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3G Mobile Spectrum – Issues & Prospects

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Pakistan's mobile sector has seen enormous growth after the telecom deregulation in 2004 – cellular revenues reached Rs 262.8 billion in FY11 compared to the level of mere Rs 19.8 billion in FY03, whereas cell phone density rose to 65 percent in FY11 compared to 1.6 percent in 2003. However, the intense competition among the five cell companies – Mobilink, Telenor, Ufone, Warid and Zong has not only resulted in a steep fall in cell tariffs, but has also led to a sharp and consistent fall in overall cellular revenue growth. Importantly, the Average Revenue per User (ARPU) in Pakistan is one of the lowest in the region.

Lower cell tariffs though augur well for consumer welfare; the consistent decline in revenue growth is a sign of stagnation in the cell phone market and reflects badly for overall contribution of this sector in economic growth.[1] The reversal of this trend needs introduction of value added services, as promised by 3G mobile technology. This technology has the potential of not only boosting cellular companies' business but also contributing to national exchequer in the form of license fees and increased corporate income and sale taxes.

In this context, this note investigates the case for introducing 3G technology in Pakistan and suggests some measures that can improve the outcome of the auction of 3G licenses.

What is 3rd Generation Mobile Technology?

3G mobile telecommunication is a generation of standards for mobile phones fulfilling the International Mobile Telecommunications specifications by the International Telecommunication Union (ITU).[2]

The development of mobile technologies can be divided into several generations, each with improved air and network interface standards, enabling better performance. A glimpse of features of developing technology is as under:

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[1] Telecom sector contribution to GDP declined to 1.3 percent in FY11 from 1.5 percent in FY10 due to declining profitability.

[2] International Telecom Union is the United Nations specialized agency for Information and Communications Technologies (ICT). ITU allocates global radio spectrum, satellite orbits and develop technical standards that ensure networks and technologies seamlessly interconnect.

- The first generation (1G) mobile technologies were introduced into the market in the early 1980s. This system was based on analogue technology and provided only voice communications. The 1G network had huge cost of investment that limited its use to business purposes only.
- In the mid-1980s, second generation (2G) appeared, containing the feature of digital processing. This technology was much efficient than its predecessor, as it introduced the features of communicating short texts in addition to the voice communication.
- Later 2G was upgraded to 2.5G standard, known as General Packet Radio Service (GPRS) and the 2.75G standard Enhanced Data Rates for GSM (EDGE) that enabled use of internet on mobile phones.
- The recent developments of mobile technologies, i.e., 3G, 4G, etc. promise high speed mobile internet access along with improved voice quality **(**Table 1).

Table 1. Features of Mobile Technologies

2 G:	**3 G:**
Telephone	Mobile videoconferencing
Email	Video Phone/Mail
SMS	Remote Medical Diagnosis
	Remote Education
2.5 G:	Mobile TV/Video Player
Mobile banking	Advanced Car Navigation/ City Guides
Voicemail	Digital Catalog Shopping
Web	Digital Audio/Video Delivery
Mobile Audio Player	Collaborative B2B Applications
Digital Newspaper Publishing	
Digital Audio Delivery	
Mobile Radio	
Push Marketing/ Targeted programs	

Source: www.itu.int/osg/spu/ni/3G/workshop/Briefing_paper.PDF

According to the ITU (2011), 43 percent of world's population is now covered by a 3G mobile network. 3G networks are being launched in 159 countries, whereas some countries as Sweden, Norway, Ukraine and United States are already moving towards 4G. In terms of regional penetration, Japan has the highest 3G mobile density followed by Europe and North America (Table 2).

Table 2. Top Regions for Penetration of 3G Handsets

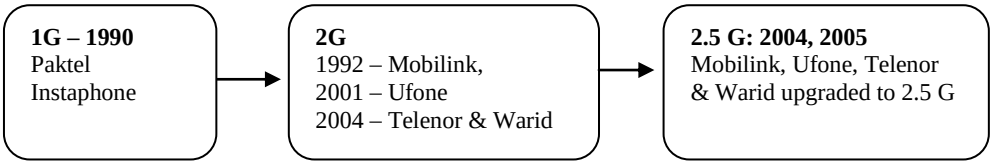
	2009	2014[P]
Western Europe	39%	92%
North America	38%	74%
Eastern Europe	9%	40%
Asia Pac (without Japan)	7%	37%
Japan	91%	100%
Middle East & Africa	7%	35%
South & Central America	4%	17%
Global	15%	43%

Source: Morgan Stanley (April 2010) via mobithing.com
P = Projections

Mobile Telecom Services in Pakistan

Mobile service in Pakistan was introduced by *Paktel* with 1st Generation technology in 1990 followed by *Instaphone*. The evolution of technology, however, was fast as Mobilink entered the market carrying 2G technology in 1992. The 2G market got extended with the entry of other firms in the industry over the years (Chart 1). By 2005, a number of these companies upgraded their infrastructure to the so-called 2.5 G that contained internet connectivity through General Packet Radio Service (GPRS) on mobile phones.

