

TELECOMMUNICATIONS IN RUSSIA: from monopolistic village phones, to competitive global players in 20 years

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ABSTRACT

This paper analyzes and reviews the rapid transformation of Russian telecommunications and Internet operators over the past 20 years, from small town phone service suppliers, to top-5 global players. The approach taken is a dynamic eco-systems oriented analysis of the past 20 years evolution, to identify disruptive strategy changes , and to assess their weight compared to a regulation based process in countries or regions having achieved a high economic impact of their telecommunications sector. The identification of the key disruptive changes allows studying stages in the evolution. In turn, the strategy dynamics driving the key players is mapped out. The comparative analysis identifies what Russia has done in a distinctively different way to major telecommunications and Internet countries, or not at all. On that basis, perspectives for the Russian telecommunications and Internet eco-system are elaborated. Such a study has implications on both the entrepreneurial approach and the regulatory approach in telecommunications and related industries.

KEYWORDS

Telecommunications, Russia, Fixed operators, Mobile operators, Internet, CATV, Broadband, Strategy

INTRODUCTION

Who would have foreseen that in 20 years' time, the Soviet telecommunications operators would have transformed themselves from small town's monopolistic suppliers, into global players competing in the top 10 spot worldwide? Academic journals have had no articles on it for 15 years, while business studies burgeoned in phases where financial opportunities emerged or collapsed, and in both cases the subjects were complicated to analyze. While largely ignored, this evolution has taken place not because of pro-

active regulations, nor because of technological achievements, but because of systemic transformations tightly linked to some entrepreneurs and their political backers. This evolution is also very interesting as the home Russian market is geographically huge, and exhibits huge living standard discrepancies as well as low average revenue per user one would think would have constrained its growth.

The purpose of this paper is indeed an attempt to carry out a dynamic systems oriented analysis of the past 20 years evolution, to identify disruptive strategy changes , and to assess their weight compared to a regulation based process in countries or regions having achieved a high economic impact of their telecommunications sector. Such a study has implications on both the entrepreneurial approach and the regulatory approach, as well as for telecommunications dissemination in developing countries.

This research does not include neither telecommunications systems design and manufacturing, handsets/ terminals, or marketing / distribution networks , as it turns out that they all have had much less importance in Russia sofar than elsewhere, and can be treated essentially as competitive imports as the domestically controlled share is very small (as in India).

Almost none of the evidence is found in the academic literature, especially in English, so the key sources have been verbal reports, field work over many years (since 1987), and Russian language reports with their peculiar mix of claims / facts and hidden elements. The reader is especially strongly warned about the big difficulty in independently verifying some of the data or observations, and caution is thus asked not to expect exact accuracy. Many facts are quite detailed mostly because the systemic evolution has demonstrated an uncommon ability to rebound or die on a grand scale on oddities, or small and extreme deviations, akin large third moments of statistical distributions. Needless to say also, the “byzantine” aspects of the evolution are not to be looked upon in a purely rational deductive way.

The paper first identifies in Section 1 some key disruptive changes in the evolution of Russian telecommunications, the stages of which are described in detail in the following Section 2; in this way the reader can also map out the preambles and consequences of each change. Thereafter are identified in Section 3 key players, comprising holding companies, government bodies, Russian operators and some foreign actors; having earlier mapped out the historical evolution of events, in this way the reader can follow the strategic turns taken by each key player leading to these events. The last Section 4 further identifies failures, major discrepancies with worldwide trends, and structural deficiencies which may either lead to instabilities in the growth, or creative solutions to these challenges fueling yet another stage.

1. DISRUPTIVE CHANGES IN RUSSIAN TELECOMMUNICATIONS EVOLUTION

The following entry point and disruptions can be identified from the situations described in the following Sections 2 & 3 in a stepwise staged way:

Phase 0 (entry point) (1991): Existence and low growth of Soviet state controlled fixed and satellite operators, with in addition communications infrastructure owned by other state sectors (railways, oil and gas, defense) [1-2].The Soviet State collapses in 1991, with a short period of disorder resulting from it in the industry. The main body was the State Committee for telecommunications.

Disruption no 1 (1993) : Privatizations at local geographical level, often with speculative foreign financial investors and suppliers, alongside local mavericks , leading to the formation of over 3500 licensed communications operations , without technology consistence nor real interoperability. This included the formation of over 200 village/ town/ region / federal district operators, sometimes overlapping, with enormous management structures and rivalries, and almost always local or central political involvement / shareholdings.

STAGE 1: VERY FRAGMENTED and UNCOORDINATED INDUSTRY STRUCTURE

Disruption no 2 (1995): Central federal government creates a structure, Svyazinvest, in general to exert majority control over weak fixed operators, while letting entrepreneurs drive unchecked the establishment of so-called “alternative operators” which it did not see the importance of , namely mobile / cable / ISP operators.

STAGE 2: CENTRAL GRIP ON FIXED NETWORKS BY GOVERNMENT, and on MOBILE OPERATORS BY ENTREPRENEURS

Disruption no 3 (1998-2000): The Russian currency and economy collapses, with governments (central, local) offering no life-line to the many small fixed operators. A wave of mergers of the small fixed operators took place in principle on the basis of larger federal districts, leading to inter regional operators. Foreign mobile operators and suppliers, profiting from the low Ruble (RUB) exchange rate, bought large stakes in “alternative operators” and accelerated the digitization of the networks as well as a technological convergence around dominant world standards, with enormous subscriber growth as a result. Failing to make attractive enough Svyazinvest in view of a survival-mode privatization, the central government lets it absorb the incumbent dominant fixed long distance operator Rostelecom, the cross-subsidizations at which also represent a stumbling block in Russia’s entry in to the World Trade Organization.

STAGE 3: CONCENTRATION, MOBILE OPERATORS SURGE AHEAD and BROADBAND TAKES OFF

Disruption no 4 (2003): As the ability to provide mobile coverage far outstrips the fixed teledensity increase amongst a more affluent population, a handful of mostly privately owned mobile operators became dominant , and obtain a rebalancing in their favor of interconnection tariffs levied by fixed networks.

STAGE 4: MOBILE OPERATORS TURN GLOBAL, BROADBAND EXPLODES and FIXED NETWORKS IMplode INTO ROSTELECOM SEARCHING FOR A NEW ROLE

Disruption no 5 (2007-2011) : 3G licenses are granted on very favorable terms to the dominant mobile operators, who , suffering from no uptake of value-added services and low ARPU in Russia, redeploy

their profits or creditworthiness into a global web of higher growth/ higher ARPU foreign investments worldwide . In 2011, one such mobile operator, Vimpelcom, by a share-swap, conquers the 5 th rank worldwide with 170 Million subscribers and a presence in 20 countries. The inter regional fixed operators are merged into Rostelecom, Svyazinvest will cease to exist, and Rostelecom is in search of a new role.

2. TELECOMMUNICATIONS ECO-SYSTEM DYNAMICS IN RUSSIA

This Section makes a stage by stage analysis of the historical evolution from 1993 to 2011 in the Russian telecommunications eco-system. The transitions between stages are marked by the disruptive changes summarized in Section 1, the forerunners to which, and consequences of which, appear in this Section 2, amidst of course many other events. At most stages are analyzed the main evolutions in all major branches of the sector: fixed telephony, mobile communications, Internet access and services, broadband access, CATV, satellite communications, enterprise communications.

2.1.STAGE 1: VERY FRAGMENTED and UNCOORDINATED INDUSTRY STRUCTURE

Until 1993, all telecoms were fully controlled by the Ministry of Communications; in 1993 local operators were privatized in such a way that each “oblast” or republic or large city received one provider. Rivalries sometimes led to the creation of several though. Rostelecom became the single national fixed long-distance network provider .Shares were originally allocated as follows: management 5 % (common shares), employees 35 %(10 % common shares, 25 % non-voting preferred), for sale through auction 22 % (common shares), governments 38 % (common shares) and a higher share of votes.

In 1994 was passed a law for licenses and a “regulator” was created (Goskomsvyaz) ;there was no consensus on updates to this law, which was summed up in 2 subjective pages open for interpretations; a license can be held only by a Russian legal entity (Rule 578) . In 1995 a law was passed on telecommunications .Radio frequencies were separately licensed and fees determined separately (Sept 1 Decree 552) ;operator licenses are only for 15 years; this was not really changed after the new telecommunications law of 2004 ;it is unclear if spectrum licenses are included in infrastructure costs when operating expenses are calculated for tariff regulation.

As a result of that process, there were originally 85 privatized fixed operator, mostly regional (see the main ones in Table 1), until Svyazinvest later was formed in 1995 taking over 51 % of votes (in average) over the following one-two years. Many were not or only very thinly traded, on the RTS Stock Exchange (Moscow); US ADR's were often issued; market cap could therefore only be calculated on the basis of indicative bid prices of common or preferred shares. The data show a very high revenue/ access line when taking purchasing power into consideration, meaning most fixed lines were actually installed at public or private organizations, and not at residences. The fixed operator productivity measured in access lines / employee was appallingly low. Regional operators used only little their own funds, but a lot of foreign supplier credits (50 %) and minimal regional development funds (3 %). Equipment leasing was often used as well e.g. from RusLizing Svyaz.

Residential users in 1997 often had to pay a monthly charge, plus a huge installation fee to get a fixed telephone (1997: 1,1 Million RUB). The European Bank for Reconstruction and Development estimated at 30 USD/month (1997) the average revenue per line needed to trigger investments; this threshold just excluded a very large majority of the population at that time.

