

ING Investment Weekly

Your Cellphone's Next Wave of Technology

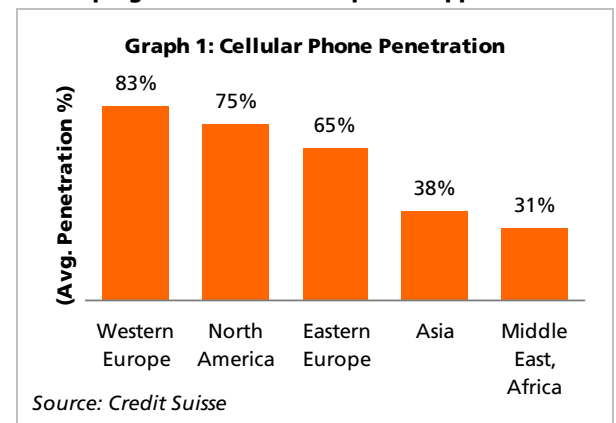


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Cellular phone technology has made dramatic and continuous improvement over the past thirty years. The first phones were so physically large and heavy that they were portable only in the trunk of a car and were strictly for voice calls. Today the most advanced phones fit in your shirt pocket and can browse the web and download streaming video. Cellular phone companies are in the process of upgrading their networks to more advanced data capabilities, and the cellular phone manufacturers are improving their devices to take advantage of the new networks. The next three to five years will see a huge change in how people use their mobile devices. Apple's iPhone and RIM's Blackberry have started the Smartphone evolution, but we expect this to be only the beginning of a huge change in how mobile devices are used.

Cellular phone usage worldwide has become extremely pervasive. As can be seen in the nearby graph, Europe and North America are both heavily penetrated, perhaps even saturated. Even Eastern Europe is fairly heavily penetrated. Only the developing markets continue to add substantial new subscribers (with China and India providing most of the new subscribers in the world). The vast majority of phones today are voice-only, particularly in the developing world. In the developed markets, the cellular carriers have moved away from their old strategy of trying to attract new subscribers toward the strategy of getting more revenue from each subscriber every month. In order to do this they are offering more services. These new services come about because the carriers have upgraded their networks to take advantage of higher data speeds.

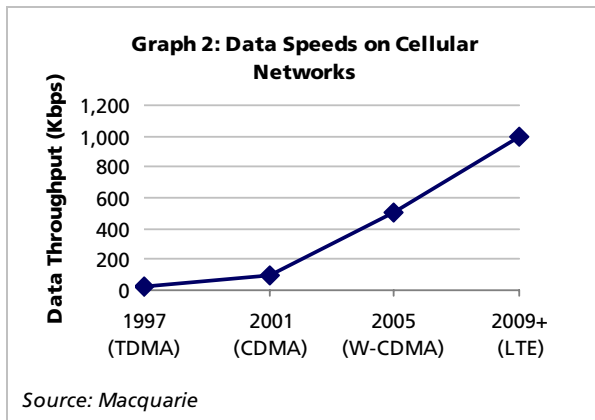
Developing Markets Offer Cellphone Opportunities



The cellular network has gone through four generations of technology. The original network was built upon analog technology and was only capable of voice conversations. The second generation upgraded the network to a digital signal, which had much higher voice capacity and only a slight data capability (short text messaging). The third generation of technology (our current network) was yet another upgrade to digital networks that incorporated more data capability (some minor web browsing along with texting). The fourth generation, which will soon be installed in networks, will incorporate data speeds that are becoming comparable to speeds found in DSL networks and cable modems. While there have been four generations of the network, the real evolution has

been from a voice-only network to a data network that also carries voice traffic. Data speed has gone from basically nothing a decade ago, to the latest technology allowing for more than one megabit per second downloading speed. In turn, the cellular phone has gone from just being a phone to a phone, computer, iPod, and television all in one.

Ever Faster Data Download Speeds



A cellular phone is a relatively complicated device, but can be broken down into a few main components. The main part of the phone is its baseband. These semiconductor chips control the sending and receiving of the radio signals between the phone and the cellular towers. Originally this (plus the battery) was pretty much the entire phone. More recently almost all phones have a computer processing chip which allows you to browse the web and run all the other applications on the phone. The third component of the phone is its battery. The more complicated the phone becomes, the more it will drain the battery. The final component of the device is its operating software. The operating software will determine whether the phone is easy to use, intuitive, and allows you to fully utilize all of the network's features.

The term "Smartphone" was coined to more accurately describe a device that is able to do more than just telephony. Smartphones are capable of email, texting, web browsing, and basically any other functions that a computer or phone can do. The obvious drawbacks for a Smartphone are the screen size, ease of use (including the keyboard), battery life, and up until now, speed of the connection to the internet. While screen size will always be an issue, each of the other drawbacks is being diminished through technical advancement. Apple's iPhone ushered in a new era of ease-of-use. Its operating system is intuitive, simple and quite effective. This has substantially raised the bar for other manufacturers to improve their user interface. Products coming out over the next year or so will have much improved operating software to compete with the iPhone. Microsoft and Google both are devising standard operating software that may be used by multiple manufacturers to run their phones. Battery life has been one of the main issues in the cellular world from the earliest days; the reason the

original cellular phone was so big was because it had a huge battery! The process of integrating many components on an integrated circuit significantly reduces power consumption (and also allows the phones to be smaller). New technologies to reduce power drain from the LCD screens, further integration of the components, and software that improves battery function will lead to much better battery life. The main drawback to using smartphones has been the slow speed at which it can connect to the internet. RIM's Blackberry devices took over the email-over-cellular market because they are relatively fast and simple to use. They were able to achieve higher speed because they had their own network that was specifically tuned for email, while the regular cellular network did not. In the new generation of the cellular network, email speeds are very quick; you can use your Yahoo! or Gmail accounts and carry only one device. It does not

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necessarily have to be a Blackberry. Web browsing was not usable until the third generation networks were available. As can be seen with the iPhone's popularity, browsing speeds are sufficient now and will be blazing fast when fourth generation networks are installed.

While revenues from Smartphones were only about a quarter of the industry last year, conservative expectations are that it will be half of their worldwide revenues by 2015. The basic infrastructure has been installed, and now it will be up to all of the entrepreneurs to take advantage of the new capabilities. One of the bigger applications for the new technology is position-based marketing. With a GPS chip in each phone you will have a "smart search" capability that will allow you to find things based upon your location. This will be much more relevant to you as a user, and will be much more successful for Google or another search engine in generating business.

You should be ready for a huge jump in effectiveness of your mobile device over the next few years. The generational improvement in the network, phones that utilize this new bandwidth, and most importantly, applications that make your life easier and more productive are on the way. Don't get overly attached to your current device or service because there are better things just around the corner. ■

Smartphones To Generate a Rising Share of Revenues

