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# Mobile Content & Services

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Industry Profile 2007

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Canadian Advanced Technology Alliance (CATAAlliance)

May 2007

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## LETTER FROM THE PRESIDENT

The cellular telephone has become the driving force behind telecommunications. Today, there are more 18 million cellular telephone subscribers in Canada (as opposed to 20 million landline subscribers). Growth is now migrating from network access toward content, services, and applications.

Hundreds of companies have entered the race, from the one-product SME (small to mid sized enterprise) to ubiquitous corporate giants such as Microsoft, Symbian and Electronic Arts. The mass media are caught up in the “push” services frenzy. Geopositioning applications are redefining entire sectors, such as security, transportation, utilities management, civil engineering, natural resource management, and tourism. We now see interactive guides for hotels, restaurants, auto repairs, museums and historical sites. More will follow suit.

As Canada’s leading spokes group for advanced technology, we believe that the time has come to assess the state of the mobile-services industry in Canada without discounting the sector’s particular situation derived from its bilingual market. This is what we have attempted in the present study, **Mobile Content & Services**.

Our goal is to provide the industry with a tool that will allow it to promote its services domestically and abroad. We have also raised some issues that are typical of the Canadian mobile content and services industry in the hope that by making them transparent, both the corporate and government levels will work towards their resolution.

Canada’s mobile content and services industry is vibrant, but it is still in the emerging phase. To succeed, the industry requires all the care of the main stakeholders: large corporations, federal and municipal governments, academics, journalists and of course the associations that are communities of best practice and collaboration. In presenting you **Mobile Content & Services**, *CATAAlliance* is pleased to contribute to this cooperative task.

Ottawa, March 12, 2007



John Reid  
President  
*CATAAlliance*





## ABOUT THE AUTHORS

This study was written by **Jean-Guy Rens** in association with **Graham Sibthorpe**

**Jean-Guy Rens** was CATA project manager and lead researcher. He is an information-technologies consultant specializing in public policy analysis and marketing assistance for the introduction of new products and services. As such, he created the consulting firm **ScienceTech Communications Inc.** in 1992. Mr. Rens regularly gives lectures in Quebec and in France on Information and Communication Technology (ICT). Jean-Guy Rens is a Director of CATAAlliance. Mr. Rens wrote *L'empire invisible*, a 1,200-page book of history of Canadian telecommunications covering the management, political, technological and social aspects of this industry (1993). Volume one of this work was published in English at McGill-Queen's University Press under the title *The Invisible Empire* (2001). Volume two is in preparation.

For details, see <http://www.sciencetech.com>

**Graham Sibthorpe, President of Graytek Management Inc.** was a key contributor of original content to the study. He is an acknowledged authority on sector and cluster development, particularly with respect to technology sectors, as well as the ability of technology to enable other sectors of the economy. He also has considerable experience in strategy and policy development. He has completed many projects at the national, provincial, community and company levels both in Canada and internationally. Of particular note is the major Graytek Management study of ICT, Life Sciences, and emerging next generation technology clusters across Canada for Industry Canada - . <http://strategis.ic.gc.ca/epic/site/ict-tic.nsf/en/it07738e.html>.



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*Disclaimer: The opinions expressed in this study are the opinions of the authors and may not reflect the opinions of the interviewees or the firms they represent.*

## 0. EXECUTIVE SUMMARY

### 0.1 STUDY OVERVIEW

A **qualitative** study of Canadian mobile data services capabilities, focusing on the current shift from voice to data and video services in the wireless industry.

**Objective.** To build a profile of the mobile services industry and adjacent industries in Canada

Means:

- Define a value chain for the mobile services industry, including adjacent industries
- Develop an understanding of industry capacity
- Assess the industry's potential to respond to market needs
- Provide a Provincial benchmark

Thus this is not viewed as a definitive or prescriptive study. Rather, the intent is to use the study as a starting point for an ongoing CATA-led structured debate among stakeholders on the continuing development of world leading mobile content and services in Canada.

### 0.2 STUDY APPROACH AND STRUCTURE

**Working Hypothesis.** The degree of convergence between telecommunications and computing has been underestimated. What actually took place rather was an invasion of telecommunications by the computer “ethos”. The traditional telecommunications paradigm (based on evolution and reliability) had to give way to the more innovative computing paradigm (based on disruption and speed, by times at the expense of reliability). This results in two consequences:

- *Industry consequence:* Telecommunications is becoming a sub-sector of the computing sector that has been renamed ICT sector, which often creates a culture shock.
- *Technology consequence:* Telecommunications is becoming a specialized, largely software-driven, application of computer communications.

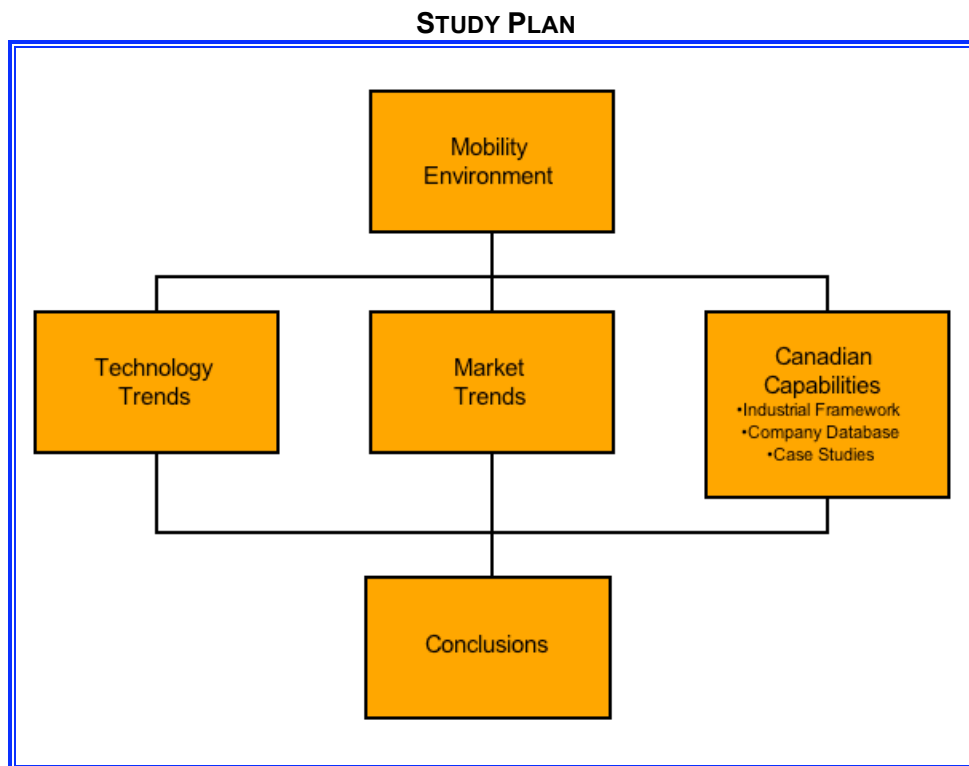
The same phenomenon can be observed in other sectors, particularly the content sector which is also rapidly increasing, again largely driven by computer industries. This is resulting in a stratification of ICT services into infrastructure, content and applications. It has several consequences:

- *Infrastructure consequence:* Telecommunications services is becoming a low value-add bandwidth business.
- *Content consequence:* The growth of online content, particularly user-driven content, threatens to upset traditional broadcast business models and regulatory environments.

- *Application consequence:* Explosive growth in business-driven applications is redefining the relationship between the providers and their clients within the ICT sector, particularly Telecommunications industries, and is creating many new economic opportunities.

In our study on Mobile Content and Services, this means **it is possible to anticipate the chances of success of an industry or of a technology by assessing its degree of computerization** and its relationship with the emerging ICT paradigm.

**Organization.** The overall approach was to build a bottom-up understanding of the mobile services industry:



Key elements of the structure are:

A definition of mobile services

A discussion of mobile and wireless technology trends, including both cellular and non-cellular technologies

A review of market trends, including specific sections on Asia, Europe and North America

A discussion of Canadian mobile services capabilities related to the industry value chain.

A set of conclusions on the state of mobile services in Canada

Also included as integral parts of the study are a Canadian capabilities database with entries for over 200 companies as well as the results of 23 case studies and interviews.

### 0.3 MOBILITY ENVIRONMENT

The study is based on the following definition of mobile services:

**Mobile** – refers to individuals or things in motion

**Services** – refers to an integrated set of applications, content and infrastructure

**Mobile Services** - connects one, or more, individuals or things in motion via a set of services

Mobile services may connect:

- Mobile individuals to each other
- Mobile individuals to a central service
- A central service to mobile individuals, or things
- A user (not necessarily mobile) to mobile individuals, or things

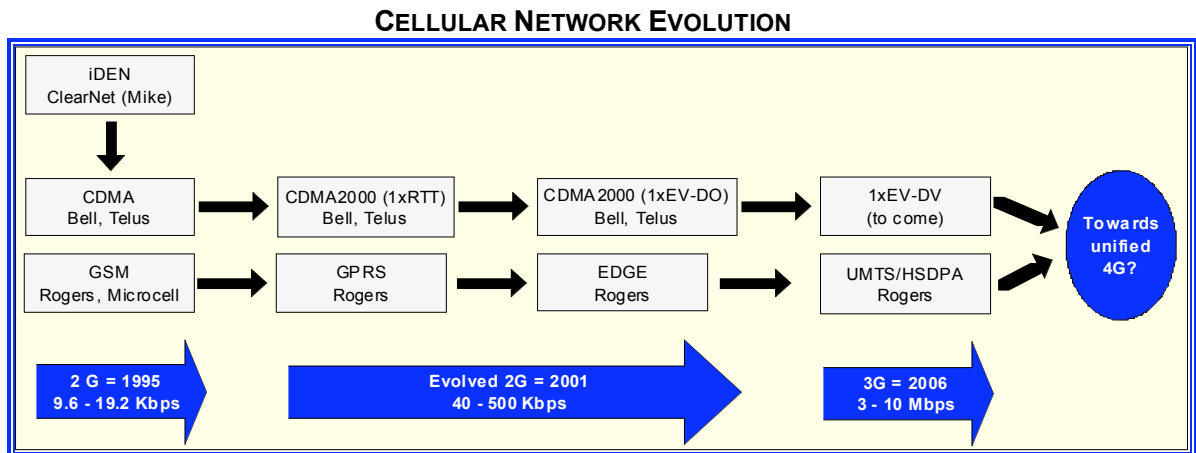
Mobile does not necessarily mean a “wireless connection”. For example an iPod is mobile but not connected to a wireless network.

Mobile services apply equally to work and play activities.

### 0.4 TECHNOLOGY TRENDS

Technology trends are characterized by:

Continued cellular evolution in terms of the move to Broadband wireless (2G – 3G – 4G)



Source: ScienceTech Communications

The development and growth of non-cellular technologies such as

- WiFi
- WiMAX
- Bluetooth, Zigbee and UWB
- RFID

The gradual integration of wireless and non-wireless networks

The growth of mobile content, particularly user-driven content

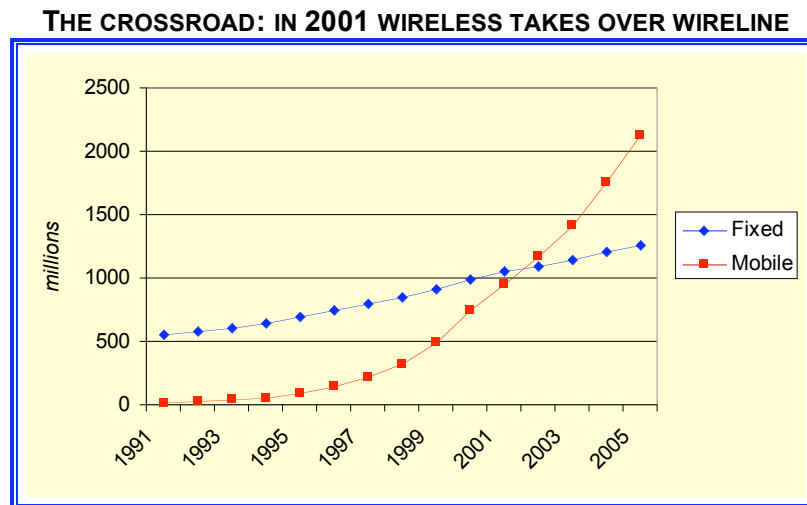
The development and growth of applications in a number of key areas, including:

- Text Messaging
- Entertainment
- Industrial Wireless
- Health Care
- Financial Services

Mobile applications are aimed at enabling business and consumer activities in 3 key areas:  
 Increased Competitiveness (e.g. fleet management, inventory tracking and meter reading)  
 Wealth Creation, particularly in terms of new sources of revenue (e.g. mobile gaming and social networking)  
 Quality of Life Improvements (e.g. patient monitoring and personal security)

## 0.5 MARKET TRENDS

Mobility has become the core of the telecommunications sector: wireless subscribers overtook wireline subscribers in 2001 and continue to grow rapidly, particularly in China, and now India.



