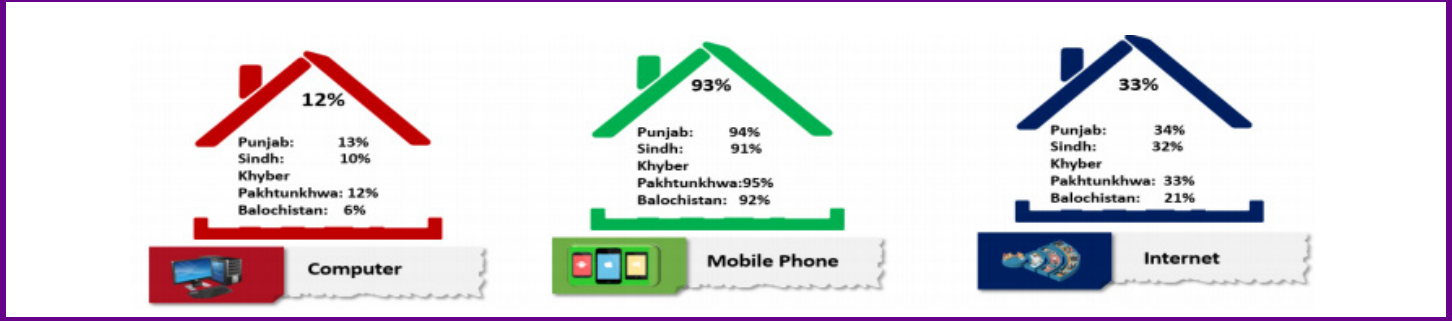


Fig 2:
Internet Accessibility in Pakistan (% of Households)





Source: *PSLM 2019-20*

How Pakistan Ranks Comparatively?

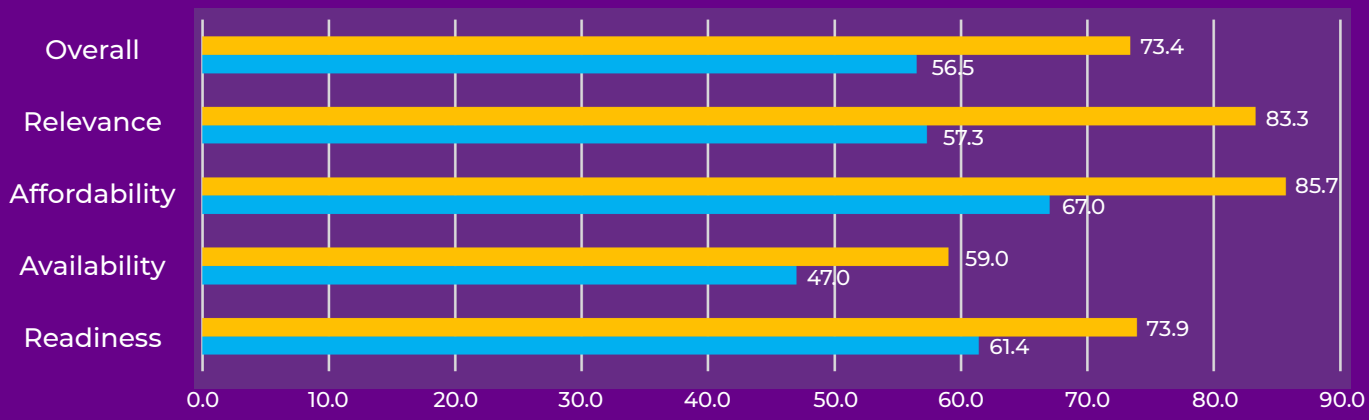
The state of internet accessibility in Pakistan is well below international standards and considerably lower than other regional countries. For instance, Pakistan's neighboring country India is ranked 41 places higher on The Economist's The Inclusive Internet Index. Pakistan is ranked 90th on the list whereas India is in the 49th spot. Furthermore, scores for Pakistan are significantly lower than for India for each of the Index's sub-categories. *(See Figure 3).*

Internet and the Right to Information

It is about time we realize not only the economic losses that we are incurring as a country by depriving the majority of the population of access to proper and affordable internet, but also stress the point that in this day and age, access to adequate and affordable internet is something that falls under the ambit of essential public services. It is the responsibility of the state to make sure that the relevant infrastructure and trade policies are put in place that ensures adequate and affordable internet access to its citizens. This does not mean that the state has to ultimately provide this service itself, but rather that through effective public policies and private sector development the length & breadth of internet access along with its affordability can be increased in the country.

Every person innately has a right to access public information and we should not deprive a large section of our population of this basic right. Access to adequate and affordable internet plays an integral part with regard to access to public information in this day and age. By connecting our masses with the global information base through internet we can effectively reap the social and economic benefits that come with it.

Fig 3:
Inclusive Internet Index (2021)



Source: *PSLM 2019-20*

Internet of things: The new economy in making

"If we had computers that knew everything there was to know about things—using data they gathered without any help from us—we would be able to track and count everything, and greatly reduce waste, loss and cost. We would know when things needed replacing, repairing or recalling, and whether they were fresh or past their best."

"We need to empower computers with their own means of gathering information, so they can see, hear and smell the world for themselves, in all its random glory."

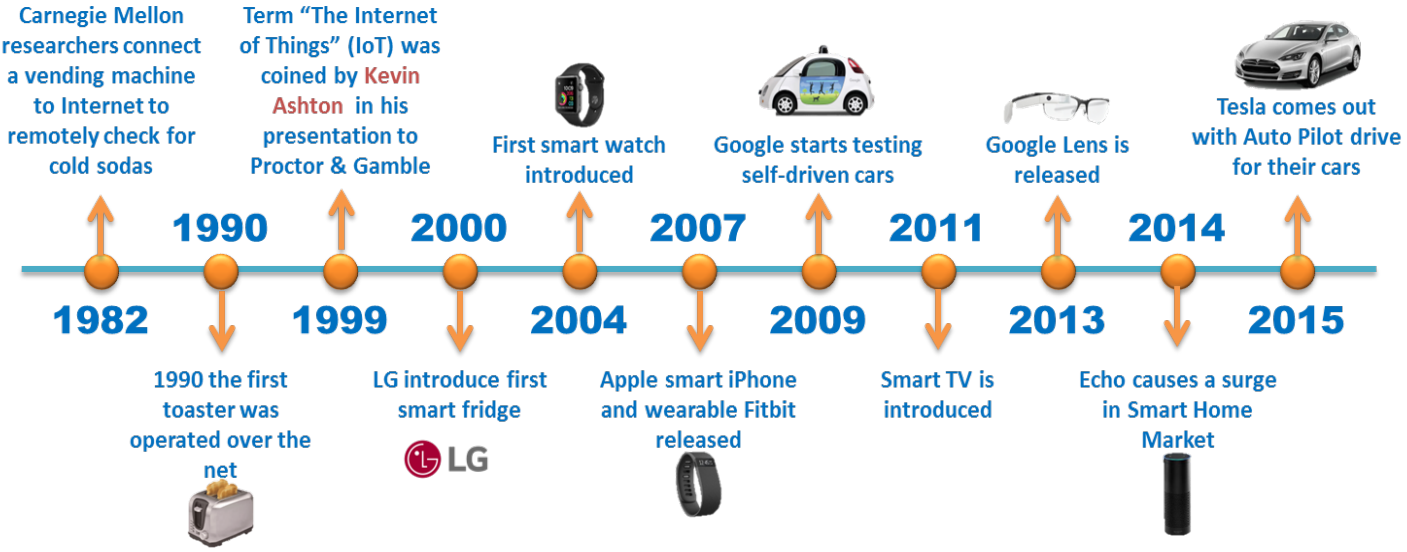
Kevin Ashton wrote a quote in 2009 for the RFID journal and this will help us in understanding IoT from its core. Internet of things (IoT) is the interconnection of computing devices embedded in everyday objects, enabling them to send and receive data via the Internet. These devices range from ordinary household objects to sophisticated industrial tools. With more than 10 billion connected IoT devices today, experts are expecting this number to grow by 22 billion in 2025. It has spawned a new economy all together.

The IoT works in five simple steps: 1) storage devices collect data for future use 2) remote devices such as smartphone control IoT 3) the internet will provide the platform for connectivity 4) the router and gateway will allow devices to connect via wifi 5) thousands of devices will connect with internet and/or each other. The IoT concept is already in use such as Smart Mirror,

Smart Money Transfer, Smart Irrigation, Smart Doors, Air monitoring system, Smart alarm clock, Weather reporting, Smart Wheelchair, and Smart Street Light system.

