

phoneWorld

Issue 36 | Jan-Feb 2019

2019

**Challenges ahead
for Telecom Industry**





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Adnan Khan
Managing Editor

Dear Readers,

The growth rate of Pakistan's telecommunication sector has been impressively fast-paced and contributed a lot in bringing Mobile Broadband services to the country and has contributed \$ 4.42 billion to National exchequer during July 2014 to June 2017. In 2014 there were only 114 million mobile subscribers that quickly rose to 152 million mark by the end of November, 2018. While the 3G/4G subscribers also grew at an impressive rate from 13 million in 2014 to 60 million in November 2018.

Now 5G has become the talk of the town and telecom industries around the world are gearing up for the next tech revolution, Pakistan being one of them. We have discussed the upcoming 5G revolution in detail in one of our articles hoping that it will give an insight to our readers.

2018 was a good year for our industry although it was slower than the previous couple of years but still the industry managed to put some impressive work forward. Now that we have headed in to a new year, we are face to face with some key challenges that are blocking the overall growth of the industry.

We have shed light on some of the key challenges in our feature article, "2019: The Challenges ahead for the Telecom industry". Our current issue also includes exclusive articles on cyber security, impact of modern social applications on our youth and role of telecom on Pakistan's digitization.

This time, our in-focus section features an exclusive interview of Yusuf Hussain, CEO Ignite. He is a Tech Entrepreneur, angel investor, and tech enthusiast with international experience. He is associated with Ignite, The National Technology Fund for last two and a half years now and played a very significant role in promoting innovation and commercialization of research in the country.

Like always, our regular sections including phone reviews, Smart moves, TVC reviews, top applications and smartphone wish list are also part of our current issue. We always try to bring something new and interesting for our readers, we hope you guys will appreciate our efforts and give us your feedbacks so that we can improve further.

Enjoy Reading...!!!

Thank you,
Adnan Khan
Managing Editor

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Exclusive Interview: Mr Yusuf Hussain - CEO Ignite



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Tackling the increased cybercrimes in the modern financial age



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By Rizwana Khan

2019

Challenges ahead for the Telecom Industry

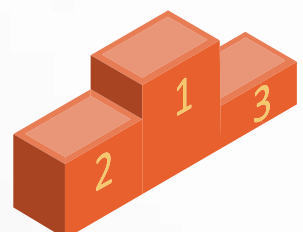
Mobile technology transformed almost all the industries in the country and m-commerce, m-governance, m-agriculture, m-health, and m-education have become a routine part of our lives through one way or another. Regarding the technological developments in the country many international companies like Uber, Careem, Oppo, Vivo, i2C have also started taking interest in Pakistani market and this not only has accelerated the digital revolution but have also played a major role in uplifting the socio-economic conditions of the country.

Pakistan's Telecom sector has been impressively fast-paced and contributed a lot in bringing Mobile Broadband services to the country that has contributed \$4.42 billion to National exchequer during 3 year period from July 2014 to June 2017

The growth rate of Pakistan's telecommunication sector has been impressively fast-paced and contributed a lot in bringing Mobile Broadband services to the country

and has contributed \$ 4.42 billion to National exchequer during July 2014 to June 2017. In 2014 there were only 114 million mobile subscribers that quickly rose to 152 million by the end of November, 2018 while the 3G/4G subscribers also grew at an impressive rate from 13 million in 2014 to 60 million in November 2018. But where there are opportunities, there are some challenges as well.

2018 was a good year for our industry although it was slower than the previous couple of years but still the industry managed to put some impressive work forward. Now that we have headed in to a new year, we are face to face with some key challenges that are obstructive to the overall growth of the industry. Here are some of the key challenges.



1 License renewal

The three mobile licenses awarded by PTA are due for renewal in 2019. These licenses were granted in 2004 for 15 years to Telenor, Zong and Warid Telecom. While the remaining two mobile operators, Jazz (Mobilink) and Ufone are not due for renewal until 2022 and 2029, respectively. Previously, \$291 million each was paid by Ufone and Mobilink-Jazz for their first license renewal for GSM services in 2007(Jazz) and 2014(Ufone).

Prime Minister has constituted a technical committee to evaluate benchmarks for the license renewal of three mobile operators and award of additional spectrum. The government is expected to generate \$2 billion in revenue from the process. The technical committee is headed by Secretary MoITT while officials from PTA, Ministry of Finance, Law and Justice and FAB are the members of the body.

All telecom operators have made suggestions to the federal government that term and conditions of the renewal of mobile license should be kept same on which license of Ufone got renewed in 2014 to provide a fair and balanced playing field

According to experts, renewal decisions should ideally be finalized 18-24 months prior to license expiry to ensure service and business continuity. Due to delay in announcing license renewal policy, telecom operators would have little time for decisions about future investment and business plan, which is creating uncertainty in the industry.

This is going to be a huge challenge in the coming months as the government will have to come up with a policy plan that satisfies all stakeholders. Just recently, all telecom operators have made suggestions to the federal government that term and conditions of the renewal of mobile license should be kept same on which license of Ufone got renewed in 2014 to provide a fair and balanced playing field for all companies' equal growth.

2 5G Trial

2019 will be a big year for mobile technology. International Telecommunication Union (ITU) is going to finalize 5G standards in 2019. Many countries have already started 5G trials, and are expected to officially launch their 5G services this year. The launch

of 5G will be a game changer in the mobile world as recent 5G trials conducted abroad have already demonstrated the speed of 9.3 Gbps over 24 GHz spectrum, nearly 10 times faster than the theoretical maximum data rate for 4G.

Telenor and Zong might be the prime candidates to introduce 5G as both have shown interest in 5G trials

In Pakistan, Telenor and Zong might be the prime candidates for introducing 5G as both have already shown their interest in 5G Trials. Telenor Pakistan has already announced the cutting-edge aggregation technology which is a step towards 5G in Karachi, Lahore, Rawalpindi and Islamabad.

Utilizing the advanced broadband feature of 'Carrier Aggregation', Telenor Pakistan is the first to aggregate its LTE 850 and LTE1800 networks as one to give better data service experience. This feature leverages the available frequency of different bands, thus enhancing the customer experience.

Telenor Pakistan has also marked the first deployment of the AirScale Base Station Controller (BSC) and AirScale Radio Network Controller (RNC) on AirFrame cloud infrastructure in Pakistan. On the other hand, Zong and Huawei have launch LTE FDD MIMO sites with innovative 32T32R technology used on the existing spectrum to improve the user-perceived rate from 3.8 Mbit/s to 13.6 Mbit/s.

To quickly resolve live-network challenges, like insufficient coverage and limited capacity and improve user experience, Zong 4G and Huawei jointly carried out multiple innovative projects in 2018, including LTE 4T6S, microwave MIMO and CloudAIR. Particularly, the 4T6S solution improved network capacity by 1.8 fold and the user-perceived rate by 3.8 fold

PTA has unveiled a draft framework document related to 5G trials, its possible spectrum and information about its related services in Pakistan

During the tenure of previous government, the directive to PTA was approved by the Cabinet to start the testing of new technology and its ambitious plan to commercially launch 5G by 2020. PTA has now

unveiled a draft framework document related to 5G public trials, its possible spectrum and information about its related services in Pakistan.

The draft document contains different procedures and conditions needed for legal testing of 5G in Pakistan. Frequency Allocation Board will issue temporary spectrum for non-commercial testing after which authorization certificate will be given to the companies.

However, according to the industry experts, deployment of 5G is more expensive than 4G, therefore; therefore, the new government may take some time in introducing the technology due to the challenging economic and market conditions of the country. Also, as said earlier Telenor, Zong and Jazz-Warid will get their licenses renewed this year which will require huge investments from these operators. So first going for a license renewal and then for additional spectrum will be unfeasible for the operators as well.

Although PTA has drafted an initial document but there is still a long way to go and requires a detailed roadmap as a proactive approach is vital to ensure market readiness and affluence of all stakeholders for the next wave of mobile revolution. 5G has the potential to create employment and investment opportunities in Pakistan during coming years, therefore; the government will have to come up with a policy decision that benefits all stakeholders.

3 Policy Implementation

The much awaited Telecom Policy of 2015 was a stepping stone for the industry. The policy included a number of important issues including new competition rules, licensing framework, policies for OTTs, Public Wi-Fi, infrastructure sharing, spectrum Harmonization, Refarming, Sharing & Mergers/acquisition, Interference Protection.

Policy initiatives still needs more to be accomplished. Spectrum harmonization, refarming and mergers/acquisitions, test license, and licensing framework while have been developed but have to be closely monitored for successful implementation

A lot of work has been done on the policy initiatives but still much more is needed to be done. Spectrum

harmonization, refarming and mergers/acquisitions, Test license, and licensing framework have been developed that resulted in successful refarming by Ufone and Telenor while paving way for historical Mobilink-Warid merger.

Although back in 2017, MoITT released a Draft Pakistan Telecommunication Competition Rules 2017 but no further work was done on it. Similarly, nothing substantial has been done so far for interference protection, Public Wi-Fi, and OTT policies, national roaming.

Zong is still facing network interference in their uplink GSM 900 MHz band due to the cross-border spillover from Indian CDMA operators. Frequency Allocation Board assigned the compensatory band to Zong on a temporary basis but a permanent solution has yet to be devised. In such situation, the spectrum holdings in 900 MHz and 1800 MHz band have to be rationalized for proper carrier planning that requires proper policy plan.

PITB in 2017 had installed WiFi routers in about 250 locations, including metro stations, educational institutions, the railway station and other public spaces of Lahore, Rawalpindi and Multan. Due to lack of Funds, the project has recently been terminated by the Government

Free Wi-Fi project was also included in the Telecom Policy 2015 but only Punjab government took up the initiative. PITB in 2017 had installed WiFi routers in about 250 locations, including metro stations, educational institutions, the railway station and other public spaces of Lahore, Rawalpindi and Multan. Due to lack of Funds, the project has recently been terminated by the government.

The project was started in association with the Pakistan Telecommunication Company Limited (PTCL), but the government failed to pay dues worth over Rs 150 million. In addition to that, another Rs190 million was needed to keep the service running so the government discontinued the project terming it as a “burden on the exchequer.”

Policies for regularization of OTT and other online services are a topic of debate among government institutions for quite some time now. The Policy

stated any new licensing policy may require over-the-top services to get “general authorization” to operate in the country. This “general authorization” may require OTT services to agree on terms — that will be defined by PTA — including any national security requirements. But no concrete efforts have been taken so far to develop a proper policy for them.

Similarly, no policy has been developed for national roaming either. Besides these main aspects of Telecom Policy 2015 there are many other issues as well that require government’s attention.

4 Telecom Laws and Regulations

The Telecom Policy 2015 also required the government to devise new laws and regulations for Type Approval, content management on the internet, lawful interception and convergence. PTA has successfully developed its Type Approval mechanism further strengthened by development and implementation of DIRBS. Country’s first cyber-crime law was also shaped although according to some it is quite rigid and ambiguous and requires improvement but nevertheless, a step forward towards the right direction.

PTA has successfully developed and launched state of the art Device Identification Registration and Blocking System (DIRBS) that will clean the device eco system of all illegal handsets

A very important point mentioned in the policy was the convergence of regulatory bodies; PTA and PEMRA as it not only adds to the confusion but organizational inefficiencies. Unfortunately, the matter has never come under further discussion in any MoITT meeting and agenda after that.