Source : ITU Key Global Indicators for the World Telecommunications Service Sector, 2006

In terms of revenue, the wireless data global market was estimated between \$86 billion and \$100 billion in 2006.<sup>1</sup> The bulk of this market is constituted by messaging (headed by SMS), generating 67% of the total revenue. Interestingly enough, user-generated content, one of the most potentially disruptive applications of mobile services, already generated \$3.5 billion in 2006.<sup>2</sup>

This is a beginning. The amount of traffic is about to surge, and most observers agree with the prediction that within seven years the majority of the mobile traffic will be data oriented (messages, music, video streaming and downloads, and enterprise applications).

<sup>1</sup> Informa Telecoms & Media (\$86 billion) and ABI Research (\$100 billion).

<sup>2</sup> Informa Telecoms & Media: <http://www.informatm.com/itmgcontent/icoms/s/press-releases/20017401985.html>



**Mobile Internet**

The arrival of the mobile web on the mobile handset over in 2007 and beyond will see users embracing the same content they take for granted on their PCs. Operators need to ensure they are firmly locked into this value chain or risk missing out on what will be an enormous market by 2011.

*Daniel Winterbottom, Senior Analyst  
Informa Telecoms & Media*

Market trends are characterized by:

Market leaders are Asia, Europe and the US followed by Canada in terms of mobile subscriber penetration and mobile versus wireline density

Cellphones account for ~60% of the Canadian mobile device market, followed by MP3 players (~12%)

Voice dwarfs all other mobile usage in Canada (wireless data represents 990 million over the \$11 billion cellular market)<sup>3</sup>

Within wireless data, messaging dwarfs all other services

The US is by far the largest RFID market (Canada is a distant 10<sup>th</sup>)

## 0.6 KEY CONCLUSIONS

### 0.6.1 Mobile Data Services

**2007: Canada's Takeoff.** Mobile data services have reached the 10% mark of Canada's wireless revenues – Rogers passed it last year, the other wireless carriers will pass it in 2007.<sup>4</sup> Once a product passes 10% of net revenues, it is no longer a passing fad and its continued proliferation becomes irreversible. Companies cannot treat such a revenue source as a temporary anomaly and have to embrace it forcefully and fight for it. In 2007, Canadian carriers have reached this threshold. There appear to be a number of signs to confirm this prediction:

An agreement between Telus and Amp'd Mobile for the distribution of mobile content to the Canadian market (music, 3D mobile gaming, live sports and concert video streaming, mobile communities, personalization features, etc.)

Launching in December 2006 by Rogers of the first Canadian high speed wireless network (HSDPA) which will facilitate the development of mobile services

Launching of Mobile Movies by Bell Canada in February 2007, the country's first service offering full-length, pay-per-view movies on mobile phones. Content deals were secured with Disney and Sony

Canadians send more than 18 million text messages per day<sup>5</sup>

The rapid growth of mobile services does not go without missteps. For instance, in January 2007 Telus started offering pay-per-download adult content to its domestic clients through

<sup>3</sup> Revenues for 2005 (CWTA figures). <http://cwta.ca/>

<sup>4</sup> Rogers' revenues from wireless data services grew approximately 54.5% year-over-year to \$459 million in 2006 from \$297 million in 2005, and represented approximately 10.6% of network revenue compared to 8.2% in 2005. Rogers' Annual Report 2006.

<sup>5</sup> CWTA Wireless Facts & Figures: <http://cwta.ca/CWTASite/english/industryfacts.html>

their cellphones. The financial rationale may have been sound, but the popular opposition was acrimonious and Telus withdrew its service two months later. However, even if unfortunate, the incident underlines the growing interest in mobile content.

Similarly, there is a growing number of blogs criticizing the carriers for their speed and approach to providing mobile content and services. Clearly there is a strong demand and the market is impatient to see the faster introduction of affordable services that meet their needs.

The technology is clearly available, the content and services are rapidly being developed and the market is ready. The question is whether the services will be sufficiently affordable to realize their growth potential and help move Canada into a leadership position.

### 0.6.2 Infrastructure

**Canada's Paradox.** Canadian wireless infrastructure is characterized by a paradox: On the one hand, it is growing rapidly and appears to be highly competitive yet it is not among the world champions. This is a departure from Canada's traditional leadership in wireline infrastructure where Canada has always been the first or among the first three countries in the world. Factors contributing in varying degrees to this situation include:

- Canadian cellular penetration rate is lagging Japan and Korea, the US and Western European countries (even though European countries have an artificially high penetration rate due to interchangeable SIM cards – actually a sign that common standards and unlocked phones have helped foster competition).
- Canada has a relatively high level of average monthly minutes of use (MOU) compared to most other countries – though it lags behind the US by a wide margin (1 to 2).
- Rate structures that are contradictory to competitiveness and growth (e.g. higher cost wireless per minute pricing versus inexpensive flat rate landline local calling, few prepaid subscriptions, long term contracts with punitive penalties, and locked SIM cards in the case of Rogers).
- In addition to cost concerns, complex billing for voice and especially data is an issues (as many who have tried to surf the Internet with a Canadian cellular subscription have attested).
- A continuing focus on voice as others move more aggressively into data services (e.g. capturing the remaining 25% of the mobile voice market and converting landline use to higher revenue per minute mobile use).
- The implications of a vast and sparsely populated geography on continued infrastructure re-investment required by technological development (carriers have so far invested ~\$20 billion on 3 national networks and have struggled to become profitable).<sup>6</sup>

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<sup>6</sup> Indeed, we should write 2.5 national networks, since only Rogers has a true national infrastructure. Bell and Telus concluded a roaming agreement in October 2001 that allows Bell to access the Telus wireless network across rural Alberta and BC. Similarly, Telus gains access to the Bell network in Ontario and Québec, extending Telus' rural coverage in Ontario and Quebec. As a result of this agreement, Bell and

- Leapfrogging by other countries without a fixed telecommunications infrastructure investment to protect (particularly in Asia where wireless growth is occurring at a phenomenal rate).
- A multiplicity of transmission standards that diffuse rather than leverage Canadian wireless strengths.
- A low rate of innovation by the carriers (investment in R&D is at the same level as the beverage industry, lower than the automotive industry).
- Lack of a pure foreign wireless player without investments in existing fixed infrastructure and, even more important, with a competitive culture (typically a catalyst for increased competition in other countries). Even Rogers, which has almost no landline legacy to protect and arguably innovating more than its competitors, does not compare to a company such as Vodafone for instance.
- Occupation of large chunks of spectrum that are left unused or under-used and prevent competitors from entering the market (the clearest example being Inukshuk, a joint-venture Bell/Rogers , that has the potential to bring high speed outside the big cities).
- A less developed mobile culture (particularly compared to countries such as Japan and Korea).

**The disruptive effect of infrastructure convergence.** As the wireline and wireless infrastructures converge through the development and deployment of such technologies as WiFi and WiMAX, the distinction between the two previously separate services is blurring. This has the potential to disrupt existing business models, particularly wireless.

**The coming collision of device technologies.** Much of Canada's strength lies in the use of keyboard based devices, common in North America, while the rest of the world is more comfortable with telephone keypads. The convergence of devices, particularly cell-phones and PDAs, as well as the emergence of new wireless device interface technologies is likely to disrupt existing business models and open up existing markets to a wider range of competitors.

### 0.6.3 Content

**Content is a driving force.** It has the potential to increase use of mobile bandwidth much more substantively than simple messaging applications and change the business model from usage pricing to access pricing (predefined bandwidth with unlimited usage, maybe with a volume ceiling). User created content (the YouTube phenomenon) is moving apace while business driven content is evolving more slowly.

**Obstacles faced by Content Owners.** Existing large content owners (media, film producers, game developers) are at the early stages of exploring mobile content delivery for a variety of possible reasons, including:

- Lack of market clarity for content on small screen mobile devices
- Lack of established revenue sharing formulae with carriers

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Telus are said to have avoided capital expenditures of more than \$500 million (over the term of the 10-year agreement).

Concerns about Intellectual Property issues and potential regulations

**The emergence and growth of IPTV.** At this time IPTV is still in its early stages and threatens to redefine the world of broadcast content. Its potential impact on mobile content is not yet clear and will probably be a function of such factors as:

- user demand for TV content on small screen devices
- bandwidth & pricing for broadband content
- demand for connected mobility versus unconnected mobility (e.g. iPod).

#### 0.6.4 Applications

**Messaging.** With about 85% of the wireless data market, messaging is currently the killer application. This is an application with broad applicability, from mobile marketing to social networking to mobile payments. It generates high traffic volumes but has relatively low bandwidth consumption. It is already heading towards maturity and is characterized by three competing technology approaches, including SMS (the prevailing application), Instant Messaging (IM) and standard email. Messaging uses both keypads and keyboards.

**Entertainment.** While Canada has some substantial strengths, particularly in the gaming area, the question is whether Canada can compete globally in this market. It is a fast moving global market, but a weak domestic market with global differences and barriers for Canadian companies. In terms of mobile TV, the market is in its early stages (11 broadcasters are currently making some content available on mobile platforms), but the US is starting to make a substantial move.

**Industrial wireless.** Canada has existing wireless strengths in such areas as transportation, inventory tracking, fleet management, and service management. These location-based applications typically integrate wireless devices with global positioning systems, and increasingly incorporate RFID technology and sensor networks.

These strengths are equally applicable to other areas of Canadian industrial strength, particularly the Natural Resources sector (e.g. in mining, oil & gas, and forestry), as well as the Environment. At this time, there is limited evidence of mobile application development resulting in company formation, although some large Natural Resource companies have been using the technology internally for some time (e.g. mining companies).

Most of the companies engaged in this area are small and the challenge is to develop the larger companies required for sustained leadership in this area.

**Medical wireless.** This is also an area of Canadian strength involving both ICT and Life Sciences companies. Of particular note is the development of patient tracking services involving the same underlying location-based technologies as the industrial wireless area.

**mCommerce.** Again this is an area in which Canada appears to be falling behind. The carriers are focusing on developing a common domestic wireless payments

infrastructure while the Financial Services sector appears to be pursuing its own individual approaches. Meanwhile, the US is taking the lead in the international arena:

- PayPal, now owned by eBay legitimized the market, with 133 million active accounts. The company recently announced a major deal with the world's largest mobile carrier Vodafone to offer mCommerce services in Europe.
- VISA also announced in November 2006 that it is moving into the market in a substantive way. It started a mobile payment trial with approximately 500 Visa employees in California that would last during 2007. Pilot participants received payment coupons and rewards that can be redeemed at on-site cafes located at Visa's corporate campus.

## 0.7 KEY ISSUES AND OPPORTUNITIES

### 0.7.1 Issues

There are a number of key issues facing the development of mobile services, some of which are endemic to the ICT sector as a whole. These include:

**Lack of market clarity.** In the absence of available infrastructure required to support content-rich mobile services, it is difficult to gauge demand for multimedia services. As with any emerging technology, much of the demand is likely to be “latent” demand that will only become evident once the services are available. Non-connected content delivery in North America (e.g. iPod), and connected services successes in other jurisdictions (particularly Japan and Korea), suggest two main models:

- Users are ready to pay for content that they can relate to personally (music, games, video clips).
- Users are very reluctant to pay for undifferentiated generic content (news, weather, traffic) and hence there is a dependence on advertising revenues by companies addressing this type of content.

**Tariff structures out-of-synch with market realities.** A key advantage of fixed telecommunications in Canada has been the flat rate pricing for local calling. The per-minute pricing for mobile calls, as well as paying for incoming calls and the overall complexity of the tariff structure, especially for mobile data (mobile Internet), has been an inhibiting factor in the adoption of mobile services. As mobile has overtaken fixed communications and other countries have adopted flat rate mobile pricing especially for mobile data, tariff structures have become a liability to Canada and the situation is likely to get worse with the move to broadband mobile services.

**Content owners are in an uneasy position.** Content owners are faced with difficult issues related to developing business models for mobile content. This is due to a number of factors, including:

- The lack of market clarity issues addressed above;
- Persistent “walled garden” attitude of carriers;

- Lack of a clearly defined revenue sharing formulae with carriers (Japanese carriers take a well published transparent 9% mark-up on the sale of mobile services by third parties while Canadian carriers negotiate mark-ups that are often in the 50% range);
- Delay of carriers to embrace mobile content compared to other jurisdictions such as Japan, Korea and northern Europe;
- Intellectual Property issues on digital media (including mobile) that were at the root of the first Canadian artists' strike ever<sup>7</sup> and the persisting hostility of the major players of the music and cinema industries; and
- Uncertainty regarding potential content regulations relating to the protection of Canadian culture, not an immediate issue, but one that will become more sensitive as Internet media delivery in general, and mobile content delivery in particular, proliferates.