Main Regional telecom operators	Access lines in use (2005)	Revenues / Access line / year (USD)	Net profit / Access line (USD)	Access lines per employee	Remarks
Tambov Electrosvyaz	170000	151	8	42	Merged into Center Telecom
Kaliningrad Electrosvyaz	114000	283	47	n/a	
Novgorodtelecom	120800	206	29	n/a	
Vologda Electrosvyaz	127500	208	34	40	
Chita Electrosvyaz	130000	209	9	n/a	
Orel Electrosvyaz	130100	141	19	n/a	Merged into Center Telecom
Karelia Electrosvyaz	140700	246	14	39	
Ryazan Electrosvyaz	151000	208	19	n/a	Merged into Center Telecom
Uvtelcom	161500	184	25	48	
Ulyanovsk Electrosvyaz	166800	169	30	n/a	
Tyumentelecom	167000	327	27	45	
Lipetsk Electrosvyaz	180000	199	35	72	Merged into Center Telecom
Khabarovsk Electrosvyaz	184700	400	34	34	
Tver Electrosvyaz	189600	201	22	39	Merged into Center Telecom
Novosibirsk Municipal Telephone system	379 200				
Elektrosvyaz (Novosibirsk)	168 500				
Murman Electrosvyaz	194300	292	47	54	
Smolensksvyazinform	199800	146	10	21	Merged into Center Telecom
Udmurttelecom	250000	222	43	63	
Krasnoyarsk Electrosvyaz	266000	401	44	35	
Irkutsk Electrosvyaz	272400	322	26	39	
Saratov Electrosvyaz	290000	166	16	60	
Lensvyaz	295800	187	30	58	

Uralsvyazinform (in Perm)	382200	321	89	50	Owns GSM operations
Svyazinform Chelyabinsk	459000	268	89	58	
Samara Svyazinform	641 000	258	67	58	132 000 rural users; has a CDMA network
Rostov Svyazinform (Rostov on Don)	490000	208	14	50	
Nizhnovsvyazinform	553000	196	65	59	
Kubanelectrosvyaz (in Krasnodar)	558000	317	63	45	
Moscow City Telephone MGTS	3849000	113	17	226	80 % subs. are households but bring only 30% of revenue
Petersburg City Telephone PTS	1708000	97	22	270	Svyazinvest owns only 38 % with many unnamed other key shareholders
St Petersburg Intl and long distance telephone (SPMMT)					Long distance and intl. lines for Petersburg City Telephone customers; Svyazinvest has 38 % shares but 50,6 % of votes
DELTA Telecom (St Petersburg) (brand: Skylink)					Founded in 1991 and was the first cellular operator in Russia with a NMT 450 network which got migrated to CDMA ; it has Coverage between Karelia and Leningrad oblasts (expanding further to Novgorod, Pskov) for CDMA2000 at 450 MHz (Lucent supplied) ; Skylink brand is used also in Moscow via Moscow Cellular Communications

					(MCC) ; 130 000 customers in 2005; DELTA has majority in OAO TeleNord (Murmansk area)
MCC (Moscow Cellular Communications)					MCC was one of the first operators in Moscow with NMT-450, and remained long the 3 rd biggest cellular operator there; its subscriber base declined strongly after 1998 ; it got big Sberbank loans
MCTR					MCTR plans, develops , finances and supports the operations of telecommunications in CIS; it also participates in GSM operations in Chita region ; MCTR had GSM services in Yekaterinburg through affiliate Uraltel ; Uraltel is owned by MCTR, Rostelecom and several local partners; MCTR in 1996 has GSM JVs : Sibintertelecom and Recom in Russia and Coscom in Uzbekistan
RUSSIAN AVG	223	36	65		

Table 1: Main regional and cellular operators in Stage 1; as Rostelecom was not a regional operator, it is on purpose not included; Sources: RINALCO Plus [27], AK&M, NAUFOR; for additional details, also on the regional or small fixed operators not listed here, see [3]

In 1991 there were only 500 users of public wireless communications in all of Russia, using NMT450.

At that stage, Internet access was very limited and over PSTN only.

In St Petersburg, Metrocom created in late 1990's an Internet backbone using fiber laid in underground metro tunnels.

Network construction and equipments were made subject to separate approvals, and inspections were by a separate Directorate (see Table 2 and [3]). Also most CIS countries, including the Russian Federation, did not recognize certificates or test results from others, and documentation must be provided in Russian; test and certification laboratories included Tatincom / Persel, Combellga.

License or certification	Authorization entity
Frequencies	State Committee for radio frequencies (GKRCh) , part of Ministry of Communications of Russian Federation
Use of frequencies	Gossvyaznadzor of Russian federation
Commercial service	Regional Gossvyaznadzor
Field Trial service	Ministry of Communications of Russian Federation
Import of equipment	Gossvyaznadzor of Russian Federation , and Gosstandard under Ministry of Communications
Registration	Regional Gossvyaznadzor
Base station registration	//////////////
Registration of operator company as a license holder	//////////////
Temporary certification	Gossvyaznadzor of Russian Federation

Table 2: Licenses and certifications required for commercial operation in Russian Federation [3]; for details on the Regulator, see Section 3.1.5.

2.2.STAGE 2: CENTRAL GRIP ON FIXED NETWORKS BY GOVERNMENT, and on MOBILE OPERATORS BY ENTREPRENEURS

Having sold off a 49% share in 85 of Russia's 87 regional telephone operating companies in 1993, the government pooled its remaining 51% interest in these companies to create a holding company, called Svyazinvest. This holding company was created during the summer of 1995 in order to bolster the rate of growth of public networks in Russia and to develop a common management policy for those networks. Additionally, government sought to create a major competitor to Rostelecom. In anticipation of Svyazinvest's future role as a competing entity, the Ministry of Communications granted Svyazinvest a license to develop a long-distance and international network. Also, it was maybe not yet intent, but a possibility, to let Svyazinvest itself have foreign investors, just like the regional operators had as

shareholders foreign merchant banks, telecom equipment suppliers or operators. This very complex web of conflicting interests existed throughout this stage.

At the operational level, the many legacy systems posed unsolvable technical problems in fixed networks ; in 1998 IBM/ AMDOCS was awarded a mammoth billing project to replace multiple billing systems supporting 35 M wireline users of Svyazinvest (180 systems in 7 regions).

Mobile networks on the contrary grew and grew in terms of coverage and revenues, although much less in terms of subscribers as the addressable market was constituted mostly of companies and privileged users. In 1998, the average mobile ARPU was 215 USD in Moscow! Mobile phones used to symbolize the nasty side of the “New Russia” with sky high prices, bad service, and well-connected customers “showing-off”; there was little competition [4]. As fanciness got linked to the mobile phone model you used, bundling of terminals with the subscription was an unrealistic commercial proposition. Thus, from that stage on, all users had to buy or rent the terminals separately from their pre-paid or postpaid subscription (with the exception of the commercial launch periods).

In the same phase, driven largely by entrepreneurial thinking, emerged a categorization of operators, aimed at profiling and preserving the independence of mobile and broadband operators, as well as those of corporate network owners. The categories recognized by Government were:

i.-Traditional operators: this included companies run partly or entirely by OAO Svyazinvest, as well as MGTS, Lensvyaz, Komi Svyaz and the largest long distance operator Rostelecom;

ii.-Corporate communications operators: for companies in transport, logistics, such as: Transtelecom, Gasvyaz, Gaztelecom, Gazcom, EES Telecom, Makomnet, Metrocom;

iii.-“Alternative operators” : licensed operators started by entrepreneurs, with or without joint ventures with foreign capital, such as ISP’s , mobile operators, WLL operators, and some of business communications operators; these alternative operators had a larger subscriber base in Moscow than traditional operators already since 2002;

Corporate communications operators represented a typical example of bypass, the negative consequences of which are well known. But they provided modern services to a limited number of privileged subscribers; also they accumulated experience to diffuse later into the two other operator categories [5].

Private business users were interested in mobile networks .When Russian Telecommunications administration allowed 3 standards: NMT, GSM and AMPS they forgot or did not know that AMPS had no mandatory roaming .Paging networks also were encouraged. From 1997-1998, mobile operators Vimpelcom and MTS had dual band GSM networks. Pre-paid subscriptions emerged as the dominant type, even for large ARPU, simply because of the hassle and risks involved in the banking / payment systems; it is still so today.

Despite advantages over wireline, and its suitability for Russia’s low telephone density of 14 %, wireless-in-the-local-loop (WLL) vendors in 1997 had great difficulties in penetrating the market; the

reasons were the certification processes, and frequency allocation, which were only improved slightly much later (6 months certification). In 1997 there were CDMA WLL tenders in the 828-831/ 873-876/ MHz bands; Hughes and Tadiran led that market; at that time the Ministry of Communications assigned CDMA to WLL networks only. The State Commission on radio frequencies (GKRCh), an agency of the Ministry of Communications (MOC) (Table 2) freed up for WLL 450 MHz and 800 MHz bands which were previously used only for NMT 450 and AMPS cellular; prior to that only the 2,3 GHz band was allocated for WLL. WLL vendors had the advantage in Russia over the rest of Europe of landing contracts for hybrid/ mobile networks because WLL licenses were in Russia made available to both fixed and cellular operators .Furthermore, the operator (often a regional operator) had the ability to charge higher WLL tariffs, which generated revenues to subsidize the provision of less profitable fixed services .At the same time, if cellular providers acquired WLL, they could sell spare capacity on cellular networks to fixed telephone clients ; E-TDMA equipment found a niche amongst AMPS cellular networks operating in the same 800 MHz frequency band as TDMA.