Chart 1. Evolution of Mobile Technology in Pakistan



Initially, the licensing to mobile companies in Pakistan was free, i.e., no license fees were charged from cell companies. However, with the deregulation of Pakistan's telecom sector in 2004, licenses for 2G services were auctioned, and two new firms -Telenor and Warid – won these licenses at a price of US$ 291 million in 2004. These auctions were carried out by open cry method and did not carry a base price. After an initial payment of 50 percent of bid price, the spectrum price had to be paid in equal annual installments. Later, the license of Mobilink was also renewed at the price of US$ 291 million in 2007.

Continuing with the agenda of technological advancement, PTA wanted to move ahead with 3G auctions in 2007. However, at that time cellular companies strongly recommended delay in the licensing on the plea of almost nonexistent mobile internet demand, huge investments required for up gradation of infrastructure and very high base price, which was set at US$ 107 million. Therefore, no progress could be made at this front, except a recent introduction of 3G Evo Wi-Fi Cloud by PTCL which is a small mobile hotspot that can provide high speed internet.

Moreover, in 2011, Government of Pakistan again decided to move ahead with the technology neutral spectrum auctions both for enabling the country to reap gains from advancement of mobile technology as well as to fulfill its revenue generation requirements for financing fiscal deficit.[3] According to schedule announced by PTA, the auction had to be held on March 29, 2012 and PTA also issued an Information Memorandum, in January 2012, outlining the basic rules and regulations for the auction as given below:

- The 3G spectrum license tenure will be for a period of 15 years.
- Government has decided to grant three technology neutral Mobile Cellular (3G/4G/LTE etc.) License/Spectrum through auction:
    - Five operators, who are currently licensed to provide mobile cellular services, are eligible to participate in the auction;
    - Any new entrant who has been determined as a successful bidder as a result of Auction for Mobile Cellular License shall be eligible to participate;
    - All new prospective entrants eligible to bid and agree to start commercial operations after March 2013 may also participate in the auction.
- Base Price for the Mobile Cellular (3G/4G/LTE etc.) license/Spectrum is US$ 210 Million
- A bidder may bid for a maximum of two blocks. This implies that one company can get two licenses.
- One time upfront Initial License/Spectrum Fee.
- Infrastructure sharing shall be considered as a matter of first priority by the Mobile Cellular Operators at the time of roll out. The cellular mobile licensees are required to share infrastructure with other operators as per PTA's directives.

[3] The provision of technology neutral licenses will enable cellular companies to launch 4G services also. However, technically at this point the roll-out of 4G will require huge investment in infrastructure.

- No two bidders shall have any common directorship on their respective boards.

The auction was, however, postponed later due to procedural changes in the auction exercise.

Case for 3G in Pakistan

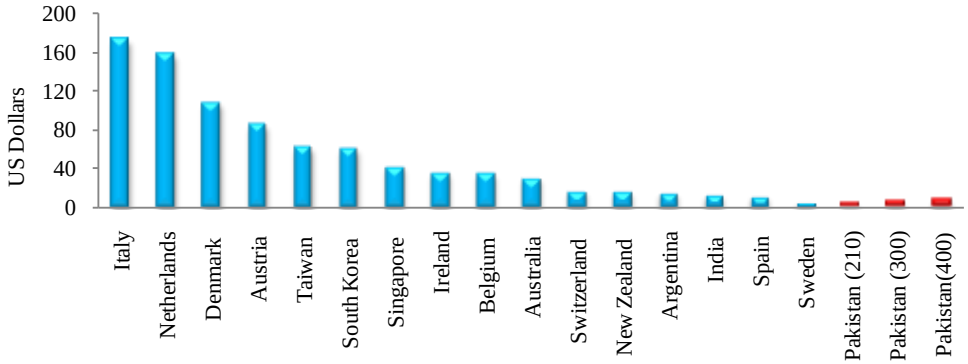
Government Revenues: The auction of 3G mobile spectrum has the potential of generating significant revenues for the government. At the base price of US$ 210 million, the minimum amount that can be generated from the auction is US$ 630 million. There are even indications in the market that the base price is likely to be revised to US$ 291 million, which implies minimum revenue of US$ 873 million. In this context, a study of international experiences of spectrum auctions highlights some very unsuccessful experiences – in the EU – resulting from overbidding by firms.[4]

However, in the case of Pakistan, a comparison with other regional countries indicates that the per capita license fee is likely to remain significantly below than that in other countries even if the final price of the licenses increases to 100 percent of the base price, i.e., US$210 million as specified in the Information Memorandum communicated by PTA (Figure 1).