**Application developers are fighting to survive.** Most of the mobile application developers are small companies struggling to get their products to market. They are generally starved for cash by an investment community that does not understand content-based services and mobile applications and have to rely on relationships with carriers, government agencies and content owners in order to get their products to market. Given the newness and uncertainties surrounding mobile services, developing these relationships takes a considerable amount of time and effort. Increasingly, start-up companies are focusing on developing their products to the point where they can profitably sell-out to foreign multinationals, mainly in the US.

**The Canadian Master Asset: Manufacturers.** The void left by the limited amount of R&D performed by the carriers has been filled by the three major mobile infrastructure and handset manufacturers Research In Motion (RIM), Ericsson Canada, and Nortel. Not only have they been innovating in their core business (manufacturing) but they are establishing interesting links with mobile applications developers:

- For the last five years, RIM focused its Independent Software Vendor (ISV) partnership efforts around supporting development of mobile applications that serve key industries: financial services and insurance, legal, health care, real estate, government, and law enforcement. In addition to 1,500 business applications, the BlackBerry supports thousands of consumer applications, including mapping and photo sharing.
- Ericsson Canada launched in May 2006 a Mobility World Expert Center in its Montreal laboratory. This Expert Center aims to accelerate the creation of innovative multimedia applications and services by content and applications providers, as well as operators. The Montreal Expert Center has a dual mission: local and international. Hence developers can leverage on the Ericsson Mobility World network that is present in 35 countries.
- Nortel research is very focused on the emerging 4G technology, and is involved in standards development. The technology is there but the

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<sup>7</sup> The Alliance of Canadian Cinema, Television and Radio Artists (ACTRA) went on strike from January 7 to February 17, 2007.

market is still developing. Canada appears to be trailing by about 2 years in 4G.

### 0.7.2 What can be done?

It is clear that Canada is at a crossroads in terms of telecommunications and the recent mobile services takeoff has to be nurtured with care. It is an area of great opportunity for Canada and this report identifies many emerging suppliers of advanced mobile content and applications.

Developing the opportunity is not something that can be adequately addressed by governments (both federal and provincial), business, or associations individually but will require the concerted attention of all of them to help foster a vibrant mobile content and services industry. In terms of mobile services, areas where government and industry can provide a positive impact include:

By Industry (particularly by the carriers and major content owners)

- Accelerate and champion the deployment of the mobile services environment and available content
- Move towards a more open network, including encouraging infrastructure convergence in areas of fixed and mobile infrastructure, and cross-carrier interoperability
- Recognize that broadband content will drive revenues and adopt tariff structures that are both competitive and simple
- Provide innovation support for smaller mobile services companies
- Set a revenue sharing formula that promotes the creation of mobile content and services
- Recognize the importance of the consumer in driving mobile content and embrace user generated content

By Governments

- Develop a national wireless strategy focused on mobile services (and encourage provincial governments to do the same in their own jurisdiction areas)
- Foster development of wireless (and mobile services) champions
- Provide mCommerce leadership through the mobile delivery of government services
- Encourage mobile application development across the economy (spurring the creation of mobile industrial clusters and cross-cluster fertilization)
- Encourage carriers to do R&D (e.g. through financial incentives such as tax credits and if necessary by using the spectrum allocation process)
- Encourage full convergence of fixed and wireless infrastructure across Canada (if necessary by using the spectrum allocation process in order to foster and support this convergence)
- Address issues related to intellectual property and revenue sharing for mobile content (if necessary by using the spectrum allocation process to promote aggressive solutions)

By Associations

- Increase staff with intimate knowledge of the industry, clients and development, particularly regarding mobile content and services, and who are valued for this knowledge.
- Increase the number of specific wireless associations.
- Increase short-term support for wireless companies, including business development in general, bringing companies to meet local companies, and help with the first sale.
- Increase long-term support by understanding company needs, taking a cluster perspective and helping put supporting infrastructure, services, and education in place.



# 1 INTRODUCTION

The objective of the study is to build a profile of the mobile services industry and adjacent industries in Canada and their potential. The goal is to assess the industry's capacity to respond to the current needs of the international market and anticipated needs of the domestic market – with a provincial benchmark. Special attention has been paid to defining the value chain of the mobile services industry. In fact, the rules of the game are not yet well defined and many issues remain. Thus this is not viewed as a definitive study. Rather, the intent is to use the study as a starting point for an ongoing CATA-led structured debate among stakeholders on the continuing development of world leading mobile content and services in Canada.

## 1.1 MOBILITY ENVIRONMENT

Mobility has changed the telecommunications industry. The issue is everything that can be remotely transmitted without being routed through fixed networks. The BlackBerry has become the professional's basic tool. Everywhere, new wireless technologies are accessorizing more cumbersome equipment, such as computers, television sets, radios, and stereos, making them accessible everywhere.

But making content mobile doesn't mean simply deleting graphics and changing format. New ways of creating and communicating information must be invented. An entirely new industry is emerging that will change how we work, learn, and entertain ourselves. In short, the entire professional and cultural environment will be affected by this emerging phenomenon.

First some definitions:

Mobile refers to individuals or things in motion.

Services refers to an integrated set of applications, content and infrastructure

Hence Mobile Services connects one, or more, individuals or things in motion via a set of services. Some points to note:

- Mobile services may connect:
  - Mobile individuals to each other
  - Mobile individuals to a central service
  - A central service to mobile individuals, or things
  - A user (not necessarily mobile) to mobile individuals, or things
- Mobile services designed to be used by individuals in motion include both users' personal activities (games, news, commercial services, etc.) and their activities at work (access to corporate intranet, medical files, security systems, etc.). In some cases, the same services will be used for both entertainment and work.

- The notion of mobile services includes software designed to process computer data (compression, routing, etc.), format mini-interfaces, and manage invoicing systems. The services may be delivered directly online (via networks, cellphones, Wi-Fi access, satellite, etc.) or indirectly (synchronization with a computer connected to the Internet). It excludes activities involved with manufacturing mobile terminals and operation of wireless networks.
- To be clear, mobile does not necessarily mean “wireless connection” as well. Some good examples used simple desktop synchronization to take information into the field, reference the information throughout the day, and then resynchronize in the evening such as MP3 Players, iPods and PDAs, (see table below). Camera cellphones can be used off connection and photos taken may never be transmitted by wireless. These types of solutions can be very simple and very powerful — the question then becomes how much better can these solutions be when wirelessly enabled? The ability to work off-line, when not connected to the wireless network is critical. Several companies commented that their choice of vendor was dependent on this capability.<sup>8</sup>

**PERSONAL DIGITAL DEVICES**

Percentage of Canadians who reported using various digital audio-visual devices in December 2005 and how they used these devices

Devices	% of total population	% of device users who are	
		Male	Female
Cellphones	59%	52	48
BlackBerry	3%	75	25
PDA	7%	66	34
MP3 Player	12%	60	34
iPod	4%	70	30
webcam	8%	60	40

Percentage of cellphone, BlackBerry or PDA owners who used these devices to:

Watch television	2%	72	28
Take pictures / record video	3%	75	25
Obtain news or weather	7%	72	28
Obtain sports scores	4%	97	3

Source: CyberTRENDS, ComQUEST Research, Research Dimensions: December 2005 edition

In summary, mobile services results from the convergence of infrastructure, content and applications. These value-added user services are typically provided through an increasing range of highly functional mobile devices.

<sup>8</sup> Thought leadership: The Business Case for Wireless Software (Applications in the Enterprise), by Iain Gillott, Editor at Software Magazine, August 9, 2006 - Toronto Wireless User Group Newsletter [www.torwug.org]

## 1.2 STUDY AUDIENCE

What does the mobile services industry look like in Canada? To-date, information on mobile services has been fragmented, poorly disseminated and typically out of date.

As a consequence, it has been impossible to identify the best practices with regard to mobile services. What are the promising applications? What are the research axes? What is the state of the projects underway? This study answers these and other questions about the mobile services industry. It is targeted at:

- **Government.** Specific audiences include policy makers and regulators who are concerned about the implications of the rapidly evolving wireless infrastructure and access devices, as well as the explosive growth of content (particularly user-generated content) which is increasingly being accessed through mobile services, often outside of the current regulatory environment. Other key government audiences are industry development groups (both within the ICT sector, as well as other enabled sectors) who are looking for direction on how Canada can deploy and use mobile services in key strategic areas in order to increase overall competitiveness.
- **Corporations.** Any company that wants to develop mobile services must do so in reference to a foreign environment, without regard to the specificities of the Canadian context. More seriously, the public and large corporate services that have the most to gain by using this new distribution channel have too little information on what is being done in the mobile services sector here in Canada – and in each of its provinces. The study is intended to provide help in advocacy and with networking.
- **Industry support groups.** Associations are looking to help their members, investors are trying to assess potential business opportunities, and law firms are wrestling with intellectual property and privacy issues in the new converging and evolving technology arena. These and other support groups are trying to come to grips with the realities of the rapidly emerging mobile services environment.
- **Academia.** Academics and researchers are always looking for information that will trigger new ideas and lead to additional research projects. This study is expected to provide academics and researchers with a greater knowledge and understanding of technology developments and market trends with respect to wireless development in general, and mobile services in particular, as well as what currently exists in Canada in terms of company capabilities.

## 1.3 APPROACH

### 1.3.1 Working hypothesis

The Information and Communications technology (ICT) sector is in the process of being entirely digitized or computerized. This process became particularly apparent in the 1980s with the digitization and computerization of telecommunications. But the scope of **convergence** between telecommunications and computing has been underestimated. What actually took place rather was an “**invasion**” of telecommunications by the computer sector. The traditional telecommunications

paradigm (based on evolution and reliability) had to give way to the more innovative computing paradigm (based on disruption and speed, by times at the expense of reliability). The symbol of the new paradigm of course is the Internet. This results in two consequences:

- *Industry consequence:* Telecommunications has become a sub-sector of the broader ICT sector.
- *Technology consequence:* Telecommunications has become a specialized, largely software driven, application of computer communications.

**One promising way to assess the future of an industry or of a technology is to assess its degree of computerization**, its origins and its inner rationale. This working hypothesis was tested throughout this study and used in our conclusions.

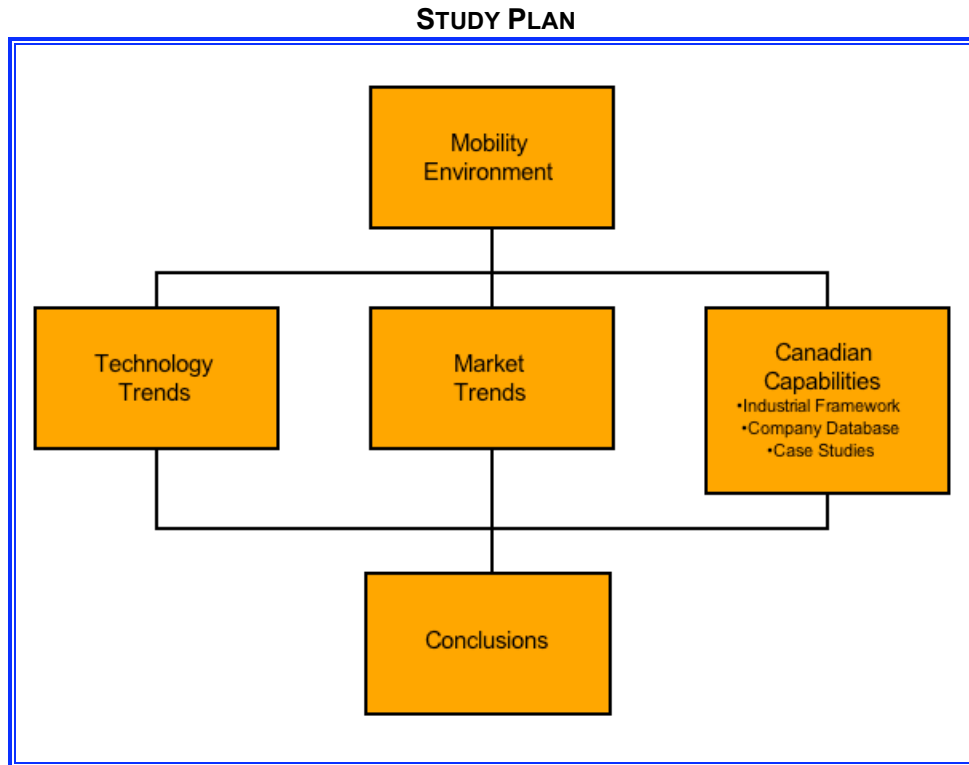
The same phenomenon can be observed in other sectors, particularly the content and applications sector which is also rapidly increasing, again largely driven by computer industries. This is resulting in a stratification of ICT services into infrastructure, content and applications. It has several consequences:

- *Infrastructure consequence:* Telecommunications services is becoming a low value-add bandwidth business.
- *Content consequence:* The growth of online content, particularly user-driven content, threatens to upset traditional broadcast business models and regulatory environments.
- *Application consequence:* Explosive growth in business-driven applications is redefining the relationship between the providers and their clients within the ICT sector, particularly Telecommunications industries, and is creating many new economic opportunities.