When the Russian economy's collapse came about in 1997-1998, the unrealistic situation mostly in the mobile area turned around; the market shrank drastically and the ruble (RUB) fall did not help: several cellular operators were squeezed between low traffic and huge foreign currency denominated credits and telecommunications equipment bills. In 1997-1998, prepaid subscriptions were made at a loss and infrastructure investments fell. NMT450 operator Moscow Cellular communications was hardest hit due to its about 50 % corporate users. Nevertheless, both Vimpelcom and MTS then launched for the middle-class unique offers bundling a cheap terminal and a voucher for limited pre-paid use; people were queuing up! A price war in mobile raged into 1999. In fixed networks, Svyazinvest had a nominal growth of only 5 %. Rostelecom reduced workforce by 5 % in 1998. The 1998 crisis also caused many regional operators tariff and payment problems with accumulated debt to vendors; large debts were restructured and foreign investors lost out in a big way. Although fiber is key to data traffic growth, in 1998 only 54 % of the installed capacity was used.

Amidst such a background, financial investors and investment banks saw treasures. An incredible number of events were staged 1993-2001 by the likes of EPIC, Goldman Sachs, Barings, CS First Boston, KPMG, Renaissance capital, Commerzbank, ING Barings, JP Morgan, Lehman Brothers, Telecominvest etc. . . .

2.3.STAGE 3: CONCENTRATION, MOBILE OPERATORS SURGE AHEAD and BROADBAND TAKES OFF

Operator (with RTS symbol if applicable)	2002 Turnover MUSD (GAAP)	Number of mobile subscribers	Notes
MTS	1361	9 910 000 (2003); 60 Msups in total (2005) ; 52,59 Msups (Q3-2007) in Russia	See Section 3.2.4.; Collaboration with Vodafone on handset s
Vympelkom (NYSE: VIP)	779	7 950 000 (2003); 45	See Sections 3.2.3. and

(Brand: Beeline)		Msubs (2005); 50,08 subs (Q3-2007)	3.3.2.; 2008 employees: 38400; ownership: Altimo 39,2 % and Telenor 39,6 % of capital following shareholder agreement of 2010; employees own 2,1 % capital and free float 27,3 % (2010)
Megafon	409	4 645 350 (2003); 22,8 Msubs (2005); 33,38 Msubs (Q3-2007)	See Section 3.3.3.
Rostelecom (RTKM)	810		Government has 38 % of shares and 51% of votes; controls still over 80-85 % of international traffic and a large share of long distance ; foreign investors own about 30 % of common stock and 10 % of non- voting ; owns a coast to coast microwave backbone and 11000 km of optical fiber; approx. 37000 employees and 3000 executives
Tele 2 Russia		8,54 Msubs (Q3-2007) ; 18 M subs (2010) (mobile and broadband)	See Section 3.3.1.
Uralsvyazinform	471	837373 (2003) ; 4,81 Msubs (Q3-2007)	
Center telecom (Tsentr Telecom) (Moscow region) (ESMO)	522	6 M fixed subs. (2002)	Made up by 17 smaller regional operators
Volga Telecom (Nizhny Novgorod)	34,7		Established 2002 integrating 10 regional carriers
Sibir Telecom (ENCO) (Novosibirsk)	389	4,19 Msubs (Q3-2007)	
Yenisey Telecom	335	160 486 (2003)	
Moscow City Telephone Network (MGTS)	322		Has about 600 corporate clients
North West Telecom (St Petersburg) (formerly Petersburg Telephone network)	321; 2008 revenue : 24,5 BRUB	0	Svyazinvest has 50,7 % of votes; 2008 employees about 21 000 ; absorbed regional

			operators in North West region; also part-owns Telecominvest and their billing company Peter Service ; 198 lines/employee (2008)
St Petersburg Long distance telephone (Peter Star)			Significant US ownership
Transtelecom (TTK)	40,4		53000 km Fiber optic backbone owned by 17 railways incl. RZhd ; 960 PoPs ; VPN's for logistics services; 33 % of national long distance traffic ; goal to reach 15% of residential broadband market also
Dalsvyaz (ESPK) (Vladivostok)	170		
Sovintel	145		Was considered a threat to Rostelecom; was bought by Golden Telecom
Central Telegraph	40,2		
Bashinformsvyaz	73,1		
Komisvyaz	35,5		AMPS system
Lensvyaz	33,5		
Kazan GTS	12,5		
Southern Telecommunications (Krasnodar) (ST Company)			
SMARTS (Samara)		860 000 (2003) ; 3,92 Msubs (Q3-2007)	25 % owned by Rostelecom ; GSM network ; has Euroset as MVNO on its network
NSS		268 142 (2003)	
Tomsk Cellular communications		169 926 (2003)	
Yekaterinburg 2000		155 699 (2003)	
Sibchallenge		138 000 (2003)	
Multiregional transit telecom		None directly	Major mobile transit, signalling, roaming and bit-timing operator in 84 regions; is a GRX provider

Table 3: Major operators in Russia in Stages 2 and 3; Sources: Company reports, RBS, Sotovik Analytical Information agency, Kommersant, Wireless Intelligence

The crisis of 1998 demanded structural reforms which, rather than being initiated by the Regulator in public interest, were initiated almost solely by Government and entrepreneurs as direct stakeholders. In many ways, this was a phase of bail-outs in disguise amidst nationalistic voices, leading to a concentration and to a much smaller list of main operators (Table 3).

A plan by Government to sell off first 25 % of Svyazinvest and then 26 % to western strategic investors failed because the Italian STET backed off suddenly [6]. The Duma also wanted to keep Russia Russian. To make Svyazinvest more attractive, government's stake in Rostelecom was transferred to Svyazinvest, the previous competitor.

In yet another act of despair, in 1999 the Ministry of Communications granted 1700 new licenses to provide communications services, bringing the total number of licenses to 5200 granted since 1993.

In 2002, Svyazinvest created 7 larger inter regional operators by forcing the mergers of many (but not all) of the smaller regional operators (Table 1), and received a 4 BRUB Sberbank loan. In 2002 Rostelecom was reorganized also into 7 enlarged branches uniting 17 territorial centers of long distance communications and TV broadcast. The 7 inter regional operators, usually quoted as separate entities on stock exchanges, even despite the 51 % Svyazinvest take over, often owned 2-5 % of Rostelecom. The creation of the 7 inter regional operators did not solve many issues, such as very high tariffs in some regions, high interconnect rates, and lack of investments to increase the teledensity. In 2004, the governments sold its direct shares in some of these inter regional operators: Tsentr Telecom, Uralsvyazinform, Volga Telecom, South Telecommunications Co, but of course retained majority control via Svyazinvest. Rostelecom reinvested 460 MUSD from the sale of its stake in Golden Telecom (see Section 3.3.1.); it had trouble with its institutional shareholders like shaky bank KIT Finans.

Fake attempts at creating a spirit of competition failed. Rostelecom was claimed to lose 20-30 % of the long distance market as the 7 larger interregional carriers could in principle use their own networks for long distance connections, and choose a network operator for the transit of international traffic.

The fixed line market in 2006 represented 10,1 BUSD (54 % corporate, 45 % residential), with segments: 100<fixed ARPU<2000USD/month (64 % of corporate segment), >2000 USD/month (36 % of corporate segment) [7].

But already in 2003 it was acknowledged that only 26 % of the fixed infrastructure equipment used was up to world standards; 75 % of the networks had to be modernized; for a while switches and routers were almost all imported, and far less than 20 % sourced from local design centers such as Kvant Intercom, Russian telecom company Ltd, Minsk Computer engineering production association, besides

joint-ventures with foreigners (still 80 % of market). These local companies wrongly betted their R&D on DECT, TETRA and other odd technologies.

No surprise therefore those by early 2002, 6 Million people were on waiting lists to get in-house fixed residential telephones. From 2004 the number of telephone subscribers increased only at a rate of 4-5 %/year and traffic by 20 %, so infrastructure renewal was urgent .Digital exchanges allowed to increase subscriber lines. The majority of fixed operators used rather high tariffs for long distance calls, starting from the 5 th zone, splitting the excess between inter regional operators and long distance operators. The incongruity of tariffs (difference between long distance and local tariffs) got reduced from 30 times in 2000 to 9 times in 2003. The 10% of excess prices on long distance calls (mostly charged to companies) were the major source of subsidizing non profitable services (regions or privileged categories). The Regulator was not energetic in rebalancing long distance/ local tariffs; it was made slowly and stumbled on what should be reasonable network access rates to the Rostelecom network. Because of all this there was intense migration to mobile providers, and to a lesser extent to those Internet providers offering VOIP.

Regarding mobile telecommunications, over 200+ cellular operators existed for real or on paper in 2002; all technologies thinkable were featured: NMT, AMPS, DAMPS, CDMA, GSM, DCS, PHS, TETRA and others among which different Wireless in the local loop (WLL) designs .For a full table of names, ownership and characteristics, see [8]. Eight larger GSM operators with licenses in 10 or more big regions in 2000 were consolidated into 4: Vimpelcom, AFK Sistema (MTS), Telecominvest and Smarts. What made these into very attractive investment propositions at that time were high growth, very low subscriber acquisition costs (about 23 USD even in 2004 i.e. two blended ARPU months) , and churn policies of scrubbing out inactive pre-paid users (MTS: 6 months, Megafon: 3 months).

But the main development was the acquisition into the previously-strong, but currently weakened, mobile operators MTS, Vimpelcom and Megafon primarily, by foreign operators who obtained blocking minority stakes in capital and/or in votes. Also some foreign operators decided to try to build themselves majority owned mobile operators in joint ventures. The essential element of these moves was that they all brought experience, commercial organization, and forced a technology convergence (AMPS, DAMPS and almost all CDMA networks were migrated into GSM) .Subscribers grew again at large rates but above all on a large scale (see Table 3); they were sometimes forced to it thanks to the characteristic of the Russian market since about 2001 that terminals are not bundled with a subscription, so a technology change meant a change of terminals paid by the user (normally low end phones with reduced functionality). The 2005 ARPU of mobile operator MTS in Russia was 8,9 USD/month (MTS claimed to be profitable from 2,5 US cents/minute); Megafon ARPU was higher at 14 USD/month. Despite these rather low numbers, the three largest mobile operators in this Stage3 had profit margins in the 50 % range, compared to a 32 % worldwide average. The failure to generate revenue from value-added mobile services persisted; several costly WAP projects foiled in 2000 [9]; there were at most a couple thousand WAP users , due also to a lack of WAP enabled phones.

