# Wireless Revenues:
# Threats and Opportunities

## *WHITE PAPER*

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## 1.  Summary

In today's market wireless carriers can charge a huge premium for voice and SMS services compared to data services. Users typically pay about 100 times more per bit for mobile voice compared to mobile data service. At least three trends threaten this model in the near future:

1. The rapid growth of free Internet telephony services, such as Skype, and the blurring of the separation of voice and data on the land line side has educated consumers. They treat voice more and more as "just bits" and start comparing the bit prices of voice with that of data.

2. The flat IP model of future wireless networks will make it nearly impossible for carriers to keep separate price plans for voice and data. Consumers will insist that both are just bits and will refuse to pay significantly more for one versus the other.

3. Cloud computing players, such as Google and Yahoo, do anything they can to convert carrier networks into a commodity and move all the high value services to the periphery (the cloud and the software on the consumer devices).

It is therefore likely that the retail price per voice minute will drop to the level of data services. This means it will drop from about 10 cents per minute to about 0.1 cents per minute.

To maintain or even increase their profitability, wireless carriers need to find other high margin service models to replace the voice services. Such high margin service models do indeed exist. They even provide an effective defense against the commoditization of wireless networks as driven by companies like Google and Yahoo. This White Paper explores two specific opportunities for wireless carriers.

## 2.  Introduction

### 2.1.  The Current Pricing Model

The following table compares today's typical retail prices for three popular wireless services: SMS, voice, and broadband data. While the price drops sharply from SMS to broadband data, the data rate the carrier needs to provide increases dramatically. In other words, carriers charge most for the services that require the smallest data rate and charge least for the services that require the highest data rate. While we don't examine how the data rate influences the cost of providing the service, it is safe to assume that the higher the data rate the higher the cost for the carrier.

|  | Price per MByte | Required data rate |
|---|---|---|
| SMS | $650.00 | about   1 Kbit/sec |
| Voice | $1.00 | 13 Kbit/sec |
| Broadband data | $0.01 | more than   500 Kbit/sec |

The prices are somewhat difficult to estimate because of the large number of complicated plans offered by the carriers and the dependence on the usage patterns due to the flat pricing components of those plans. Nevertheless, the above table should

provide a useful guide. We estimated the numbers as follows: for an SMS message we assume an average price of 5 cents and an average message size of 80 characters which is 80 bytes (the maximum SMS message size is 160 characters). For voice we assume the standard GSM speech codec compression rate of 13 Kbit/sec and an average price per minute of 10 cents. For mobile broadband data we assumed a rate of $60 per month for 5 Gbytes.

## 2.2. Why More Data Does Not Lead to Higher Profits

In 2003 analysts claimed that the revenue growth from traditional cell phone voice services was slowing, despite the increasing popularity of wireless phones and portable multifunction "smart" phones [1]. At that time, they saw that the next big opportunity was mobile data, suggesting a new business model for the wireless carriers. A business model which involved a more active participation of the carrier in the packaging, promoting, and selling of content. Wireless carriers adopted to the change and data revenues have grown over 88% year after year.

We now face a new transition to an even larger data pipe, and  it may be time to step back and evaluate how this data pipe will be used. In 2007 analysts from Bain & Company indicated that with this model wireless providers were heading in the wrong direction [2]. The analysts' emphasis was on evaluating the market trends with the eyes of maturity rather than early growth. They came to the conclusion that in the beginning early adopters are also the ones which make most use of technology. It remains to be seen what average consumers would do. In addition, only 10% of the US population live in highly dense urban areas where mobile data access is most attractive. Therefore, the levels of penetration for data services  would not be as high as for voice.  Furthermore, this 2007 report does not consider the new trends started by Skype and VoIP on the wired-networks, which will  inevitably cross over to the wireless networks. Such services let users place voice calls through a data channel and thus bypass the traditional wireless voice services completely.

Altogether, users demand a larger wireless data pipe, but they are not ready to pay large premiums for it. In addition, VoIP has educated consumers that voice is a commodity. Finally, consumers are not willing to pay for content and frequently find it for free. Therefore, more data does not add up to more profits for the carriers.

## 2.3. New Opportunities

From the above comparison it becomes clear that the carriers enjoy the highest profit margins on services for which they can charge a premium far beyond the plain bit price and which require a low data rate. To be able to charge a premium, the services cannot be perceived by the consumers as "just transporting bits". Otherwise, they will experience the same fate as voice currently does. Voice was, until recently, perceived by consumers as something distinctly different from data but that perception is rapidly fading for reasons discussed above.

To explore  new opportunities carriers must therefore  enter new service fields. The road ahead can be expected to be difficult with many pitfalls as unfamiliar technical challenges are encountered, unfamiliar new markets need to be entered, and new business models need to be developed. However, the alternative is to settle for one cent per MByte for anything carried on the network. The remainder of this White Paper looks at several promising new high margin services.