Since the policy release, many changes in the market have taken place so the government will have to take a pro-active approach and introduce policies and regulations that are according to the changing trends

The Telecom Policy was meant for five years or depending upon market and other developments. This is the fourth year since the policy release and many changes in the market have taken place so the government will have to

take a pro-active approach and introduce policies and regulations that are according to the changing trends while at the same time it should also work to finish the incomplete aspect of the policies and update the ones that have already been introduced. To achieve all of this, relentless dedication is required from MoITT and PTA.

GSMA Mobile Gender Gap Report 2018 says that only 44% of women own mobile phones whereas, 80% of men are using mobile phones. Also mobile internet penetration is only 10% for women compared to 26% for men

5 Inadequate educational capacity and Gender Gap in ICT

The fast paced growth of ICT industry of Pakistan is a commendable feat recognized all over the world but unfortunately, the adoption rate is not at par with that pace.

Since technology has become the most important aspect for the socio-economic growth of any country, steps should be taken to educate people about its usage and benefits, especially in education sector

One of major reason for slow adoption is the inadequate educational capacity and gender gap in mobile technology. Since technology has become the most important aspect for the socio-economic growth of any country, steps should be taken to educate people about its usage and benefits, especially in education sector.

Learning about tech developments should not be limited for IT graduates or tech enthusiasts rather it should be imparted across the board. Similarly, concrete steps are needed to be taken to fill the gender gap in technology. According Mobile Gender Gap Report 2018, only 44% of women own mobile phones whereas, 80% of men are using mobile phones.

Mobile internet penetration is also very low in Pakistan, only 10% of women in Pakistan use mobile internet compared to 26% of men. The government needs to take some serious initiatives to promote technology uptake in the country.

6 Intellectual Property Rights Protection

To promote and protect and support young entrepreneurs and new startup business in ICT the government also needs to work on Intellectual Property Rights Protection. Intellectual Property (IP) refers to creations of the intellect for which an exclusive right is assigned to designated owners by law. Intellectual property rights (IPRs) are the protections granted to the creators of IP, and include trademarks, copyright, patents, industrial design rights, Layout designs of integrated circuits, Geographical Indications and Plant Breeder's Rights.

IP laws are important to attract foreign investors in the market. Also, local players will be more confident to start businesses if they are sure they are well protected by the law

With developments in technology there are number of new unique online business ideas and applications coming in the market every now and then. Therefore, the government needs to introduce ICT specific IP laws to improve the confidence of the industry. These laws are highly important to attract foreign investors in the market also, local players will be more confident to start businesses if they are sure they are well protected by the law.

7 New Government setup

2018 was a year of change in the political setup of the country where a new political party came to power for the very first time. Due to its inexperience and difficult economic conditions of the country, it was quite hard for PTI to settle in its position rather it is still struggling to formulate a clear roadmap to run the country.

The personnel at the MoITT and PTA are also still trying to get a hang of their roles. There are so many fronts at which the new team has to work which includes, introduction of forward looking policies and regulations, introduction of new technologies,

boosting the IT exports with a cross-cutting strategy driven from the centre, improved infrastructure, uplifting human capital, supportive tax policies, incentivizing innovation and encouraging entrepreneurship.

There are so many fronts at which the new team has to work that includes introduction of forward looking policies and regulations, introduction of new technologies, boosting IT exports, improved infrastructure, uplifting human capital, supportive tax regime, incentivizing innovation and encouraging entrepreneurship

Although PTI government is very committed towards technology advancements and gave special importance to digital policy in its party manifesto but before formulating any major policy, it has to fully understand the dynamic of the Pakistani ICT industry and that requires time.

Let's wait and see how the future of our ICT industry will shape in the future.



Vivo is a Brand That Brings Innovation at Affordable Prices in Pakistan

Over the past few years, young smartphone manufacturers have taken over the industry by storm. The Chinese market is already flooded with home-grown brands and now a few prominent ones have managed to capture a huge market share in Asia, Africa and Europe.

One of the reasons behind their success could be the aggressive pricing strategy, however, innovation played an important part as well.

Vivo, for example, an innovative young brand has recently introduced a smartphone with Full-Display Fingerprint scanning technology. Which means you can touch anywhere on the screen and it unlocks — just like magic! Surprisingly, there are no ports or holes in this phone, making it a truly futuristic device.

Since it began global operations, Vivo quickly captured developing markets in Southeast Asia and India. In 2017, Vivo entered Pakistan's market with affordable smartphone options including the budget V and Y series smartphones.

Vivo became the First smartphone brand in Pakistan to introduce the FullView™ Display with V7+ offering a very high screen to body ratio and minimal bezels. The V7+ was also the world's first smartphone to offer a 24MP selfie-camera.

The next year Vivo surpassed its own record by offering Vivo V9 and a newer version of FullView™ Display with an even higher screen-to-body ratio and with V11 Pro it managed to achieve over 85% — dubbed as the Halo FullView™ Display.

Moreover, V11 Pro was the First smartphone in Pakistan to offer Vivo's revolutionary In-Display Fingerprint Scanning technology, eliminating the need for a physical scanning pad.

Keeping in mind Vivo's tradition to introduce latest technologies at affordable prices in Pakistan, one can certainly hope that this year there are going to be bigger surprises.

It is also worth-noting that Vivo does manage to integrate the same features in its budget devices after introducing them in flagship models; just after a year or less.



Top Smartphone Trends to Look Out for in 2019



Every year we see a lot of technological advancements, especially in the smartphone market features such as AI, AR, triple camera setup, bezel-less display (all kind of notches), in-display fingerprint scanner and wireless charging, were some of the common technological trends that we saw on most smartphones in 2018. If the rumors are to be believed, 2019 also has a lot to offer as well. Without further ado, here are our top picks on the most interesting trends to watch out for on smartphones in 2019. Take a look!

5G: In addition to the 5G network, smartphones next year will be designed with 7nm processors. These chipsets will be extremely powerful. Apple and Huawei have already introduced these 7nm chipsets on their latest smartphones. These powerful processors combined with 5G will take the smartphone experience to a whole new level. Some of the smartphones that are expected to work on the 5G network next year are Samsung Galaxy S10, OnePlus 7/7T, Huawei P30, Oppo 5G, Honor 5G and Xiaomi Mi Mix 3.

For the recent few years, we have been using the 4G VoLTE mobiles. Without a doubt, 4G has been the fastest and the best network we have used till date. In 2019, we will finally be seeing 5G smartphones. However, even though 5G smartphones will make their appearance next year, a report by statista reveals that the technology will not take off until 2021 or 2022.



Foldables

Huawei, Oppo, LG, and likely a few others are working on folding phone designs that they may or may not show off in 2019, and we've already seen the Royole Flexpai and Samsung Galaxy Fold. The fact is that folding phones are coming, but the first wave is going to be chunky, glitchy, and incredibly expensive. We think it's going to take a lot more work before folding phones develop into a major, mainstream trend.



Pinholes

Bezels be damned. For better or worse, the notch has been a mainstay of flagship smartphones. Practically everyone (save for Samsung) has embraced the cutout in an attempt to go edge to edge. Even Google made it a part of Android (while giving the world a notch you can see from space with the Pixel 3 XL).

We've already seen and will continue to see a number of clever workarounds like Oppo's pop-up. The pin hole/hole punch design found on the Huawei Nova 4 seems like a more reasonable route for a majority of camera manufacturers.



Cameras, cameras, cameras

Smartphone cameras are pretty good across the board these days, so one of the simple solutions has been simply adding more to the equation. LG's latest offers a pretty reasonable example of how this will play out for many. The V40 ThinQ has two front and three rear-facing cameras. The three on the back are standard, super wide-angle and 2x optical zoom, offering a

way to capture different types of images when a smartphone camera isn't really capable of that kind of optical zoom in a thin form factor.

On the flip side, companies will also be investing a fair deal in software to help bring better shots to existing components. Apple and Google both demonstrated how a little AI and ML can go a long way toward improving image capture on their last handsets. Expect much of that to be focused on ultra-low light and zoom.

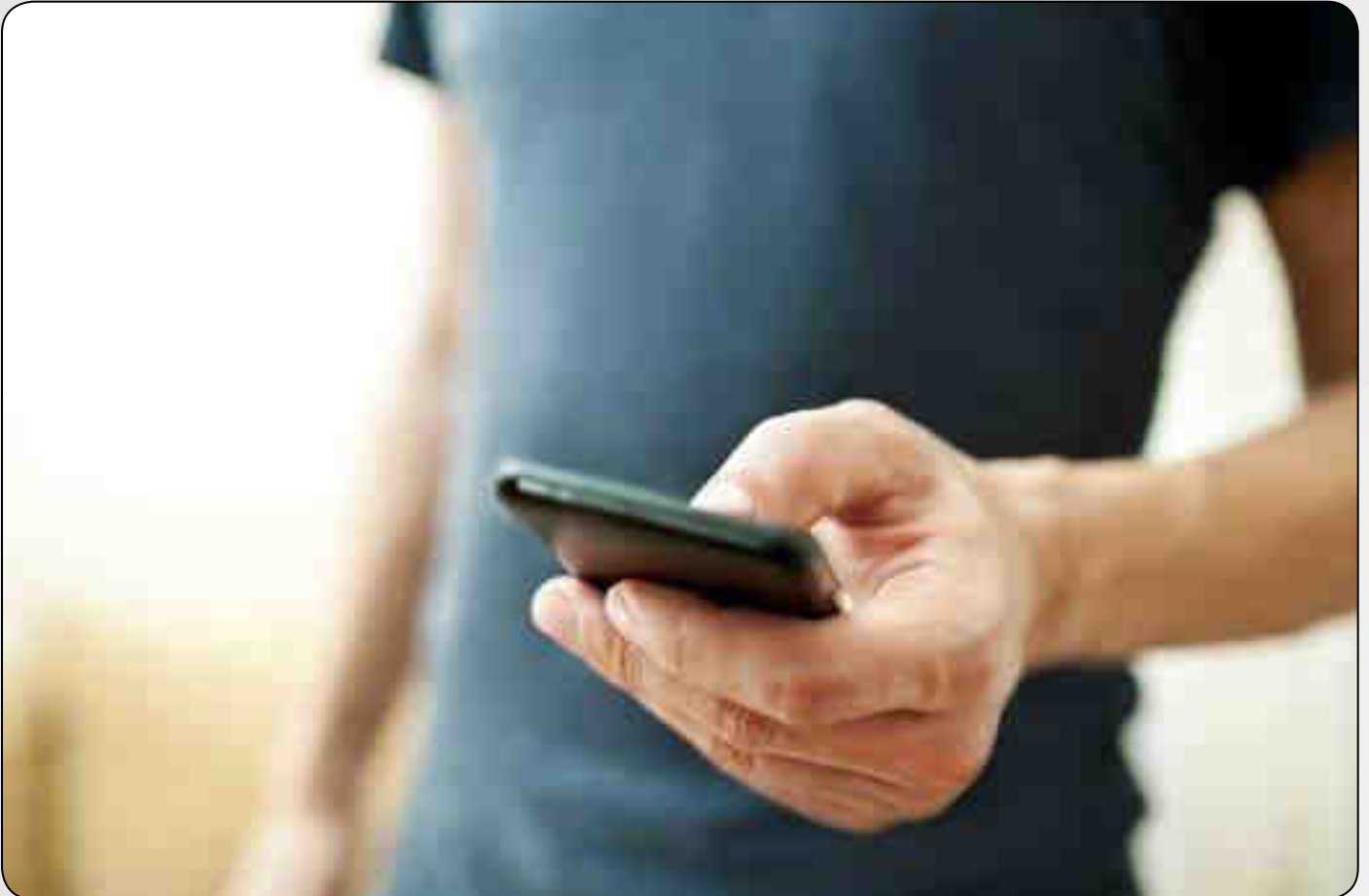


Faster charging

With battery technology at an impasse, any potential increase in capacity are quickly shrugged off in the pursuit of slimmer, sleeker designs or larger, power-hungry displays. What has been steadily improving is the time it takes to recharge our batteries once they're depleted. Chinese manufacturers like Huawei, Oppo, OnePlus, and Meizu are already offering astounding charging speeds, but the two biggest smartphone sellers stateside are among the slowest.