Industry preparedness: The cell companies have mostly upgraded their infrastructure and no substantial investment would be required except the payment of license fee if this technology is introduced now. The anecdotal evidence suggests that the 3G equipment is available in the market at much reduced costs now. Specifically, Huawei and other vendors are offering very flexible terms for sale of equipment. So the cost of countrywide rollout of 3G has also become manageable for the firms.

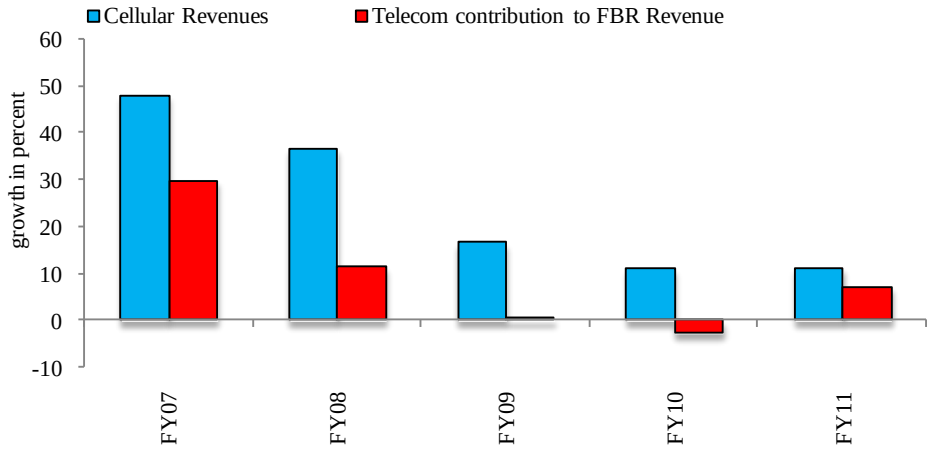
[4] In Europe, 3G spectrum was auctioned during 2000 and 2001. Overwhelmed by the success of 2G services, easy availability of finance, lower interest rates and higher valuations of firms at stock markets telecom companies showed over-enthusiasm for 3G. The result was huge overbidding for licenses – per capita license fee was more than US$ 500 in UK and Germany (Annexure). Hence, 3G license auctions were followed by a market slump. The telecom firms could not spend on network construction, due to difficulties in raising finance causing very low subscriber base. Resultantly, within a year of the 3G auctions, the market valuations of telecom firms crashed and many of them became bankrupt.

Figure 1. Per Capita 3G license Fees



Parenthesis show hypothetical prices of 3G license in Pakistan
Source: http://aisel.aisnet.org/amcis2002/250/

Figure 2. Cellular Revenues and Telecom Sector Contribution to FBR Revenues

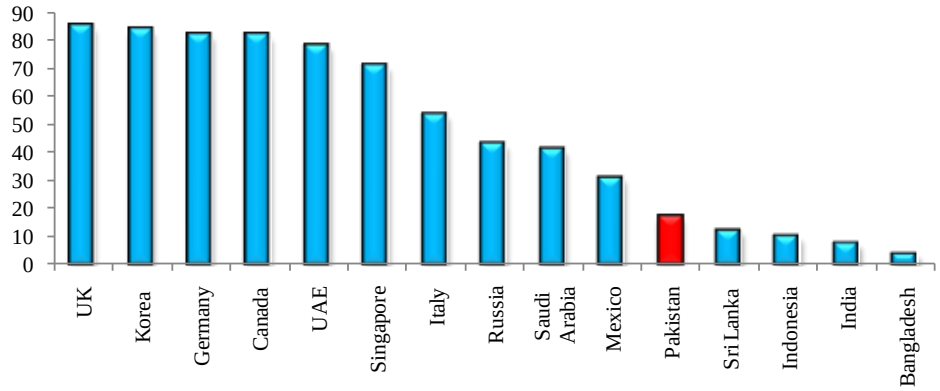


Cellular Revenues: The mobile telecom sector has a substantial share in country's overall revenue base. Hence, the consistent decline in cellular revenues growth resulting from the intense price war among firms is alarming (Figure 2). There is a need to break this trend by introducing value added services promised by the 3G technology.

Technological efficiency: 3G spectrum is technically more efficient, more frequency will be available to cell companies such that they will be able to provide services to even the existing subscribers at reduced cost.