There is a general view around the globe that 5G has been specifically designed for IoT use. 5G will be much quicker than first predicted. According to ETSI, 5G will address the following IoT segments: the Massive Machine Type of Communication (MTC) or Massive IoT, & Ultra-Reliability and Low latency Communication (URLLC) or Critical IoT. Examples of Massive IoT include Smart Cities, Smart Homes, and Buildings, Critical IoT includes, Gigabytes in Second, Augmented reality, 3D video, UHD Scenes, Work and Play in the cloud, Industry Automation, Self-Driving Cars, and Mission-critical applications like e-health etc.

In Pakistan, international and national computer technology firms are in the initial stages of developing Innovative services using IoT technology. IoT concept is using in measuring infrastructure with automatic meter readings in real time, Communications smart devices / sensors / actuators, smart farming, healthcare solutions, Smart grid and connected agriculture. However, a formal and comprehensive regulatory framework is needed for elaborating IoT Ecosystem. PTA Pakistan Telecommunication Authority has created an Industry working group. The purpose of this functioning group is mainly to a) Foresee the IoT future expansion in Pakistan, and b) To evaluate and recommend the possible regulatory options that PTA and the Government of Pakistan may adopt to handle the challenges and avail the opportunities offered by IoT services/applications.



Many IoT devices run wirelessly, while others are connected. Most IoT devices use very little bandwidth, but the sheer amount of devices going online means that more bandwidth will be required. As IoT progresses, it will be important to make sure that the network can accommodate these changes. The accumulation and transmission volume of IoT devices will increase as the technology continues to evolve, resulting in an increase in bandwidth. Consumers believe bandwidth is available at the fastest speed, even as demand for IoT increases. Companies focus on bandwidth and scalable solutions because the solution will be important as the need arises. Reliability is important, self-healing fiber optic networks automatically detects and redirects in the event of a fiber cut or other interruption.

History of IoT
Courtesy: https://simplycoding.in/internet-of-things/

INTERNET IN PAKISTAN

HANIA AFZAL

Pakistan currently has 184 million cellular subscribers and still growing. Last year in 2018-19 there were only 168 million subscribers. After the COVID-19 the potential number of subscribers have increased significantly. It is because of the certain incentives provided by the cellular companies amidst the pandemic. There are five major companies currently operating in Pakistan namely Zong, Jazz, Telenor, Ufone, and Warid. These companies provided their services at subsidized rates when Pakistan started transforming from a physical mode of work to digitalization or work from home due to the COVID19 attack in early March 2020.

Many challenges were faced by the Pakistan Telecommunication Authority for providing access to internet to its citizens. This issue arose because internet access varies from province to province in Pakistan. For instance, in the province of Balochistan, out of 32 districts, nine districts lack the facility of internet, similarly, only 5% of the population residing in the province of KPK has access to broadband internet. To cater for this issue, the government along with the World Bank funding launched a tele-school channel for distance learning of students of the country. Moreover, the government is also currently working on the project of launching a radio school that will help the students of marginalized areas.

To digitalize the whole country, for the first time in the history of the country, Spectrum Auction has been approved for Gilgit Baltistan and Azad Jammu & Kashmir. Under the Digital Vision of Pakistan, no region in Pakistan will remain deprived of digitalization. Broadband Internet and mobile services will improve in GB after the auction of additional spectrum in Pakistan. As part of the program software technology parks will be soon inaugurated at Skardu, Baltistan, and Hunza. Currently, Pakistan has fourth-generation (4G) facility available but after the new spectrum auction, fifth-generation(5G) services will be available to the people. Under this new spectrum policy for commercial auction of next-generation internet and mobile phones, the internet facility will improve in all the marginalized areas.

According to the policy directive for the auction of NGMS spectrum in AJK and GB:

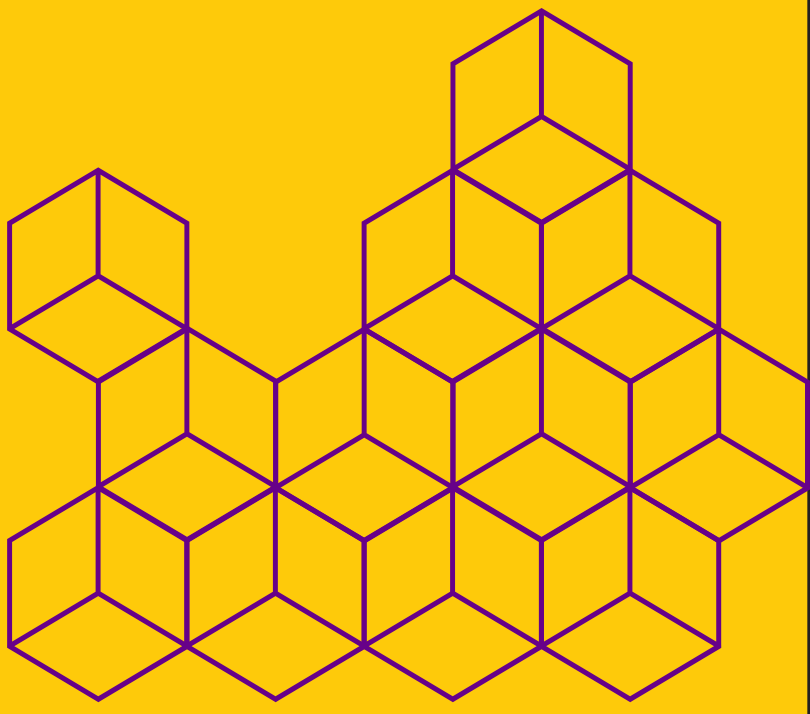
a. A transparent, competitive process shall be formulated by the PTA for auctioning 2x16 MHz spectrum in the 1800 MHz band and 2x30 MHz spectrum in the 2100 MHz as made available by the Frequency Allocation Board.

b. The base price for 2x1 MHz (1 MHz paired) spectrum in both I800 and 2100 MHz bands is $0.87 million, respectively.

c. Additionally, the 2x10 MHz spectrum earmarked by FAB for SCO in both 1800 and 2100 MHz bands is approved for assignment to Special Communication Organization.

d. the spectrum assignment will be “Technology Neutral” and usable for all existing and upcoming advanced generations technologies within the applicable policy framework of the government of Pakistan.

e. payment terms shall be a minimum of 50 percent upfront payment within one month of auction date while the remaining is to be paid in 10 equal installments in 10 years.



THE DIGITAL DIVIDE

SADDAM HUSSEIN

Many academics believe that if internet is used and acquired to its full potential it can create a large-scale social and economic change, both at the national as well as global level. With internet, access opportunities in terms of communication, education, and human relationships can be generated easily, which can become challenging otherwise. However, the proliferation of internet is not an easy task and is subjected to a range of issues, especially in the developing world. One of such issues is the digital divide.

Digital divide explains that there is a restriction when it comes to the proliferation of information among people which creates the social and economic gap. Most people think that the digital divide is merely the lack of internet access, but in reality, it also includes issues like people who have internet connection but lack the skills and devices to operate it. It also comprises how information is collected and if the people who gather certain information from the internet can interpret it or not.

The digital divide is a global phenomenon. The use of the internet and its restriction is different for different countries, based on their legal and political environment. The global disparities in terms of digital divide are primarily between developed and developing countries. The internet service all around the world are expanding in an exceedingly swift manner, but most of the developing countries have a different story to tell. It is pertinent to note that digital divide across the globe does not necessarily mean the non-availability of the internet, it also means that the technology is different in different regions. This uneven distribution of internet across globe causes disparities in terms of education, labor, technology, opportunities etc. Western democratic regimes are more open to the idea of internet accessibility as compared to other governance models. In western democracies, people have far greater freedom to access information and there is almost no restriction on the use of the internet. On the other hand, many developing countries and authoritarian regimes have limited internet access - one of the key reasons behind the huge digital gap in these countries. It is imperative to tackle this internet disparity, so that the issue of digital divide can be mitigated sooner than later.

Moreover, with the advent of telecommunication services, the proliferation of information has become an easier task. Owing to the huge demand for the internet and computers, many countries are working to improve their ICT (Information and Communications Technology) - based programs. Many academics believe that augmenting ICT is very critical as it helps to remove barriers in society and promotes social connectivity and inclusiveness. In Pakistan, for the last five years, government has been trying to integrate ICT across many sectors of the economy. However, the number of internet users is still very less as compared to other countries. One of the main reasons behind this is the limited access to internet services in certain areas of Pakistan. This creates a digital divide, creating social inequalities which can surge with time if sufficient steps for internet provision across the country are not taken well in time.

Certain crucial factors behind this digital gap include a high tax on internet services, mediocre quality of internet, restrictions grounded in culture and societal norms. Increased taxes make it difficult to afford Wi-Fi or 4G network; whereas, companies are also not able to afford better ICT services due to poor planning and policy of the government. Even if the internet is present, people are not educated or qualified enough to operate it. Rural women are often restricted from using internet, but it has more to do with the patriarchal customs that are at play in Pakistan.