Although the most recent iPhones can charge from zero to 50 percent in 30 minutes, you have to pay extra for the fast charging kit and a full charge still takes close to 2 hours. Having had its hands burned already with the Note 7 recall, Samsung has severed its charging speeds, sticking with Adaptive Fast Charging which is compatible with Qualcomm's Quick Charge 2 standard. In 2019, Qualcomm is also introducing a new triple charge system that will offer up to 32W for wired charging and 15W for wireless charging. To give that some context the iPhone charger that ships in the box puts out 5W.

5G: From Dream to Reality



Finally, we are expected to see a big technology shift this year. The transition to fifth generation cellular network will soon shake the smartphone and rest of the devices that include industrial robots, security cameras, drones and cars that send traffic data to one another. 5G will facilitate people to download entire movie within seconds. We are going to experience a big change in connectivity, entertainment and lifestyle.

The transition to fifth generation cellular network will soon shake the smartphone and other smart devices

The next generation 5G technology will be a significant tool to connect billions of internet users and devices. Unlike 2G, 3G and 4G that focused on mobile phones,

the 5G will offer faster, more stable connections for cars, homes, factories and offices. According to a survey, in countries where 4G has been introduced for the last few years, the businesses have gained a 67% increase in productivity, 47% have been able to cut costs and 75% accept that 4G has enabled them to innovate and jump ahead in the competition.



In Pakistan, the 4G LTE has improved network responsiveness for real-time communication and reliability of a fast connection. Pakistan is also getting ready to welcome this big technology shift. PTA has already unveiled its roadmap about public testing of 5G services in Pakistan. The draft framework for 5G enables the use of radio spectrum on trial basis for noncommercial purposes.

Unlike 2G, 3G and 4G that focused on mobile phones, the 5G will offer faster, more stable connections for cars, homes, factories and offices

Pakistan has experienced 3G and 4G mobile broadband technology shift quite successfully. In Pakistan, the rapidly increasing demand for high bandwidth telecom services has gained pace towards 5G testing. PTA has also confirmed that it would be launching 5G services in Pakistan very soon.

Malaysian Tower Company edotco has offered annual investment of \$100 million in Pakistan in a bid to lay a firm foundation for the launch of 5G telecom technology in the country

In next five years the smartphone penetration is expected to grow from current 30% to over 60% so, in order to handle the projected fivefold spike in mobile data usage, the country's telecommunication industry will need over 30,000 new tower sites by 2022. Therefore, Malaysian Tower Company edotco has also offered annual investment of \$100 million in Pakistan in a bid to lay a firm foundation for the launch of 5G telecom technology in the country.

Pakistan has begun the preparations of 5G and has set its eyes on launching 5G technology by 2020

The telecom officials have highlighted that the existing 3G/4G mobile broadband technologies have been gaining momentum continuously since their launch in mid-2014 and the demand for data services has been growing along with the broadband subscriber base that has now crossed 56 million. In the current fiscal year, 4G had a significant impact on mobile phone banking transactions as well. According to the State Bank of Pakistan (SBP), these transactions had crossed the PKR 410 billion mark, translating to a growth of 195%. There are almost 3.4 million registered users of mobile phone banking apps, with the bulk of the transactions falling under intra- and inter-bank funds transfer. With the



launch of 5G Services, we can see more improvement in banking transactions via mobile phones.

Zong and Telenor might be the first telecom operators to introduce 5G as they have already started testing the advanced technology

However, at the same time telecom officials admit that the quality of 3G and 4G are very low in Pakistan. According to the wireless network mapping company known as OpenSignal, Pakistan's average 3G speed is among the lowest in the world at just 3.33Mbps. Though, 4G services are comparatively much better than 3G services. It is expected that 5G speed will be one thousand times faster than current LTE data transfer speeds. In this regard, even China has tested a prototype with data transfer speeds of 3.5Gbps. 5G services will be operating on a millimeter wave base.

The draft framework for 5G enables the use of radio spectrum on trial basis for noncommercial purposes

Over the past five years, Pakistan has experienced a rapid increase in mobile broadband penetration, but still the mobile broadband market is at an early stage of development with penetration that is below other Asian countries. However, it is to be expected that by further adoption of 4G and eventually 5G services, a strong growth will occur over the next five years.

PTA has also claimed that Pakistan will emerge as the first nation in South Asia to introduce 5G internet services and even beat the larger regional nations like India. Pakistan has begun the preparations of 5G and has set its eyes on launching 5G technology by 2020. With the arrival of 5G services, the market for high-end smart phones will also grow. Moreover, the mobile companies such as iPhone which are not directly doing business in Pakistan may open up their stores here.



5G is going to bring the next big revolution globally in the area of mobile broadband. We expect that it will result in attractive data rates and considerably enhance the experience. The young generation will definitely enjoy the applications of next generation technology, as they will be able to download their favorite games within no time. Telecom operators realize the fact that 5G technology will be a key factor to allow millions of devices to be connected simultaneously in highly populated areas. That's why they are working hard for the successful implementation of 5G services in Pakistan.

Zong and Telenor might be the first telecom operators to introduce 5G as they have already started testing the advanced technology.

5G will become the underlying fabric of an entire ecosystem of fully connected intelligent sensors and devices, capable of overhauling economic and business policies, further blurring geographical and cultural borders

Telenor Group has announced that it will soon finalize its 5G vendor whereas, in Pakistan Telenor has already marked the first deployment of the AirScale Base Station Controller (BSC) and AirScale Radio Network Controller (RNC) on AirFrame cloud infrastructure in Pakistan, and the first cloud-based BSC deployment in the Middle East and Africa region.

While Zong has also launched LTE FDD MIMO sites with 32T32R technology used on the existing spectrum to improve the user-perceived rate from 3.8 Mbit/s to 13.6 Mbit/s. The government should also take supportive steps to facilitate the industry as the commercial operation of 5G technology will bring a boom to the IT sector.

Unlike its predecessors, 5G will bring a major technological paradigm shift. It will not be just a network upgrade rather 5G will become the underlying fabric of an entire ecosystem of fully connected intelligent sensors and devices, capable of overhauling economic and business policies, and further blurring geographical and cultural borders. It will affect all the industries particularly automotive, health care and the Internet of Things. With the arrival of 5G, we will experience dramatic transformations in our daily lives.

TECH TWISTS

01



The Strange Wi-Fi Devices

Some of the strangest Wi-Fi connected devices now include Walking Sticks, Umbrellas, Shirts, Water Bottles, Tails (for festival goers) and Cutlery.

02



The Garage Business

Hewlett Packard was started at a garage. Do you know which other companies share these roots? Microsoft, Apple and Google all began from a couple of motivated guys in one garage.

03



Want to Block Zuckerberg on Facebook? Think again.

On Facebook, You can block anyone but you can't block Mark Zuckerberg (The founder of Facebook).

04



GPS Navigator is not new guys

GPS navigators in cars may seem like a new achievement of technology. It was named ETAL Navigator and worked by using a computer with a pre-installed dead reckoning program for navigation purposes.

05



How old is Wireless internet?

It may seem like only yesterday we were all dialing in for our connection, but wireless internet was actually founded in September 1990! Wi-Fi is only a few years away from its 30th birthday – feeling old yet?!

Impact of Entertainment Applications on our Youth



Technology has enabled people to stay connected with others, irrespective of the distance. The communication barriers between people have been removed to a greater extent with the introduction of various innovations including smartphones and social media. The revolution accomplished by technology is phenomenal. It has literally breathed life into the word 'convenience' by enabling it seep into our lives through various inventions. This can be seen through the various platforms that the technology has provided to people so that they are better able to connect and stay in touch.

The communication barriers between people have been removed to a greater extent with the introduction of various innovations including smartphones and social media

As the wings of technology are spreading in Pakistan, the country seems to go through a revolution as

well. This technological revolution has unlocked the world of social media to the larger Pakistani market. With the ever rising technology, mobile, computers and tablets are easily available to the Youth. The Internet has made it easier for youth to reach entertainment applications which are not only source of information for them but have also become an addiction.

The concerns over Impact of entertainment applications on youth are not new and many researches have also been conducted that establish the effects of social media on our youth

The concerns over Impact of entertainment applications on youth are not new and many researches have also been conducted that establish the effects of social media on our youth. There are many entertainment applications widely used by people all over the world. Some of these applications are Facebook, Twitter, Instagram, YouTube, Snapchat and Games, etc. Attention has thus been

shifted from real to the virtual world and from visible to invisible friends.

Attention has been shifted from real to the virtual world and from visible to invisible friends

Definitely, entertainment applications have both negative and positive impacts on our youth. When it comes to positive impacts, Today's youth is better-informed than before as they are aware of the events happening around the globe due to the social media sites that help them stay connected with their friends. Such entertainment applications also bridge the gaps between people and keep them connected.

Today's youth is better-informed than before as they are aware of the events happening around the globe due to the social media sites that help them stay connected with their friends

Many people make pages and groups on social media regarding studies or any other thing, through which they can easily interact. Every so often such groups also lead to employment opportunities for unemployed youth. However, there are also hosts of online dangers that kids can get involved with if they are careless — not to mention the number of embarrassing decisions teens tend to make online that they regret later in life.



It has now become a routine practice for youth to keep on holding their mobile devices in their hands without caring whether they are with some relative, or at some guests at home. Youth preoccupied with their devices results in inability to prioritize what's more important in life.

One cannot negate the fact that such applications reduce the face to face interactions amongst youth as they spend most of their time on these platforms

Though entertainment applications are fun and they are said to connect people and let them stay up to date, but they also lead to physical isolation. One cannot negate the fact that such applications reduce the face to face interactions amongst youth as they spend most of their time on these platforms. Physical isolation can cause emotional, mental and psychological issues in youth. Such issues can lead to depression, anxiety and sometimes the conditions even worse.

Using too many social media sites also leads to misspelling and misuse of words and tenses through the use of short forms and abbreviations. Due to this, youth gets poor grades in languages. Sometimes such applications exposes teens to sexuality and pornography which results in unacceptable behavior.

Sometimes such applications also lead to spread of misinformation and shaming people on the basis of their views, religion or different political party affiliation. This in turn leads to fights and enmity between the concerned parties.