In our study on Mobile Content and Services, this means **it is also possible to anticipate the chances of success of an industry or of a technology by assessing the degree of independence gained by the content and applications industries compared with infrastructure industries**. Again, this working hypothesis was tested throughout this study and used in our conclusions.

### 1.3.2 Methodology

The overall approach was to build a bottom-up understanding of Canadian capabilities within the defined scope of mobile services and to assess these capabilities within overall technology and market trends. The following diagram illustrates the main components of the study and the ensuing explanation provides a roadmap to report contents:



### **Mobility Environment**

The starting point was to define and describe the mobility environment and this provides the overall context for the study (Chapter 1).

### **Technology Trends**

Mobile technology is undergoing rapid change and technology trends were examined in 3 key areas, namely cellular infrastructure, non-cellular wireless technologies, and wireless data services (Chapter 2).

### **Market Trends**

For once, the engine of innovation in the mobile industry is not located in the United States – at least, not exclusively. The mobile services industry was born in Japan when it launched the “*i-mode*” wireless Internet access service in February 1999.

Today, the mobile industry is most developed in Asia (mainly Japan and South Korea, but also China and India) and Western Europe (with Scandinavia leading the way). Asian and European mobile service companies are way ahead of their North American competitors.

After a stuttering start, the mobile services industry in North America has now taken off. By either collaborating with or bypassing cellular operators, hundreds of companies have joined the race, from SMEs created around a single innovation to omnipresent giants such as Microsoft and Apple.

The study examines overall market trends, as well as specific market trends in Asia, Europe, the United States and Canada (Chapter 3)

### Canadian Capabilities

Central to this study is a good understanding of Canadian capacity in terms of mobile services. This was determined by a bottom-up analysis of individual companies using a framework-based approach. The results were complemented by interviews and case studies of a number of key and emerging companies across the mobile services value-chain. There are three components to the study that address Canadian capabilities:

- **Industrial Framework.** The structure of the wireless industry, and the position of Mobile Services within this structure, provides the vehicle for analysing industrial capability (Chapter 4). In addition, the individual companies examined are mapped onto the framework according to their position in the structure (Appendix A).
- **Company Database.** Complementary to the report is a database of more than 200 mobile services companies in Canada. Extensive tombstone, technology, product and market information is included for companies in this database
- **Case Studies.** More than 20 interviews were conducted and close to 20 companies were profiled in the form of case studies (Chapter 5)

### Conclusions

In addressing the question “What is the future for mobility in Canada?” the study examines the trends, issues and implications for the three main elements of Mobile Services, namely infrastructure, content and applications. As well an overall summary is provided of what this means to the study audiences, namely government, corporations, industry support groups, and academia (Chapter 6)

## 2 TECHNOLOGY TRENDS

One is often tempted to forget that cellular telephony started in Canada in 1981 when AGT launched the Aurora 400 service which is considered to be the first Canadian cellular-telephone system, even though it did not feature handoffs. The Aurora system covered the entire province using large sized cells. It was called “cellular” because it employed frequency reuse. The entire R&D for this Canadian first was carried out in Alberta. The lack of handoffs worked well in a rural area needing wide area coverage.

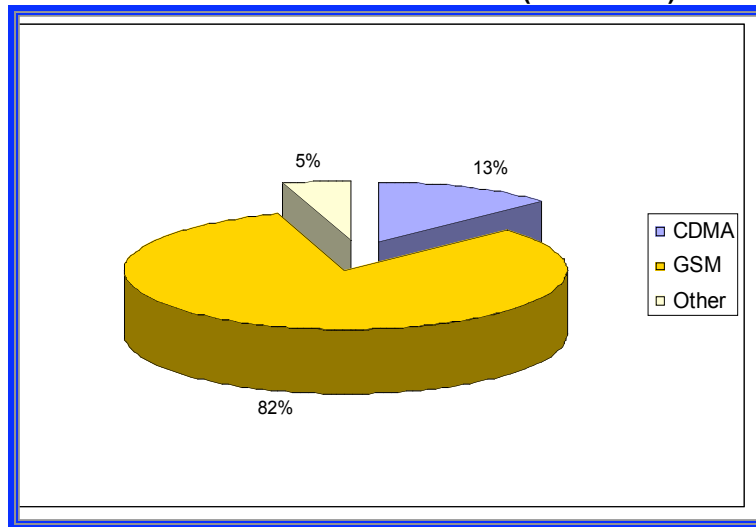
Encouraged by the Aurora success, AGT launched a company called NovAtel to manufacture cellular telephones in January, 1983. NovAtel, owned equally by AGT and the petrochemical firm Nova Corporation of Alberta, quickly became the second-largest cellular-telephone company in the world. This star of AGT’s diversification policy cornered 25 per cent of the Canadian cellular-telephone market, 21 per cent of the US market, and had significant sales in Great Britain and Norway. At the height of its glory, NovAtel had nineteen hundred employees, most of them based in Calgary and Lethbridge. This success did not last and after many errors and scandals, NovAtel ended up being purchased by Nortel. But this initial success may explain why Alberta, and in particular Calgary where NovAtel was based, has remained until now one of the Canadian centres of excellence in wireless.

### 2.1 CELLULAR INFRASTRUCTURE

Regular cellular telephony was introduced throughout Canada in 1984 in the form of a duopoly comprising Rogers-Cantel on one side, and Bell and its allies, the other telecommunications carriers (Telus, Sasktel, MTS, etc.), on the other side. Its actual deployment started the following year with each side using the same analog technology (AMPS). Things started to change with the introduction of digital technology: Rogers-Cantel started the digitization process in 1992, well before Bell and its allies. At first, all carriers adopted the TDMA standard. But in November 2001, Rogers switched to the European GSM standard with the help of Ericsson Canada.

CDMA is mainly used in North America, Japan and Korea while GSM dominates the rest of the world. Changing standards is a costly and hazardous move. The reasons invoked by Rogers to switch to GPRS are that GSM/GPRS was used by a majority of mobile users in the world, its network had a greater capacity and the upgrade to 3G was smoother. Since 2001, the GSM standard accentuated its prevalence and it now covers 82% of the 2.7 billion cellular subscribers worldwide. As a consequence of this domination, GSM devices and network equipment were cheaper and offered more variety. Rogers’ move was not obvious in 2001 and required a good dose of vision, but it now appears profitable. One has to add, it was facilitated by the presence in Montreal of an important core of Ericsson researchers and engineers devoted to both TDMA and GSM.

**WORLD NETWORK SUBSCRIBERS (DEC. 2006)**



Source: GSM World and CDMA Development Group (CDG)

As a result of Rogers' choice, Canada was then divided between GSM carriers (Rogers) and CDMA carriers (Bell, Telus, SaskTel and MTS-Allstream). In 1995, two new cellular carriers were launched, Microcell Telecommunications and Clearnet: Microcell chose GSM for its innovative Fido service while Clearnet preferred a variation of the TDMA technology, the iDEN Motorola standard. When Telus acquired clearNET in late 2000, it unified the two networks under the same CDMA-based standard. Rogers acquired Microcell in September 2004 consolidating the two GSM networks. As a result, we now have in Canada, as in the US, two blocks of competing standards.

**NORTH AMERICA IS DIVIDED INTO CONFLICTING STANDARDS**  
(million of subscribers – spring 2006)

	CDMA		GSM	
<b>CDN</b>	Bell/Aliant	5.4 M	Rogers Wireless	6.2 M
	Telus Mobility	4.5 M		
	MTS-Allstream	0.3 M		
	Sasktel	0.3 M		
<b>USA</b>	Verizon	51.3 M	Cingular	56.0 M
	Sprint/Nextel	39.7 M	T-Mobile	20.0 M
	Alltel	15.0 M		

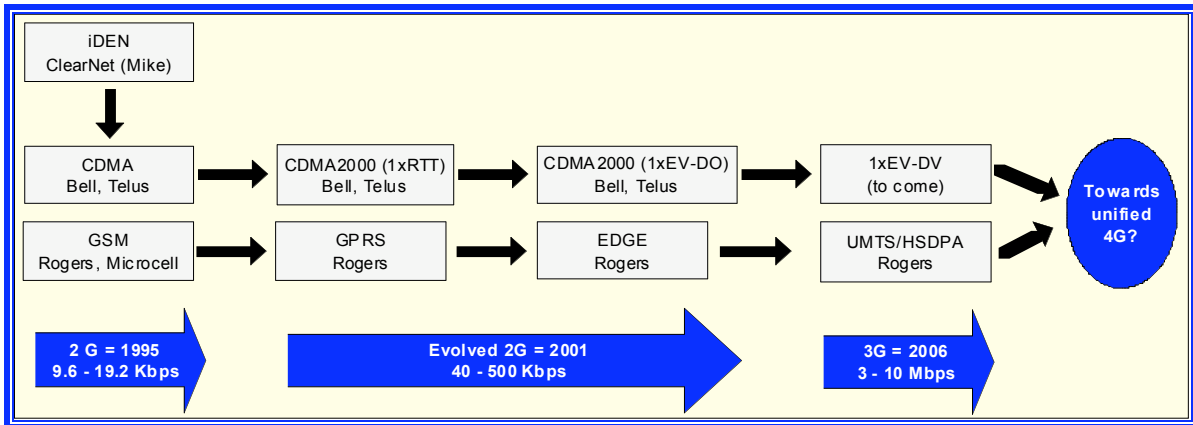
Source: ScienceTech Communications

All subsequent technological generations will continue to evolve from this initial choice. GSM companies will naturally choose GSM-based standards: GPRS, EDGE and finally UMTS. On the contrary, TDMA networks had no future, so they migrated towards CDMA and followed the evolution of this standard, i.e. the three phases of CDMA2000: 1xRTT, 1xEV-DO and 1xEV-DV.

This is why in November 2002 Bell chose the CDMA2000 1xRTT to launch its 2.5G service in Toronto and has kept expanding it since then. Bell estimated that it would cost less to upgrade its existing technology rather than switching to GPRS and EDGE. All other Canadian TDMA-based carriers followed the same track.



**CELLULAR NETWORK EVOLUTION**



Source: ScienceTech Communications

In November 2001, Rogers was the first Canadian company to adopt the second generation of wireless technology (2G), i.e. in digitizing its network. Microcell (Fido) was the first company to go to 2.5G in September 2001, well before the main contenders, including Rogers. In November 2006, Rogers was again the first company to start deploying a 3G network. A first observation comes to mind: pure players such as Rogers and former Microcell seem to be the early adopters of new technologies while the wireline based incumbents such as Bell and Telus lag behind. However, this observation must be put in perspective: on a worldwide basis, Canada as a whole is lagging behind Asia (Japan, Korea and now China), Western Europe and even the US carriers that were late themselves.

**GENERATIONS OF MOBILE TECHNOLOGIES (DETAILS)**

#	Technology	Description	Speed	Companies
1G	AMPS	Advanced Mobile Phone Service: The 1G analog wireless technology was deployed in 1984 in Canada.	Voice grade	All carriers
2G	TDMA	Time Division Multiple Access. TDMA provided up to 3 times the number of calls a standard AMPS system could by using a time-sharing protocol.	9.6 Kbps	Rogers (since 92) and then all carriers
2G	iDEN	Integrated Digital Enhanced Network or enhanced specialized mobile radio (ESMR). iDEN is the Motorola version of TDMA technology.	9.6 Kbps	Clearnet-Mike
2G	GSM	Global System for Mobile Communication. A 2G digital wireless TDMA technology that is the world's most widely used system.	9.6 Kbps	Rogers (Nov. 01) Microcell-Fido (95)
2G	CDMA	Code Division Multiple Access. CDMA is a spread spectrum technology, where each voice or data call uses the entire radio band and is assigned a unique code.	14.4 Kbps	Bell (Sep. 02) All carriers but Rogers and Microcell
2.5G	1xRTT	Single Carrier (1x) Evolution-Data Voice - 1 <sup>st</sup> phase of CDMA2000: CDMA2000 is a registered trademark of the Telecommunications Industry Association (TIA-USA) in the United States, not a generic term like CDMA.	40 to 60 Kbps	Bell (Feb. 02) Telus (Jun. 02) MTS (Nov. 02) Aliant (Nov. 02) SaskTel (Apr. 03)

#	Technology	Description	Speed	Companies
2.5G	WiDEN	Wideband Integrated Dispatch Enhanced Network. WiDEN, is a software upgrade developed by Motorola for iDEN.		None
2.5G	GPRS	General Packet Radio Service. GPRS provides a migration path for GSM carriers to offer higher data speeds.	115 Kbps	Microcell (Fido) since Sep. 01 Rogers since Jun. 02
2.75G	1xEV-DO	Single Carrier (1x) Evolution-Data Only - 2 <sup>nd</sup> phase of CDMA2000.	300 to 500 Kbps	SaskTel (Aug. 05) Bell (Oct. 05) Telus (Nov. 05) Aliant (Feb. 06) MTS (Mar. 06)
2.75G	EDGE	Enhanced Data for GSM Evolution: An enhancement for GPRS networks that works within the existing radio spectrum.	384 Kbps	Rogers (Jul. 04)
3G	1xEV-DV	Single Carrier (1x) Evolution Data-Voice - 3 <sup>rd</sup> phase of CDMA2000. CDMA2000 is an incompatible competitor of the other major 3G standard UMTS	5.2 Mbps	None
3G	UMTS/ HSDPA	Universal Mobile Telecommunications System: it uses Wideband Code Division Multiple Access (W-CDMA) as the underlying air interface. Current networks such as the HSDPA version chosen by Rogers can expect a performance up to 3.6 Mbit/s.	3.6 to 11 Mbps	Rogers (Nov. 06)

Source: ScienceTech Communications

## 2.2 NON-CELLULAR WIRELESS TECHNOLOGIES

The wireless world incorporates a great deal more than cellphones, ranging from satellite-based services (GPS) and Wi-Fi hotspots to various specialized applications such as personal area networks (PAN) that have a very limited range and that are used for communication among the personal devices themselves (from headset to cellphone), or for connecting to a higher level network (from PDA or iPod to the Internet) – not to mention Radio Frequency Identification (RFID) that enables machine-to-machine communications such as tracking goods and assets in the workplace.