It was thought that the digital divide could be tackled by the propagation of technology, and it is temporary, however, this is not the case. Certain factors that have influenced the use of the internet are cultural barriers, regulation, and censorship.

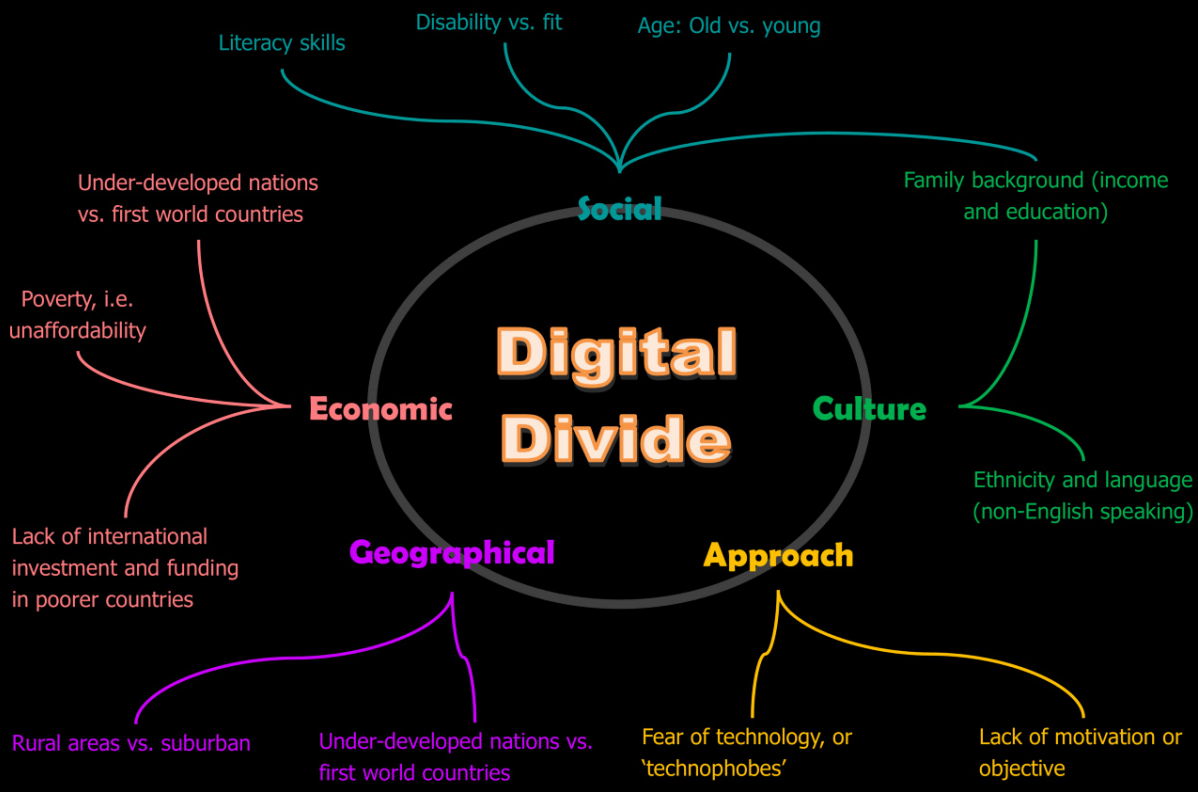
Furthermore, education plays a key role when it comes to digital divide. People who are educated are going to use the internet and internet devices more as compared to people who do not have proper access to education. This points out to the lack of digital skills which are required for proper usage of internet. Apart from education, income also plays a significant role in digital divide. Households with more income are likely to purchase better internet and internet devices as compared to households with lower income. In rural areas in general people have lower income and thus they are not much inclined to buy internet. This can also be linked to the investments made by telecommunication companies; such companies are more hesitant to make costly investments in

less developed areas, causing the quality of internet to deteriorate in such areas, which further causes digital divide. Apart from these factors gender, location, race, political and cultural attitudes have a significant impact on digital divide.

The internet plays a key role in the lives of people; it helps in creating opportunities for different people. Digital divide is a form of self-deprivation which can have adverse effects on any society. In Pakistan, the consequences of digital divide were noticed during COVID-19 pandemic. Most people found it difficult to work from home pertaining to internet usage as well as connection issues. Students and teachers living in rural areas in Pakistan were unable to attend and deliver lectures due to poor internet connections and lack of skills required to operate internet. Similarly, businesses were also unable to operate optimally.

In parallel, digital divide is having a negative impact on worker's economy in Pakistan, people are unable to find quality jobs due to a lack of digital skills. In Pakistan, limited access of internet hinders the opportunities for positive spill-over effects. This is causing divergence among the rich and poor.

In a crux, digital divide in Pakistan would eventually result in economic stagnation. Internet is particularly vital for productivity, development, and innovation while minimizing transaction cost. Hence, it is vital for the government to partner with the private sector and facilitate the provision of affordable internet across the country.



Source: https://medium.com/@ShwetaBarupal/digital-divide-a-critical-analysis-7156333237f7

INTERNET FOR ALL: A RESEARCH PERSPECTIVE

ANJEELA KHURRAM, FARHAT MEHMOOD

Admittedly, the internet's use has its marks in almost all walks of life, transforming and evolving various domains. Scholarly research is not an exception. Extensive use of internet across disciplinary boundaries has transformed the research domain in terms of its reach and volume. From information collection to disseminating the outcomes of their research, researchers rely greatly on the use of internet. Presently, internet seems an arena with a plethora of overwhelming information on almost all subjects to meet the information needs of the masses. This accelerates the reliance of researchers on internet to explore research sites like Science.gov, Google Books, BASE (Bielefeld Academic Search Engine), Google scholars, Research gate, Infotopia, Ebsco, Lycos, Altavista, Web Crawler, Infoseek etc. Institutional e-libraries are also serving the purpose of gateway to virtual knowledge banks. Information gathered online from research sites can serve multiple purposes. For example, for researchers, the information obtained from published research manuscripts can provide a theoretical base in the form of literature review to provide a crux of the extant research and facilitates in identifying the research gaps to open research avenues for future researchers.

Internet is not only an information giant but also provides efficient quantitative and qualitative data collection tools, software and mobile applications. For instance, *Instant Data Entry Application (IDEA)* for documents and records, *Google Forms and Zoho Survey* for questionnaire data collection, *Learning Space Tool Kit for focus groups, Sony ICD ux560* for interviews, *Quetext* for case studies, *Checkli* and *Forgett* for checklists etc. Similarly, Amazon Mechanical Turk (MTurk)—a crowdsourcing marketplace—also offers paid data collection services to researchers to collect survey data across global. In the same vein, it is interesting to mention the availability of various invaluable data analysis tools on internet for descriptive, inferential, diagnostic, predictive and statistical analyses, and data visualization. Like, *SAS*, *Teradata*, *E-Programming*, *Python*, *SQL*, *Matlab*, *RapidMiner*, *Qlik*, *Intesoft*, *Oracle Business Intelligence*, *Sisense* to name a few. While, plenty of software like *AMOS*, *SPSS*, *JMP*, *STATA*, *R*, *E-Views*, *NVivo*, *ATLAS.ti*, *XLSTAT*, *Graphpad*, *CAT*, *MAXQDA* and many more have facilitated qualitative and quantitative data analyses. Once published, research findings can easily get diffused online, assuring more virtual visibility. Internet has, thus, ensured the massive dissemination of knowledge with an ease for audience in bulk. Institutional or open access to the recorded information in electronic form has resulted in *Information Revolution*, giving an edge to researchers to quench their scholarly curiosity. Now, scholars around the world can search most of the information about the subject matters of their interest online. The reliance on internet for knowledge sharing has expanded massively during COVID-19. Webinars and virtual conferences using software like *Zoom*, *Teams*, *Bb Collaborate*, *Webex Meetings*, *Panopto* etc. have been proving the efficient and effective means to disseminate knowledge among researchers, which would otherwise have been not plausible. The attributes of internet use like the ease of use, efficiency, cost-effectiveness and quick dispersion of information have allured more and more researchers to adopt this mode. Their reliance on internet-mediated research has to get momentum. On realizing a dire need to deal with the methodological issues like the nature, confidentiality and consent of the participants, modes of virtual communication, scholars have set some guidelines for internet mediated research. Notably, the authorized bodies like the *Association of Internet Researchers (AoIR)* and *Institutional Review Boards (IRB's)* have complemented their extant guidelines realizing the increasing use of internet during COVID-19 for research purposes.