There are many entertainment applications trending but ticktok , Musically and Dubsmash are new kind of apps that are getting popular these days

There are many entertainment applications trending but ticktok , Musically and Dubsmash are new kind of apps that are getting popular these days. These applications allow people to make their voice-over videos and expose them to “caustic comments and other potential abuse.”

Teenagers who probably are not well-aware of the social media menace and social set-up sometimes post videos and pictures that are obscene and unacceptable and later on get in to serious trouble like blackmailing or cyber-bulling

There are also some media reports about users getting disturbing comments, such as asked for private contact information or provocative images. Above all, these applications are impairing the moral values of our young generation. Teenagers who probably are not well-aware of the social media menace and social set-up sometimes post videos and pictures that are obscene and unacceptable and later on get in to serious trouble like blackmailing or cyber-bulling.

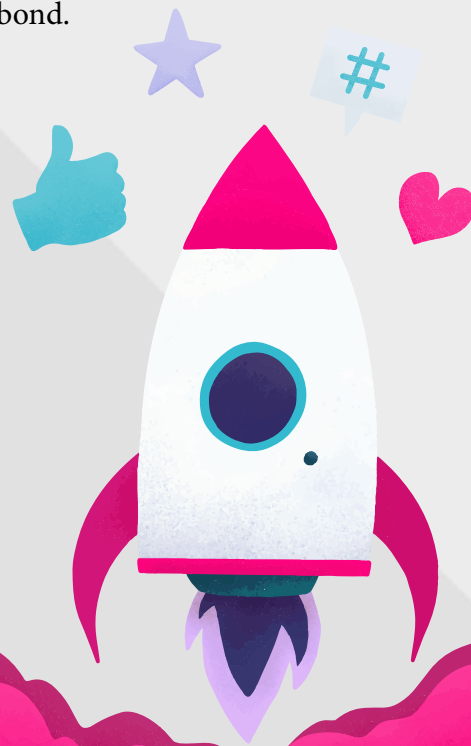
Besides, such apps have no beneficial impact on youth as they are used just for fun. They only waste time, and that's it. So one should refrain from over using such apps as time is money and



Tik Tok

they do not lead to any positive thing. These apps have raised concerns among parents regarding their kids and their time. According to some researches these apps acquire your personal data, location, contacts and your messages as well. Another troubling thing about these apps is that they have two privacy setting, either private or completely public. There is no middle ground like other social media platforms that allow you to share only with your friends.

Many concerned parents are using number of ways to monitor their children's activities on social media. There are many child protection applications now available on the app stores. But instead of spying on kids its far better to educate them in a friendly manner about the drawbacks of such applications. It will not only give them confidence but will also result in stronger parent-child bond.



How to Save a Wet Phone



Switch it Off

01

If it's on, turn it off immediately

Don't Move it

02

Don't shake it...that forces water in to unaffected areas

Dry it Off

03

Dry the outside as best as you can and take it apart...remove any cases outer shell, SIM cards, and the battery.

Bury it in Rice

04

Fill a small bag with rice and bury it in.

Don'ts

- Put it in a microwave
- Use a hairdryer
- Place on a Heater





ROLE OF TELECOM SECTOR IN PAKISTAN'S DIGITIZATION

By Laiba Mohsin

The Smart telecommunications have played a significant role in the digitization wave and have drastically changed our lives. In addition to that, the Internet has incontestably made the world a 'Global Village.' Like all the emerging countries, Pakistan is also at the cusp of digitization. The Telecom Sector of Pakistan is playing an important role in Pakistan's Digitization drive. Moreover, Pakistan's government, education system, health care, businesses, transportation, and socialization all rely immensely on the telecommunication sector for their smooth functioning nowadays.

Pakistan's government, education system, health care, businesses, transportation, and socialization all rely immensely on the telecommunication sector for their smooth functioning nowadays

Pakistan Telecommunication Company Limited (PTCL) was a major player providing all core telecom infrastructure services including

international data and voice services. After that, some of the foreign titans entered Pakistan's Market making it possible for the consumers to no longer wait for months to get a telephone line. Mobilink came in 1994, Telenor in 2004, Warid in 2005 and Zong in 2007. In order to promote telecom industry, 3G licenses were awarded to Jazz, Telenor, Ufone, and Zong in 2014. On the other hand, Zong was also given the license of the 4G service. Later on, in 2016, Telenor received the 4G license and after that Jazz was also awarded the same license in 2017.

As a result of this, the number of subscriptions increased dramatically, playing a significant role in digitization drive. We all know that the Internet helps in business creation and improvements in the ways we work, live, entertain ourselves and connect to the people all over the world. So, all the telecom companies that are providing internet facilities are directly and indirectly helping Pakistan in its digitization drive.

In 2018, Pakistan had 153 million cellular subscriptions, up from 250,000 in 2004, and 61 million 3G/4G data subscriptions as well. Telecom industry has seen a radical increase during the last four years. All the Telecom companies in Pakistan are now at the forefront of pushing the country into the digital century.

The latest reports by the GSMA and the World Bank have estimated that a 1% increase in mobile phone subscriptions boosts GDP growth by 0.28 percentage points. The good part is that the digital economy is offering Pakistan a model for inclusive and sustainable growth by creating jobs for women, unskilled, home-based workers and those in far-flung areas.

The latest reports by the GSMA and the World Bank have estimated that a 1% increase in mobile phone subscriptions boosts GDP growth by 0.28 percentage

There are many insights by Jazz that have been helping in the digital transformation. Jazz Cash Mobile account allows you to pay all your utility bills from your sofa. In addition to that, it also allows you to purchase railway tickets as well. Jazz has also partnered with Careem to manage employee transportation and make the workforce more agile.

Furthermore, they launched the National Incubation Center in Islamabad in collaboration with the Ministry of Information Technology and Telecom (MoIT) to bring entrepreneurs, investors, and innovators together so great ideas can be developed. Jazz has also done some commendable work in m-health as well. Its Healthpass application helps to improve health expenditure management.

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It also allows all its consumers to find quality healthcare services nearby paying JazzCash. It is also available at all branches of the renowned Islamabad Diagnostic Center and will soon be expanded to multiple cities through hundreds of health providers such as hospitals, labs, and pharmacies with even more discounts.

Furthermore, Telenor is the first operator to pioneer branchless banking for the 85 percent unbanked and under-banked population of the country with

Easypaisa. Easypaisa online payment has accelerated the country's e-commerce sector by eliminating barriers in its progress. Likewise, Zong has also been quite active in introducing various mobile services to facilitate its users. Currently, Zong provides the largest 4G coverage in the country offering a wide array of services with superfast broadband connectivity.

Easypaisa online payment has accelerated the country's e-commerce sector by eliminating barriers in its progress



In addition to that, the Ministry of Information Technology and Telecommunications (MoIT) formulated Digital Pakistan Policy to rapidly transform the IT and related sectors of Pakistan's economy. The basic objective of this policy was to take into account the increasingly transformed role of Information Technology (IT) across all sectors of socio-economic development, and a holistic knowledge-based economy. The policy also provided opportunities for local entrepreneurs and firms to acquire core competencies, experience, and credibility to compete at international level. Furthermore, the Ministry of IT and PTA prompted the digital ecosystem in Pakistan with the active involvement of all stakeholders.

The frequent sustainable development, accelerated digital projects, research and innovations, Software Technology Parks, subsidized bandwidth, international marketing, international certifications, internships, and training have played an important role in Pakistan's digitization drive

The frequent sustainable development, accelerated digital projects, research and innovations, Software Technology Parks, subsidized bandwidth, international marketing, international certifications, internships, and training have played an important role in Pakistan's digitization drive. In addition to that, there are a lot of incentives that are playing a significant role in Pakistan's digitization. Those incentives include 100% equity ownership, 100% repatriation of profit, tax exemption on IT and IT Enabled Services (ITeS) export revenues, tax exemptions to startups. These are some of the areas that have been focused on accelerating digital drive in Pakistan.

With the world becoming smaller with billions of smart devices and connectivity becoming a way of life, telecoms of the future will have to consistently keep innovating and rebuilding their strategies

A comparison of our lifestyles over the past 50 years is a testament to the rapid pace of technology. We've entered the digital era in Pakistan with a lot of developments happening right before our eyes and many more yet to come. Telecom companies of Pakistan have played an important role in bringing us to this point. Telecoms

all over the world are getting ready to realize the revolutionary vision digital transformation has projected. With the world becoming smaller with billions of smart devices and connectivity becoming a way of life, telecoms of the future will have to consistently keep innovating and rebuilding their strategies.

Now, the new government is also working to bring some improvements and changes in the digital policy so that Pakistan can be transformed into a knowledge economy. Their aim is to make IT the top contributor to Pakistan's exports and job creation. So, let's see what will be the new strategies of government to help the Telecom Sector in this digitization drive.



Reid Hoffman The Uber Investor of Silicon Valley

Hoffman has been called “the most connected man in Silicon Valley,” the “über-investor” who “has had a hand in creating nearly every lucrative social media start-up.” As an entrepreneur, executive and an investor, he has played an integral part in building LinkedIn, PayPal, Facebook and many others.

Reid Hoffman has been involved with several of the world's most prominent tech firms.

Hoffman started his career in 1994 as a product manager at Apple and later served on the board and as executive vice president for PayPal. In 2003, he cofounded LinkedIn, the professional-networking service that has more than 400 million members in over 200 countries and is worth \$32 billion.



Hoffman was born on 5th August, 1967 in Stanford, California. He studied at The Putney School and then went on to Stanford University where he received his degree of B.S in Cognitive Science and Symbolic Systems in 1990. He did his master's in philosophy from Oxford University in 1993. Reid Hoffman wanted to do something big; something that would positively affect the world. He realized that although his educational background would no doubt be very useful for him the main factor would be a career as an entrepreneur. So he started in 1994 by joining Apple Computer where he made his first attempts to make a social network. He worked on eWorld which was acquired by AOL in 1996. He took a job at Fujitsu for a while before co-founding his first company called SocialNet.com. It was mainly an internet dating website but back then it was an idea before its time. During this time, Hoffman was also a member of the board of directors at PayPal. He left SocialNet.com in 2000 and began working fulltime at PayPal as a COO. By 2002, he had become the vice president of the company.

After PayPal was sold to eBay, Hoffman became very successful and one of the most creative angel investors of the Silicon Valley. Known as ‘Silicon Valley’s uber-investor’, Reid Hoffman has invested in many ventures such as Zynga, Wikia, SixApart, Permuta, Flickr, Ping.fm, Care.com, Kongregate, Tagged, IronPort, OneKingsLane, Edmodo, shopkick, Vendio, Digg, Nanosolar, Knewton, Technetto, Wrapp and OneKingsLane. He is said to have sat on almost every seat on the table in the Silicon Valley. He was a junior product manager at Apple and Fujitsu, an executive at PayPal, an institutional investor, angel investor, board member of public and private companies and finally the founder and chief executive officer of LinkedIn. He has shared his insights on the new world of work in his book *The Start-Up of You: Adapt to the Future, Invest in Yourself, and Transform Your Career*.

Realme 2 Pro Worthy of a PRO Tag...!!!

Display

Realme 2 Pro is a 6.3 inch device and it has an IPC LCD capacitive touchscreen that supports 16M colors. The screen is protected with Corning Gorilla Glass 3 and its display supports 1080 x 2340 pixels resolution and pixel density of 480 dpi. The colors and icons are super clear plus the sharpness, contrast, and brightness is also great.

