

Central and Eastern Europe's 3G Future

The future of 3G has been subject to rigorous global debate over the last few years. Concerns raised have included high licence fee expenses, infrastructure costs and handset launch delays as well as the uncertainty over service take-up, pricing points and “killer applications”. Business sentiment during this period has changed from extreme enthusiasm to general pessimism. However, the debate has centred on Western Europe and North America - what does the future hold for Central and Eastern Europe (CEE)?

Yet the factors which caused GSM to be so much more successful than was predicted in CEE - higher than expected ability to pay, the cost advantages of lagging behind Western launches, poor alternative infrastructure - apply with equal force to 3G. In this paper we consider whether a similar surprise may be in store in the case of the next generation offering.

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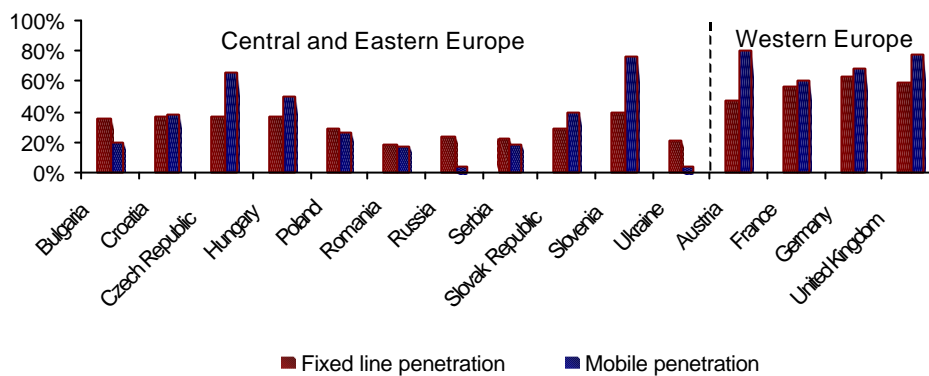
REVENUES & SERVICE OFFERINGS

The first part of the argument for bankable 3G business plans comes in the form of reduced uncertainty regarding the likely revenues from mobile services.

Fixed Line Penetration vs Mobile

Fixed line penetration in CEE is far below that of Western Europe and the products and services offered on those fixed lines have traditionally been of low quality and high price with few creative offerings. Due to the high cost of expanding fixed line infrastructure and the current lack of financing many incumbents are struggling to improve this situation. In the Moscow Oblast, for example, unsatisfied demand for telephone services has been estimated at 600,000 to 800,000 lines. At the current rate of new subscriber installation this demand will take at least 20 years to meet.

FIGURE 1: FIXED LINE VERSUS MOBILE PENETRATION 2001



Source: ITU

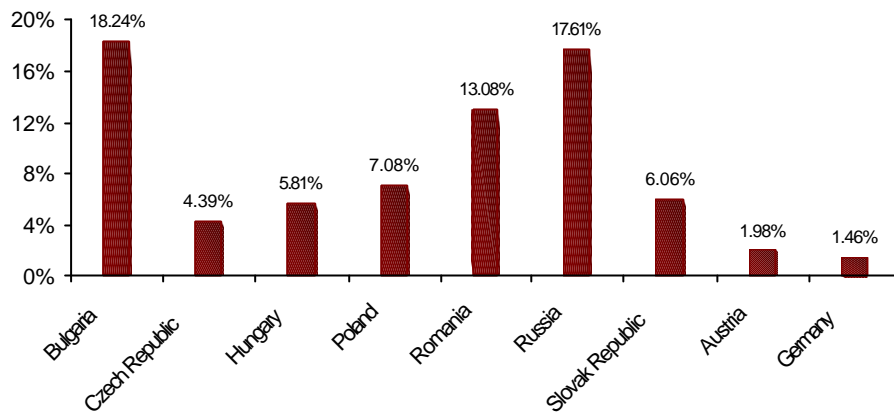
As a result some countries, notably the Czech Republic, Estonia and Slovenia, are witnessing the migration of traditional fixed line usage onto their mobile networks. The substitution effect has been driven by the relative low cost of “installation”, competitive call pricing and superior quality of service. Substitution will continue to provide a strong core to revenues as services migrate to 3G platforms. We expect this pattern to repeat itself in other CEE countries as mobile penetration approaches critical mass. The implication is that the potential exists for mobile networks to provide the residential data services also traditionally associated with fixed line networks.