Recommendations

In the era of this unprecedented pandemic, the internet use has increased manifolds in many domains in general, and particularly in research. The constraints of in-person research activities have accelerated the reliance on the internet use. In the era of this new normal, the research community at the national level should be well abreast of the use of the available online research resources. This calls for the need to increase awareness among researchers. Institutions should offer training on the use of software and applications used for research purposes. The issues related to the internet use should be identified and solved to maximize the efficiency of the researchers.

DATA PRIVACY IN SOCIAL MEDIA

NADIR ABBAS

Did you know that, on average, an internet user spends more than two hours on social media or that forty-five percent of the world's population uses social media? That means evidently 3.48 billion people are online right now. Networking sites like Facebook, Twitter, Instagram, and Snapchat have become digitized advertisements for internet users rather than just an app.

With the increased use of social media, there comes a privacy concern. Although today's widespread use of social media cuts across all age groups, according to 2019 reports, children and teenagers are the most active Internet users, and they are the least aware of how to secure their personal information on the Internet and, therefore, most exposed to cyber-crimes involving breaches of information privacy.

Unlike other topics that may come and go, data privacy remains a top concern of users online. According to a research analysis among UK and US adults, 29 percent are concerned about how businesses utilize their data. In contrast, 36% of consumers are worried about their privacy but have their profile on public and are not actively willing to change their behavior.

Since these apps are designed solely for connecting and sharing, achieving complete anonymity on social media is quite challenging. According to recent allegations, some of the world's top corporations, including Amazon, Microsoft, and Facebook, as well as different government agencies, are gathering information without consent and keeping it in databases for future use. On the other hand, a recent documentary called "The Social Dilemma" states that users are the product, and their data is what social media is selling to big corporations. Companies analyses our behaviors on internet platforms and then extract the capital generated by people online to enhance growth and advertising income. Therefore, in this digital age, it is nearly hard to claim privacy.

Cybercriminals are skilled at duping social media users into disclosing and stealing personal information and obtaining access to accounts that users deem private. For example, cybercriminals use phishing to get sensitive personal information in the form of an email, text message, or phone call. These communications dupe users into disclosing passwords, banking information, or credit card information. Additionally, one of the social media threats includes Malware sharing, which is a method of gaining access to a user's computer. Once an account has been compromised by acquiring credentials via a phishing attempt, hackers can use it to disseminate malware to all the user's contacts and further use malware to steal personal information, extort money, or profit from forced advertisement. On the other hand, social media bots are commonly used to steal data, spread spam, and conduct distributed denial-of-service assaults, which aid hackers in gaining access to user's devices and networks.

The apparent lack of privacy on social media makes it necessary to safeguard users' online privacy before sharing anything on any social media network. All social media platforms have privacy policies, and therefore, before creating an account on any social media platform, it is critical to comprehend their privacy policies. Most social media default privacy settings may allow your information to be shared with other third-party internet users if it is not checked by the user beforehand. For example, when you make an Instagram account, it is public by default; therefore, changing the privacy settings may restrict the amount of information shared by the social networking site with other users without your awareness.

Consider the following actions to address the issue of lack of privacy.

- Use unique passwords for each of your social media accounts.
- Avoid utilizing public computers for social media accounts.
- Avoid clicking on social network links, especially click baits.

Secure your social media accounts password by using protection apps for that purpose.

In conclusion, the improper use of social media can lead to security breaches and expose information that can lead to privacy violations—as a result, educating users about the risks of exposing sensitive data and promoting awareness of individual privacy is critical. This will lead to a more secure social environment. Furthermore, the use of social media should be regulated by universal standards, regardless of ethnicity, culture, religious beliefs, or socioeconomic standing.

INTERNET!
A DEVELOPMENT ENABLER

SANA HABIB

The Internet has become an essential gismo to access public information and is a source to protect fundamental independence. Over the last two-decade, the number of Internet users globally has increased substantially. Access to the Internet world has the potential now-a-days to change the way people's lifestyle, mode of communication, activities trends, working structure and business market. Internet access is considered a development enabler by policymakers. Information and communication technology (ICT) access is still far from equal distribution, and many people have not yet benefited from the potential of the Internet. This intensifying digital divide is due to various reasons including lack of infrastructure, deficit of affordable amenities and essential digital skills required to get maximum benefits from the opportunities that Internet offers.

The world has been attacked by the Covid-19 pandemic, which has disturbed every sector of the economy. The education sector has also been affected, where the conventional education system cannot remain working and the educational institutions around the world started to look for an unconventional education system. In Pakistan an alternative online education system has been designed, to benefit each student at home but due to the unavailability of internet and quality of internet education has been severely affected. It seems very difficult to live without the Internet access during the crisis of pandemic. First year of the Covid-19 has many lessons to be learned that cannot be overlooked. As internet access had an unfathomable impact on the lives of people, providing many options to the people to work from home and continue their working, skills and education.

In Pakistan, the necessary infrastructure is lacking to conduct online classes. It's time to build it! The Internet can give more children access to affordable education, and it will provide opportunities for businesses to excel. Current statistics reveal that only about 33 percent of households in Pakistan have the access to Internet. Many peoples in rural areas have poor access, or no access, to Internet service, and schools in rural areas often lack Internet access and ICT hubs. There are several issues that contribute to the relatively low number of Internet users; cost of internet is one of them and misconceptions are another big reason as some people consider social media as Internet only.

UNICEF and the International Telecommunication Union (ITU) estimate that, two thirds of children of age group 3-17 still have no access to the Internet. In Pakistan, out of 80 million children of the same age group, only 11 million children have access to Internet. Gender gap with 7 million boys and 4 million girls making the situation more vulnerable. According to PSLM 2019-20, only 3.17 percent of children of age group 3-17 years used Computer / Laptop Tablet in last three months. Education indicators of Pakistan are also not satisfactory as from 2012-13 till 2019-20, Literacy rate is stagnant at 60 percent. In the last five years, school attendance of population 10 years and older has also been declined to 60 percent from 62 percent. Pakistan with 32 percent out of school children is among the top 3 countries in the world that have the highest number of out-of-school children due to socio-economic disparities. It is expected that due to Covid-19, this percentage will increase as education was technology dependent during the last whole year. Access to Internet along with the availability of devices is a big issue in Pakistan. Quality of education provided during the pandemic period is another issue that will be raised when the proper school resumed again. Children with disadvantaged backgrounds suffered a lot due to access to Internet, affordability of devices and illiterate parents; since there was no one at home to guide the children during the pandemic.

In order to handle the above discussed issues, prompt action is required to counter this; we are facing digital divide as well which further deepening several other divides, e.g gender and economic inequalities. There is a time to launch Network Organizations like Internet Society with people-centered approach to handle the Internet standards, education, and policy development. This will push members for more Internet access across the country by increasing awareness about the benefits of Internet. More Internet users and affordable excellent quality Internet services in Pakistan will bring opportunities for distant learning, easy access to health and shopping services, increased productivity, and technological development. The future will be bright, if Pakistan can utilize and sustain the benefits of Internet for the people, it will unlock the human competencies and delivers the platform upon which an incipient digital economy can prosper. As the Internet and digital technologies have become more indispensable, it has also become more crucial to link the people who are being left behind.

Pakistan has also adopted Global Development Agenda, Sustainable Development Goal as Vision 2030, without making Internet accessible it is not possible to achieve the SDGs. More Internet access is required for the vision to become reality.

SDGs called for the universal and affordable access of Internet in developing countries by 2030 - a Goal that we are far from reaching.

SOCIAL MEDIA AND COVID-19

FATIMA HASNAIN

The World has witnessed the evolution of Media from a piece of paper to wireless societies. With the development of technology, Media has transformed into multiple types. Furthermore, globalization has led to innovation and enhanced forms of media, ranging from the printing press to digital media. As important as it is. media has also been titled as the "fourth pillar of democracy" by the Victorian writer, Thomas Carlyle. It functions as a watchdog in the political operations of any democracy; this is what it has been doing in Pakistan.