## OTHER WIRELESS TECHNOLOGIES

Wireless Standard	Speed	Coverage	Licences	Usage
<b>RFID</b> (815.3a)	26 Kbps	3 metres	No	Barcode replacement in passive transponders
<b>Zigbee</b> (802.15.4)	250 Mbps	30 metres	No	In-house wireless monitoring and control devices (sensor meshes)
<b>Bluetooth</b> (802.15)	3 Mbps	10 metres	No	Wireless headsets, phones and other nearby peripherals
<b>Wi-Fi</b> (802.11)	54 Mbps	100 metres	No	Public wireless hot spots, residential and business LANs
<b>WiMAX</b> (802.16a)	75 Mbps	50 km	Both	Fixed last mile between subscribers and carriers.
<b>Ultra-Wideband (UWB)</b>	480 Mbps to 1 Gbps	10 metres	No	Short-range and indoor(s)???

Source: ScienceTech Communications

### 2.2.1 Wireless fidelity (Wi-Fi)

The most important characteristic of Wi-Fi is its use of the unlicensed spectrum, which allows for cheaper access to the Internet and easier adoption (everybody can install a Wi-Fi antenna and use it privately or publicly). Wi-Fi is specified in the 802.11b standard from the Institute of Electrical and Electronics Engineers (IEEE) and is part of a series of wireless specifications together with 802.11, 802.11a, and 802.11g. Its range of 100 metres and its relatively high rate of 54 Mbps make it a natural substitute for wired local area network (LAN) – we then speak of WLAN.

The Wi-Fi technology rapidly became very popular because it does not require any license to operate and it is very simple to install. As all recent laptops include a Wi-Fi interface, this technology became the preferred way to connect to high-speed Internet. The Wi-Fi technology is already widely used by Canadian corporations (WLAN) and by households as a substitute to inside wiring. In this case, the Wi-Fi platform complements the standard fixed access to the Internet.

Many Internet Service Providers (ISPs) realized that the Wi-Fi technology could be profitable and installed it in public locations. New players, like FatPort or Boingo concentrated on providing “Wi-Fi hotspots”. Other ISPs specialize in offering this type of service to hotel or restaurant chains that offer it in turn to their own clients. Even Bell Canada is interested. More than 60 regional ISPs in Canada are offering this type of service.

Some municipalities offer Wi-Fi as a complement to public libraries for free or for limited charges. The most publicized example is Philadelphia which launched a citywide Wi-Fi network in September 2004 to address the lack of broadband coverage, achieve telecommunication cost savings, increase productivity for mobile workers and address digital-divide issues and economic development goals. The news sparked a wave of RFPs throughout the United States, as other major cities sought to provide similar services. In Canada, several cities adopted municipal Wi-Fi: Vancouver, Ottawa, Fredericton, and of course the mega network deployed by Toronto (see below).

In December 2002, Bell announced Bell AccessZone, a Wi-Fi hotspot pilot. During the three month pilot, Bell converted a number of high traffic payphones at Ontario's Union Station and

several Air Canada lounges, among other locations, into wireless Internet access points. In February 2004 Telus partnered with the ISP Spotnik Mobile to launch a Wi-Fi service trial aboard high-speed VIA Rail Canada trains traveling between Montreal and Québec City. But the incumbents never pushed the promotion of hotspots very hard as a commercial service. When Rogers upgraded its network to 2.75G Edge in July 2004, it announced its intention to provide Wi-Fi hotspot access with its cellular service.

The Canadian Wireless Telecommunications Association (CWTA) is a strong supporter of Wi-Fi and it encouraged the wireless carriers to cooperate. In August 2003, it could announce that all Canada's national wireless carriers, Bell Mobility (including Aliant Mobility), Microcell Solutions (Fido), Rogers Wireless and Telus Mobility, agreed to establish common standards for roaming and interoperability among public Wi-Fi hotspots. The agreement was the first of its kind in North America. In March 2004 the CWTA announced the launch of inter-carrier Wi-Fi service along with plans to develop more than 500 new hotspot locations. This new hotspot network would allow for cross-Canada roaming between carrier-run hotspots under a common brand. After many delays, the inter-carrier Wi-Fi service was finally launched in May 2005.

Canada's public hotspot penetration lags behind the other industrialized countries. At the end of December 2006, 132,080 free and paid Wi-Fi hotspots were identified in 131 countries.<sup>9</sup> Out of this number, only 1,523 Wi-Fi hotspots were located in Canada, making it the 15th country out of 131, right behind Brazil and just before Spain. How can we explain this mediocre result? It seems that the federal and provincial governments have no interest in wireless access to the Internet (and telephony) and there is definitely no national policy to promote it. Again, the dynamic policies deployed in municipal and school fixed fibre optics access seem to have slowed Canada's effort towards wireless, though, wireless is not a substitute for fixed broadband (see Chapter 4 – Industrial Framework). Wireless opens the door to various new services and has the potential to reduce the digital divide: it is a different way to access the information society.

#### PUBLIC HOTSPOTS TOP 20 COUNTRIES (2007)

United States	50,397	Switzerland	2,002
United Kingdom	17,113	Belgium	1,694
Germany	13,934	Brazil	1,669
France	11,053	Malaysia	1,666
South Korea	9,415	<b>Canada</b>	<b>1,621</b>
Japan	6,808	Spain	1,373
Taiwan	3,713	Portugal	1,243
Italy	2,871	Sweden	1,028
Netherlands	2,759	Hong Kong	963
Australia	2,069	Austria	946

Source: JiWire, <http://www.jiwire.com/>

Inside Canada itself, large discrepancies exist among provinces with Quebec lagging behind British Columbia although it has a larger population. Another concern is that isolated provinces and territories which need the most public hotspots are the least equipped. This is a clear sign of the lack of government involvement in wireless access. Canada's wireless industry may well be a victim of the country's former success in fixed broadband access.

<sup>9</sup> Each week, JiWire tracks the most popular countries, cities, and locations where Wi-Fi service is available. <http://www.jiwire.com/search-hotspot-locations.htm>

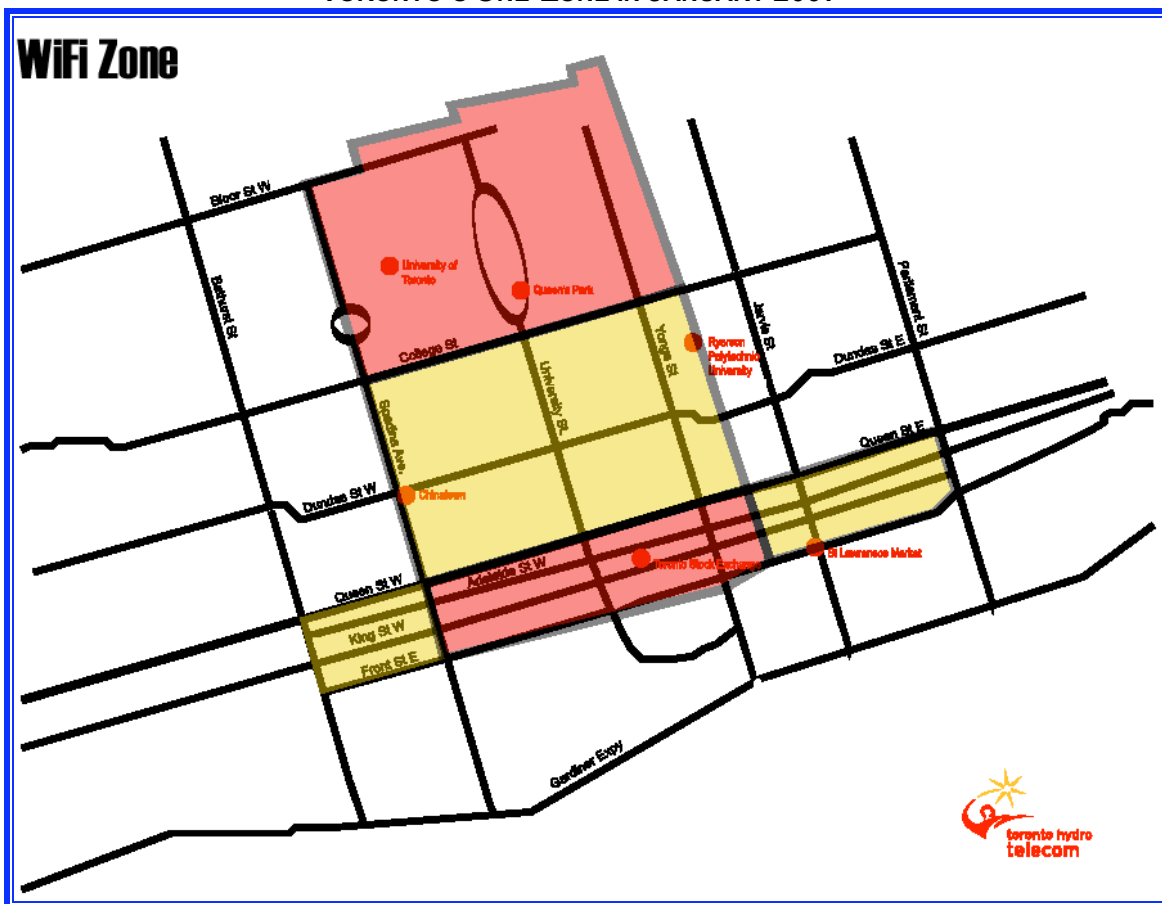
**PUBLIC HOTSPOTS LOCATIONS IN CANADA**

Alberta	167	Nova Scotia	35
British Columbia	457	Ontario	480
Manitoba	56	Prince Edward Island	3
New Brunswick	38	Quebec	354
Newfoundland	4	Saskatchewan	25
Northwest + Yukon	2	Canada (Total)	1,621

Source: JiWire, <http://www.jiwire.com/>

The most important Canadian involvement in the Wi-Fi platform is without any doubt the deployment in Toronto of a meshed network which provides the downtown core with broadband access (54Mbps). Launched in September 2006 by Toronto Hydro telecom, this initiative called One-Zone already covered six square kilometres of the downtown core by the end of 2006 (see map below). One Zone is powered by both German-based Siemens and Canadian-based BelAir Networks broadband wireless mesh equipment. Access to One-Zone is free until March 2007 and customers will be charged \$29 on a pre-paid monthly basis thereafter. Alternatively, they can buy a 24-hour subscription for \$10, which entitles them to use the network for 24 consecutive hours. The third option is an hourly subscription that costs \$5.

**TORONTO'S ONE-ZONE IN JANUARY 2007**



Source: One-Zone - <http://www.onezone.ca/>

When completed in 2009, One-Zone will cover 622 square kilometres that will go northward to North York, westward to Etobicoke, and eastward to Scarborough. This network will offer

seamless access to the Internet from any location within the ubiquitous Wi-Fi zone thus providing a solution to the dead zones that are currently found in downtown Toronto. Currently, radio transmitters are located arbitrarily in coffee shops, fast food outlets, train stations or hotels, depending on the service provider. While it is too early to assess the success of One-Zone, its business plan seems sound since it is guaranteed a fixed income from one driving application: telemetry. Indeed, Toronto Hydro telecom will use One-Zone to measure power consumption data in each household and workplace all over its territory.<sup>10</sup>

Despite Toronto's One-Zone and the CWTA efforts, Canadian carriers remain cautious in front of the Wi-Fi technology. They contend there is no profitable business model for Wi-Fi. Not surprisingly, Toronto's entry into the Wi-Fi business received a critical reception from the carriers: Mike Lee, chief strategy officer with Rogers Communications declared he could not understand why Toronto Hydro, which is owned by the cash-strapped city of Toronto, wanted to enter the Internet access business, because it can be expensive to operate and maintain: "It will not be an easy business."<sup>11</sup> Chris Langdon, vice-president of wireless solutions with Telus, said many municipalities have launched wireless networks over the past 15 years, only to return to private suppliers.<sup>12</sup> Carriers categorically oppose any municipal or community involvement in telecommunications infrastructure.