Average Revenue per User (ARPU)

ARPU declined in Western Europe for several years as operators pushed down prices to encourage growth and take market share. ARPU has increased since then as operators have focused on profitability. Several CEE countries have already followed this pattern but other, lower penetration, markets are unlikely to do so due to the need to maintain margins from current financing restraints. Furthermore, contrary to general western opinion, consumers in the Region do spend a large proportion of their wealth on mobile services, particularly in Russia and Bulgaria. Stable and larger than expected ARPU therefore provides a second strong base to the core revenues of mobile operators as they progress to 3G offerings.

The potential exists for mobile networks to provide data services traditionally offered over fixed line

FIGURE 2: GDP PER PERSON/ARPU 2001



Source: ITU; World Bank; CET Analysis

Many CEE operators can use the experiences of their strategic owners

Content & Application Service Offerings

The key issue for Western operators is to create additional, rather than substitutional, revenue streams on 3G networks in order to recoup investments costs. They have had to consider (1) what services and applications can they offer over 3G networks and (2) what should be the pricing mechanisms? Fortunately CEE operators have not made large commitments to license or infrastructure expenses and as a result they have the luxury of being able to observe how Western operators resolve this issue. Even better, many CEE operators can leverage the content and application platforms developed by their strategic owners into their local context.

FIGURE 3: STRATEGIC SUBSIDIARIES IN CEE

Vodafone	Orange (France Telecom)	T-Mobile (Deutsche Telekom)
Polkomtel (Poland) VRAM (Hungary) Mobifon (Romania)	Orange Slovensko (Slovakia) Orange (Romania) Centertel (Poland)	Westel (via Matav, Hungary) Oskar (via Radiomobil, Czech) T-Mobile (Croatia) T-Mobile (Slovenia) T-Mobile (Slovakia) MTS (Russia)

The industry is currently trying to emulate the spectacular, and unexpected, success of Short Messaging Services (SMS) with the more bandwidth intensive Multimedia Messaging Service (MMS) now possible over GPRS upgraded networks. The service has been introduced in many countries and the pricing point, with the various flavours of packages and bandwidth size restrictions, is approximately 3-4 times the cost of an SMS message.

The experiences of implementing these 2.5G services will provide valuable insight into the introduction of 3G services. Furthermore CEE operators will have a longer lead time to experiment with 2.5G before attempting to migrate subscribers. However in Poland, where penetration of mobile subscribers is quite low, MMS has not yet created much impact. Observers put this down to the relatively high cost of MMS capable handsets which are not yet affordable for the target audience of younger users.

FIGURE 4: EXAMPLE SMS VS MMS PRICING COMPARISON (RESTATED IN EUR)

Country	Operator	Introduction	SMS	MMS
UK	Orange	Aug 02	€0.146	€0.585
Germany	T-Mobile			€0.39 (30Kb) - €0.99 (100 Kb)
Czech Republic	Eurotel	Aug 02	€0.0476-€0.0793	€0.301
Hungary	Westel	Aug 02	€0.123	€0.312 (<10Kb) €0.656 (10Kb-30Kb) €1.312 (>30Kb)
Poland	Plus	June 02	€0.056	€0.455 (0-50Kb)

Source: Company Websites; CET Analysis

Whilst tried and tested communication services over mobile networks (e.g. voice, SMS, and email) will continue to be the core offering of a mobile service, uncertainty remains over the adoption of static content (news, features), transaction services (e.g. mobile banking, shopping and payments services), and location services (maps, place locators). Ideally, operators hope that more bandwidth intensive services (e.g. networked gaming, video streaming and even videophones) take-off that will fill capacity and carry large service premiums the 3G “killer apps”.