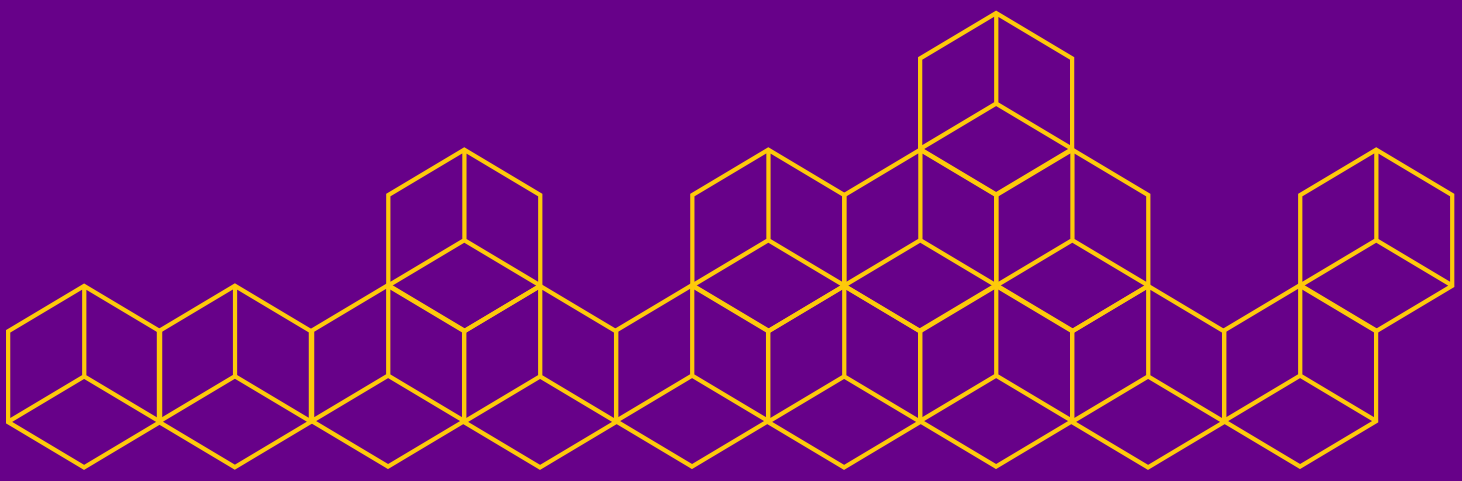
More recently, media can be seen in the form of social media applications that have taken their place in the information society. Facebook, Instagram, and WhatsApp are among the more active applications in informing the masses about current affairs and daily social issues than the news channels themselves. The official hours leave less time to go through a newspaper; this is where social media floods in. Due to social media, we know how provincial governments are responding to the Covid-19 crises in the country. From the activities in the Parliament to the ebb and flow of the social sector of Pakistan, social media has covered it all for us. However, the openness of social media has its cons as well.

During the crises of Covid-19 in Pakistan, social media has been active in informing the digital citizens about positivity ratios and current positive cases. More recently, our national news agencies, such as DAWN and The News, have taken to social media to reach the masses. But with the positive role of social media during the pandemic, social media users have exploited cyberspace to spread disinformation regarding the efficacies and importance of vaccines. According to the Center for Countering Digital Hate (CCDH), social media became the largest platform for anti-vaccine propagators with more than 59 million followers. But with the disease, social media also brings the remedy where global health organizations such as WHO counter such misconceptions about Covid-19 vaccines.

Other officials have also stressed the fact that social media has been badly used to spread conspiracies regarding vaccines. Secretary-General of Pakistan Medical Association, Dr. Qaiser Sajjad, also told during a talk that the masses were falling prey to the disinformation shared on social media regarding the vaccines. The founder of Media Matters for Democracy, Asad Beyg, opined that Pakistan is highly susceptible to such concerns, keeping in view our literacy rate.

The concerned officials appealed that the government devise strategies to counter such conspiracies, and make social media a safe haven for the country. However, the Federal Information Minister responded that a comprehensive communications strategy was being rolled out effectively. In a nutshell, social media is a democratic platform. Not only does it display the provider's perspective, but it also keeps the platform open for the public's comments and views on the matter. Hence, where it is capable of empowering the marginalized, it can also infect the masses with digitalized misinformation.

Social media is one of the most crucial elements of modern man's life. It has the power to elevate even the remotest of people and bring them to the limelight within the blink of an eye. But at the same time, it is the duty of the people to make fruitful use of media and help the Government to counter cyber problems. Today with the help of social media or the "digital democracy", we can join our hands in the global fight against the Covid-19 pandemic.



INTERNET ACCESS

A limited population of Pakistan enjoys internet access. Imagine the benefits that would accrue to the society and the economy if the entire population of the country had internet access. The internet access would prove useful in raising the literacy rate through online education to the deprived ones, providing health advice remotely in far-flung areas, enabling farmers and handicraft manufacturers to connect wholesalers and retailers directly in cities without the intervention of middlemen, and providing freelancing opportunities to many more, accelerating e-commerce. These are just a few of the benefits of internet connectivity. Given the disruption that Artificial intelligence and technology are causing a full range of benefits is even difficult to imagine at this stage.

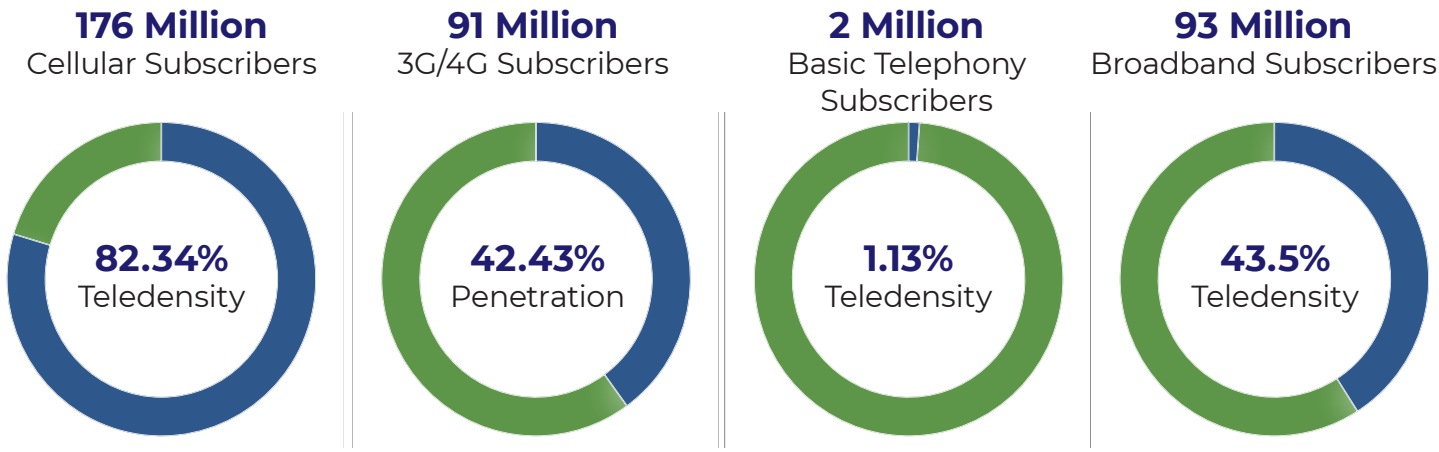
What needs to be done to provide universal internet access is described in Table 9.1, after a brief overview of the cellular industry, which is to play a key role in ensuring access.

The State of Cellular Penetration

Pakistan is an emerging cellular economy, with digital technologies beginning to transform the way people live and work. Currently, there are 169 million cellular subscribers that cover 80% population of the country.

- 40% of the population is using internet facilities.
- The total economic contribution of the mobile ecosystem in Pakistan was $16.7 billion in 2018.
- The ecosystem created more than 450,000 direct and indirect jobs.
- It contributed $2.2 billion to public sector revenue, including $1.5 billion direct and $0.7 billion indirect taxes.

Celluar Penetration and Teledensity

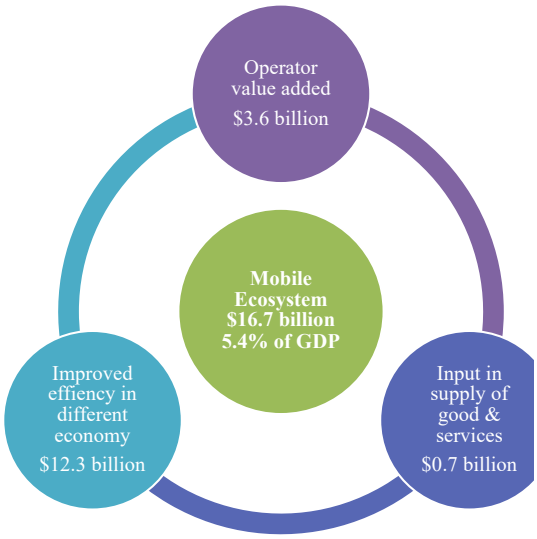


Source: Pakistan Telecommunication Authority (December 2020)