## 3.  Payment Transactions and Consumer Credit Services

### 3.1.  The Credit Card Industry

According to the Federal Deposit Insurance Corporation (FDIC) the US volume of credit card transactions in fiscal year 2004 accounted for $1.3 trillion [3]. More recent data points to $1.8 trillion, a 26 fold growth from 1989 [4]. Today, credit cards are responsible for more than $2.5 trillion in world wide transactions a year and are accepted at more than 24 million locations in more than 200 countries and territories. Estimations indicate that 10,000 payment card transactions are made every second around the world. This volume hasn't gone unnoticed, and non-traditional payments players such as Nokia, Motorola, Google and Microsoft have emerged [5].

The revenues from the credit card industry come from different venues. Card issuance, which generates income by managing credit risk and interest spread provides the largest amount. An often overlooked segment corresponds to the credit card merchant acquiring, which function creates fee-based revenue by handling, routing, and settling transactions. RBS Group cited $8.1 billion in revenues for merchant acquiring [6]. For wireless carriers this venue at the point-of-sale may be particularly interesting.

### 3.2.  The Opportunity

Today's credit cards are neither convenient nor secure. Some readers may be surprised about our assertion of credit cards not being convenient. Lets look at a real credit card transaction process to purchase an item at a grocery store once you get to the cash register to check out. First, take out the card, swipe it once (or several times) through a machine, wait for the system to respond, sign the receipt on paper or on a touch pad device, keep the receipt for your records, and finally, put everything away in your wallet.

Now compare this to a payment by cell phone: your cell phone buzzes and displays the amount to be charged to your account. Just answer "yes" or "no" and you are done. You also have the option to automatically accept future charge requests from this merchant so that you don't have to take out your cell phone at all. This option may raise security concerns if the cell phone is stolen or lost. However, the automatic payment option can easily be narrowed down to a particular grocery store and even particular checkout lines within the store, certain times of the day, and certain groceries to which automatic payment is limited as well as a maximum amount per day or per store visit.

This type of wireless payment further enables services that traditional credit cards cannot match, such as car toll payments.

Wireless carriers already have everything that is important for a successful payment transaction business:

- ◆ The relationship with the customer.
- ◆ The billing infrastructure.
- ◆ The communication and computer network to handle the transactions.

Furthermore, they have something the traditional credit card companies cannot match: a wireless network and a smart device in the hand of every customer.

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The step from a payment transaction services company to a consumer credit company is then a small one.

To compare the potential profit margins with the table in Section 2.1 we assume that a typical payment transaction requires 1 KByte of data and a typical profit per transaction is 50 cents:

|  | Price per MByte | Required data rate |
|---|---|---|
| Payment transaction | $500.00 | about 1 Kbit/sec |

This makes handling payment transactions quite lucrative for carriers, in fact more lucrative than the current voice service. Furthermore, there is little danger that consumers will compare payment transaction fees with the bit rate provided. This will avoid the current price pressure fate of voice services.

This analysis, of course, is not very detailed and there are many additional costs involved in providing payment transaction services which are not mentioned here. This paper by no means attempts to offer a comprehensive business case. It does, however, attempt to offer new and innovative ideas for future high margin mobile services to replace the reduction in voice profitability.


## 4. Intelligent Assistant Services Supported by Telemetry

### 4.1. The Telemetry and Telematics Industries

The telemetry and telematics industries have evolved significantly in the past few years and there is great potential for growth in the coming years. ABI Research analysts indicated that by 2012, original equipment manufacturer (OEM) and after-market telematics will reach revenues of $1.5 billion in North America [7]. Telemetry, including advanced metering infrastructure (AMI), security, randomized message authentication (RMAC) and vending, will accrue revenue of nearly $1.2B. An even more promising outlook estimates $4.84B in 2013 for the North American passenger vehicle telematics markets [8] and $11B for the commercial vehicle telematics [9].

Another related area is telemonitoring or remote patient monitoring. This industry has shown a sustainable growth over the last few years, with expectations of revenues of $312 million by 2013, according to Frost & Sullivan [10].

Telemetry can be extended to remote monitoring of industrial equipment and home appliances, which can significantly improve the life expectancy of the devices as well as reduce the energy consumed. With an automatic wireless metering infrastructure in place, owners and operators can take advantage of preventive maintenance. Even though there are no specific numbers for this opportunity, a report from the Army [11] indicates that preventive maintenance can save $3 million to $4 million per year for the Army-wide Directorates of Public Works alone.


### 4.2. The Opportunity

Telemetry and Telematics can be implemented and priced very differently from what is been done today resulting in larger benefits for all the stake holders involved, especially consumers and wireless carriers.  To our knowledge, wireless carriers cur-

rently only offer the data pipe and therefore the stream of revenues is limited. A more interesting alternative would be for the wireless carriers to become service providers themselves. They have the infrastructure for that in place already.

For example, your car is equipped with a series of sensors which regularly monitor its status. Imagine that even before you notice a problem, your dashboard display reports that there is an anomaly which needs to be repaired and it suggests a list of three or four mechanics which will repair that for you, along with their costs. These features are standard features of the car and you did not pay anything extra to get them from the car manufacturer, nor do you pay any monthly subscription. On the other hand, the car manufacturer as well as the wireless carrier get revenue every time you choose any of the suggestions, in this case, one of the listed mechanics. In other words, this is analogous to Google's non-intrusive but highly profitable revenue model.