A telecommunications law made effective in Jan 2004 tried timidly to make the market more transparent, and to strengthen competition mostly in mobile. But, despite this growth and the ubiquity

mobile communications did offer, it did not resolve the huge living standard discrepancies between regions; mobile tariffs were set by operators to be affordable for Moscow and 2-3 large cities, but *not elsewhere* (see Table 4) . Despite the high uncertainty in these data, it shows that in many federal districts, only the rich could afford mobile communications on a continuing basis , and that tariffs in Siberia/ Far East were outrageous.

FEDERAL DISTRICT	2004 ARPU/month (USD)	2004 Annual gross average income/person (USD)	Mobile consumption share in Monthly gross average income of a subscriber
Central	14,5	3668	4,7 %
Northwestern	12,1	1041	13,9 %
Volga	8,5	968	10,5 %
Southern	8,2	744	13,2 %
Ural	10,8	543	23,8 %
Siberian	10,7	621	20,6 %
Far Eastern	20,7	333	74,5 %

Table 4: Mobile affordability across federal districts (2004); Source: iKS Consulting and [5]

The first large ISP MTU-Inform had 100 000 subscribers in 2000, besides the other large RTCOMM.ru . In 2003 12% of the population accessed Internet, but only 4 % from home. Some ISPs wanted to offer pay-TV via broadband ADS L (e.g. MTU-Intel in Moscow). In many rural areas, there was “no problem” simply because there was no access to Internet meaning that denial of service was not a concern to central Government!!! Almost everywhere, the QoS of Internet access was very variable. Satellite based ISP was NTV-Internet for rural areas. There were 380 ISP's in 2000, usually subsidiaries of telecoms or of MPLS VPN's, and 200 Web server consultancies such as Sibintek, Terralink, V6 etc. At this stage were formed and emerged Russian language Internet utilities such as Rambler.ru search engine, search engine Yandex, and the Stack company (controlling: Rambler, iXBT.ru and top-100.ru).

Multimedia VSATs were in strong demand, esp. for Internet access, with 2000 active terminals in 2003 (incl. those made by domestic company ELSOV); but the VSAT number was still very low compared e.g. to India .This low number is due to national policy: draconian VSAT regulations, with aggregate license fees about 10 000 USD/terminal, as well as a protectionist stance wrt. to delivery of satellite services by non-Russian interests' .The VSAT capability was essentially “kept in a box” as it was seen as a threat to return-on-investment of competing terrestrial infrastructure, and seen furthermore as a security threat [10].

Just like value added mobile services have a small share in Russia [11], eBusiness was and is still restricted by the lack or suspicions towards payment systems and information filtering [12]. eBusiness works like this due to the fear of credit card payments: the order is made on-line, payment is made to

distributors or to the Post office, and receipt is sent to e-retailer. The sale is effective when the e-retailer receives that receipt; due to postal delays, 2-3 weeks delivery delays and more are frequent. Payment only arrives months later to the e-retailer .There was also a solution provider working with Internet scrape cards (ORC, 50 % owned by The Telegraph company). Most eBusiness is therefore today via foreign Web sites, with derived problems with customs. Some foreign venture capital companies had seen in eCommerce a way in CIS countries to bypass market access drawbacks (e.g. EDventure holdings).

In 2003 Russia had 10 satcoms (244 transponders) for communications and broadcasting , to grow with the planned modernization by 5 Express-AM satellites , besides making use of Intelsat, Eutelsat , Inmarsat (ground station in Moscow) and others such as NPO PM [13] . Energia also made advanced Yamal satellites with Gazprom financing. The main Russian satcom operators are: Russian satellite communications company RS SCC (a company of the Ministry of Communications) (15 geo satellites), and Teleport-TP (an Intelsat partner). There is also a joint venture satcom operator: Vostocktelecom with partners KDD 37,5 %, Nisshe Luai 37,5 %, Inter Darltelecom 25 %, and Satcom Tel. Gazprom has a videoconferencing system based on Yamal telecoms satellites.

Fiber based communications developed rapidly during this Stage 3, based upon cooperative joint ventures with energy utilities, railways, and regional telecoms. Some fiber networks rested on the privatization of previous State enterprises. Rostelecom developed fiber and feeder links to connect all regional operators to its digital backbone. Railways were the second major fiber optic deployer with 45 000 km (WDM and SDH), especially Transtelecom (uses WDM) which is owned by 17 railroad companies. Transtelecom built networks at the request of Ministry of railways. West Siberian railways also buried 12-16 links. RAO United Energy systems and Gazprom as well had plans for 20 000 km and 10 000 km (extensions into Bielorussia, Poland and Germany) respectively. Sverdlovskaia Railways installed 2500 km. Gaztelecom, contractor of the ground network of Gazprom, received licenses to provide local communications in 53 regions. Comcor Telecommunications operated 2800 km in the Moscow region. Rascom is a joint-venture involving Oktyabrskaya Railways with 1400 km in the North West region. Foreign investors Sonera, GTS Access, Opten also invested or owned stretches of fiber in Russia.

Whereas TV always has had a huge penetration rate and impact in Russia, and government had instrumented a huge reduction of the number of TV channels from about 400 in 1998 to a handful in 2003 (mostly in order better to control news and debates) [20], CATV is only 3-5 % of fiber optic use [7].The reason is the low population density in most places. Carriers with more than 700 km of fiber around Moscow included MGTS Moscow City telephone network (also with JV Telmos), Macomnet, Comstar, PTT Teleport Moscow, Sovintel. Comcor 's TV cable distribution via Moscow's fiber network was owned by Comcor Telecommunications; the fiber network was built and paid by the Moscow City council in the early 1990's; it has links to 200 000 buildings and residents normally pay for CATV as part of rent.

The enterprise communications segment also concentrated, but in sectorial and geographical terms, due to the lesser means of companies and organizations outside the main big cities and their regions (Tables 5, 6). In that segment grew some Russian integrators with often max 2000 persons, supported by the

association Russoft (uniting 80 companies with 7000 employees) ; examples of integrators include: Luxsoft (outsourcing) , ZAO DVA Klyucha , Datatel , Tele Compass, CBOSS (billing and CRM) , Peter-Service , Optima , Exigen Services (St Petersburg), Geyser Co, Asteros , Jet Infosystems, etc... In general, revenues from CRM and billing services were not seen as a business opportunity by these integrators.

Sector	Average ICT budget 2004/company (kUSD)
Finance, banks	439
Public administrations	350
Services	207
Manufacturing	170
Trade	90

Table 5: Average ICT budgets of Russian companies by sector; Source: Market visio “Trends in the development of ICT investment 2002-2004” www.marketvisio.ru

Region	Average ICT budget 2004/company (kUSD)
Moscow	348
Nizhny Novgorod	198
St Petersburg	173
Yekaterinburg	164
Novosibirsk	141

Table 6: Average ICT budgets of Russian companies by region; Source: Market visio “Trends in the development of ICT investment 2002-2004” www.marketvisio.ru

Concentration also happened in terms of telecommunications service charging, not so much out of regulatory principles in public interest, but mostly because the mobile entrepreneurs who had the upper hand under their new eco-system structure stopped accepting to pay high interconnect fees to the stronger , but indispensable, inter-regional operators .Therefore , as a means to consolidate these newly formed operators facing loss of income from mobile operators from Disruption no 4, a 42 % increase in fixed rates was decided pre-emptively in 2002 by the Russian Ministry of Anti-Trust Policy ; the average fixed subscription became in 2003 : 96 RUB for households and 142 RUB for companies. Also, the many irregularities amongst predecessor regional operators had to be resolved ; many regional authorities did not pay their bills for long times and during the crisis, but these subscribers could not be cut off; as a result, central Government ended paying for losses at inter regional operators covering big bills from

public bodies. Before then in Stage 1, fixed tariffs were set by local governments but rate fixing got transferred to the Ministry for Anti-trust policy and support of entrepreneurship (MAP).

On another issue as well, government backed in the face of operator intervention that is on Universal service obligation (USO). USO got removed from Russia's 2005 law on communications on the grounds that the drafts of this law left operators open to arbitrary demands from the Ministry of Communications for funds (a single % on revenues). The 2005 legislation mandated that every village with over 500 citizens should have a phone (representing 30 000 villages) and every village with over 1000 citizens (representing 20 000 villages) should have a phone and an Internet connection (mostly via terrestrial infrastructure and a few VSATs using a simplified procedure for VSATs) [16]. The debate on how to fund USO out of the federal State budget is still not finalized in 2011.

2.4. STAGE 4: MOBILE OPERATORS TURN GLOBAL, BROADBAND EXPLODES and FIXED NETWORKS IMplode INTO ROSTELECOM SEARCHING FOR A NEW ROLE

A new communications law of July 2006 specified that the interconnection tariff from a fixed network to mobile per minute was set at max 1,50 RUB and min 0,75 RUB (for national calls, except Artic areas and Yakoutkia+ Tschukotka)[17] . The fixed operators objected, also because this happened together with the migration to "calling party pays" (CPP). Unclear were the shares leveraged by fixed and mobile operators respectively. The Parliament (Duma) in 2000 already had considered "calling party pays" (CPP) legislation.

Also, from 2006, only "calling party pays" applies with the advantages described in [18]. Finally the new 2006 law suppressed all shared costs irrespective of the network (except basic exceptions and roaming fees).

