Introduction

Since its inception the Palestinian Ministry of Telecom and Information Technology (MTIT) has worked hard to put forward sectoral strategic plans to achieve sustainable economic and social development. These plans aimed at providing universal access to information technology and telecommunication services at affordable prices, as well as developing skills and applications in the fields of information technology, telecommunications, and mail services. In addition, MTIT provides a supportive legal and legislative environment and appropriateness which are applied in the means of fair and transparent policies and procedures to build a partnership with the private sector within the framework of liberalizing the Palestinian telecommunications market. However, these gigantic efforts of MTIT are being undermined by the obstacles and challenges facing the development and growth of the Palestinian national economy in general and the IT and telecom sector in particular; the biggest of these challenges is the Israeli occupation and its suppressive discriminatory policies and actions.

The Oslo Accords, signed between the Palestinians and the Israelis in 1993, stipulated the Declaration of Principles for the Establishment of a Palestinian Authority in the West Bank and Gaza Strip. Abusing the terms of this agreement, Israel placed restrictions on the work of Palestinian telecommunications and internet companies and made them dependent on the infrastructure of the central Israeli telecommunications network. These arrangements turned the Palestinian telecom and IT sectors into "hostages" that are subject to Israeli permanent control.

Article 36 of Annex III of the Oslo Accords, which refers to telecom and information technology sector, states that "the Palestinian needs of the frequency spectrum, which must be met within a month of their submission to the Joint Technical Committee". As a matter of fact, the agreement granted the Israeli side complete control of the frequencies spectrum in Gaza Strip and West Bank, including the frequencies of telephones, radio and television / satellite broadcasts, in addition to determining the digital range of telephone services. However, Israel keeps violating all agreements by abusing its control and preventing Palestine from getting its rightful access to frequencies. The agreement also granted the Israeli occupation authorities full control over telecom international gateways. Palestinian companies can only access international telecom and internet services through Israeli companies, this further contributed to a significant impediment to the growth of these industries Palestine.

According to recent World Bank study, quality internet and digital money services present huge opportunities in MENA region to boost economic growth, start new businesses, and create jobs; these advancements will present a new digital and mobile application economy in MENA named "moonshots"[1]. Unfortunately, the **Israeli government policies** on the ground have always been a major constraint for a Palestinian moonshot. As an example, in August 2020, the Israeli government concluded a **bid of 5G multi-spectrum to Israeli operators in addition to offering financial subsidy in order to encourage them to roll-out 5G services**[2]. Likewise, on October 18, 2020 the Israeli government issued a license[3] to **Bezeq allowing them to expand their fixed line telecommunication network** in internationally-recognized Palestinian territories. These are only the latest chapters in a saga of attempts to legitimize **illegal competition that defies international law**. It is characterized by a **blatant entrance of an Israeli fixed line operator to Palestinian territories**. Simultaneously Israeli

[1]The World Bank is using this term to highlight the importance of high-speed Internet connection to create opportunities for the youth MENA region
[2]GlobeNewsWire and ITU Country Profile for Israel, 2020. Pelephone Communications Ltd. accessed 19.9M Euro grant from Ministry of Communication
[3]Jerusalem Post

cellular operators are continuously upgrading their cellular network technologies and expanding their coverage using tower sites erected in illegal settlements built on occupied Palestinian territories. **Israeli cellular operators are now able to cover the West Bank with 5G services** and are attacking the Palestinian market t**hrough voice/ data plans offering massive volumes** at very **low-price points. With the presence of such advanced technology infrastructure and attractive pricing capability fueled by Israeli authorities' policies, this illegal competition is an existential threat to all Palestinian mobile, fixed-line and internet operators.**

Minister of Telecom and IT, Dr. Ishaq Sider asserts that the right to access telecommunication and technology services is a humanitarian need guaranteed by all international conventions. Whereas the **Israeli government total control over the Palestinian frequency spectrum** is inhibiting the management of a national wealth asset for the Palestinians. The international framework governing the use of frequency spectrum that allows for greater planning while improving spectrum occupancy and dividends is met with Israeli government appropriation of the Palestinian frequency spectrum for Israeli operators and other non-civil usage. This abuse has turned the **Palestinian frequency spectrum into a scarce resource for Palestinian telecommunication operators**. Hence, licensed **Palestinian operators are technologically handicapped and are depending on outdated 3G networks in the West Bank**; such technology is deemed to become obsolete in the near future. And to make an already gloomy picture even much worse, Dr. Sider explains that **while Gaza Strip** is possibly the only place left on earth that **is still forced to use 2G services**, Palestinian 3G networks are limited to a very poor frequency allocation. **MTIT and the operators are employing excruciating processes and operations to optimize the frequency spectrum allocated to Palestinians.** This challenge is proving to be much greater while planning to provide more than 4 million Palestinian mobile users with access to new broadband 4G/5G services.