Let's extend this concept to the home. Imagine that all your appliances are equipped with sensors which regularly monitor the appliances' health. Before you even notice the problem, the built in display indicates the problem and gives you a list of service providers who can fix the problem along with their price and estimated time for repair. Once you have made the selection, it automatically places the order and sends the necessary diagnostic data to the repair service.

This type of services will be possible because of the economies of scale that next generations wireless data service ecosystems are expected to stimulate, reaching the critical volumes necessary to drive device costs down [12] .

Assuming the revenue for automatic referral to be 1% and the typical cost of a refrigerator or car repair of $200, then 1KByte of data transmitted would have a profit of $2 per transaction.

|                        | Price per MByte | Required data rate |
|------------------------|-----------------|--------------------|
| Intelligent Assistance | $2,000.00       | about   1 Kbit/sec |

As Google benefited from the ubiquitousness of the web browser in the PC, now wireless connectivity and transmitting devices built into the appliances would allow wireless carriers to reap the huge 75% profit margins of Google, in a market where Google or Microsoft cannot compete. This appears to be a very lucrative high margin emerging business for wireless carriers.

## 5. Conclusions

The trends observed in the industry are clear and the status quo will change. The high margin services such as SMS will disappear [13], [14], and even when mobile data services increase, the data ARPU is shrinking [15]. Inevitably, they will have the same fate as the consumer Internet and storage services.

The wireless carriers have no choice but to embrace change and offer new high value services with no relationship between bits and cost. This paper illustrates two very lucrative options for achieving this.

| | 2009 Price per MByte | 2014 Price per MByte |
|---|---|---|
| SMS | $650.00 | $0.01 |
| Voice | $1.00 | $0.01 |
| Broadband data | $0.01 | $0.01 |
| Payment transaction | N/A | $500.00 |
| Intelligent Assistance | N/A | $2,000.00 |

## References

[1] Helmut Meier, Roman Friedrich, Hanno Blankenstein, and Alexander Froment-Curtil . How Wireless Carriers Will Make Mobile Data Pay. 2003. http://www.s-trategy-business.com/enewsarticle/enews102303?pg=0

[2] Dan Frommer. Wrong Way For Wireless?. 2007. http://www.forbes.com/2007/01/11/bain-wireless-entertainment-tech-intel-cx_df_0112phone.html

[3] FDIC Banking Review. Overview of Recent Developments in the Credit Card Industry. 2006. http://www.fdic.gov/bank/analytical/banking/2005nov/article2.html

[4] Ben Woolsey and Matt Schulz. Credit card statistics, industry facts, debt statistics. 2008. http://www.creditcards.com/credit-card-news/credit-card-industry-facts-personal-debt-statistics-1276.php

[5] CARD Research Team. Next Gen Payment Technology Space is Crowded. 2008. http://creditcardindustryresearch.com/2008/09/01/card-general/next-gen-payment-technology-space-is-crowded/

[6] RBS WorldPay. FACT SHEET – MERCHANT ACQUIRING. 2007. http://www.rb-sworldpay.us/RBS_WorldPay_Merchant_Acquiring_Fact_Sheet_Dec_23.pdf

[7] IHS News. ABI: Telematics Outshines Telemetry in N. America. 2008. http://au-to.ihs.com/news/2008/ai-telematics-telemetry-n-america.htm

[8] IHS News. Frost: Telematics Set to Gain Major Market Share by Losing 'Luxury' Tag. 2007. http://auto.ihs.com/news/frost-telematics-luxury.htm

[9] IHS News. ABI: Strong Outlook for Commercial Telematics Points to $11B Market in 2013. 2008. http://auto.ihs.com/news/2008/abi-commercial-telematics-2013.htm

[10] Philips. Home Healthcare Solutions named recipient of the 2008 Frost & Sullivan Growth Strategy Leadership Award . 2008. http://www.medical.philips.-com/main/products/telehealth/news/frost_sullivan_2008award.wpd

[11] James Johnson. VALUE-ASSESSMENT METHOD FOR EVALUATING PREVENTIVE MAINTENANCE ACTIVITIES. 1999. http://owww.cecer.army.mil/facts/sheets/UL03.html

[12] Motorola. Driving 4G: WiMAX & LTE. 2007. http://www.motorola.com/static-files/Business/Solutions/Industry Solutions/Service Providers/Wireless Opera-tors/Wireless Broadband/wi4 WiMAX/_Document/StaticFile/a Driving_4G__WiMAX_and_LTE.pdf

[13] Randall Stross. What Carriers Aren't Eager to Tell You About Texting . 2008. http://www.nytimes.com/2008/12/28/business/28digi.html?_r=1

[14] EU Business. Commission initiative to cut cost of texting and mobile data services abroad - briefing. 2008. http://www.eubusiness.com/Telecoms/eu-tex-ting-guide/

[15] Kevin J. O'Brien. Mobile data service joining the mainstream. 2009. http://www.iht.com/articles/2008/03/09/business/mobile10.php