FIGURE 5: HUTCHISON WHAMPOA'S "3"



Hutchinson Whampoa's 3G service, branded globally as "3" and yet to launch, plans to offer video clips of goals scored in England's Premier League Football matches as part of its monthly contract packages starting at £59.99 per month (handsets will retail from £399).

Source: Company Website

CEE operators can experiment with 2.5G services before upgrading to 3G

COSTS & TECHNOLOGY

The second part of the argument centres on the increased visibility and understanding regarding the costs of 3G network planning and implementation.

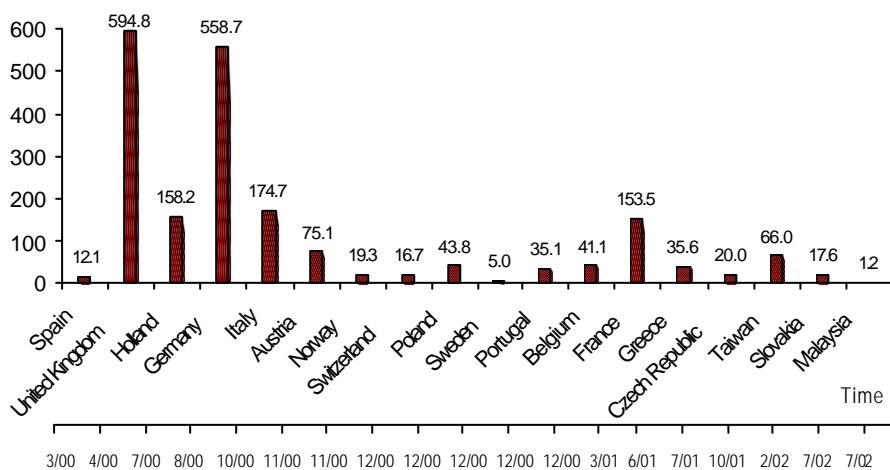
Government Expectations

The Governments of CEE may consider themselves unlucky that their mobile markets were insufficiently developed to capitalise on the high market valuations of mobile operators and hence the high price operators were willing to pay for 3G licenses several years ago. However, the reduction in prices has provided alternative opportunities to government and operators alike.

CEE Governments have the opportunity to design a process that will allow national mobile networks to develop at a rate that is beneficial to the whole economy, therefore compensating for lower licence fee revenues, without the complication of having to create future legislation to take back licences from failing operators (as has happened in Spain and Slovakia and should happen in Germany and the Netherlands). Furthermore, they can be more creative with their policies on issues including infrastructure sharing, Mobile Virtual Network Operators (MVNOs), and infrastructure roll-out schedules. When combined with lower license fee expenses such policies will give operators more strategic and financial flexibility to launch infrastructure and service projects. The indirect effects of this are likely to promote information technology investment and employment environments, which could more than offset the reduced expectations on license fee revenues.

Who will be the first to separate network infrastructure and customer service on a national basis? Infrastructure sharing and MVNOs are the first step...

FIGURE 6: 3G LICENSE PRICE PAID PER CAPITA (USD)



Network Launches

Dropped calls when moving between cells and low data rates in comparison to theoretical predictions are just two of the problems that infrastructure vendors, such as Ericsson, Nokia, Nortel and Alactel, have had to overcome – and mobile operators, in countries where licenses were issued some time ago, have had to wait for them to be resolved.