The truth is they fear the disruptive impact of this simple and affordable technology. Indeed, Wi-Fi can also be used by new entrants to entirely by-pass the landline and even the wireless networks to access the Internet and to make telephone calls. The threat comes from the new bi-mode handsets commercialized by manufacturers, in particular Nokia. A bi-mode handset functions in the regular cellular mode when used outside WLANs and hotspots, but as soon as it detects a WLAN or a hotspot, it switches to the Wi-Fi mode and all calls are thus billed as landline calls. The same handset can therefore function as a cellphone outside and a landline phone inside a Wi-Fi zone. This is an advanced version of convergence between fixed and mobile technologies.

There are two ways to use bi-mode or converged handsets: the "Walled Garden" one and the "Open Gateways". Several carriers are already embracing a bi-mode approach such as BT in the UK<sup>13</sup> or Orange in France and the UK. They allow bi-mode handsets to automatically switch to Wi-Fi but exclusively when they are within the range of one of the carrier's public hot-spot – therefore paying the carrier's local or long distance rates.

The open Wi-Fi such as the one provided since February 2006 by the British startup Barablu allows anyone to use voice-over IP from a public or private hot-spot anywhere in the world. Another British firm Truphone and the Swedish firm Challenger Mobile launched similar services respectively in June and December 2006. At the time of these launches, only Nokia was proposing Wi-Fi enabled handsets (Nokia's E series and N-series handsets) This approach to Wi-Fi is not only threatening the carriers grasp on Internet access, it will threaten as well their core

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<sup>10</sup> The Ontario government mandated Toronto Hydro to install by 2010 smart hydro meters that are capable of communicating power consumption data to a data centre at 15-minute intervals. This would give the utility the ability to charge different rates at different times of the day depending on supply and demand. Jeffrey Fang, "Wireless disruptive forces – noises or reality?", UBS Investment Research, November 2006, 56 pages. Cf. p. 10.

<sup>11</sup> Mark Evans, National Post, March 07, 2006.

<sup>12</sup> Idem.

<sup>13</sup> BT's converged service called Fusion was first launched in June 2005 using a Bluetooth connection in the home. This was not a success and was replaced in September 2006 by a Wi-Fi connection. Ken Wieland, Telecommunications Online, February 1, 2007.

business which is voice communications. Some advances in this direction have already been implemented in Korea and Europe.

**Free Internet Calls on Nokia Phones**

Challenger mobile, a pioneering global telecom service, has launched a new offering that makes free mobile Internet calls available to people who own a mobile phone that supports Internet calls (such as the Nokia E-series). When signed up for the service customers can make free mobile Internet calls whenever they are in a Wi-Fi zone. The service was launched in beta in December 2006, setting in motion Challenger mobile's strategy to bring free Internet calls to the mobile telecom market. Since then, customers in more than 100 countries around the world have joined and are using the service. Press Release, Challenger, February 13, 2007.

### 2.2.2 Worldwide Interoperability for Microwave Access (WiMAX)

Like Wi-Fi, WiMAX is an IP standard aimed at delivering wireless broadband access but with a much longer range, in principle of 50 kilometres. In practice, the average cell ranges for WiMAX networks in urban environments (through tree cover and building walls) will most likely be in the 8-10 kilometres range. Much of the credit for the WiMAX initiative must go to the WiMAX Forum, an industry-led, non-profit corporation formed in 2003 to help promote and certify the interoperability of broadband wireless products based on the IEEE 802.16 standard and compliant with its European equivalent (ETSI HiperMAN). The key point in the initiative came with Intel's commitment to manufacture WiMAX chips.

There are two main applications of WiMAX today: fixed WiMAX applications are point-to-multipoint, enabling broadband access to homes and businesses, whereas mobile WiMAX offers the full mobility of cellular networks at true broadband speeds. Both fixed and mobile applications of WiMAX are engineered to help deliver ubiquitous, high-throughput broadband wireless services at a low cost. The first fixed WiMAX certified products were announced in January 2006 whereas the first mobile ones are expected early in 2007. It is interesting for us to notice that mobile WiMAX uses Orthogonal Frequency-Division Multiplexing (OFDM) chips that were first promoted by Montreal based Wavesat Inc. (see Chapter 5 - Case Studies). In December 2005, Wavesat's Chief Scientist Officer Dr. Jonathan Labs was appointed Chairman of the WiMAX Forum's Evolutionary Task Group created to develop technical specifications for the evolution of WiMAX standards from fixed to mobile.<sup>14</sup>

While WiMAX, whether fixed or mobile, is definitely considered as complementary to Wi-Fi, it is increasingly being considered as a competitor to the 3G cellular platform. As the promise of 3G services has been slow to emerge, WiMAX systems based on newer technology such as OFDM and scalable OFDMA offer the promise of cheaper, more effective and faster deployments of broadband mobile wireless systems. In the US, Sprint/Nextel has announced plans for a massive nationwide WiMAX network. Sprint/Nextel's objective is to create a market for linking devices to the Internet that today are unconnected – everything from digital cameras and music-players to sensors and household appliances. This will let people do things that are now difficult or expensive, such as mobile video-conferencing or managing a building's lighting online. The new

<sup>14</sup> Understanding Wi-Fi and WiMAX as metro-Access Solutions, White Paper, Intel, October 2004. The WiMAX Forum Certified program for fixed WiMAX, White Paper, WiMAX Forum, May 2006.

service will compete not only against mobile operators, but also with telephone companies and cable firms that sell broadband.<sup>15</sup>

This convergence of wireless and wireline technologies is the next big disruptive thing that is going to take place in the telecommunications arena – indeed it is already taking place in Korea and Japan. A new generation of entrants coming from outside the telecommunications industry aiming to compete head-on in the broadband access market will likely emerge. When Intel promises to equip all laptops with WiMAX chips, it is pushing the WiMAX standard to the mass market. From a worldwide revenue base of \$1.1 billion in 2007 for both equipment and services, the WiMAX market is forecasted to reach close to \$49 billion by the end of 2012.<sup>16</sup>

In Canada, Microcell set up a joint venture, Inukshuk Wireless, in early 2004 with Canadian carriers Bell and Rogers, to build a national wireless broadband network licensed by Industry Canada. This next generation IP wireless network, based on pre-fixed WiMAX standards, enables portable megabit services, allowing subscribers to access the Internet and other applications such as VoIP, video streaming and a variety of data applications. The initial phase of the network covers over 5 million households and 40% of the population and is now available in 20 areas across Canada. When completed by the end of 2008, the Inukshuk Wireless network footprint will cover 45 cities and approximately 100 un-served rural and underserved communities across Canada. After the acquisition of Microcell by Rogers, the project became an equally owned joint venture between Bell and Rogers.

The Inukshuk Wireless network uses existing cellular towers of both Bell and Rogers but the two companies compete in the service commercialization. Until now though the service has not been very popular and former Microcell's Chief Financial Officer Jacques Leduc laments: "Inukshuk is an unconsummated love; unfortunately the company is not ours anymore. The two current owners, Bell and Rogers, do not take advantage of the full potential of the Inukshuk network for fear of cannibalizing themselves."<sup>17</sup> Whatever the truth, it remains that the Inukshuk Wireless network is one of the largest pre-WiMAX networks in the world. The total investment by the Bell and Rogers partnership is expected to reach \$200 million by 2008 and Inukshuk also invests a minimum of \$3 million per year to support content and connectivity initiatives through a Learning Plan.

Wireless manufacturer SR Telecom entered the WiMAX market in 2003. Traditionally specialized in narrow-band services, the company now derives nearly 100% of its revenues from broadband, largely due to OFDM, pre-WiMAX technology. Today, SR Telecom supplies some of the world's largest broadband wireless accounts with 25 commercial networks in place and counting, including industry-leading corporations such as Telmex, Telefónica and Axtel. From 2007 onwards, WIMAX technology will be at the forefront of SR Telecom's product roadmap.

### **2.2.3 Bluetooth, and ZigBee and UWB**

Bluetooth (IEEE 802.15.1) is a very simple type of wireless networking that can allow up to eight devices to be connected together in a mini-network. It is very short range in operation, and so is

<sup>15</sup> "Up in the air: Sprint Nextel gambles on a 4G network", The Economist, Aug 10th 2006.

<sup>16</sup> NSR, "WiMAX, 2<sup>nd</sup> Edition: Analyzing End User Demand Trends", November 7, 2006.

<sup>17</sup> "La haute direction de l'ex-Microcell reprend du service", Les Affaires, December 9, 2006 (our translation). Jacques Leduc is now senior partner of a venture capital fund aimed at the wireless industry.



considered to be for use in Personal Area Networks (PAN). With a range typically under 10 metres, this allows enough distance to communicate across an office, but not any further. The Bluetooth specification was first developed in 1994 for Ericsson mobile platforms in Sweden.<sup>18</sup>

The key features of Bluetooth technology are: relatively slow speed (3 Mbps), relatively low power, and low cost - Bluetooth chips sell for under \$3. Bluetooth chips are designed to be compatible across a range of very different operating systems and devices; for example, it can enable headsets to connect with other devices such as a cellphone, an MP3 player, or a computer. Bluetooth has been slow to become accepted in the market, but is now starting to become increasingly prevalent. Prices are falling and increasing numbers of devices are offering Bluetooth connectivity. About 600 million Bluetooth-enabled devices had been sold worldwide at the end of 2006 (although mainly outside the US).<sup>19</sup>

Bluetooth is often compared to a closely related technology called ZigBee, a much more recent technology that takes its name from the zig-zag path of bees that form mesh networks between flowers. ZigBee proponents believe mesh networking is the key to unattended wireless systems in the home, business, or industry. Mesh networking, they say, provides redundancy required for unattended system operation and is essential for the reliability of the ZigBee network. Based on IEEE 802.15.4 standard, which was ratified in December 2004, ZigBee networks are low rate PANs (250 Kbps) that can support a larger number of devices and a longer range between devices than Bluetooth. Because of the differences, these technologies are not only geared toward different applications, they don't have the capability to extend out to other applications. For example, Bluetooth must rely on fairly frequent battery recharging, while the whole goal of ZigBee is for a user to be able to put a couple of batteries in the devices and forget about them for months or years.<sup>20</sup>

While ZigBee still struggles to become widely accepted, a new emerging standard is on its way to being certified: Ultra-wideband (UWB). This revolutionary wireless technology can transmit data at very high rates with very low power. UWB provides less interference than Bluetooth or ZigBee, while yielding a low probability of detection and excellent multipath immunity. When combined with other PAN standards, UWB will provide a very compelling wireless multimedia network for the home. It will have the ability to support multiple devices, and even multiple independent PANs, so nearby neighbours will not interfere with other UWB networks. This architecture allows multimedia-enabled devices to send and receive multiple streams of digital audio and video at price points and power consumption levels currently unattainable with existing solutions.

The basic drawback is that to date, UWB only has regulatory approval in the United States. UWB products are slow to come to market due to the disagreements over the standard and the lack of global regulatory approval. Currently, there are two competing UWB standards fostered by two opposed groups (UWB Forum and WiMedia Alliance). The Bluetooth Special Interest Group (SIG) announced in May 2005 its intentions to work with both groups behind UWB to develop a

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18 The name Bluetooth is derived from the cognomen of a 10th century Scandinavian king Harald Bluetooth, known for his unification of previously warring tribes from Denmark, Sweden, and Norway.

19 Bluetooth Special Interest Group (SIG) - <http://www.bluetooth.com/>, "Bluetooth Wireless Networking Explained", Originally published 20 Nov 2003, last update 08 May 2006 - <http://www.thetravelinsider.info/roadwarriorcontent/bluetooth.htm>

20 ZigBee Alliance, <http://www.zigbee.org/en/index.asp>, Christopher I. Diamond, "ZigBee vs. Bluetooth", The University of Alabama in Birmingham (UAB), last updated: 11/13/05 - <http://homepage.uab.edu/cdiamond/ZigBee%20vs%20Bluetooth.htm>

high rate Bluetooth specification for the UWB radio. One of the most dynamic UWB champions is the Burnaby (BC)-based Icron Technologies that leads the way in the development of USB solutions. Its ExtremeUSB technology was recognized as one of the top 75 technologies at the 2006 Consumer Electronics Show held in Las Vegas.