GSM in Russia is not a "mediated" market, but turned into a big one in Stage 4; in 2007 it was the 2nd largest GSM market behind China, at least counted in SIM cards in circulation corresponding to a SIM penetration of about 125 % of the population; the real penetration was closer to 70 %.

Soon after the 2006 law, 3G licenses were awarded in 2007 to 3 operators for approx. 100 000 USD only (without any cut on revenues) by a "beauty contest" (MTS, Vimpelcom, Megafon) , with only the obligation to deploy 2000 3G base stations by 2010 , which could easily be done) [19] . The 3G spectrum had previously been licensed to the military, and clearing this spectrum caused trouble at a high cost for several years; the military had to be paid by the 3G operators to change all affected equipment. There were problems also with the availability in Russia of dual-mode handsets. Due to capacity issues, the 3G operators decided in practice often only to transfer voice calls to 3G, thus not provisioning mobile data services. Russian 3G carriers established an industry association: "3G Carrier Association".

But even more important trends affected the mobile operators, even finally freed from high payments to fixed operators. As all mobile operators by now were operating on a "level field" with similar GSM platforms and with similar coverage's, competition got intense in a soon-saturating market, and it hit

hard fundamental affordability constraints in the population (Table 4) . As an example, at MTS, even postpaid ARPU was only 28,4 USD/month (usage: 390 min), and prepaid ARPU was only 5, 1 USD/month (usage: 36 min), and it was very difficult to grow them as subscribers in average just did not want to pay more. Furthermore churn amongst pre-paid users was 23,3 %, growing rapidly [20]. In Russia's mobile sector, demand for value added services was a lot lower than elsewhere; even SMS is relatively small and SMS is not used much (6 % of mobile revenues in 2000). So operators could not beef up ARPU much with SMS and other value added services either.

Thus pessimism had come to the domestic mobile market, forcing redeployment abroad; profitability was about to decline from 2007-2008, a trend reinforced by the 2008-2009 global crisis (even if it hit Russia less). Even the majors who invested each about 1 BUSD in 3G deployment, were investing in districts where they already had WiFi networks (but 3G coverage was of course better). The 2008-2009 global crisis hit hard mobile handset distribution with a 50 % cut from 1,76 BUSD (Q1-2008) to 819 MUSD in Q1-2009, or only 5,48 M units.

Internet access kept exploding: 12 M in 2007 and 33 M at the end of 2009. The 2011 Internet penetration is estimated to be 45 %. Access is by a mixture of ADSL, CATV, and very frequently by WiFi and/or Ethernet in buildings (from fiber or CATV head stations). Russian Internet ventures are luring home capital held offshore. Pre-paid Internet grows in the rural areas. VOIP and IPV were and are very popular as they help bypass especially long distance operator's legacy voice and video services and drive down prices.

Broadband operators of retail DSL, and broadband TV include: MTU Intel (Stream brand) (2005: 200 000 subscribers) , Comcor TV , Corbina Telecom , Centel ,WebPlus (St Petersburg: 2005: 21 000 subs) . In 2009 in Moscow , fixed broadband access reached 14,5 M households corresponding to a penetration rate of 71 % .The greatest potential for growth was in the regions where broadband penetration in 2009 was <20 % .In 2009, there were 330 000 wireless WiMAX users in the regions , to be migrated to LTE (dominant operator Scartel, under the "Yota" brand). Mobile operators also are investing in 3G mobile data esp. for indoor usage, or for "post-midnight" mobile data; but they have the weakness of not improving their backhaul transport, making impossible to satisfy Ministry of Communications' goal of 100 Mb/s fixed and mobile Internet access. The geography related challenges, coupled to fixed network weaknesses and costs, are not easily overcome even taking wireless LTE into consideration.

Tenders for the frequencies needed for the operation of LTE networks in Russia will be issued later in 2011. Before that can happen, the three largest Russian mobile network operators, together with Rostelcom, will have to devise 'a scheme' for converting licensed military frequencies to commercial LTE, and to pay for it. In late December 2010, the State Commission for Radio Frequencies allowed Mobile TeleSystems (MTS) , VimpelCom, MegaFon and Rostelecom to form a consortium to study suitable LTE spectrum and prepare proposals for converting this spectrum, after which spectrum will be tendered. The companies that win the spectrum will have to pay the costs of converting it and of manufacturing equipment for the military, although they may immediately begin to offer communications services as they free up the frequencies. This is the second time the Russian military takes hefty payments for spectrum, a most unusual approach, and Government did not earmark directly that spectrum as free

“digital dividend” as elsewhere. The cost of freeing up military spectrum, which lies in the 710-860 MHz range and which analogue TV is currently using, could run as high 2 BUSD. The competition will be open to all applicants, foreign and domestic, although the Ministry of Communications is doubtful whether foreign companies will participate due to the difficulty of gaining access to Russian military equipment. However, foreign companies will be allowed to form joint ventures with Russian partners to build LTE networks, thus introducing a mandated technology transfer mechanism (see Section 3.2.9.). In another LTE development, the Regulator cancelled the 800 MHz licences for regional CDMA operators, including Kaliningrad-based operator Svyazinform and Saratov-based NTS; the cancelled frequencies might be used to deploy LTE.

Russian WiMAX operator Scartel (Yota brand), finished in 2010 its implementation of a trial LTE network in Kazan and plans to deploy LTE networks in Novosibirsk and Samara. In July 2010 Scartel received approval from Regulator Roskomnadzor to abandon WiMAX for LTE, re-using its existing spectrum; the regulator had however previously insisted that the frequencies allocated to Scartel for WiMAX could not be used for other access types. Even more surprising is the announcement by Scartel that it wanted to operate as a wholesale LTE provider that will cover 180 cities by 2014. The company, with the obvious support of Prime Minister Vladimir Putin, stated that Russia's four top operators (MegaFon, MTS, Vimpelcom and Rostelecom) could then share the Yota network on an MVNO basis. The proposal gives the four operators an option to each purchase a 20 per cent shareholding in Scartel in 2014, and this tiny operator would borrow 2 BUSD by 2014 to finance the national LTE network. The involvement of Prime Minister Putin seems to come via the state-owned company Russian Technologies which has a 25 per cent stake in Scartel (see Section 3.2.9.). Telconet Capital Fund, which currently owns 74.9% of Scartel, would be required to sell all of its shares, whilst co-owner Russian Technologies would reduce its 25.1% stake to 20%. Many believe that the Prime Minister personally oversees all major deals in Russia. This one is opposed by AFK Sistema, the parent holding company of MTS which is unhappy with the exorbitant price-tag already being suggested by the WiMAX operator, casting doubts over the consortium's future. Tele2 as well has raised formal objections. In the tangled web that is Russian business, the conglomerate Russian Technologies, led by long-time Putin supporter Sergei Chemezov, has admitted its keenness to develop and supply LTE infrastructure and cut the country's reliance on buying network equipment from overseas vendors. The situation was complicated further when the State Radio Frequency Commission (SRFC) was considering allowing also MTS and MegaFon to effectively relinquish the WiMAX frequencies (held by their respective subsidiaries Comstar UTS and Synterra in Moscow) and exchange them for alternative LTE-suitable frequencies, ahead of the spectrum tender tentatively scheduled for 1 December 2011.

Despite the challenges offered by these domestic broadband developments, what the Russian telecommunications entrepreneurs focus most on are their global expansion. This has happened both in the mobile and in the Internet areas. The reasons are falling margins in the Russian market, saturation due to affordability and coverage, and the wish not to become over dependent on the domestic political risks, while addressing strategic visions in support of some political ambitions.

In 2011, the Vimpelcom- Orascom Egypt / Weather Investments merger (including key subsidiaries such as Wind Italy and others) by a share exchange, propelled the newly created entity into the top five

largest mobile operators worldwide: 174 M subscribers in 20 countries (also in Asia and Africa) with a pro forma operating revenue of 21,5 BUSD (see Introduction). Vimpelcom will also in this way learn from the Italian mobile data experiences of Wind Italy. But it will also face conflicts in Algeria and Pakistan. A shareholder battle has emerged as well: Telenor had a hard battle with its partner Altimo, as the required share exchange mentioned above would have diluted Telenor's stake to 31,7 % of capital and 25 % of votes, while Altimo would have 31,4 % of capital and 31 % of votes [21]. It is possible that this landmark deal could spark similar deals in Russia, as MTS and Vimpelcom have often played a game to follow the leader in terms of strategy.

In the Internet content area, and social networks in particular, similar global Russian ambitions have been realized on a global scale in the case of Mail.ru and sister company DST (Digital Sky Technologies). Mail.ru is the operational holding for Internet activities in Russian turnover approx. 300 MUSD 2010), while DST Global is an investment company. Mail.ru has 100 % control of Russia's no. 1 email provider mail.ru , of no. 2 social networking site Odnoklassniki (classmates) (2011: 17 M users) and of no. 3 social site Moi Mir (My World) , as well as 32,55 % control of no. 1 top social networking site Vkontakte (in Contact) (2011: 21 M users). But Mail.ru also in stages bought a 2,38 % stake in American Facebook , achieved a listing on LSE (16 % of capital) , plus bought 1,5 % in US online game firm Zynga and 5,1 % in "deal of the day "site Groupon [22] . mail.ru in effect controls 70 % of Russian Web, but has also shares in Megafon. Mail.ru also bought chat service ICQ .One reason behind these global moves is that the Russian advertising market is *not* robust, and that they obviously increase the valuation ratios which were lower with Russia based assets only.