Fortunately for most CEE operators, by the time they come to launching their networks the infrastructure vendors should have developed robust track records of implementing commercial networks and the operators will have learned how to run them. Ericsson alone has won 48 contracts worldwide to deliver WCDMA, EDGE and CDMA2000 1X 7 3G core networks and Nokia 21 to date. However two interesting trends have emerged: (1) CDMA based networks have been upgraded faster than GSM; and (2) reduced capital expenditure schedules have increased price pressure on vendors. CEE operators should consider the advantages of leveraging this second point.

Vendors will have learned how to build networks and operators to run them

FIGURE 7: SAMPLE GLOBAL 3G NETWORK LAUNCHES

Date	Country	Type	Operator	Technology
October 1, 2001	Japan	Launch	NTT DoCoMo	WCDMA
January 25, 2002	South Korea	Launch	SK Telecom	CDMA2000 1x EV-DO
January 27, 2002	USA	Launch	Verizon	CDMA2000 1x EV-DO
May 1, 2002	South Korea	Launch	KTF	CDMA2000 1x EV-DO
June 1, 2002	UK	Commercial Trial	Manx (BT)	WCDMA
September 25, 2002	Austria	Launch	Mobilcom	WCDMA
September 30, 2002	Israel	Launch	Pelephone	CDMA2000 1x EV-DO
December 29, 2002	Japan	Launch	J-Phone	WCDMA
September 30, 2002	UK	Launch	"3"	WCDMA

Source: UMTS Forum

Handset Functionality & Availability

The delays in network infrastructure roll-out and launch has given the handset manufacturers more time to develop compelling devices, but only now are GPRS capable handsets appearing in any quantity and 3G handsets are only just being launched. The new generations of handsets have moved on considerably from earlier GSM based ones and they now offer colour screens, miniature speakers, digital camera options, GPRS networking, and Bluetooth connectivity to other digital devices. Such developments prepare the ground for operators to push bandwidth intensive content and applications to drive new revenue streams.

FIGURE 8: HANDSET EVOLUTION



Handset Generation	2G	2.5G	3G	Future
Example	Nokia 8210	Sony Ericsson T68i	Nokia 6650	
Volume/ Weight	101.5x44.5x17.4mm/ 79g	100x48x20mm / 84g	133x52x25mm/ 141g	Phones unlikely to get smaller without innovation in input/output
Display	Up to 5 lines for text, number and graphics	34x28 mm 8 bit colour	640x480 4096 colours	Innovative solutions to improve screen size; All screens colour
Battery		12 hours use 390 hours standby	2h20 talk-time <14 days standby	Battery life increasing; Smaller battery unit
Software, Memory & Storage	Calculator 250 names and numbers;	Games; Calendar; Contacts	Java based games Nokia PC suite 7 Mb dynamic memory	New applications; Memory increased on all devices
Camera	No	Yes	Yes	Camera and video functions become ubiquitous
Input Method	Key Pad	Key Pad; Voice dialling; joystick	Key Pad; Voice dialling	Increasing voice and handwriting recognition capabilities
Connection	GSM (SMS); Infrared; Dual-Band	GSM (SMS); GPRS (MMS/ email); Bluetooth	GSM (SMS); GPRS; WCDMA (MMS/ email); Bluetooth; Infrared; Tri-Band	Wireless connectivity to accessories and other devices

By the time 3G networks are launched handsets should have reached affordable levels

Source: Company Websites

Furthermore, as with previous generations of phones, the cost of these new 3G handsets will reduce dramatically as volumes grow (allowing manufacturers to exploit economies of scale) and competition intensifies (forcing network operators to absorb more of the cost of handsets to attract new subscribers). CEE consumers are likely to have a greater period to adjust to the applications and services available on these 2.5G handsets before deciding whether to adopt upgraded 3G devices. By the time 3G networks are launched the handsets should have reached affordable levels for operators and consumers alike. We anticipate that handset pricing will continue to be a key constraint for rapid up-take.