It has a Graphic card of Adreno 512 that works perfectly for 3D games and multitasking.

Design

Realme 2 Pro is a beautiful mobile with a top-notch display similar to some Vivo devices. It has a curved screen and a black bezel layer around the front body whereas; the functional keys are under the screen.

The back body of Realme 2 Pro has dual rear camera lens furthermore, the camera lenses are layered in a horizontal shape. It has an LED camera flashlight while the fingerprint sensor is also present on the back side.

Camera

The Realme 2 Pro has an awesome combination of camera lenses; it has a dual rear camera lens of 16MP & 2MP. The front camera has a 16MP selfie camera and it can make videos in full 1080p resolutions. Main features are Geo-tagging, Phase detection, HDR, Panorama, Video (2160p@30fps, 1080p@30fps).

The interface of the camera is very easy to use; at the top left side it gives us the Menu option. The menu includes options of photo, panorama, live bokeh, manual and settings. Other options are available on the main camera screen including emojis, flashlight, portrait mode, self-timer, HDR, and camera swap. We can change the ratio of camera screen by just swapping the finger towards the left side.

PKR.46,999/-

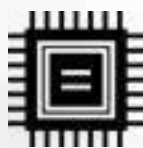


Its emoji feature is similar to Snapchat plus it has also the same feature as Apple's Animoji. The camera results are very cool and Realme has done an amazing job in this model. The bokeh effect is so cool and gives professional results. We can edit the image according to our own preferences. The selfie camera is also mind-blowing and it fulfills all camera needs at a very affordable price range. Low light camera results are also great, just felt little dullness in images else all are good.

Battery & Storage

The Realme 2 Pro is a 4G compatible phone. This device is a massive upgrade in a whole bunch of different ways. It has a Snapdragon 660 AIE SoC, which is a huge step up from the Snapdragon 450 we saw last time. It comes with up to 8GB of RAM, and 128GB of storage. It's running Android 8.1 with ColorOS 5.2 on top.

Realme 2 Pro is packed with a fixed Li-ion Battery of 3500 mAh, a suitable battery for a mid-range phone. It gives 12-13 hours of standby usage.



128GB Built-in, 8GB RAM



(Li-ion Non removable), 3500 mAh



6.3 inch



Dual 16MP +2MP, front 16MP



Rs.46,999/-

Verdict

The Realme 2 Pro delivers well on its promise of being a powerful phone. We think that many people will see its appeal too, especially at this price for the version with 8GB of RAM and 128GB of storage.

PROS

1. Plenty of storage and RAM
2. Bright and lively display
3. Face recognition is quick

CONS

1. Laminated back scuffs easily
2. Average low-light camera performance

Smart Moves for smarter Nation

Pakistan Post's mobile application

The mobile application launched by Pakistan Post provides services like complaint handling, track and trace, e-commerce, delivery, parcel collect, complaints, tariff, post office locations, postcodes and all relevant information about postal services.

The basic idea of this application is to upgrade the services of Pakistan Post as well as to keep the customers of Pakistan Post informed in order to meet their rising expectations in accordance with challenges of the digital world of today.



NHA launches mobile app to facilitate commuters

National Highways Authority has launched its mobile application for facilitating commuters of the country's highway. This application is for Android users at the initial stage.

The users and commuters of the NHA can get details of Toll Plaza and Toll Tax, Road Safety Guidelines, Information related to motorway police, project details of NHA and NHA interactive map related to motorways, highways and CPEC.

Learning is now fun with PITB's eLearn App

Keeping up with its tradition of revolutionizing different sectors of the province, Punjab Information Technology Board (PITB) has launched an e-learning application to assist millions of students from grades 6 to 12.

The eLearn App, available on the android play store, is an official repository of digitized textbooks of Punjab and has been developed in collaboration with the Punjab Curriculum & Textbook Board and the School Education Department (SED). Through the app, you can access 28 Science and Mathematics textbooks for grades 6 to 12, which have been augmented with 13,047 video lectures, 592 simulations, 2,100 audio minutes and 1,830 animations.

The service is also available as a web app to cater to the needs of the public at large while an iPhone version is under development as well.



Telenor Pakistan Adds Three New 4G Handsets to Device Portfolio

Telenor Pakistan Extends its Device Portfolio with 3 New "Infinity" 4G Handsets

As part of its objective of creating a digital ecosystem in Pakistan, Telenor Pakistan has introduced three new and affordable mobile handsets to its 4G devices portfolio under the brand name of Infinity.

As the foremost digital services provider in the country Telenor Pakistan has built a strong devices portfolio which includes handsets, mifi/wifi dongles & wearables (IoT). These have helped the company beef up the internet ecosystem and facilitate 4G uptake within the country. With more than 13 million mobile broadband subscribers nationwide, Telenor Pakistan continues to maintain its growth in terms of data subscribers. The new addition to the company's diverse device portfolio, which comprises of a range of affordable 4G-enabled smartphones and high-end smartphones, will help Telenor Pakistan reach out to a larger customer base thus making mobile internet accessible to the masses.



Telenor has once again emerged as an industry leader in terms of giving their customers value for their money. Currently, Telenor Pakistan is offering the best deal in the market.

Speaking on the occasion, Bilal Kazmi, Chief Marketing Officer at Telenor Pakistan, said:

“Ever since we began operations within Pakistan, we have continuously made an effort to empower society and have thus taken palpable measures to achieve our goal of ensuring greater digital inclusion. While we expand our network outreach and connect the unconnected, we make sure to develop the tools necessary for our customers to get the best of our services. That is the reason why we have maintained our own devices portfolio which is updated regularly so that more and more people are able to leverage the power of 4G.”

Telenor Pakistan customers will be able to benefit from a special offer with the purchase of the new handsets. The customer offer includes a free Easycard worth Rs.350 which will allow the customer to enjoy 500MB of free internet, 500 free SMS to all networks, 500 free on-net minutes and 50 free off-net minutes for one month. All handsets come with a 12-month long Telenor warranty. Business Partner Yellowstone will be the sole distributor of the new handset series and will ensure that the handsets are made available across the country via conventional mobile retailers. Infinity A4 will also be exclusively launched through Daraz.pk.



UNIDO has selected Ignite as the top government organization in the world for its policy & initiatives for the 4th industrial revolution

Mr. Yusuf Hussain-CEO Ignite

Recently, we conducted an interview with the CEO Ignite, Mr. Yusuf Hussain. He is a Tech Entrepreneur, angel investor, and tech enthusiast with international experience. He is associated with Ignite, The National Technology Fund for last two and a half years now and played a very significant role in promoting innovation and commercialization of research in the country. In a quick session with him he shed light on Ignite's contribution in the development and promotion of ICT and the regulatory changes required to keep up with technological advancements.

1 First, tell us what is the difference between entrepreneurship, startups and innovations?

Innovation is the transformation of ideas and inventions into products and services that impacts society. For example, if a light bulb is invented and there are no electricity transmission lines then the light bulb is an invention not an innovation which benefits the society. Entrepreneurship or the Entrepreneurs are the new businesses. That new business can be a restaurant, it can be an IT Firm, it can be a gym or it can be a technology innovative company which brings a new business model or a new technology model. If it's a latter, we call it a startup.

2 Tell us about your Entrepreneurial Journey?

So, my entrepreneurial journey started a long time ago. I was a cofounder of a company In America called Press Soft that used to do E-commerce, Business to Business.

Innovation is the transformation of ideas and inventions into products and services that impacts society

We had fortune 500 Global 2000 clients like Time Warner, Philips, Schlumberger and British petroleum and so on. Moreover, I've been associated with other

startups like Premier Unconventional Hydro carbons exploration and production Software Company, one of the best in the world. Also, I managed a Silicon Valley's incubator through which we trained and groomed many firms. I was heading TIE Angel fund and we did some investments so it was a great experience.

3 What have been the Major Obstacles in your career and how did you overcome them?

The main thing is your attitude. I think it's very important to have focus, passion and perseverance because if there is no passion or interest, you don't put in your best and end up in a complete failure. Setting up a great company without passion and ambition is not possible and I believe my biggest strength has been my ambitious, determination and risk taking nature. Whatever hurdles came my way, I have dealt them upfront.

I think it's very important to have focus, passion and perseverance because if there is no passion or interest, you don't put in your best and end up in a complete failure

4 What has been Ignite's Contribution in the development and promotion of ICT in the country?

If you talk about Ignite, our focus has always been on innovation. There are two major initiatives we want to undertake, one is E-government, not in sense of digitization of government and services but a well-thought out architecture which we feel is 100% better than all the other government initiatives and return on investment. It will be very simple to use and centralized architecture just like India is working on India Stack and and UK government is pursuing UK.gov.

There are two major initiatives we want to undertake, one is E-government

So we have developed a plan and put forward for criticism from experts around the world. This is our going-forward strategy for IT industry. The other one is digiskills.pk initiative through which we are training people about the digital skills at very fast pace; we have published some figures too which has left people astonished about the success of the programme. We are also planning to hold an event in which we will tell people about the structure and revenue projections. Learning

from Digiskills, we felt there should be a similar online platform like codiskills.pk to train 100,000 programmers which has a classroom component as well. We believe that finest urdu content is necessary as it is the national language.

The other one is digiskills.pk initiative through which we are training people about the digital skills

Other than that, we use artificial intelligence, predictive analysis to match right content with the right people.

5 How successful Ignite has been in promoting entrepreneurial culture in Pakistan?

As I have already said, **DigiSkills.pk** is our own startup that has been doing very well. Our second program is of National incubation centers. We have established five of them; I am very happy that the team worked so hard. People used to say that it will take at least about 5-6 years. However, we delivered in only a year and 3 month and have already making revenues. We already have some success stories like Pak Whittay that



has made a nano tech filter with the help of which you can filter and purify gutter water, it is quite cheap that anyone can afford. There are almost 10 Crore People in our country who suffer from different diseases caused by drinking unclean water. It has raised an investment of about 22 Million Dollars and will provide clean drinking water to almost 1 Crore people by the end of this year which is a huge achievement and we have many other similar success stories as well.

Pak Whittay that has made a nano tech filter with the help of which you can filter and purify gutter water, it is quite cheap that anyone can afford

Another thing that we do is seed funding. We provide funding of about 1.5 to 2 lacs to the technology startups of 4th industrial revolution that have the potential to bring the next way to innovation. Facebook, Google are now a bygone what comes next is the artificial intelligence, Robotics, the internet of things, the block chains.

We have made success in these technologies as well for example, there is a startup named Electrocure in Peshawar that uses Artificial Intelligence and Internet of Things to control line losses and power theft. They have controlled almost 90% losses in Peshawar MES in the past 1.5 years which makes almost 1.8 billion dollars. A Chinese company offered to make an investment of 46 million dollars but the Finance Minister, Dr Asad Umar said that the government will invest in it as its investment return would be very good.

Similarly, Malik Jihan from Mianwali has developed an Urdu App in which any kind of diseases or problem related to the cattle is entered that uses artificial intelligence to diagnose the problem and then suggest remedies accordingly. So these are just some of the examples of our entrepreneurial contribution.