Mail.ru and DST are owned jointly (with different percentages) by private shareholders and Internet tycoons Yury Milner and Alisher Usmanov (a doubtful personage). Mail.ru has Naspers as a shareholder. DST has its own holdings in Zynga, Groupon and Facebook, bringing the combined shareholding with Mail.ru of these entrepreneurs in Facebook to a 10 % share in total. DST has global ambitions in social Internet, while Mail.ru is suspected to be a proxy to control the Net in Russia, just like TV media once fell under government control in 2002-2005. Mail.ru grows on the basis of a distinctive culture; cultural factors favor strong local incumbents and Russian speaking worldwide (in Europe, Central Asia, Israel etc.) represents 300 M people.

In the meantime, for fixed networks, there is no progress, and these operators are seeking a new role. Most of them see revenues grow at a rate of 3-5 % per year, still invest little (CAPEX about 10 % of revenue), and see a decrease in local calls with an increase in electronic government sales and in Internet access. When occasions arise, they acquire CATV networks, e.g. Rostelecom's purchase in 2010 of 72 % in National Telecommunications (4,5 M TV users and 431 k subscribers of broadband), and even GSM networks. One possible new role, is to offer Europe-Asia transit facilities, but foreign operators at both ends hesitate; Rostelecom offers Europe-Asia transit with N*64k and N*STM-64; Transtelecom TTK offers EuroAsia Highway SDH/DWDM based transit services. One second new role is to acquire fixed operators and ISP's abroad with transmission assets, typically fiber optic networks; Rostelecom is looking at the possibility of purchasing Ukrainian operator and ISP Datagroup.

The inter regional operators, with reduced interconnect revenues, and increased broadband revenues in effect ceased to exist on 1 April 2011, as Rostelecom merged the seven inter-regional operators into its central operation, namely: North-West Telecom, Center Telecom, Southern Telecommunications, Volga Telecom, Uralsvyazinform, Sibirtelecom and Far East Telecom. The intent in this transition from long-distance operator to full-service telecoms provider was to boost the overall efficiency of state-owned telecoms assets.

More fundamentally, Government may dispose of its stake in enlarged national telecoms operator Rostelecom before September 2013. A stumbling block however may be Rostelecom's ownership structure (Government owns directly 40.07% plus indirect control via two state-owned entities, the Depository Clearing Company (11.99%) and Vnesheconombank (6.86%)). Svyazinvest will cease to exist as a company after the reorganization.

3. DYNAMICS OF THE MAIN STAKEHOLDER STRATEGIES

This Section reviews the main stakeholders in a forward-looking perspective, and the dynamics in their strategies throughout the four stages described in Section 2.

3.1. PUBLIC AUTHORITIES

3.1.1. Parliament (Duma)

Duma has a "State Duma committee for information policy and communications", but it almost never intervenes on telecommunications issues, but rather on media, Internet, and social networks issues. Its role so far has been to approve laws as drafted mostly by the Ministry of Communications.

3.1.2. Prime Minister and Ministry for Communications and Informatization of the Russian Federation (Minsvyaz)

At all times since 1991 and until recently Government has been the center of political power and political initiatives relevant to the telecommunications and media sector. This could be summarized in a "carte blanche" left to whoever was favored to do something. Strategy execution has been reduced to centralization and concentration, also at the expense of the regions / republics, with since 2000 added attention given to the special interests of defense and railways. No attention was ever given to the social and business implications of access (or lack thereof), quality of service, and universal service (USO). Mobile communications was never well understood till recently, as the culture was one of giving privileges to traditional fixed networks. The power of LTE as a 100 Mbps mobile data capability has awakened policy interest in mobile.

3.1.3. Presidency

Until 2008, with the total alignment between the Presidency and Government, there was no explicit involvement of the former. But since, the circles around the Presidency have tried to drive an agenda for innovation resting in parts on ICT, to prepare Russia better for a knowledge economy slant as opposed to the current natural resource and consumption driven structure. First, much of the infrastructure that would enable such innovation is telecommunications, with in 2008 Svyazinvest or fiber operators Transtelecom TTK as perceived actors. The second component was seen to be primarily Internet media companies, and software start-ups, in that a hope was to build upon a fervid hacker culture with reputation for excellence in computer science. The third component was a goal to stake out a distinctively Russian language Web in Cyrillic. To combine the three components, a traditional incubator model was and is still considered, with techno-parks (such as Skolkovo Foundation next to Moscow, and others). But such plans would be very centralized, due to an age-old desire to control, and also innovation hardly starts in a vacuum. As government-chosen champions Svyazinvest / Rostelecom fight for survival and/or a new role, it is unclear how they can satisfy such ambitions.

Amongst Russian software companies to play a model, should be mentioned in the above context, all with strong university and/or military ties, and besides world known Kaspersky Labs (security software, founded 1997): Chatroulette, Luoft (outsourced software development), Digital Design. In 2006, Russian software exports reached 1,5 BUSD.

3.1.4. Governors, regions and republics

From a dominating role in Stage 1, they have been almost totally eliminated by the consolidation and centralization strategy of Government.

3.1.5. Regulator (State Committee of the Russian Federation for Communications and Information , or : Goskomsviaz, reorganized in 1999 into Goskomtelekom , and later into_Roskomnadzor)

In all fairness, over the period of this study, the Regulator has not, and could not operate independently at the strategic level, and could not find backing in the judicial system. Likewise, the culture at Regulator has been too much dominated by traditional telephony, so that its impact in a way has been much smaller than the one of the Spectrum agency GKRCh, and limited almost only to influence on tariffs. As mobile is essentially non-regulated while fixed is (see Section 2.2.), “Western” regulatory notions with technology neutrality do not apply; also demand for mobile was almost always higher than supply during the period of this research.

Regulator has also a role in the TV sector and the media [14]. As an example, the regulator in 2010 issued a call for tender for the development and delivery of a software and hardware system that monitors electronic publications of online media, including those made on forums; this move follows a decision by Russia’s Supreme Court in June 2010, according to which online media must remove or edit any illegal comments made by readers only after Roskomnadzor has detected violations and appealed to editorial staff.

Regulator got assigned tariff regulations in 1999, which before was done by local governments on a “cost+” basis or rather “cost –“ basis, because tariffs covered only 40-50 % of costs. In 2000-2001 local telephone tariffs almost completed the cost recovery in most regions. There were still 30 % of providers in Central and Southern areas with “cost-“ operations .From 2002, the policy became “cost +”, with separation of service types and standard profits. During 2002 tariffs for local telephone services for consumers increased an average of 45 %. Elements of cross subsidizing existed in some tariffs in accordance with Russian Federation Government decree 715 (11.10.2001). By Decree 715, tariffs are established in two categories: households and companies. On average tariffs for companies are 40-80 % higher. Inter regional companies had uniform local tariffs (with the exception of the Northern regions); the difference between them did not exceed 30%. However interconnect tariffs between inter-regional companies varied a lot due to territorial specifics. OAO Far Eastern Telecommunications company had the highest dependency on distance in tariffs for households and companies; they exceed minimal tariffs by 50 % for households and 100% for companies when compared e.g. to OAO Center Telecom.

With Svyazinvest for some time being the key decision maker, and because of the political sensitivity of the issue, Regulator could not rebalance local vs. long distance fixed tariffs by increasing local tariffs (sum of subscriber fee and local connection fee). The consistence of the tariffs in affordability and purchasing power parity terms never got solved. And, even if they had to be increased further, long distance tariffs were already much higher than abroad, benefiting largely Rostelecom and similar long distance operators. Rostelecom was even an element of barring Russia's entry into WTO; what was irking WTO was that Rostelecom cross- subsidized its low domestic long distance fees with high cost international calls .

For a while, another issue was time based local calls, for those operators who had migrated to time-rate tariff systems. These time based tariffs were due to large Internet use over telephone lines (or Ethernet). In 2002 Regulator established tariffs for 11 providers that had already switched to time-rate tariffs.

There were frequent conflicts between Regulator, the Ministry of economic development and the Ministry of communications (Ministry for Communications and Informatization of the Russian Federation (Minsvyaz)). Regulator often suffered a lot and still does from weak methodologies and above all from inaccurate data from operators and authorities.

3.2.FINANCIAL ENTITIES AND HOLDINGS

Ever since 1991, holdings have been the preferred financial and legal instrument chosen by Government, entrepreneurs and foreign investors alike, to restructure in the telecommunications sector, and remain the legacy of Stage 1. They are easy to create, but difficult to unwind although forced share swaps have been used extensively to weed out private investors, employees, and foreigners in Stages 1, 2 and 3. The distinction between public and private holdings is non-meaningful in Russia, so intertwined are the two types of ownership.

3.2.1. Svyazinvest

The Government holding company Svyazinvest was created in 1995 in a dream of planned glory of Russian fixed communications over the wide Russian territory, to be turned into a vehicle of control and consolidation which missed however largely the big opportunities offered by mobile communications and Internet content. It also missed being truly attractive to foreign investors as it offered no added value for them over the constituent companies. Its planned disappearance does not warrant for it a forward looking role.

In 1997, Svyazinvest controlled 82 regional operators plus 50% of Rostelecom, as well as several specialized companies ; the geographical coverage was 93 % of the population with 26,6 M Lines ; the cash collection rate was 80 % , far better than electrical utilities. While Government directly and indirectly owned a majority of capital and votes, after 1995, 25 % were sold by auction (1,875 BUSD) to a consortium made of Oneximbank, and Deutsche Grenfell, helping a trend towards price growth for regional telecoms. This valuation at that time represented a capitalization average of 750-880 USD/ fixed access line. Revenues were 6 BUSD in 1997 with 1 BUSD foreign currency liabilities which were repaid in 2000. In 1998, 24 % more in 1998 were privatized. Svyazinvest had also a rocky history of relationships with private financial investors such as Renaissance Capital (at a point in time these 24%).