COUNTRY ACTIVITY

3G licensing is an issue for every Government and operator in the Region and each country has proceeded at its own pace. The Czech Republic, Latvia, Poland, Slovakia and Slovenia have already sold licenses.

However, local regulators face additional issues such as whether they need to sell more licenses or to take them away to provide effective competition. The rest of the Region can benefit from observing the situation in these countries and therefore gain a better understanding of various business models in the CEE context - as well as the wider European context. Operators and governments that have not yet issued licenses should consider it an opportunity rather than a drawback.

FIGURE 9: 3G LICENSING PROCESS IN CEE

Country	Date	# Licenses	Amount	Comment
Bulgaria	Not before 2004	NA	NA	3rd GSM license will be sold as part of BTC privatisation
Croatia	Q1 2003	2	€17.9 m each	3rd GSM license to be sold in 2003
Czech Republic	Oct 2001	2	€220 m total	Extra GSM spectrum included in one license
Estonia	Q1 2003	4	€3.2 m each	Beauty contest
Hungary	Not before 2005	NA	NA	Auction is most likely
Latvia	Oct 2002	2	€9.6 m each	Beauty contest 3rd GSM and UMTS licenses planned
Lithuania	NA	NA	NA	
Montenegro	NA	NA	NA	
Poland	Dec 2000	3	€1,900 total	
Romania	2003	4	€33 m each	
Russia	NA	NA	NA	GSM licensing incomplete Regional markets still immature
Serbia	NA	NA	NA	
Slovakia	July 2002	3	€32 m each	Profinet may have to return license
Slovenia	Nov 2002	1	€101.4 m	One out of three sold to Mobitel, owned by Slovenia Telekom

Governments and operators in the Region are proceeding at different rates

Source: UMTS Forum; 3G World; Press Releases

CONCLUSIONS

The key conclusion from this discussion is that CEE will benefit from lagging behind Western Europe in 3G development. Given increased visibility in terms of both revenue streams and costs we expect to see a number of robust, bankable business plans being developed on the back of the surprisingly high and stable revenues that the industry currently enjoys.

3G revenues will build on a stable platform with increased visibility on working models:

- ◆ Mobile operators will capture traditionally fixed line revenue streams
- ◆ Mobile services have a higher share of wallet than is generally perceived
- ◆ Content and application revenue models will have been developed in other markets and can be implemented locally

3G costs are more visible and better understood than they were when Western operators purchased licenses:

- ◆ Governments can design more creative licensing structures whilst operators face lower license fees
- ◆ Network vendors will have experience in building networks
- ◆ Compelling handsets will have been developed at more affordable prices

CEE will benefit from its 2-3year time lag in 3G development

PARTING SHOTS

Despite arguments in favour of the development of strong 3G markets throughout the Region stakeholders in the industry still need to proceed with caution. There are a number of difficult issues that require careful consideration and timely resolution.

FIGURE 10: KEY ISSUES FOR STAKEHOLDERS

Governments	Mobile Network Operators	Investors
<ul style="list-style-type: none"> ◆ How should regulators and governments evaluate the trade-off between pricing and creating more inventive license structures to stimulate IT employment and investment? ◆ What is the optimum number of licenses for each country given differing penetration, ARPU and competition environments and what can governments that have already sold licenses do to strike this balance? 	<ul style="list-style-type: none"> ◆ How can operators manage the development of content and applications such that their networks, rather than the handsets, retain the intelligence? ◆ How can operators plan for the emergence of disruptive technologies and services? Wireless Local Access Networks and telemetry systems are good examples of a source of both threat and opportunity. ◆ Should operators pursue follow -the-leader or first-mover technology strategies? ◆ How can independent operators leverage the experience currently being gained by their Western peers? 	<ul style="list-style-type: none"> ◆ Should investors consider 3G services as risky technology start-ups or inventive projects by businesses with strong fundamentals and cash flow? ◆ How should investors allocate capital to capture the potential up-side from the eventual market consolidation?

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