6 What Is the Business Model of Ignite?

We are owned by the government but are funded by the telecom operators like Telenor, Jazz and the Internet Service Providers like Nayatel and Worldcall. Our board is public private board having people from the Government as well as private sector who have equally important role in selection of startups for training.

7 What are the selection criteria of the new startups? What are the incubators, seed funds and why are they important?

First of all I would like to answer that why are incubators important. Incubators are important in experiments and creating new startups. As I already told you that startups have been the vehicle of innovations for the past 30 years and the world's 5 most valuable companies were initially startups. However, now we can't wait for 70 years to reap the



fruits so how can we accelerate this process? For that purpose, incubators are established where startups are being counseled, groomed and trained to become great companies.

Incubators are established where startups are being counseled, groomed and trained to become great companies

However, 90% of incubators had been shut all over the world now. So, we have studied all of this in great detail to highlight the factors of success and failure and to work out our own system. We have the top class mentors and trainers who guide the startups about their goals and how to achieve them, while focusing on every aspect of the business including finances, marketing, idea development, target market etc.

Each incubator has its own criteria of selection but typically, we evaluate the startups on the basis of the future prospects of the startup idea, the character of the founder, the customer traction of the business if any, and the business model.

For seed funding, our focus is on 4th generation industrial revolution; we try to analyze that weather this team can develop a certain product at this much cost in this much time and secondly, if that particular product is developed who will buy it? You will be quite happy to know that UN's industrial development organization UNIDO has selected Ignite as the top government organization in the world for its policy, strategy and initiatives for the fourth industrial revolution.

8 Are you satisfied with current technology revolution in the country? In your opinion what government and private sectors can do to speed up the process?

I think ease of doing Business is the most important factor in the process. In the past, we were at number 60 in the world and now we are at number 130, 140 in the index. It includes approvals, imports, customs, taxation system that is really hurting the companies especially the smaller ones that don't have the resources like lawyers, accountants etc to deal with the government agencies.

Secondly, our Tariff and Import Duty structure has also been quite disparaging where higher duty was charged on components as compared to the finished products which is quite opposite to what is actually required. If you want to promote local manufacturing in the country

you will have to change this approach and make the raw material and components cheaper by bringing down the duties.

Thirdly, clustering is also very important so that likeminded people and businesses could grow together. In this regard, IT Parks and Tech Parks can be highly beneficial and special economic zones are a great opportunity for this.

our Tariff and Import Duty structure has also been quite disparaging where higher duty was charged on components as compared to the finished products which is quite opposite to what is actually required

9 What do you think are the top tech trends for the next five years?

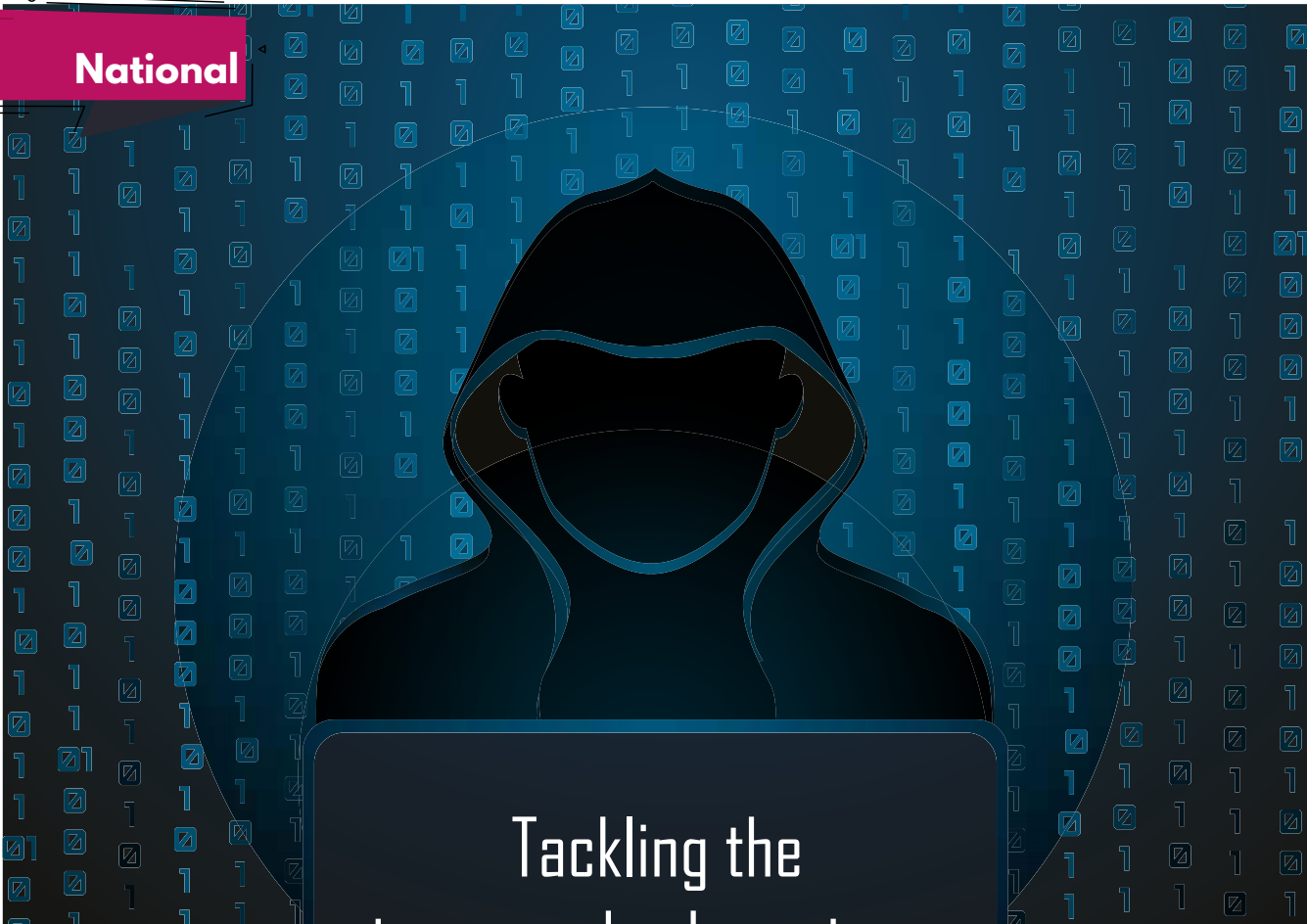
Industrial Robots, Artificial intelligence, block chain, Internet of thing, Augmented Reality and Virtual Reality etc are some of the trends that will change the world completely. We are also doing a number of projects on all these new technologies so I am quite hopeful that in next couple of years Pakistan will be at the forefront of technology revolution.

10 What regulatory changes we require to keep up with technological advancements? What suggestions would you give to the government?

I would like to reaffirm rather than suggest because the government is already well-aware about the importance of Ease of Doing Business. At the same time, we need to work on our tariff and taxation system as well in order to promote the local manufacturing industry. I think these two things can create a lot of impact.

11 What advice would you like to give to somebody who wants to become an entrepreneur?

Self Knowledge is very important aspect of life whether it's in personal or professional relationship. Whatever is your calling, just dive in with passion and perseverance, be bold enough to take risks.



Tackling the increased cybercrimes in the modern financial age

By Onsa Mustafa

With modernization in technology, cybercrime has also reached an all-time high. There is not a single organization that hasn't suffered a security breach in fact; PwC's Global Economic Crime Survey 2018 reported 49% of organizations have been hit with cybercrime in the last two years. However, some organizations are more prone to attacks than others like banking sector.

There are several threats the banking system and their customers face today. However, one of the biggest threats and also one of the hardest one to detect is data breach on the banks. The employees, contractors and partners are already inside the banks' secure perimeters and have appropriate access to its sensitive data and IT systems. When these insiders misuse their privileged access or are compromised by external attackers, the valuable data is easily exposed. Technology is evolving day by

day, giving banks more authority to expand online and mobile access, it is also exposing them to more cyber threats. Criminals can send phishing emails or set up fake websites that victim consumers engage with, giving away sensitive financial data. They also influence information from social media sites to socially engineer their way into accounts via customer service.

Technology is evolving day by day, giving banks more authority to expand online and mobile access, it is also exposing them to more cyber threats

We have seen several high-profile breaches against major financial service institutions in the last year, and the volume and complexity of the attacks are on the rise. In October 2018, Bank Islami has reportedly come under what seems to be one of the biggest cyber-attacks in the country's history.

Bank Islami claimed that Rs2.6 million (approximately \$19,500) withdrawn from the bank accounts, using its cards, have been credited from the accounts of customers. The hackers used the dark web to sell the data of Bank Islami account holders for \$60-70 per account. In November 2018, some Major Pakistani banks have also faced a major data breach. According to the FIA, the ATM fraud scam has targeted hundreds of account holders and in Khyber Pakhtunkhwa only more than 200 people lost millions of rupees from their accounts.

In October 2018, Bank Islami has reportedly come under what seems to be one of the biggest cyber-attacks in the country's history

In the wake of cyber-attacks, State Bank of Pakistan has issued the regulation of Security of Digital Payments in order to safeguard banks. SBP has made it compulsory for all the Banks/MFBs to immediately carry out extensive vulnerability assessment and penetration testing to identify potential weaknesses in their Alternate Delivery Channels (ADCs) and payment systems including Card Systems, Internet/mobile banking and agent-based/Branchless Banking etc. The assessment reports along with action plans and timelines to address the vulnerabilities shall be submitted to the Payment Systems Department (PSD).

The hackers used the dark web to sell the data of Bank Islami account holders for \$60-70 per account

Moreover, from January 01, 2019, SBP also regulated all the banks/ MFBs to send free of cost transaction alerts to their customers through both SMS and email for all international and domestic digital transactions. Such transaction alerts are generated and relayed to customers immediately after the execution of a transaction. For this purpose, registered mobile phone numbers and valid email addresses of all customers were obtained,

verified and updated in the bank/MFB's database well before the deadline. But these regulations are not enough to tackle the increasing rate of cyber-attacks. Making any system 100% secure is not possible. However, there are many security measures to minimize this threat.



According to the FIA, the ATM fraud scam has targeted hundreds of account holders and in Khyber Pakhtunkhwa where more than 200 people lost millions of rupees from their accounts



- The first ever Cyber Crime bill that was passed on August 11, 2016 is controversial in its terms. According to the law, there is 7 years of imprisonment sentence to those planning, recruiting or funding terrorism or propaganda online against the state. But the sections of the Bill does not provide any provisions to protect the privacy and sensitive data of the individuals. So, the government needs to clarify and elaborate its cyber-laws so that decisions could be made properly.

SBP has made it compulsory for all the Banks/ MFBs to immediately carry out extensive vulnerability assessment and penetration testing to identify potential weaknesses in their Alternate Delivery Channels (ADCs) and payment systems including Card Systems, Internet/mobile banking and agent-based/ Branchless Banking etc

- Improving bank security requires industry collaboration. As more banks rely on detection solutions, it will be important for them to share the insights they learn during the nearly constant stream of hacks they face daily.

Creating awareness among employees and customers alike is particularly important because there have been many cases where an account got hacked by a malicious program after someone clicked an attachment from an unknown source

- All security measures including card operations should continuously be updated to meet any challenges in the future.