Furthermore, the **Israeli government control over the so-called "C area" in Palestine** is constraining plans to provide nationwide coverage of cellular networks that needs the installation of needed equipment and tower sites. Likewise, the Israeli government is preventing the Palestinian fixed line operator from installing fiber optic cables infrastructure and network in rural Palestinian classified as area C. These **restrictions** to freely access C areas in Palestine and the **appropriation** of **multi-spectrum frequencies** for 4G/5G **are increasing the costs of needed investments to install, operate and upgrade Palestinian mobile and fixed-line networks**. Palestinian telecommunication operators find themselves obliged to bear **additional costs so as** to reach all Palestinian populated areas; the presence of C areas deprives them from using shortest distance and service easement for fiber-optic cabling as well as installing **additional cellular base sites, hardware and software tools** to reduce interference and compensate for cellular frequency shortages. Last but not least, it is worth mentioning that the Israeli authorities exercise **restrictions on telecommunication hardware imports**. These restrictions prevent certain technologies from reaching Palestinians and increase costs as well as the time to market services.

It is logical to conclude that **Palestine is not capitalizing on its frequency spectrum assets and land contiguity**. This is preventing the private sector there, despite its willingness even in the absence of government subsidy, from investing in new telecommunication infrastructure to secure much needed broadband services. Furthermore, Palestine is not leveraging the pool of its available talent nor the innovation ecosystem; thus, not making use of high penetration of 4G-enabled smart phones **to spur new digital economy**.

<u>Positive Impact of 4G/5G on Palestine Moonshot:</u>

The evolution of the cellular network broadband technology allowed transferring data at very **high-speeds (up to 1Gbps)** and created the **"app" economy with 4G** that allowed more complex mobile

applications, richer media experience for entertainment and gaming. With 4G, one could play mobile games, "video call" friends, shop online and stream favorite TV shows. With high quality video and audio one can forget getting annoyed by slow internet connection, and can rely on greater security and more reliable connections. Now, **5G presents a futuristic outlook**[4] and offers **higher speeds that can reach up to 10Gbps**. 5G **creates new use cases** and applications in Industry 4.0 systems that require high-bandwidth service such as Augmented and Virtual Reality, Internet of Things, e-Health, Connected Vehicles, Public Safety, Consumer products (Wearables, Smart Home, AR Gaming), Smart Cities Network, Precision Agriculture, Logistics, Fixed Wireless Access and Streaming in Crowded Areas).

For Palestinians, both 4G/5G are bound to:

1. Meet the **growing demand for high speed Internet connections by Palestinian subscribers,** as the improved broadband infrastructure is also bound to **enhance customer experience**. For example,
   a. 4G provides high speeds for more Palestinian customers with **better quality at lower costs**
   b. 4G provides **reliable connections** and improves quality of voice calls **and coverage as well as data transfers**

In 2018, 65% of households in Palestine had internet access through 469,741 telephone lines (residential, corporate, government). By the end of 2018 ADSL subscribers increased to about 361,000 while mobile cellular subscriptions increased by January 2020 to reach 4.33 million[5]. Furthermore, 37% of households own a computer (Desktop, Laptop or Tablet) and 82% of households own one Smartphone or more. However, the average internet speed was a mere 11.0 Mbps by the end of 2018[6]. There has been a growing societal demand for broadband in 2020.

With a population thirsty for Internet connection; it is not difficult to see additional examples as below on how quality broadband will further impact economic and social development in Palestine:

2. Enable Moonshot **economic impact on a society** includes:
   a. Where 4G can trigger the **digital and application economy**, 5G can contribute to further **industrial advances** through predictive intelligence; improving workplace and worker safety; and enhancing operational effectiveness.
   b. Improved 4G/5G infrastructure will also contribute to **fostering innovation and e-services** – it's the ecosystem of services and applications that these new 4G/5G networks will enable[7]
   c. If not spurring new digital economy, 4G/5G provide **power efficiency**.
      i. 4G/5G can also reduce service cost of Mbps and impact industry by **managing the carbon footprint**.
      ii. Another example is Narrow band IoT (NBIoT) over 4G enables connectivity of devices to last years on small batteries without the need for charging.
   d. 4G/5G infrastructure will impact a **positive growth to GDP and Tax Revenue**[8].

Between 2013 and 2015, the World Bank reported an estimated **total revenue loss** for Palestinian **mobile operators from US$ 436 to 1,150 million**. The revenue loss directly attributable to the **absence of 3G is between US$ 339 and 742 million** and the total Value Added Tax **(VAT) fiscal loss** for the Palestinian Government is **between US$70 and US$184 million**. The direct impact represented up to

[4] 5G offers on-demand tailored connectivity through **ultra-reliable low latency communication (uRLLC);** higher speed over **enhanced mobile broadband (eMBB**) that can reach up to 10Gbps that can handle high volumes of traffic, consequently reducing the cost per Mbps realizing power efficiency. Also, for massive multiple input, multiple-output (MIMO), small cell implementation and the use of mmWave bands also permits the provision of high-speed connections. 5G **massive machine-type communications (mMTC)** enables the connection of a large number of devices and sensors.