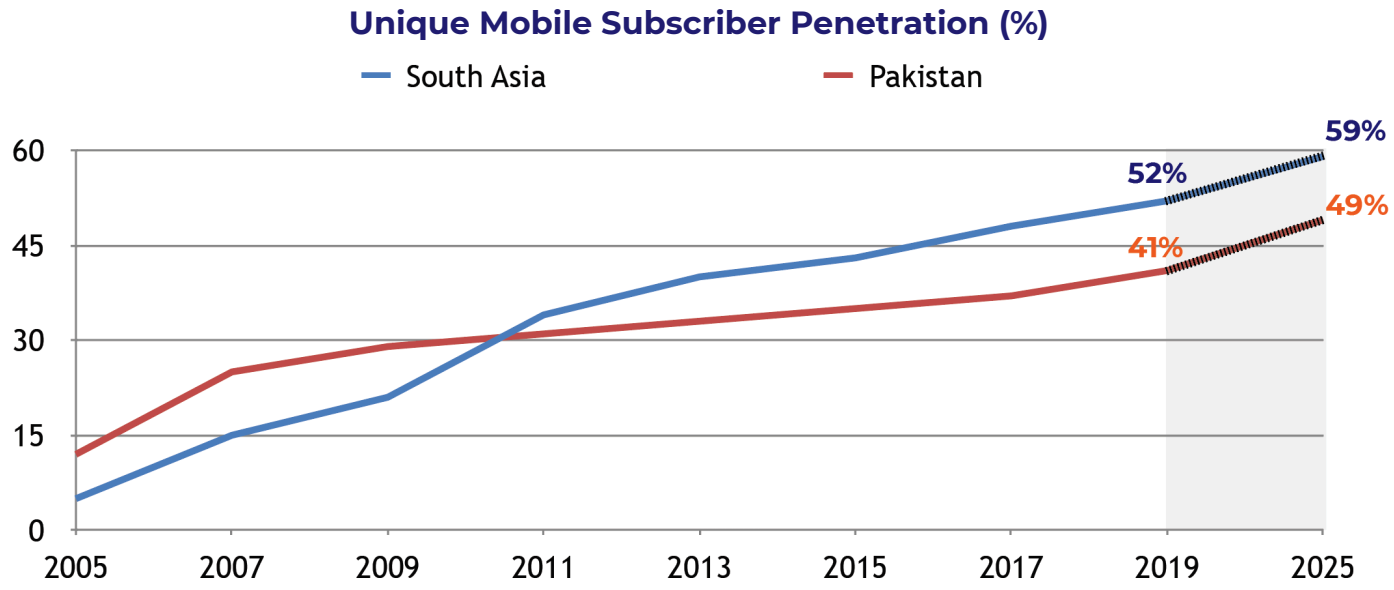
The Story So Far

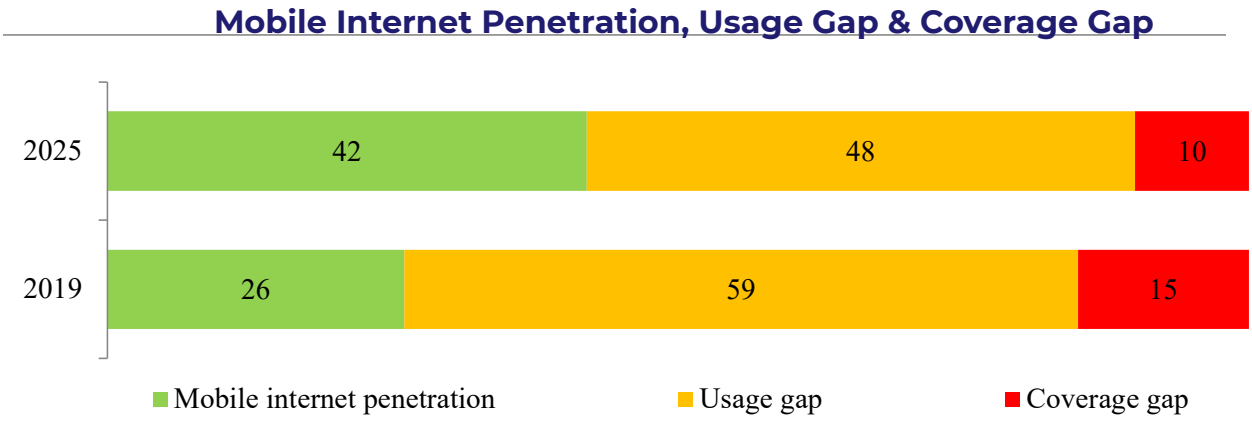
- Mobile subscriber penetration is still low.
- The country scored 39.8 in the latest Mobile Connectivity Index, compared to an average of 45.7 for South Asia.
- There is a sizeable 'coverage gap'; mobile broadband (3G or 4G services) accounts for less than five in 10 cellular connections.
- Availability, affordability, and content are the key barriers.
- The smartphone adoption rate is 49%.
- Conservative pace of 4G adoption in recent years.
- (23% in 2019) suggests certain intervention are required to disrupt market dynamics.

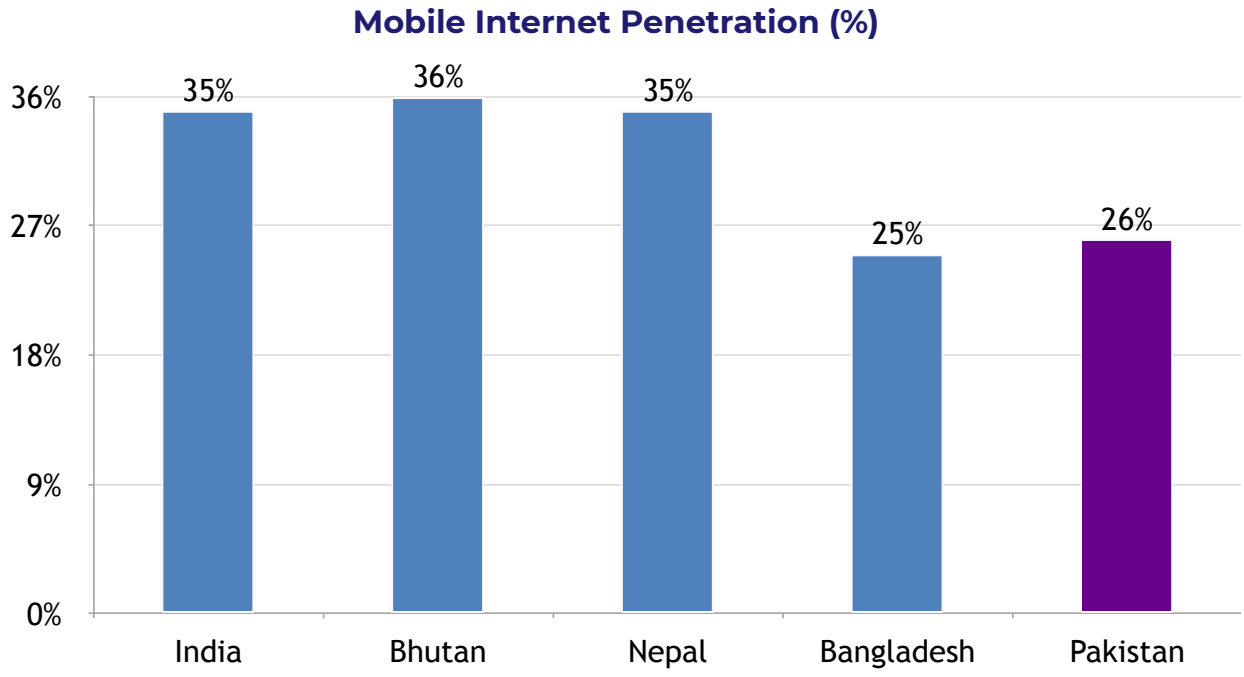
Cellular Ecosystem



- Pakistan's operators invested $5.3 billion between 2010 and 2018, but the average CAPEX as a proportion of revenue is lowest (23%) in South Asia.
- There is poor local manufacturing. Still, the Samsung and Huawei account for over half of all mobile phone sales in Pakistan, reflecting an absence of homegrown firms.







Internet Access

Issues	Solutions
• Provision of internet infrastructure does not require public investment – the infrastructure shall be laid and owned by the network operators. They have to be facilitated by easing out their overall cost. • A total spectrum of 19000 MHZ is available out of which only 256 MHZ has been auctioned so far . • The infrastructure required to provide internet access is to be laid by the cellular industry. • The rising demand for the internet increases the radio frequencies that a mobile phone operator requires. • Radio frequencies are auctioned to mobile network operators in the shape of the spectrum. • The first sale of spectrum fetched $291 million from each of the network operators in the early 2000s. Since then the sale of spectrum is being viewed as a revenue generation avenue.	• Do not eye sale of the spectrum to mobile network operators as a source of revenue – Internet access should be a priority. Provide spectrum at a nominal price or even free of any fee. • Bind the cellular industry to lay down the infrastructure required to provide access to at least 90% of the population. • Spectrum for 5G, whenever auctioned, should preferably be at a nominal price or even free because the deployment (infrastructure) cost of 5G for the network operators is quite high.
A significant segment of the population, especially the recipient of grants from BISP, may not be able to afford internet charges.	Provide a targeted subsidy to those who either cannot afford or can afford only partially. This investment will carry high payoffs.
Tower sharing by network operators would reduce the cost for all operators. Some institutional issues that constrain tower sharing needs to be addressed.	Institutional constraints to tower sharing need to be addressed (**We need to understand the institutional constraints to tower sharing through research**).
While awarding spectrum to mobile network operators some conditions regarding access are part of the contract.	Coverage obligations may be enhanced to increase access.
E-commerce: Currently most of E-commerce is relying on 'Cash on Delivery'. The real breakthrough will come when online payment becomes easier.	With the launch of RAAST by SBP, online payment is likely to become easier.
1% sales revenue of the cellular industry goes into USF (Universal Service Fund). The funds available in the USF were to be utilized for providing connectivity in remote areas. The USF has not been utilized exactly as intended – at some point the funds available were even used for retiring circular debt.	The law should be enacted to make it difficult for using the USF funds other than the prescribed purpose. USF needs more focus on fixed Internet for high speed. As fixed is more under served.