3.2.2. Telecominvest

Then-Minister of Communications Leonid Reiman had close connections with Svyazinvest (incl. the 7 inter regional operators) .They formed the holding company TelecomInvest in 1994 with two leading fixed line operators in St Petersburg : Peterburg Telephone Network, and St Petersburg Domestic and Intl. Telephone company, and with TeliaSonera founded Megafon . Telecominvest does not have a controlling stake in Megafon and may face losing control of its daughter company .Telecominvest also has as subsidiaries CJSC Peter Service, Internet service provider CJSC Web Plus, and a few regional GSM networks.

3.2.3. Altimo (Alfa Telecom International Mobile)

Alfa Group is controlled by Mikhaïl Friedman and its telecommunications focused sub-holding is Altimo. It was the dominant investor (75 % owned) via Altimo in the creation of Vimpelcom. Altimo has always had an immoderate appetite for wireless networks, and still follows an aggressive strategy after having reached 120 M subscribers in 2007. Its business models allows it to achieve high profits despite low average ARPU. The 2007 Altimo portfolio of 9 BUSD in mobile operators, with shareholdings between 20 and 49 %, included : Megafon (25,1 %) , Vimpelcom (39,2 %) , Golden Telecom (29,58 %), Kievstar GSM (43,48 %), Turkcell Iletisim Hizmetleri) (13,22. Altimo suffered from its aggressive image and hostile handling of Telenor and Teliasonera, partners in Vimpelcom and Megafon respectively; the Scandinavian operators got accused of wanting and operator culture to control the majority in these Russian operations, whereas Altimo got accused of wanting only to grow assets.

In 2010, Telenor and Altimo combined their interests in Vimpelcom and Ukrainian Kylvstar in Vimpelcom, with Telenor owning 39,6 % of capital and 36 % of votes, while Altimo got 39,2 % of capital and 44 % of

votes at that stage. The later mega-merger with Orascom Egypt (see Section 2.4.) has again changed this balance.

Vimpelcom was off to an inconsistent start .It had a tremendous commercial start in 1999 launching at the right time a bundle (korobochka): phone and 10 USD airtime for 49 USD, making mobile affordable for those with 400 USD monthly income, an unheard of proposition in Russia. In the beginning it had GSM 900/1800 and D-AMPS licenses covering 70 % of population in 12 regions. But it also had a subsidiary KB Impulse, which launched pilot DCS 1800 (Alcatel supplied), against a 10 % stake. By and large, Vimpelcom is today an efficient operator in Russia, with sound finances. Vimpelcom has high air time usage 50 % in the Moscow market, and on the financial front its price/book ratio of 1 is noteworthy. Vimpelcom has expanded in Vietnam, Kazakhstan (2004), Ukraine and Tajikistan (2005), Uzbekistan Armenia and Georgia (2006), as well as 2009 in Cambodia, Vietnam and Laos. %). End 2006 it is rumoured to have invested 2 BUSD in Indonesia. Altimo was a shareholder in Golden Telecom (40%) which was later acquired by Vimpelcom.

And more importantly, Vimpelcom is a rare bird: a Russian management that can change a failing strategy.

Over the years, all kinds of rumors largely distilled by Altimo itself were reported. In 2003, Altimo was rumoured to buy 25,1 % of rival Megafon. In 2005, Altimo should have had also sights on Svyazinvest in connection with Government's auctions.

3.2.4. AFK SISTEMA

The holding Sistema is closely linked to interests of the Liouchkov family, the ex-mayor of Moscow. It is the dominant investor in MTS (53 %, later changed to 39%), besides stakes in Moscow City telephone network MGTS, MTT (long distance) and ISP's such as Comstar, Telmos, MTU-Inform. In other words, Sistema has followed a strategy of converged networks, and another one of going after the corporate segment. The initial foreign strategic partner in MTS was Deutsche Telekom which reduced its shareholding from 41 %; Deutsche Telekom for its GSM network in Ukraine had MTS Moscow as co-investor.

Historically, ROSICO, a subsidiary of AFK Sistema, won a DCS 1800 license back in 1996, and Rosico's network was integrated into the MTS GSM network (using dual GSM/ DCS phones).

MTS has very ambitious plans and strategies: catch the highest paying post-paid customers (50 % of postpaid market share in 2006), expand abroad (Uzbekistan, Armenia, Turkmenistan, Ukraine), build and own a backhaul, squeeze supplier prices (especially for 3G / HSDPA). MTS spent 1 BUSD to roll out 3 G across cities in entire country, and wanted to be in top 10 worldwide operators by 2010 in terms of market cap. It tried, but failed, to bid for Telsim (Turkey) [23, 24].

Part of Sistema's power stems from its badly understood essential investment in MTT. MTT (Multiregional Transit Telecom) owns the only transit network for mobile operators and to a lesser extent some fixed operators: 3 regional centers in Moscow, St Petersburg and Krasnoyarsk (in this region

operated and controlled by SibChallenge Telecom). MTT operates the SS7 signalling network, roaming as well as hierarchical bit-timing.

3.2.5. RENOVA Group

The controlling shareholder in Renova Group is Viktor Vekselberg. Renova Media Enterprises were founded in 20006, with shares in: Comcor TV, Cosmos TV, Svyazinvest, and Corbina Telecom. Corbina Telecom , sold to Renova and other investors already in 2000, offers triple play/ ADSL broadband (50 000 customers in 2006) in the Moscow area , besides being a traditional supplier of long distance traffic to SME's .It wants to get into fiber and operated for a while as an MVNO on Vimpelcom DAMPS in Moscow.

3.2.6. MENATEP Group

Antel Holding is a subsidiary of the Menatep Group (oil focused) .It has stakes in ISP's, and bought the former KPN / Qwest backbone in Eastern Europe.

3.2.7. TROIKA Dialog

This financial group mostly serves as an intermediary in new supplier contracts (incl. vendor financing), refinancing of debt , and interaction with selected government clients .It also contributes IT facilities via subsidiaries for uniform billing , helping out in faster telecommunications services provisioning. It also tendered 6,4 BRUB (411 MUSD) in 1998 for a national GSM 900 license valid for 15 years in all Russia, serving as a proxy for at that time undisclosed operator interests.

3.2.8. RTDC Corp (Russian Telecommunications Development corp.)

Delta and MCC have two common shareholders: RTDC Corp (Russian Telecommunications Development corp.: 22 % in MCC and 31,9 % in Delta), and Telco Overseas Ltd (MCC: 20 % Delta: 25 %). RTDC was also a shareholder in Uralvestcom (NMT 450 in Sverdlovsk region) and in JSC Skylink (promotion of CDMA 2000 in Russia).

3.2.9. Russian Technologies Corp. (Rostekhnologii)

This new State enterprise (founded 2007) is designed to assist Russian organisations-developers and manufacturers of high technology industrial products. It essentially in fact negotiates or manages imposed technology transfer agreements to Russian dominated and localized joint ventures which in turn manufacture in Russia. Although the emphasis is on aerospace and defense, an agreement has been signed with Alcatel-Lucent to make IP LAN switches and routers for local networks, service routers and service switches for IP/MPLS-based networks and distributed corporate networks. Also, through its surprising 25 % share in operator Scartel (Yota brand), Russian Technologies Corp. looks intent to play a role in LTE (see Section 2.4.).

3.3. INDUSTRIAL INVESTORS

In this category are to be found foreign operators and suppliers; the last category was very present in Stage 1, but almost disappeared later except for WLL infrastructure, WiMAX and CATV. Are only considered here those industrial investors present in 2011, and relevant in a forward-looking perspective.

3.3.1. TELE 2 (Sweden)

Tele2 is in effect no. 4 on the Russian mobile market with a 8 % market share. Tele2 wins customers by playing on right tariffs and quality, and margin is about 48 %.

Tele2 is a Swedish owned (Kinnevik: 30,3 % of capital, 47,5% of votes) convergence operator, which has moved from being a MVNO to owning own infrastructure, with strong presences in Russia (starting in 2001 by the purchase of a Millicom network, and had 3 M customers in 2005) and Kazakhstan (0,4 M subs). 2009 customer base in Russia was 18 M in 37 regions. Tele 2 is intent on deploying LTE, which it has excellent credentials in from Scandinavia.

3.3.2. TELENR (Norway)

Telenor is a long term investor and partner of Vimpelcom (see Section 3.2.3.), but started off in Russia with a stake in North West Cellular (St Petersburg). The Norwegian operator, despite difficulties in the Russian market, is determined to stay and play a role as in the past.

One such case are the strategies around Golden Telecom. Privately held Golden Telecom first acquired the Sovintel fixed line provider in 2002, focusing on business customers (3rd largest in Moscow area at that time). Golden Telecom later received 100% of the shares in OAO Comincom and subsidiary OAO Combella, and developed Golden Telecom Ukraine. Golden Telecom had fixed business ARPU of 2000 USD/month in 2007 and its business division represented about 50 % of total revenues. It had plans to reach the 65 top cities by fiber to the building (buildings with > 100 tenants). Golden Telecom bought 51 % of Corbina which in Q3-2007 had passed 2,6 M apartments with fiber and had 170 000 subs .It offered bundles of Internet and VOIP at 15-20 USD/month; the WiFi offer was called Golden WiFi with 30 000 subscribers end 2007, which allowed to offer broadband between office and home.

Playing a convergence strategy in view of providing Internet services, Telenor acquired 19,5 % of Golden Telecom in 2003 together with Altimo (29 %), which were swapped into Vimpelcom when Vimpelcom later (only in 2008) realized the necessity of a similar strategy and the value of the Golden Telecom assets. Telenor share in Vimpelcom thus increased after the Golden Telecom deal to 39,6 %.

Telenor also is intent on deploying LTE, which it has excellent credentials in from Scandinavia.