Artificial Intelligence and Machine Learning give today's financial institutions an extraordinary advantage in the fight against fraud

- Banks should share that information publicly, most banks do not prefer to reveal breaches to the public out of fear of damaging their reputation and customer loyalty, but without open communication banks are unable to do security analysis and hence, failing in prevention of future hacks. The banking organizations should bring these incidents to light so that people could also learn the dynamics of cyber-attacks and

prepare themselves for future.

- All customers must be made aware of the dangers of opening or downloading email attachments from unknown sources. Creating awareness among employee and customers alike is particularly important because there have been many cases where an account got hacked by a malicious program after someone clicked an attachment from an unknown source. Also, they should not share their sensitive data with others.

- Artificial Intelligence and Machine Learning give today's financial institutions an extraordinary advantage in the fight against fraud.

SBP also regulated all the banks/ MFBs to send free of cost transaction alerts to their customers through both SMS and email for all international and domestic digital transactions

The reality is that most hackers collaborate, so banks should do too. Cyber security is no more a run-of-the-mill area. Some banks have started to unite behind closed doors, but the financial industry needs to create a knowledge-sharing standard. Cyber security is a massive issue that requires a strategic re-think by taking it out of I.T. silo and treating it as separate risk equal to credit, compliance and counterparty. Such approach is crucial to secure the banking system in digital age.



Vivo Launches the Affordable Y91C with Halo Display & Bigger Battery

The budget-friendly smartphone Vivo Y91C is now available across Pakistan, after a hot pre-order period. This new device from Vivo borrows the same design elements from its sibling Y91 but comes with a lower price tag — aiming at the entry level segment for an attractive price of **Rs. 18,999**.

A trendy 6.22-inch Halo FullView™ Display gives Y91C a further enhanced viewing experience with a screen-to-body ratio of 88.6%, even higher than its predecessor, by redesigning the notch. In addition to a smart design, smart hand gesture controls make using this large display effortless.



In terms of design layout, Y91C adopts a stylish back-cover gloss painting process, intricately blending colors to invoke a breath-taking visual effect. The 3D curves fit your palm perfectly, for an experience that's truly irresistible. The phone is available in three striking colours, namely Fusion Black, Ocean Blue and Sunset Red.

This new device is fitted with a high-performance octa-core SoC, 2GB of RAM and 32 Internal storage; giving you ample freedom to store more photos and files without the need to frequently declutter. Y91C also offers you the option to expand up to 256GB so that you can save whatever you want.

Y91C adopts AI photo algorithms for its camera to automatically deliver facial enhancements, saving you the trouble of manually adjusting beautification levels. Achieving professional shots has never been so easy.

To power the internals there is a 4030mAh high-capacity battery which works with an exclusive smart power management system, allowing for long-lasting endurance — so worrying about running out of juice is a thing of the past.

Y91C runs on Funtouch OS 4.5 based upon Android which results in faster processing speeds while consuming less power, allowing you to open apps faster, switch between them seamlessly, and enjoy a smoother user experience.

Honor 8C

The Incredible Battery Smartphone

Design:

The Honor 8C borrows design traits from all the top-end smartphones in the market. It has a dual-tone rear panel and dressed unapologetically in premium plastic. At first glance, we would not fault you for misinterpreting the design for metal or glass as it does appear to look like it's made of costlier materials. The Honor 8C features 86 per cent screen-to-body ratio. Very rarely would you find a large display with minimal bezels at such an affordable price.

Display

Being a midrange handset, you won't find high-res full HD display here like that is seen on the Honor 8X; instead, you get a 6.2-inch IPS LCD HD+ display that boasts a resolution of just 1520 x 720 pixels. While the resolution may be a put off to some, handsets with FHD+ displays assert themselves as a top performer — thanks to the lesser strain on the processor from the graphics and display end.

Performance

Strangely, the Honor 8C doesn't come with its home-grown HiSilicon Kirin SoC; but instead, this is the first handset to come with Qualcomm's all new Snapdragon 632 chipset and a Kryo 250 CPU that boosts performances up to 40 per cent over its predecessor. This chipset has been designed to support advanced photography as well as enhance the overall gaming experience as it takes advantage of its power efficiency. This octa-core CPU has been clocked at 1.8GHz and is paired with an Adreno 506GPU.

The battery on the Honor 8C is rated at 4000mAh and this is one of the strongest points of the device. The handset comes with 4GB of RAM and 64GB of storage. There is also a variant configured at 4GB RAM and 32GB of storage. While using this handset to play casual games, the Honor 8C excelled in every department with no lag or stutter visible. The handset comes with a rear-mounted fingerprint sensor that is more than up to the task. The 8C also comes with facial recognition software for unlocking the phone.

Cameras

On the imaging front, the Honor 8C features a 13-megapixel primary rear camera with an aperture of f/1.8, and a 2-megapixel depth sensor with an aperture of f/2.4. At the front, the Honor 8C has an 8-megapixel fixed-focus camera with an aperture of f/2.0. Both the front and rear cameras feature single-LED flashes. The main USP here is its AI-powered cameras. Honor has added a 13MP + 2MP dual-rear camera setup on the back and this is probably the handset's biggest selling point as it has included AI to capture the best possible photograph based on the current lighting condition.

In theory, this may sound great, but we were a bit disappointed with the camera's performance. While outdoor shots were decent as they pack in a lot of detail, indoor shots appeared to have a lot of noise. In our experience, most images were soft and overexposed.





PROS

- Gradient color design
- Long battery life
- Stable gaming

CONS

- Plastic body
- AI makes little difference in photos

VERDICT

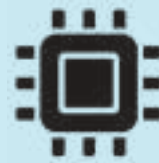
With the Snapdragon 632 chipset, 4 GB of RAM, dual-cam setup at the back, 4,000 mAh battery, and a price tag of Rs 26,900, the Honor 8C stands directly in competition with the some of the great mid-range devices.



Back 13 MP , Front 8MP



Non-removable
Li-Po 4000 mAh battery



4 GB RAM



6.26 inches

Rs. **26,900/-**



TECNO Mobile has a new official distribution Partner; The YELLOSTONE

TECNO Mobile, a leading smartphone brand has appointed Yellowstone as its official distribution Partner in Pakistan. This recent partnership is aimed to create a new dimension of corporate culture to further the marketing strategies of TECNO Mobile. It also serves the purpose of making available for more customers the opportunity to connect with the TECNO Mobile, which has seen an immense expansion since it first launched, by providing them a touch point for sales services.

“TECNO Mobile has always pushed itself to bring about the most enchanting ways of catching the eyes of customers. This time besides focusing on the standards of our devices, we are going to do something new for our customers, i.e., we are going to collaborate with one of the leading distribution companies in Pakistan, Yellowstone.” Stephen Ha, the General Manager of TECNO Mobile Pakistan said while announcing the venture. He further added that we are focused and determined to mold this alliance into a more strong hold that will encompass all the core values and norms of TECNO.



Farid Ullah Jan, the CEO of Yellowstone said that this venture is going to change the way distribution networks work here in Pakistan. “We, at Yellowstone, will make sure to work closely with TECNO Mobile in order to make these fine products available across the country at all available markets for our esteemed customers and also work closely with the trade to have smooth product flow. At the same time exceeding service expectations of our customers and sellers in this highly competitive market. As a partner of TECNO Mobile, we are dedicated to become an exemplary front for the customers of TECNO Mobile”.

This partnership is certainly going to have vital foot prints in the years to come and will add to the market share of both TECNO Mobile and Yellowstone.

Yellowstone is a dynamic and a leading distribution company of Pakistani origin which saw its inception in 2017. With distribution network, service and collection centers all over Pakistan, Yellowstone will be another leading retail front for TECNO Mobile. This mutual collaboration of TECNO Mobile and Yellowstone will give rise to a new meaning to the sales culture and trends in Pakistan.

This recent venture comes as an example that the venues and new dimensions of exploring and establishing corporate footprints are always open. This joint collaboration will increase the opportunities for the customers to connect with TECNO more efficiently, and in a more useful way.

Smart Living

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7. **Smart Lock**
8. **Smart Bulb**
9. **Motion Sensor**

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The Huawei Y7 Prime 2019: a competent budget phone

Design

On the front, the plain all-black bezel and logo positioning is familiar, as is the general shape of the device. This handset isn't made of glass, however, the whole phone is formed of various types and shades of plastic, which probably explains the reason it weighs a relatively light 155g. It's quite a skinny thing, too, at 7.8mm.

The sides of the phone are also formed of a shiny plastic, although seemingly with a slightly different coloration effect than the rear. Returning to the rear of the device, you'll find a fingerprint sensor. All of the phone's essential openings are along the bottom edge, including a 3.5mm headphone jack, a micro-USB connection port (no USB-C here) and a single weedy speaker.

Display

Huawei has made a concerted push to introduce 'FullView' displays across its twin smartphone brands, and the Y7 Prime is no exception. The front of the device is dominated by a long, stretched-out 18:9 display.

At 5.99 inches it's a little disappointing to learn that the resolution is a mere 1440 x 720. That's 720p with extra pixels to account for the increased length. Resolution gripes aside, the Y7 Prime's display is pleasant enough to look at. It's bright enough in most situations, and its colors are reasonably accurate. Huawei lets you fine-tune the warmth of the display in the Settings menu, too, which is always welcome.

Performance

The Huawei Y7 Prime runs on Qualcomm's low-end Snapdragon 430 CPU. It isn't a particularly swift runner by any stretch of the imagination, but the general performance of the Huawei Y7 Prime does benefit from the provision of 3GB of RAM.

Web browsing is a reasonably fluid experience, and flicking between open apps isn't a problem for the Y7 Prime and gaming performance is generally decent. Thankfully, there's ample room for storing such games and other media with 32GB of internal storage, as well as a microSD slot for optional expansion.



Camera

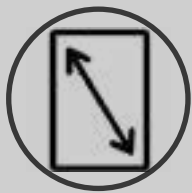
In the Huawei Y7 Prime there is a dual-camera setup. The main camera is a 13-megapixel unit, which is backed up by a 2-megapixel assistant. This latter camera doesn't provide the zoom effect that other manufacturers have gone with. Rather, it provides depth information to the main camera for the Wide Aperture mode.

Just like Apple's Portrait mode, this allows you to create the kind of exaggerated depth-of-field backgrounds previously associated with high-end DSLR cameras. The wide Aperture mode lets you alter the bokeh effect after the picture has been taken. Another ability of the Wide Aperture system is to select a new area of focus of a taken picture simply by tapping.

Around the front you get an 8-megapixel selfie camera, complete with the kind of icky beauty mode effects that make you look inhuman. Deactivate that and it's a pretty regular budget selfie cam – that is, not very good in anything less than ideal lighting.

Battery life

The Huawei Y7 Prime packs a 4000mAh battery, which isn't unusual for a phone of this size. When it's time to recharge you'll have to make do with an old-fashioned micro-USB and a complete lack of any fast-charging standard.



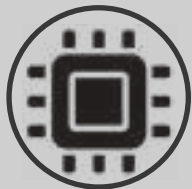
6.26 inches



13 MP , front 16 MP



Non-removable Li-Ion
4000 mAh battery



3 GB RAM +
32 GB ROM



Y7
Prime
2019

PKR. 28,999

Score in detail



The Good

- Large, bright display
- Dual-camera tricks on a budget
- Affordable

The Bad

- EMUI is just unattractive
- Display isn't sharp enough
- Unremarkable in its field

The Bottom-line

The Huawei Y7 Prime is a competent budget phone, with some decent features.