Consumers in Pakistan Face a Complex System of Taxes and Fees

- Telecom services in Pakistan are perceived as a luxury.
- For the country's bottom 20% and 40% income groups, the total cost of owning a mobile phone for both low and medium consumption baskets is above the UN's "1 for 2" target (i.e. 1 GB of data costing less than 2% of monthly income).
- The 31% tax rate as a percentage of the total cost of mobile ownership (TCMO) is significantly above the global average of 19%.

Cellular Phones: Cross Country Comparison of Taxes & Fees

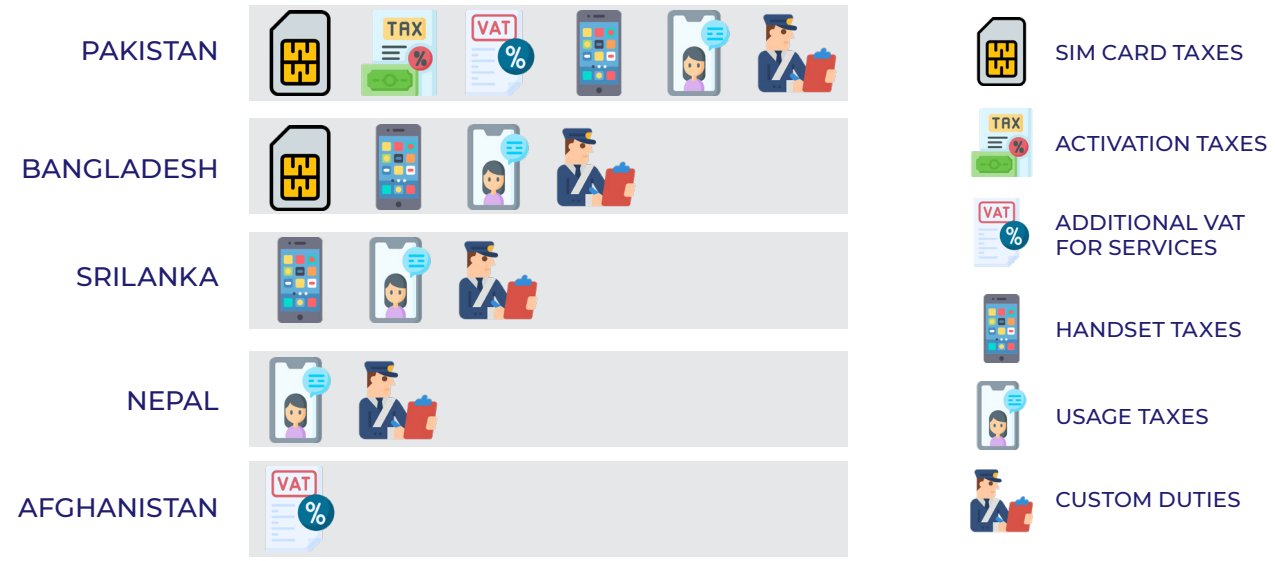


Figure
Action Points

1. Make internet widely and cheaply accessible - consider fully funding fast internet access to all major cities within 2021.
2. Look at the sale of Spectrum (i.e. frequency) to telecom firms as an internet access issue rather than revenue generation.

Figure
Further Research

1. What will be the cost of providing internet access to almost entire population of the country? What percentage of population cannot afford internet? What annual expenditure will have
2. to be incurred to provide to those who cannot afford it?

References:

Global System for Mobile Communications, GSMA (2020a). The Mobile Economy Asia Pacific 2020. GSMA Association.

Global System for Mobile Communications, GSMA (2020b). The Mobile Economy Asia Pacific 2020. GSMA Association.

Global System for Mobile Communications, GSMA (2020c). Mobile Internet Connectivity 2020 South Asia Fact Sheet. GSMA Association.

WEBINAR BRIEF
INTERNET FOR ALL
PART I

According to "Inclusive internet index for 2021" Pakistan secured 90th place among 120 countries globally and 24th among 26 in the South Asian region. The prospects of growth with technological advancement seem to be a dream for a country where more than 89% of the population cannot afford the internet. What is more alarming for Pakistan is left behind on various internet and communication-related indicators such as the e-government development index, network readiness index, and e-commerce index compared to Bangladesh, India, Nepal Sri-Lanka, and Myanmar.

The panel discussed the following main issues and challenges faced in Pakistan.

Issues Highlighted

The dilemma of the government in Pakistan is that it considers the internet as a luxury instead of a necessity without realizing the scope of the internet that goes beyond social networking. In the modern era, the internet has become an integral component of all sectors including education, health, commerce, banking, and agriculture. It is high time to revise our tariff policies to make the internet and devices affordable for the masses for greater penetration.

The Internet has become a divider instead of an equalizer by providing quality services in some areas and cities while ignoring the rest of the population in rural parts. Availability of devices such as smartphones and other devices is also a big issue the young generation is facing. Policymakers, regulators, and internet service providers need to understand the scope of the internet and its importance for our young generation.

One of the major challenges faced by telecom companies is regarding the release of spectrum by the government through auctions. The spectrum released in Pakistan is the lowest in the world and no new spectrum is released every year. Hoarding of the spectrum is seen as short-term money-making activity by the government to finance its budget deficit therefore, it is creating artificial scarcity thus pushing service providers to pay high prices for the release of new spectrum.

Pakistan does not have a policy goal regarding the proliferation of the internet. Revenue per user is one dollar in Pakistan which is the cheapest in Pakistan while it is 30-40 dollars in the USA. Considering the revenue generated, the government needs to adopt a policy such as a pay-as-you-go instead of charging high upfront charges thereby allowing the operators to have the spectrum improve service delivery and provide network faster and quicker.

Spectrum is auctioned by setting minimum/ floor prices in Pakistan without considering the ability of the operator to pay back through earning a single dollar per user. There is a disconnect between the expected average return per user and the minimum bidding price set by the government. Moreover, nearly 30% of tax is collected from the cellular operators which are not only the highest in the world but also the most efficient tax collector. On one side, the government collects a huge amount of tax from cellular companies, while on the other side telecom companies are penalized by charging high fees as the right of way and spectrum fee.

The policies in place have not been revised for the last fifteen years. Government and policymakers should formulate farsighted policies that enable, encourage, and incentivize companies to improve coverage and services. For instance, optic fiber is taxed as a luxury item that needs to be reconsidered keeping its current utilization and importance. Moreover, telecom is not recognized as an industry which constricts it from having opportunities that an industry enjoys.

Almost every telecom company is managing towers across the country. Initially, there was a competitive advantage for having individual towers by each company but later neither government nor companies made deliberations regarding sharing towers. Although, some companies are willing to opt for tower sharing tax implications that restrict them from selling assets or sharing towers.

In Pakistan optical fiber and penetration of the internet is worse and only 10% of mobile towers are connected to optical fibers. Similar constraints are also faced by optic fiber companies due to the absence of unanimous policy or framework. Civic authorities see this as an opportunity of earning money by charging a fee for laying optic fiber from different companies.

There is a need for fast-tracked technology and hardware to enhance coverage and reach ultimate users either by 4G/5G of wire connectivity. But it is hampering fixed connectivity by charging a different fee for laying optic fiber and taxes. Government should remove impediments regarding the laying of fiber optics, and spectrum, the operators will ultimately improve services.

Suggestions

- There are two important funds, universal service fund (USF) and ignite technology fund, generated by telecom companies and controlled by the government. These funds need to be deployed effectively to subsidized internet and device availability in Pakistan.
- The government should make long-term policies because the contribution by ultimate users of the internet is going to be higher than upfront fees and levies that are recently focused.
- Government should make a service corridor for optic fibers along the side of the highways. Companies interested in laying optic fiber can use those services and pay a fee to the government for utilizing those services.

PART II

CEOs of telecommunication companies continued the discussion in this session pointing out major challenges their companies face and policy recommendations. Mobile has been a great equalizer by providing internet services to everyone. Although the regional comparison shows that Pakistan remained alarmingly behind on internet inclusiveness, progress has been witnessed at affordable prices in terms of services and coverage over the years.