3.3.3. Telia Sonera (Sweden / Finland)

Since the 1998 crisis, Telia Sonera owns 39,44 % (down from 43,8 %) in Megafon. Telia Sonera's role is however reduced mostly to commercial operations, lobbying and finance.

GSM dual band Sonic Duo was awarded 2000 to Sonic, a joint-venture of Sonera (35 %), and of the government owned Central Telegraph (65 %), representing the first operations in Russia of the future Telia Sonera. Telia Sonera, via FINTUR Holdings, has also cellular assets in Azrcel (Azerbaijan), Geocell (Georgia), K-Cell (Kazakhstan) and Moldcell (Moldova).

Megafon, has always been said to be close to the Ministry of Communications, and was said to have got preferential access to licenses and spectrum.

3.3.4. KONTAKT EAST HOLDING (Sweden)

Vostok Nafta and Kinnevik group company Kontakt East Holding has 2 operating companies forming part of Yellow pages Russia (YPR) , formerly started by Swedish ENIRO which sold it in 2005.YPR makes all kinds of directories (on- and off-line) , plus direct marketing , and B2B .Advertising revenue in Russia though is still far behind other places (0,69 % of GDP in 2005)

3.3.5. Baring Vostok Capital Partners

It owns ozon.ru, a very successful eCommerce operation (2010: 5 M registered users and 143 MUSD turnover) similar to Amazon with 1 M products in 12 categories .As Russian Post does not function fast enough, key was the build-up of logistics chain OCourrier , supplemented by decentralized collection points ; payment is by cash upon delivery .

4. COMPARATIVE ANALYSIS AND PERSPECTIVES

This Section, on the basis of the previous Sections 2 and 3, first highlights those differentiated dynamic processes which have taken place, or not, in Russia over the past 20 years, compared to the generally consistent trends in telecommunications and Internet regulation in countries or regions having achieved around 2010 similar economic weight globally for that sector (China [25], India [26], Europe, North America, Japan, Korea). This economic weight is estimated by adding up per country the total worldwide revenues, capitalizations and customer numbers of national operators, and selecting by a balanced view the top countries or regions. Next, the Section provides some forward-looking perspectives for Russia, rooted in the 20 year evolution.

4.1.COMPARATIVE ANALYSIS

4.1.1 What Russia has done in an explicit and different way, can be summarized as follows:

-Government itself has taken a very interventionist and controlling stance in many issues, driven by a combination of “neo-authoritarianism”, nationalism and overbearing management, to an extent even surpassing clearly China and Korea.

-Whereas in most countries or regions, licensing over the years has been made easier to foster competition by letting newcomers emerge subject mostly to technical interoperability constraints only, the reverse was true in Russia which went from an incredibly large number of licensed operators to a very small number by a very strong and fast concentration and consolidation process.

-Entrepreneurs in Russia could, and did, almost single handedly build from scratch very strong mobile operators with global ambitions, rather than evolving mobile operations from prior fixed operations like elsewhere (except specific cases in Europe and India).

-The Regulator is in all practical sense not independent of Government, and suffers from non-verifiable data and information, due to insufficient transparency and governance at operators [30]; this is a unique situation amongst the countries or regions compared here.

-Geographical coverage conditions linked to the licenses (fixed or mobile or Internet) never got enforced in Russia on a significant scale, contrary to all others (with regional exceptions in China and India).

-Ambitions linked to the incumbent or new fixed operators got largely nationalized (via public-private partnerships where only Government decided), only to see this strategy fail entirely at high cost to users, and with no significant benefits in geographical capacity supply.

-Mobile terminals never were included in bundles, even pre-paid, like only some specific operators in China, Korea and emerging countries in Europe; the only exception was to launch mobile subscriptions in the very early days (see Section 3.2.3.); there is no handset subsidy in Russia since about year 2001; in 2007, MTS subscribers recycled their handsets every 14 months; this feature allows for fast technology changes.

-Russia switched to mobile “calling-party pays” (still largely preserved in USA), but did not drop distance based long distance fixed tariffs (alike China and India).

-Russian users have only used to a limited extent value added services (intelligent network applications, SMS, value added applications such as mobile banking and localization), even generic one's, a situation different from almost all countries and regions.

-Most small or financial foreign investors, although having shareholder rights, very often got diluted or side-stepped in many ways.

4.1.2 What Russia has explicitly not done (except minor cases), can be summarized as follows:

--To bring fixed line penetration to a high level; it was claimed by Ministry of Communications in 2000, that a 30 % penetration would require 47 BUSD, 50 % 126 BUSD, and to reach 20% cellular would require 33 BUSD (1000 USD per fixed line and 500 USD per cellular); as we know from Section 2, the effective cellular penetration then had to grow, and did so well beyond this target.

- Authorize and regulate network sharing, which was not even considered to ensure coverage.
- There is a very bad segmentation of customer bases and there are no differentiated brands; MTS made some attempts.
- Encourage the formation of MVNO's and allow enterprises to run VPN's MVNO's on public networks (subject of course upon acceptable dependability QoS performances being met). Under Russian law, the MVNO model is restricted to that of reseller or agent. A MVNO can only sell the hosted service for a fee, while all the time making clear within the customer contract that the agent merely represents the host. No separate branding, even of additional services .MTS and others also claim not to have capacity to support an MVNO .The three largest mobile operators also fear to lose customers to freer MVNOs. But these mobile incumbents may want to expand in new markets being themselves MVNOs.
- Address the needs of the poor (except some groups inside privileged categories like veterans or former Army personnel)
- Distribute technical skills were needed ; a critical case is the lack of technical skills in Siberia and the Far East; there has been a dramatic increase in the variety of networks and network elements , but people employed to support operations has not kept pace .Operators turn to OSS to bridge the gap .Scalability is also stumbling block.
- Address through modern training at all levels, the productivity of operator staff, esp. at management levels.
- Outsourcing of network operations is seldom; MTS has outsourced a small operation to Nokia Siemens Networks for 3G.
- Invest long term in technology and international property rights for telecommunications infrastructure , applications and real time software for commercial use; compared to investments which have gone into similar defense focused capabilities or products (e.g. in Federal Institutes and at OAO Geofizika) , the effort has been minimal and far less in comparison to all countries and regions in this comparison.
- Define export markets for technologies, products and services in telecommunications, as have all regions and countries (with the exception of India).
- Prepaid is muted in the primitive financial system, as direct debits from bank accounts or credit cards are rarely used and often not possible; paying a monthly bill is still a chore; in this sense, it is surprising that mobile payments were not seized as an opportunity by operators, except for the preference given by most entrepreneurs to their financial bank holdings over their telecommunications holdings.
- Entrepreneurs did not discover the truth that the best way to make use of e-Business in Russia is to run their existing businesses more effectively.
- A fundamental difference of Internet search in Russia is that many of the social networks don't make their info available to search engines, but instead build their own.

4.2.PERSPECTIVES

For obvious reasons, almost no perspectives can be rooted in this case in extrapolations, but rather in large identified opportunities revealed by the systems analysis above. Also telecommunications in Russia cannot be labeled as consumer growth diffusion led developing market, due to large differences between regions and mature town markets. This is the only aspect of perspectives which has not changed since those perspectives crafted almost 15 years ago [27, 28]. Even the Russian mobile market closely mirrors the serious regional imbalances in the economy, with about 40 % of subscribers living in Moscow, and 20 % in St Petersburg. Who dominates these two markets can dominate elsewhere will remain a constant property [29]. DWDM is considered a key technology, and Government has set itself yet again an overall target for 2015 to reach a penetration of 60 fixed lines/100 inh. across the entire country, rather than building upon the strengths of LTE coupled with DWDM.

The overall effects of the handling of the 1998 melt down were beneficial in the long run, by introducing competence in the mobile area as well as some competition instead of maintaining a supply driven market.

Also in Russia, some consumers are poor, but also these same consumers are unproductive as producers: employees lack training, office / specialty equipment and effective bosses. One opportunity is therefore to develop “carrier grade” robust e-Business applications, alongside simple manageable user configurations, to bring the diversity and power of decentralized business processes to these users, leveraging carrier advantages as they progress further. There is already an immediate opportunity to capture a part of the 4-6 BUSD loss caused by domestic distribution inefficiencies. This perspective of course extends to benefits in logistics and banking. The question is of course if the political forces will encourage or inhibit such a decentralized distribution of economic power.

To the extent as elsewhere that GDP is driven by telecommunications and Internet penetration rates, it is high time for Russia to wake up to compensate for the accelerating reduction in income from accessible natural resources, by vastly strengthening the ubiquity, dependability and quality of domestic telecommunications services. Telecommunications spend as a % of GDP has been stable at 2,2 % until 2006 (according to Analysys) and the mix in it favors mobile, but that ratio has fallen since as ARPU's stayed low.

By a strange reversal of perspectives, some Government circles, relayed by some entrepreneurs expanding abroad, have a dream to improve the same network attributes *abroad* and for transit networks, to replicate the imposed dependence they think they achieved on some countries by controlling their supplies of gas and/or petrol. Entrepreneurs will have to learn that you cannot be a large operator and elite brand at the same time unless operations are flawless and affordable. Russian operators have now the same technologies as elsewhere, but OSS should be managed more according to business level objectives rather than old network management centric rules .Managing a VOIP network

to compete on QoS is quite different from deploying best effort VOIP to win a price war. There is also public pressure on all tariffs due to the increased availability of unregulated VOIP.

Russia re-emerges as a desirable investment destination; but interesting enough, none of the 11 privatizations of minority stakes in 2011-2016 of state run companies include telecoms, except maybe the privatization of Rostelecom and some SME's. The new Minister of Telecommunications and mass communications I. Shchegolev has however stated "This makes the modernization of the country's telecommunications system both a key step towards the foundation of a modern information society, and a necessary condition for the development of the country's economy".

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