Pakistan's First Online Store With Official Varranty

XIAOMI Mi 9

Memory: 64/128 GB, 6/8 GB RAM
Display: 6.39 inches
Battery: 3300 mAh
Camera: 48 MP , front 20 MP

XIAOMI Mi 8 Pro

Memory: 128 GB, 6/8 GB RAM
Display: 6.21 inches
Battery: 3000 mAh
Camera: 12 MP , front 20 MP

VIVO Y91c

Memory: 32GB Built-in, 2GB RAM
Display: 6.2 Inches
Battery: 4030 mAh
Camera: 13 MP, front 5 MP

INFINIX HOT 7

Memory: 16 GB, 1 GB RAM
Display: 6.2 inches
Battery: 3000 mAh
Camera: 13 MP, front 8 MP

HUAWEI MATE 20 PRO

Memory: 128/2 GB, 6 GB RAM
Display: 6.39 inches
Battery: 4200 mAh
Camera: 40 MP, front 24 MP

HONOR 8C

Memory: 32/64GB , 3GB RAM
Display: 6.3 inches
Battery: 4000 mAh
Camera: 13 MP, front 8 MP

HONOR 10 Lite

Memory: 64GB , 3GB RAM
Display: 6.2 Inches
Battery: 3400 mAh
Camera: 13 MP , front 24 MP

NOKIA 4.2

Memory: 32GB , 3GB RAM
Display: 5.7 Inches
Battery: 3000 mAh
Camera: 13 MP , front 8 MP

REALME 2 Pro

Memory: 128GB , 8GB RAM
Display: 6.3 inches
Battery: 3500 mAh
Camera: 16 MP, front 16 MP



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House#7A, Street 22, F-7/2 Islamabad, Pakistan

GALAXY S10+



Memory: 128/512 GB, 8 GB RAM
Display: 6.4 inches
Battery: 4100 mAh
Camera: 12 MP, front 10 MP

HUAWEI Y9 2019



Memory: 64GB Built-in, 4GB RAM
Display: 6.5 Inches
Battery: 4000 mAh
Camera: 16 MP, front 13 MP

NOKIA 9



Memory: 128 GB, 6 GB RAM
Display: 5.99 inches
Battery: 3320 mAh
Camera: 12 MP, front 20 MP

HONOR 10



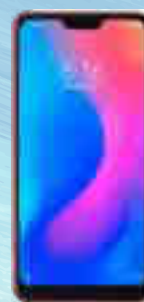
Memory: 64/128 GB, 4/6 GB RAM
Display: 5.84 inches
Battery: 3400 mAh
Camera: 16 MP + 24 MP, front 8 MP

NOKIA 7.1



Memory: 32 GB, 64 GB, 4 GB RAM
Display: 5.84 inches
Battery: 3060 mAh
Camera: 12 MP, front 8 MP

XIAOMI REDMI NOTE 6 Pro



Memory: 64GB Built-in, 4GB RAM
Display: 6.2 Inches
Battery: 4000 mAh
Camera: 12 MP , front 20 MP

Oppo A3s



Memory: 32GB Built-in, 3GB RAM
Display: 6.2 Inches
Battery: 4230 mAh
Camera: 13 MP, front 8 MP

VIVO V15



Memory: 128 GB, 6 GB RAM
Display: 6.53 Inches
Battery: 4000 mAh
Camera: 12 MP , front 32 MP

VIVO V15 Pro



Memory: 128 GB, 6/8 GB RAM
Display: 6.39 inches
Battery: 3700 mAh
Camera: 48 MP , front 32 MP

TELECOM CAMPAIGNS

3

**Honor
8C**



It is a good theme advert but sadly the actors have not done justice to the ad. The start was slightly confusing as a man with no acting sense jumps on the sofa. The Background music is fantastic but yet ruined by bad acting skills. Honor's marketing agency needs to bring new faces to the market but shouldn't compromise on the talent.

Verdict: Koi achay Actors Hire Karo!

5

**Huawei
Y7 Prime**



The TVC of Huawei Y7 Prime clearly shows the hard work of marketing agency behind it. The overall theme, production, music and the way device is presented is substantial. This advert is the best example that how even without actors, the advert can blow your mind. The unique strategies are used to represent the features of the device. Everything is just perfect!

Verdict: Kya Baat Hai!

5

**Daraz
Shopping
League**



Daraz always comes up with unique ideas. Being an official partner of Peshawar Zalmi, Daraz seems super excited on social media and they have even launched an advert featuring PSL and their ongoing sale. All the actors are wearing yellow like Peshawar zalmi, trying to grab things on Daraz Sale as they are promoting their team and at the same time announcing the sales. The overall theme and actors have also done justice to the advert..

Verdict: Aala!

3.8

**Jazz
4G**



Jazz has recently released a new commercial of Jazz super 4G. The ad is short but inspiring. The performer in ad communicates the message wonderfully that how you can get benefits from the new package of Jazz super 4G speed. It offers 100Mb data for whole week only in RS. 30.

Verdict: Cool Ad!

4

**Telenor
Infinity i4**



Telenor Infinity i4 commercial is short and communicates the message via infographics. Telenor has introduced the Infinity i4 with fingerprint sensor. The device comes with 16GB ROM and 1GM RAM. Camera section is packed by 5MP front lens and 8MP back lens. The background music is also good.

Verdict: Nice Ad!

2.5

Foodpanda



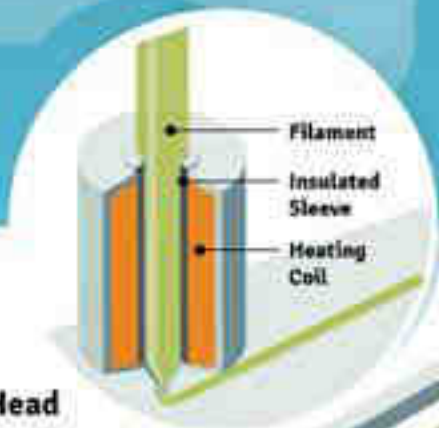
We get to see the new ad of foodpanda. It also highlights the PSL season however, the performance by the actors is quite ordinary. The overall advert does not have a good feel and the rap style script fails to grab our attention.

Verdict: Fazool Ad!

THE BASICS OF PRINTING IN 3D

How it works:

- 1 Plans are drawn in CAD applications and then passed to printer specific software that allows materials to be specified, scale to be set, etc.
- 2 Instructions can be passed to a 3D printer connected to your PC or sent to one of many online services for printing.
- 3 Depending on the size and complexity of the object, minutes or hours later the object is ready.



Print Head

Filament is extruded through a heated nozzle and sets as it cools.

Filament

Materials are stored and fed to the printer on spools. Here are a few of the many types of materials that can be used to print:

Metals

Expensive. Medium to high strength.

Plastics

Cost effective, can be glossy, elastic, translucent. Available in a variety of colours.

Earthenware

Sandstone can be used to print in full colour and ceramics can also be printed and glazed.



Printing

Thin layers of material are printed overtop of each other. After the object is complete a chemical treatment can be applied to smooth out surfaces and remove imperfections.

3 axes

Unlike an inkjet printer which can only move along a flat plane, the mechanism on a 3D printer can move in all three axes.

Tray

Extruded material is built up on base to form model.

Info Graphic



Uses Many industries are using 3D printing right now. Here are a few examples:



Aerospace

One-off parts can be constructed quickly and easily to fill specific rolls.



Medical/Dentistry

Prosthetics can be produce that conform perfectly to patients' bodies.



Prototyping

Designs can be quickly iterated through and physically tested.



Custom Jewelry

Detailed jewelry can be personalized and created by consumers.

All shapes and sizes

3D printers are available in many different sizes, from low-cost consumer models to high quality professional printers that are capable of printing 1-to-1 scale models in multiple materials. Here are three notable printers:

The Pirate3D Buccaneer



Cost: \$337 (US)
Dimensions: 25 x 25 x 35cm
Layer resolution: 100 microns
Build Volume: 15 x 10 x 12cm

Notable because: The Buccaneer aims to make the printing process as easy and seamless as possible. Parts are hidden in an attractive case and materials are delivered in enclosed cartridges that are easy to load.

Makerbot Replicator 2



Cost: \$2,199+ (US)
Dimensions: 49 x 32 x 38 cm
Layer resolution: 100 microns
Build Volume: 28.5 x 15.5 x 15.5 cm

Notable because: According to Makerbot, the Replicator 2 targets the prosumer market. It's capable of quickly making professional quality builds and is optimized for multitasking and printing multiple parts rather than just single objects.

200cm

150

100

50

0



Objet1000

Cost: \$40,000+ (US)
Dimensions: 700 x 1000 x 1000 mm
Layer resolution: 16 microns
Build Volume: 1000 x 800 x 500mm

Notable because: The Objet1000 can print huge 1:1 scale models of objects in multiple materials.

TOP APPLICATIONS & GAMES FOR SMARTPHONE



Popular Wars

Rating : 3.8 Price : Free

Want to know how it feels to be popular?
Then this game is for you!



Drive and Park

Rating : 4.6 Price : Free

- Park cars.
- Earn money.
- Travel to around the world and collect cars from each location.



Wind Rider!

Rating : 3.3 Price : Free

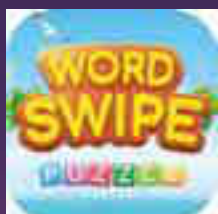
Cross the city in wingsuit.
Close the buildings to gain to score all the points



Magic Cleaner - Boost & Clean

Rating : 4.2 Price : Free

Cleaner - Boost & Clean - Free and Powerful Android junk & cache Cleaner, speed
Booster and CPU Cooler!



Word Swipe

Rating : 4.9 Price : Free

Word Swipe is a CREATIVE & BRAND NEW word search game with beautiful
scenery landscapes for FREE!



True VPN Network / Free Vip IP 2019

Rating : 4.7 Price : Free

True VPN Network - Faster, more smooth, and easier to use. It is the best app for
Unblock sites, Wi-Fi Security and Privacy Protection.



Cookie Swirl World

Rating : 4.8 Price : Free

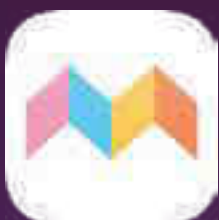
From the YouTube channel CookieSwirlc comes a brand new experience! Explore an exciting new world.



WiFi Router Master - WiFi Analyzer & Speed Test

Rating : 4.5 Price : Free

WiFi Router Master - WiFi Analyzer & Speed Test is a handy and free WiFi Manager and WiFi.



FamilyAlbum - Easy Photo & Video Sharing

Rating : 4.7 Price : Free

FamilyAlbum is the #1 app loved by more than 4 million users! Save, share, and remember the special moments in your child's life.



Daily Board

Rating : 3.1 Price : Free

When you place your tablet on the 'pogo charging dock,' the Daily Board gives you access to information that you will find useful in your daily life.



MV Master - Video Status Maker

Rating : 4.6 Price : Free

MV master is the ideal video maker tools to turn your photos into a great looking video clips with only 3 steps!



Turbo File Manager

Rating : 3.9 Price : Free

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