- The ***issue of high spectrum prices*** has been witnessed by many countries in the initial phases of telecom implementation but sooner mistakes were realized and corrected. Pakistan, a country with a perpetual current account deficit sees spectrum receipts as an opportunity for governmental value capture by charging high amounts in the beginning. We need to realize the fact that when companies overspend on the spectrum, they are left with less money to enhance quality or coverage and compromise on long-term growth. Pakistan needs to learn from the experiences of other countries and resolve the issues of the spectrum to provide faster services in the long term.
- The government is sacrificing long-term economic growth for short-term money. Government should not see telecom companies as efficient tax collectors, whether it is regulatory duties or spectrum. We need to realign our mission and vision by focusing on development needs at affordable prices everywhere and to everyone. There are excessive regulations and regulators are least productive in terms of catering needs of the sector.
- The Telecom sector is deprived of the rights that are given by the law and there is huge negligence from the government in enhancing the scope of this sector. The pandemic has put tremendous pressure on telecom service providers because it is the only viable solution to ensure online education, health care, banking, and functionality of many other sectors. Surprisingly, the government has neither interested nor contributed in this sector nor given any relief/concession in the last fifteen years.
- The Telecom sector is facing various issues and disputes in settling prices with external service providers. Despite those, telecoms are striving hard to provide the cheapest services by paying huge amounts to upstream submarine cable operators. Various petitions have been filed regarding pricing issues and internet bandwidth in courts by telecom companies. Delayed decision-making at the federal level prolonged the case decision to years which otherwise would have been resolved in days. For instance, FBR has not been able to decide about the status of telecom as an industry even after two decades of recognition by the cabinet.
- There is no ownership of the telecom sector in Pakistan. Every sector is moving towards internet-based sectors such as finance as fintech,

agriculture as agri-tech, education as ed-tech, and so on, therefore, Pakistan needs to understand the state of digital emergency and prioritize the telecom sector as a crucial driver of growth. This sector needs complete government ownership and proactive forward-leaning support. Our fight should be about how to take Pakistan out of the current myopic situation and change the status quo.

- Readiness for 5G: Pakistani market is not ready to take up 5G technology due to the non-enabling environment (existing regulatory structure, capital) and non-affordability of the smart devices. 5G is low latency which is required for technology-controlled businesses like the autonomous car industry and remote surgeries. Our market is not ready for such a business as Pakistan is still struggling to penetrate 4G which is not happening due non-availability of smart devices and handsets. Nearly 50% of the customers are using 2G technology with the cheaper mobile set. Affordability of the devices is one of the biggest impediments Pakistan is not able to capitalize fully on 4G and 60% of users don't have 4G devices. As a nation, it is suboptimal to divert to 5G because we need to assess our abilities, infrastructure and technology to adapt to 5G. We need to develop a whole ecosystem to leapfrog because service providers alone cannot ensure the availability of 5G without fulfilling pre-requisite conditions.

- The main objective of telecom is to provide fast internet to its citizens instead of providing 5G and take up technology which is most appropriate for us as a country. Given the existing tax structure on customers (32%), it is a great challenge for certain groups or segments such as students to afford smart devices and the internet for education.

Policy Recommendations

Policy framework 2004 was a forward-looking policy that enabled the sector to develop from 5% to 50%. The policy framework needs to be upgraded every five years but it did not happen. Pakistan was performing ahead of many regional counterparts in 2004-2009 comparing the connectivity index at that time. Therefore, there is a dire need to upgrade our policy according to the requirements of the current era to make things happen for guaranteed progress. There is no ambition and mission in our policy.

Spectrum is the lifeline of the telecommunication sector, but we are losing its economic value by not utilizing it timely. Pakistan has 1/3 of the spectrum as compared to that of India or Bangladesh and ¼ of advanced countries like Arab and Turkey. Instead of hoarding spectrum, the government should release it in time for better utilization.

Consolidation of telecom companies is also an important aspect to build robust infrastructure, enjoy economies of scale and improve efficiency. The Telecom sector needs a consolidated regulator or an umbrella organization that can monitor the progress and reset prices of spectrum and availability. Telecom is a competitive market, therefore, the government should provide a conducive environment to enable companies to perform better. Pakistan can consider the case of China which limited its networks due to affordability issues whereas, in Pakistan, multiple companies are investing in isolation on towers and networks.

The telecommunication sector needs to be recognized as a sector of sectors and needs a sustainable framework due to its prospects. The fact is that this sector boosts and flourishes other sectors like education, commerce, health, and economy with changing dynamics of the market. Our goals need to redefine with the evolution of technology and ensure that the internet for all is a sustainable way to achieve economic growth.

Pakistan also needs to build on its demographic dividend by enhancing skills through policy interventions.

Malaysia did a rigorous exercise for digital transformation supervised by President Mahathir himself to ensure the functionality of the digital transformation which led to successful results. A similar vigorous exercise is required in Pakistan that can help to boost economic growth.

Prepared By

Nazia Hasan
Ph.D. Scholar, PIDE

Edited By

Hafsa Hina
Assistant Professor, PIDE

WEBINAR BRIEF
VIRTUALIZING SERVICES BY OFFERING INTERNET FOR ALL

Preamble

The dilemma of the government in Pakistan is that it considers the internet as a luxury instead of a necessity without realizing the scope of the internet that goes beyond social networking. The internet has become a vital part of all industries in the modern era, including education, health, business, banking, and agriculture. It is a time to review our policies to make the internet and devices more accessible to the general public, allowing for wider penetration.

Dr. Nadeem ul Haque started the discussion with this question

In Pakistan, the internet is considered a luxury. Sadly, the government taxes the use of the internet and internet devices. So, how do we achieve "Internet for All"?

Key Messages

Mr. Khalid Raza

There are two challenges to the internet for all

1. Restricted Telephony

Unfortunately, WhatsApp calls are restricted in the Middle East. The government should deregulate the taxes imposed on the spectrum of the internet. Big companies are struggling to see future innovations since the internet has evolved into a content delivery service like Facebook and Netflix in the last decade.

The next decade of internet usage is not the consumers because we hear that there will be around 6 billion users and 30 billion IT devices. The edge is the source of data, it will be consumed and it is monetizable. "Data is the next oil."

2. Unreliable Delivery

We need the original internet architecture with the universal addressing model. Right now, we can not trust our internet connection during a video call or a remote surgery. So, basically "digitalization is a threat to those who do not transform." With the world now changing, and as technology is improving, we need to make sure that the internet is not becoming a hurdle but allowing us to grow with the world.

Solutions to the challenges

- The 5G bandwidth for high internet speed. This will allow us to trust the internet connectivity during a video call or a remote surgery. It is required so that we can innovate and learn through technology.
- The right internet architecture with a universal addressing model. It will lead us to go from companies to individuals to monetize data. It would reduce the cost, and therefore the service would be available to everyone.

Mr. Ahmed Shahid

- He worked for seven years on 5G base station equipment at Valley Communications and worked on LTE baseband networks.
- We have an example of Reliance Jio, which was a major project in India to bring 5G, by just one individual. After looking at the infrastructure of it and how it changed the internet connectivity there, we began to wonder what is the hurdle for Pakistan in achieving 5G?

Hurdles

- Pakistan's communications infrastructure is too heavily regulated.
- The spectrum auction has failed thrice for the 5G network due to heavy regulations of the government.

Dr. Suhail Chughtai

As an orthopedic surgeon, he has been solving medical problems through technology. There are various methods like Direct Telesurgery, Assisted Telemedicine, and Telecare at home which can be used to help treat patients. We have successfully helped the population cope with the coronavirus, and be responsive and give the best treatment to the nation using the facilities that we have. We can treat patients in remote locations and assist them with some acute diseases, but for major surgeries, we require higher bandwidth and better internet connectivity. This will help the people living in remote locations to get the best health care services without traveling to bigger cities.

Mr. Imran Qureshi

The challenges faced during virtual learning:

- Lack of computer-aided training of teachers and students.
- Weak internet connection for video calls.
- Laptops are expensive and, not everyone can afford them.

Solutions

- Government should reduce taxes on devices such as laptops and mobile phones.
- There should be training workshops for teachers and students.
- The should be a government policy of compliance and consumer data.

Conclusion

The internet for all has become a necessity far greater than cars. It is not a source of revenue but a source of income.

Prepared By

S. M. Usman Shahid
MPhil Scholar, PIDE

Edited By

Hafsa Hina
Assistant Professor, PIDE

telenor 4G

HAPPY INDEPENDENCE DAY!

Telenor 4G Enabling Har Pakistani
To Do More, Be More & Achieve More.

#MoreSeZyadaPakistani