[5] https://datareportal.com/reports/digital-2020-palestine

[6] Palestine Central Bureau of Statistics 2019

[7] https://potsandpansbyccg.com/2020/05/21/finding-a-business-case-for-5g/ and https://www.teoco.com/blog/5g-business-case/

[8] GSMA, 2018. The WRC Series Study on Socio-Economic Benefits of 5G Services Provided in mmWave Bands, 2018

3.0% of the GDP over the mentioned three years. In 2016, the World Bank also estimated that Israeli operators have **captured up to 30% of the West Bank market in volume** (number of subscribers). The Israeli market share in value, measured by the total sales, was put even at higher numbers as Israeli operators captured high value Palestinian customers by providing 3G and 4G during these years[9].

Today, a history of losses is repeating itself due to Palestinians' inability to deploy 4G/5G. While an upgrade to 4G/5Gnetwork promises an increase in telecommunication market value, Palestinians continue to incur revenue losses; similar to those estimated by the World Bank between 2013 and 2015. With recent Israeli operators rolling out 5G services, Israeli 4G/5G SIM cards will continue capturing up-to 30% of the West Bank market in volume. These **illegal Israeli SIM cards** used by Palestinians have **continued to sustain losses to operators** and as importantly **tax revenue losses** for the Palestinian government; the latter recently estimated at**US$400 million** over the past four years[10].

3. Enable **impact on a society.**
    a. Improved broadband infrastructure will **bridge the digital divide** contributing to **deliver social value** that correspond to many of the United Nations' **17 Sustainable Development Goals (SDGs)**[11]such as: Goal 3: Good e-health and social well-being; Goal 4: Better access and coverage for quality education content; Goal 5: Gender Equality; Goal 8: Decent Work and Economic Growth; Goal 9: Industry, Innovation and Infrastructure; Goal 10: Reduced Inequality; Goal 11: Sustainable Cities and Communities and Goal 12: Responsible Consumption and Production.
    b. The year 2020 is tagged **with the CoViD-19 pandemic**. Its impact has been enormous on our Palestinian society and has **made the demand on broadband services even greater** as it disrupted all aspects of Palestinian lives, and has left no one untouched. These trends will become the norm in the Palestinian society.
    c. Recent trends of Palestinian society hungry for broadband include, but not limited to:
        i. Due to limited job opportunities amongst university graduates, **work-from-home** numbers are on the rise. **Freelancing** is high for Palestinian youth **living in urban and rural areas**.
        ii. Increasing **Work from home** activities for employees due to CoViD-19
        iii. Increase in **e-commerce activities** and household **delivery logistics**
        iv. **e-Schools** and **Online Education** programs are expected to be the norm for Palestinians where 45% of Palestinian population are below the age of 18 years. New education software tools for content creation and streaming have been consuming high broadband. Students at universities and schools are meeting their lecturers and teachers over virtual class interaction and videoconferencing. More than 1million children are attending schools all over Palestine including remote areas classified as C area.
        v. **e-Health** and supporting industry such as pharmaceutical and insurance, where dependency on broadband connectivity is needed for remote diagnostics, patient data transmission with high speed and less latency.
        vi. **Other digitization** such as in **energy and utility sectors** like utility management and smart metering will eventually be supporting smart cities with IoT and Machine to Machine connectivity. For example, with growth of solar energy site installation and more photovoltaic cells panels are mounted on residential /agriculture farming / industrial / education rooftops sites; there has been a growing need for reliable and low-cost service in order to monitor and manage these panels.

[9] World Bank report 2016. The Telecommunication Sector in the Palestinian Territories: A Missed Opportunity for Economic Development
[10] https://ramallah.news/
[11] PwC and World Economic Forum, "The Impact of 5G: Creating New Value across Industries and Society", 2020

The Palestine "moonshot" ... is in its Digital Transformation: A "moonshot" that will help Palestine accelerate progress, brings high-speed connectivity to all, and lays the foundations for a vibrant digital economy.

Call for Action

A Palestine moonshot will only be realized if all the below building blocks are involved, and a call for action is hereby addressed to the Palestinian Authority; the international community and their respective organizations and local leader:

Israeli Government:

1. **Spectrum Availability**: To release the full potential of 4G/5G networks: Palestinian cellular operators will need a sufficient mix of low, mid and highband spectrum on exclusive basis and not shared with the Israeli operators – Israeli government is required to release this frequency spectrum
2. **Infrastructure / Networks**. While capital investments by the Palestinian private sector has been and will continue to be critical for building the 4G/5G and fiber optic broadband network infrastructure – Israeli government is required to permit Palestinian operators to work in Area C

Palestinian Government:

1. **Business Climate**. A combination of access to funding, openness to risk, and business friendly policies will create an environment that is conducive to technological innovation.
2. **Innovation Ecosystem**. Government policies, investors and international community should encourage ample private sector R&D spending and provide strong IP protection to nurture cycles of innovation development.

Universities and NGOs

1. **Talent**. To ensure that the workforce has the skills necessary for future technological changes, tech related certification and degree training will be critical.
2. **Technology entrepreneurship Experiential learning** to ensure that the workforce has the knowledge and skills for innovation economy

Private Sector

1. **Infrastructure / Networks**. Capital investments by the Palestinian private sector has been and will continue to be critical for building the 4G/5G and fiber-optic network infrastructure
2. **Innovation Ecosystem**. Investors to lead private sector R&D spending