#### 2.2.4 **RFID**

A basic Radio Frequency Identification (RFID) system consists of three components:

- an antenna or coil
- a transceiver (with decoder)
- a transponder (RF tag) electronically programmed with unique information

Most often the antenna is packaged with the transceiver and decoder to become a reader, which emits radio waves in ranges of anywhere from one inch to a few metres, depending upon its power output and the radio frequency used. When a RFID tag passes through the electromagnetic zone, it detects the reader's activation signal. The reader decodes the data encoded in the tag's integrated circuit (silicon chip) and the data is passed to the host computer for processing. There are over 140 different ISO standards for RFID used in a broad range of applications, but we can classify them into two broad categories: passive and active.

In passive RFID systems, the tag does not contain its own source of power or battery. Rather, the tag is "activated" by a burst of RF energy from a separate transmitter, typically contained within the tag reader. Passive tags can be made very inexpensively. However, this low cost comes at a high price - read ranges to the tag are very short, typically only a few feet. By contrast, in active RFID systems, the tag contains its own source of power. Because of this, active tags have significantly larger ranges than do passive devices, typically 30 metres or more. With their higher output power, these tags can also usually be read through obstacles. However, active tags are significantly more complex and costly than passive tags.<sup>21</sup>

The key advantage of all types of RFID systems is the non-contact, non-line-of-sight nature of the technology. However, it is very unlikely that RFID will replace barcodes completely because the integrated circuit in an RFID tag will probably never be as cost-effective as a barcode label. As a result, RFID should continue in the foreseeable future to grow in its established niches where barcode or other optical technologies are not effective. For instance, in Japan mobile carriers are adding contactless functionality to million of mobile phones, giving many consumers the chance to pay with a wave. Contactless ID cards are being developed in the United Kingdom and in China. RFID tagging of livestock became mandatory this year in the European Union and New Zealand will join the party in 2008-2010, creating a market for tagging sheep, goats, pigs and cows.

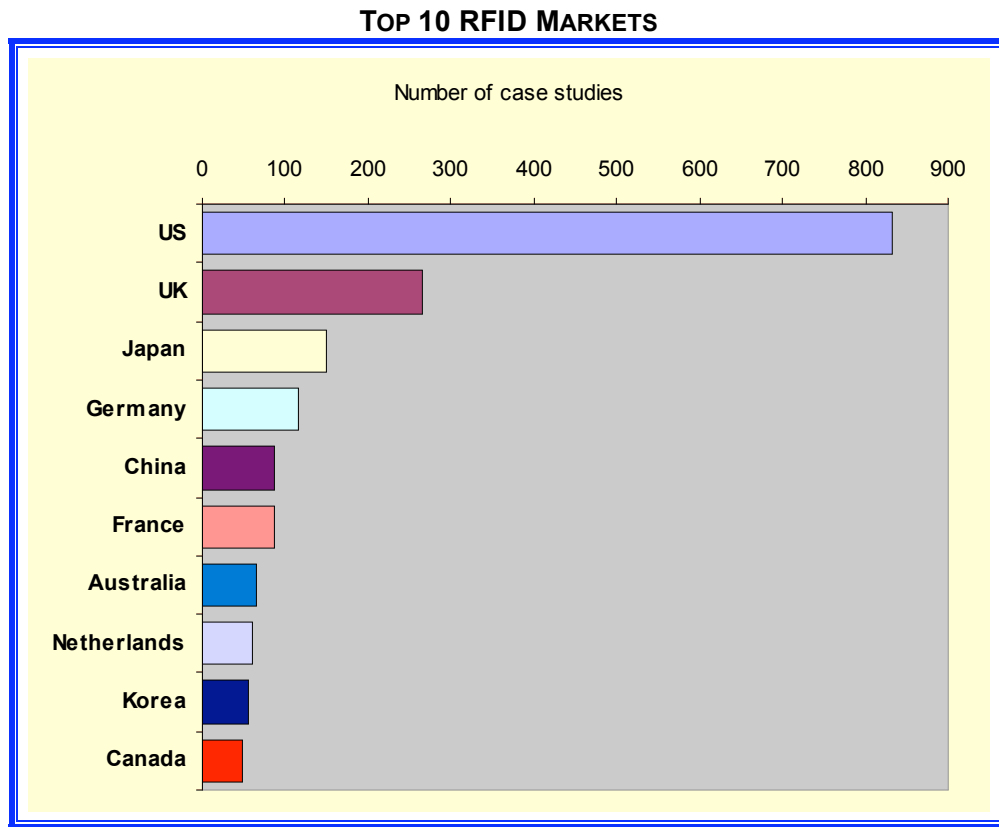
Despite the successes of these early adopters, 2006 was a mixed year, according to the Association for Automatic Identification and Mobility (AIM): "Many RFID suppliers are licking their wounds, while for others, RFID business is booming." The downturn mainly came from the consumer goods manufacturers who maintained an indecisive attitude resulting in pallet/case tag purchases being as little as 250-300 million tags in 2006, which at a price of around 10 to 15

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21 The RFID Revolution Starts Now! Multispectral Solutions, Inc., Germantown, MD - [www.multispectral.com/pdf/Sapphire\\_Revolution.pdf](http://www.multispectral.com/pdf/Sapphire_Revolution.pdf)

cents each resulted in heavy losses. At the same time RFID vendors targeting the livestock market made unprecedented profits: the point is that the cow tags are sold for two dollars each.

As well, there are wide discrepancies among countries. The consulting firm IDTechEx keeps a close eye on which countries are eagerly adopting RFID and which are not. It has built a knowledgebase of over 2300 case studies covering over 2500 organizations in 85 countries. According to the findings of this survey, Canada is in the group of ten countries that make the most use of RFID technology. Not surprisingly, the US is the greatest adopter, with by far the largest number of cases of RFID in action and orders that are often the world's largest by value. More surprising is the UK holding second place by number of cases, though not the money spent, where China has more claim to fame and Korea and Japan are strong rivals.



Source: "Hot Countries for RFID", IDTechEx, Nov 22, 2006 - <http://www.idtechex.com/products/en/articles/00000505.asp>

In the foreseeable future, RFID will continue to grow in its established niches where barcode or other optical technologies are not effective and the Canadian market is relatively active.<sup>22</sup>

### 2.3 WIRELESS DATA SERVICES

The wireless data market was assessed between \$86 billion and \$100 billion in 2006.<sup>23</sup> Messaging is by far the most popular wireless data application as it represents 67% of wireless data revenues.

<sup>22</sup> Association for Automatic Identification and Mobility (AIM) - <http://www.aimglobal.org/>

Inside messaging, SMS is the killer application with over 1,200 billion messages sent globally in 2006, generating revenues in the US \$50 billion range for the mobile industry, and this growth is expected to continue over the next five years.<sup>24</sup> This success is being challenged by Instant Messaging (IM) which takes advantage of its huge PC base (MSN Messenger, Yahoo Messenger, AOL Instant Messenger, ICQ, Google Talk, etc.) to extend its reach towards mobile devices. The IM surge is particularly important in North America where the SMS adoption is lower than in Asia/Europe and the PC base higher.

Of particular interest is the fact that Japan, which triggered the wireless data revolution, has not fully embraced SMS or IM. Instead Japan is a heavy user of regular email on mobile handsets.

### 2.3.1 *The killer application SMS*

Short Message Service (SMS) is a non-Internet based mail service where a message cannot contain more than 160-long characters. The SMS standard was defined in 1985 by the GSM data services subgroup as a possible service for the new digital cellular system. The first SMS message is said to have been sent in December 1992 over the Vodafone GSM network in the United Kingdom, but its commercialisation started in 1995. Originally designed as part of the GSM standard, SMS is now available on most networks, except the Japanese networks (for instance DoCoMo uses an alternate system called Short Mail).

The development of SMS is dependent upon inter-carrier text messaging services compatibility. In Canada, the commercial availability of inter-carrier SMS was launched in April 2002 thanks to an agreement between Bell Mobility, Microcell PCS (Fido), Rogers AT&T Wireless and TELUS Mobility. At the time it was a North American first (US carriers followed soon after).<sup>25</sup> In January 2003, inter-carrier SMS was extended to U.S. national wireless service providers through an agreement between the Canadian Wireless Telecommunications Association (CWTA) and the Cellular Telecommunications & Internet Association (CTIA).

### 2.3.2 *Mobile IM*

Instant messaging (IM), often called “chat” is the exchange of text messages through a software application in real-time. Generally included in the IM software is the ability to easily see whether a chosen recipient is online and connected through the selected service. Because IM protocols

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<sup>23</sup> Informa Telecoms & Media (\$86 billion) and ABI Research (\$100 billion).

<sup>24</sup> Gartner Dataquest (October 2006) and Informa Telecoms & Media (2007) – See as well: "Mobile 2006: Market and Trends, Facts & Figures", IDATE, Montpellier, France, cf. p. 30 - [www.idate.org/](http://www.idate.org/) and "Mobile Factbook 2006", Portio Research, Chippenham, Wiltshire, United Kingdom, cf. p. 4. <http://portioresearch.com>

<sup>25</sup> There is some irony to see how Canadian carriers boast about their interoperability agreement's few months “advance” over their US counterparts, when actually it was the US carriers that initiated the move by signing mutual deals in November 2001. Right away inter-carrier SMS in the US jumped from 6 million messages a quarter to 50 million in between the last quarter of 2001 and the first quarter of 2002. It was the success of SMS interoperability in the US that prompted the Canadian agreement. Kevin Fitchard, “Wireless operators pursue MMS interop”, *Telephony*, May 30, 2005.

were not standardized early on, there are several different IM networks: AOL Instant Messenger (AOL), Yahoo! Messenger, MSN Messenger, Google Talk, etc.

Contrary to SMS, IM was developed in the computing industry. Its origins go back to the early 80s as an element of various bulletin boards that were flourishing at the time. In 1988 AOL introduced a precursor of IM for its clients. Yet it was not until November 1996 that the “definitive” IM was created by Mirabilis, a company established by four young Israeli friends, when it released a free program called ICQ (I Seek You). IM burst onto the Internet scene and two year later AOL bought Mirabilis for \$287 million.

This computing origin explains why mobile IM is more popular in markets where both the mobile and PC penetration rates are high (North America and Scandinavia) while SMS prevails in markets where the PC penetration is low but the mobile penetration is high (Western Europe and Asia). In the first markets, operators have strong interests to work in harmony with the huge PC-based client base that makes use of portals such as MSN, AOL and Yahoo! In the other markets, the carriers that “own” large subscriber bases that pay for each SMS message sent, oppose the development of IM. One of the world champions of IM is the Montreal-based company Oz Communications (see below Chapter 5 – Case studies).

### **2.3.3 Is Mobile Email the Secret Card?**

Similar to IM, email is a worldwide computer feature. It made its entry in the mobile world in 1998 when a small Waterloo company, Research in Motion (RIM), had a brilliant and simple idea that was more fitted to the business world. In essence, they equipped a PDA with a small QWERTY keyboard and a telephone and embedded proprietary software that “pushed” the email to the new device and – this is particularly important – that was always on: the Blackberry was born. In less than three years, the new device conquered North America and the rest of the world.

The first BlackBerry devices were sold to US carriers. Rogers Wireless was the first Canadian operator to adopt this technology in March 2000. Bell Mobility followed in September 2000. Since then, RIM has not stopped enhancing its technology, up to the point that it licensed part of it to potential Personal Digital Assistants (PDA) competitors like Palm and Panasonic. Previously limited to the business world, RIM made a bold move in September 2006 when it launched its new device Pearl which incorporates a digital camera, an audio player, and a video player.

The development of mobile email in Japan is regarded by some observers as the key enabler of the mobile Internet in this country.<sup>26</sup> Indeed email is the perfect vehicle to guide the mobile user through the Internet. The limitations of a small screen do not allow mobile users to easily surf the web through a browser as in the fixed Internet. The solution invented by DoCoMo with its Short Mail service was to attach url links to web pages containing the required data, music or even video to emails. Recipients can subscribe to interest groups that send them emails about their fields of interest (horoscope, sport news, film reviews, etc.). Finnish scientist and former head of mobile R&D for Sonera – Finland’s incumbent carrier, Ville Saarikoski even thinks the adoption of mobile email by Japan is one the main reasons for the phenomenal growth of mobile Internet

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<sup>26</sup> In particular: Jeffrey L. Funk, “Solving the Startup Problem in Western Mobile Internet Markets”, Hitotsubashi University, Tokyo, 2007 (forthcoming).