Internet Access: High speed mobile internet access is a promising feature supported by 3G technology. Currently Pakistan is among the countries having lowest internet access in the world (Figure 3). The vast outreach of internet access through 3G technology is likely to have various growth spillovers for the economy, depending upon the pace of rollout and quality of services provided by the cell companies.[5] The demographic pattern of Pakistan, with a large share of young age population hints at the possibility of strong demand for 3G services in coming times, for infotainment purposes. This, however, depends upon the pricing policies of the firms, introduction of new applications, quality of services, and pace of roll-out of 3G services.

Figure 3. Percentage of Individuals Using Internet



Pakistan's experience with the roll-out of 3G is likely to be similar to that of India.[6] Creation of 3G demand will take some time and will depend on pricing, introduction of new applications, quality of services, and pace of roll-out. In the initial phase the profitability of some of the firms may actually deteriorate. However, even if firms expect sluggish growth in revenue, there is a business case for 3G technology as (a) opportunity cost of loosing high valued customers, after failing in the 3G auction could be high; and (b) firms getting license can potentially benefit from winning customers of other firms not offering in 3G services.

[5] Various services can be provided in the areas of education, health, agriculture, etc., through mobile internet access.

[6] 3G services were rolled out in India almost a year before. Reportedly, in 6 months of roll out of 3G, around 1.2 percent of total mobile subscribers moved to 3G. Various reports hint at lower quality 3G services provided by mobile companies. Low penetration of smart phones, inability of companies to develop interesting 3G applications, lack of demand for internet services, etc., are some common factors cited for slow take-off of 3G subscription in India. In addition, Indian firms paid a huge amount for 3G licenses, which constrained their ability to roll out network at a fast pace.

For obtaining maximum gains from this advancement of technology, this is necessary to ensure more competition among firms. The demand for 3G depends upon the quality of services provided by mobile companies, price structure, etc. which in turn depends upon the degree of competition in the industry. This can be ensured by encouraging entry of new firms and preventing collusion in the industry, instead of providing monopoly powers to a particular firm. In the absence of entry barriers, incumbent operators are less likely to resort to non-competitive practices to make excessive profits without attracting additional competition.

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- www.orascom.com
- www.singtel.com
- www.telenor.com
- www.mobithinking.com
- www.pta.gov.pk/index.php?option=com_content&task
- http://www.pta.gov.pk/media/im_spec_lic_200112_1.pdf

Annexure: International Pricing of 3G Licenses

	Internet users per 1000 ppl (2000)	Mobile users per 1000(1999)	Fixed phones per 1000 (1999)	3G issue date	3G license fees per capita
Japan	161.6	449	558	June 2000	Free
New Zealand	209.42	230	490	Jan 2001	15.7
Singapore	289.01	475	482	Apr 2001	42.6
Australia	260.89	344	520	Mar 2001	30.3
Malaysia	55.06	101	203	Jul 2002	
South Korea	212.8	504	438	Aug 2001	60.8
Hong Kong	205.47	726	576	Sep 2001	No auction
Taiwan	215.85	521	588	Feb 2002	62.5
China	5.54	34	86	late 2002	
Thailand	10.61	33	86	Jun 2003	
Philippines	4.68	24	39		
India				May 2010	12.3
Finland	404.2	667	552	Mar 1999	Free
Spain	90.63	312	418	Mar 2000	11.2
UK	255.42	408	575	June 2000	594.2
Netherlands	257.99	435	606	Jul 2000	158.9
Germany	148.55	286	588	Aug 2000	566.9
Italy	157.89	528	462	Oct 2000	174.2
Austria	202.92	519	472	Nov 2000	86
Sweden	445.17	578	665	Dec 2000	5.7
Portugal	79.617	468	424	Dec 2000	3.5
Switzerland	234.09	420	699	Dec 2000	16.5
Belgium	179.65	315	502	Mar 2001	35.1
Greece	139.59	311	528	Jul 2001	4.9
Denmark	393.55	499	685	Sep 2001	108.3
Luxembourg	171.62		724	Q4-01	
Ireland	131.68	378	478	Mid 2002	36
Argentina	14.07	121	201	Oct 2001	15
Uruguay	95.98	95	271	Jan 2002	
Brazil	39.33	90	149	Late 2002	
Colombia	11.33	75	160		
Mexico	20.92	78	112		

Source: Lehrer, Mark, Dholakia, Nikhilesh, & Kshetri Nir (2002), "National Sources of Leadership in 3G M-Business Applications: A Framework and Evidence from Three Global Regions", University of Rhode Island, http://aisel.aisnet.org/amcis2002/250/