Ville Saarikoski, “The Odyssey of the Mobile Internet”, University of Oulu, Finland, 2006, 252 pages. Cf. p. 199 and 206-8.

in this country, and inversely the adoption of a primitive form of messaging such as SMS in the west is an obstacle to the success of mobile Internet in the west:

*“SMS connects people very inefficiently. Those who design future services would do well to search for more efficient ways of connecting people. Mobile email not only connects people more efficiently, but its integration with the web is key. A web site creates a superconnected node, which drives networks toward scale-free properties, but information about the web site has to spread in order for that to happen. I think the role of people-to-people messaging, the online/mobile equivalent of word-of-mouth, is huge in this regard. Look at Skype -- no advertising budget, but it spreads like wildfire. Trust is important in connecting people with commerce online, and people trust their friends. Again, media like mobile email connect people to their social networks, the source of trusted information, and to the web, where transactions don't flow without trust. Perhaps the most important property of scale-free networks when you are talking about telecommunications is the property that enables them to evolve: innovations in scale-free networks can spread incredibly fast through the entire network.”<sup>27</sup>*

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<sup>27</sup> - Interview by Howard Rheingold : Email, Scale-Free Networks, and the Mobile Internet, TheFeature.com Archives, April 7, 2005 - [http://www.thefeaturearchives.com/topic/Networks/Email\\_\\_Scale-Free\\_Networks\\_\\_and\\_the\\_Mobile\\_Internet.html](http://www.thefeaturearchives.com/topic/Networks/Email__Scale-Free_Networks__and_the_Mobile_Internet.html)

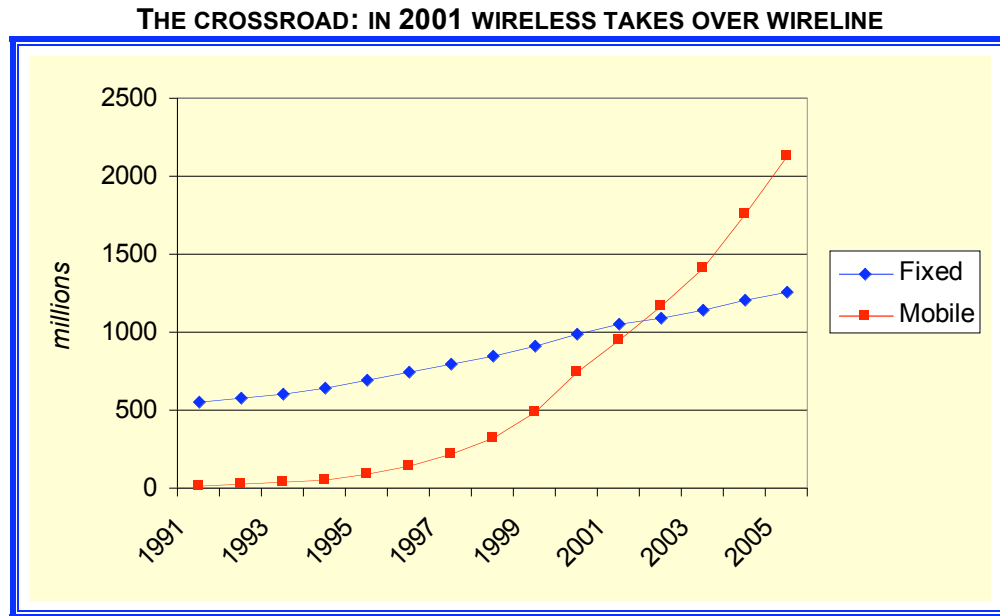
- Ville Saarikoski is a Senior Adviser from Finnish Information Society Development Centre and the former head of mobile R&D in the Finnish operator Sonera. TheFeature.com where this interview is published was a site dedicated to covering the technological, cultural and business evolution of the mobile Internet sponsored by Nokia (2000-2005).

### 3 MARKET TRENDS

Mobile services are built as the upper layer of voice services. It is therefore impossible to speak about mobile services without first mentioning cellular telephony.

#### 3.1 WORLD CELLULAR TELEPHONY

Over the last 10 years telecommunications have gone mobile. At year-end 2006, there were an estimated 2.6 billion mobile subscriptions around the world. As worldwide growth is currently running at over 40 million new connections per month, the 3 billion mark should be exceeded in 2007.<sup>28</sup> All serious thinking regarding telecommunications must start by acknowledging this central fact. The graph below translates this trend into figures and points to 2001 as the year when the number of mobile subscribers passed fixed subscribers. Moreover the trend towards mobile telephony is part of a broader move towards mobility: in the computer industry, the sales of laptops exceeded desktops in 2005. The whole ICT user community is tending to become nomadic.



Source : ITU Key Global Indicators for the World Telecommunications Service Sector, 2006

The ubiquity of mobile communications came too quickly after the Internet surge – and the dramatic bust that followed in 2001. In a way it has become a victim of this proximity. The business community and governments are still struggling to adapt to the new economic order

28 Pyramid Research, Cambridge, MA (USA) - [http://www.pyramidresearch.com/mb1\\_may17\\_mobsub.htm?SC=PD05b](http://www.pyramidresearch.com/mb1_may17_mobsub.htm?SC=PD05b)

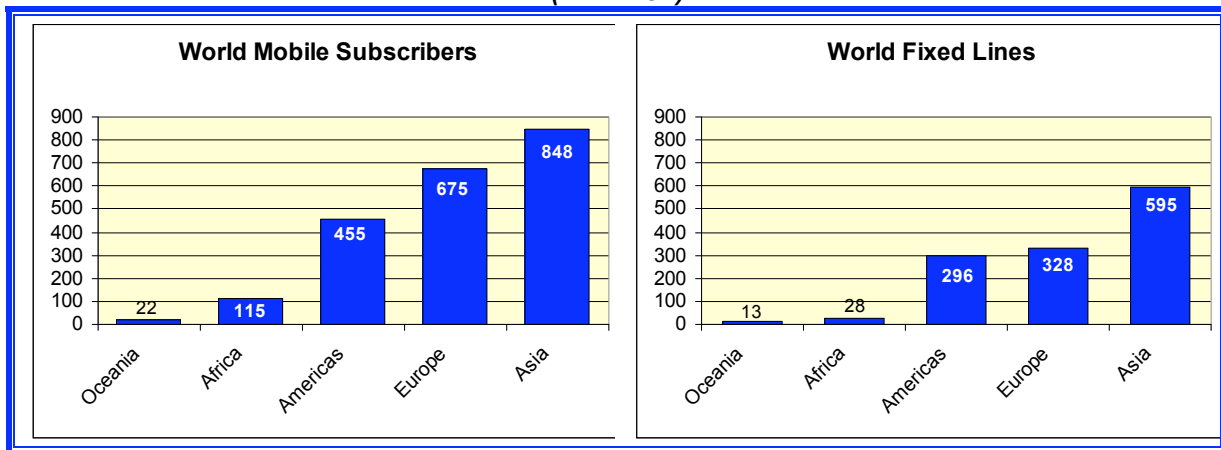
imposed upon them by the Internet. This may explain why there is some difficulty in assessing the true meaning of the mobile surge.

This attitude led to a paradoxical situation where the development of a sizable mobile entertainment market in Asia led to the appearance of a whole range of business applications, first to serve the needs of the consumer market and then the needs of the business community. The end result is that in 2005 the mobile business market in Asia was much larger than in North America. The neglect of the mobile entertainment market resulted in North America lagging in both consumer and business markets.

There is an historical explanation to this situation. Traditionally North American telecommunications carriers used to prioritize their business subscribers who could pay high rates and whose heavy use of expensive services (long distance and dedicated lines) helped very quickly amortize infrastructure investments. At the beginning of telephony, North American carriers even tried to discourage the use of telephones for private matters other than emergencies (they created the urban legend of women gossips jamming the telephone grid).

North American carriers had maintained this ancient bias against the consumer market and their "frivolous" entertainment applications until a few years ago. Rogers was the first company in the 1990s to start marketing cellular phones to women and the elderly as a means to increase security, for instance while driving at night. Since DoCoMo's spectacular success in Japan, things have been changing fast in the US, and somewhat slower in Canada. There has been a major reassessment of the value of the consumer market.

**MOBILE VS. WIRELINE DENSITY – 2005**  
(in million)



Source: ITU, World Information Society Report, August 2006.

One of the most often used international data sources for wireless density is the ITU benchmarking of OECD countries. It shows Canada second to last behind Turkey and just ahead of Mexico. Let us be clear from the start that this data is misleading. In wireline telecommunications the number of telephones lines per 100 inhabitants has provided a fairly precise profile of equipment by country. This is not the case in mobile telecommunications since the majority of countries use prepaid subscriptions and GSM technology.

The main factor that prevents easy comparisons between countries is the use of prepaid subscriptions. Obviously, when someone does not renew their wireless card, they should not be considered as a subscriber anymore. But how long does it take for a carrier to stop counting a

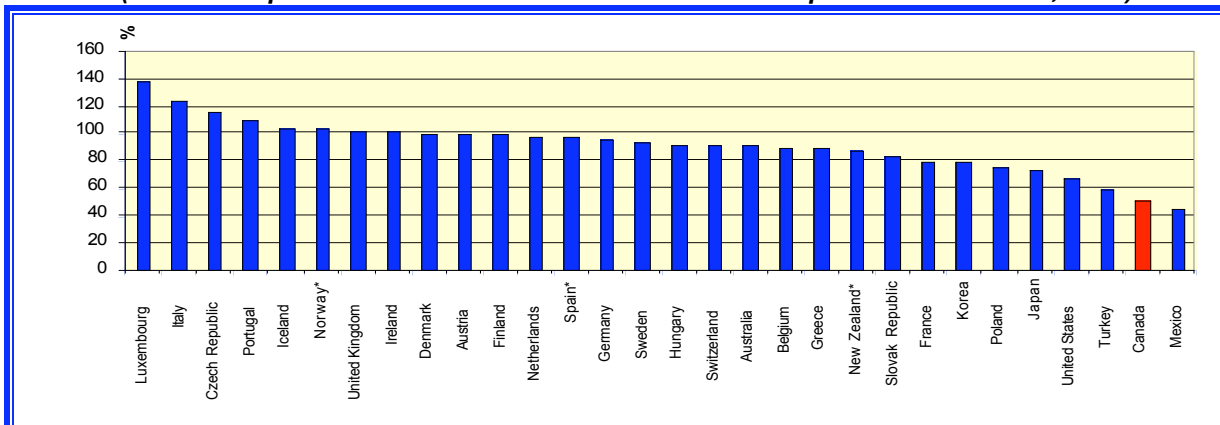


subscriber who does not renew his or her card? This varies from country to country. All countries that have a great percentage of prepaid subscribers tend to have a more or less inflated penetration rate that does not reflect the actual usage of wireless.

The second factor is technological. GSM wireless handsets are based on a removable chip called SIM that contains the brain of the phone and in particular its phone number. This SIM card can be changed if a customer wants a second subscription to another carrier. People who travel a lot internationally tend to buy several chips in different countries to avoid paying roaming charges (this is possible in jurisdictions where cellphones are not locked to a particular carrier). For instance, a French subscriber may buy a British SIM card with a British carrier when he or she goes to the UK) in order to make domestic calls. In so doing, they are counted several times as a different subscriber even though it is always the same user and the same telephone that is counted.

If one adds prepaid subscriptions and GSM SIM cards, then the number of lines loses all meaning. Even people who never travel abroad use multiple SIM cards on their phone to take advantage of the best available plan (for instance one carrier may be cheaper to use during business hours and another one during the evenings). All European countries use GSM and many of them have a high percentage of prepaid subscribers. Not only are the same people counted twice or more in different countries, but also in their home country.

**A MISLEADING IMAGE OF CANADA**  
*(The ITU Report on the Number of Mobile Subscribers per 100 inhabitants, 2005)*



Source: ITU World Information Society 2006 Report, Geneva, August 2006.

One way to correct this misleading benchmarking is to consider only the number of postpaid subscribers. The end result is an incomplete figure of total penetration rate, but at least comparisons between countries are fair. Canada does not fare as badly as in the previous benchmark: and it is much ahead of Turkey, Hungary, Belgium and New Zealand. But there exists a group of countries with even fewer prepaid subscriptions than Canada (United States, Finland, Japan and Korea) which have much higher penetration rates. Some countries do have a meaningful percentage of prepaid subscribers, but they still have many more postpaid subscribers than Canada: this is the case in Switzerland, Denmark, Germany or Australia. The fact that Canada is lagging these two groups of countries is more unsettling.

**SELECT GROUP OF COUNTRIES WITH LESS PREPAID CARDS THAN CANADA (2004)**

	Subscribers using prepaid cards	Mobile subscribers (total)
Korea	1%	76%
Japan	2%	72%
United States	5%	62%
Finland	7%	96%
Canada	9%	47%

Source: *Mobile subscribers and Subscribers using pre-paid cards per 100 inhabitants in OECD and ICCP Committee observers countries, OECD, August 2004*

The case of Australia is particularly interesting from a benchmarking perspective. Here is a country very similar to Canada, with a vast area and a low population, its population density (2.5 inhabitants per square kilometre)<sup>29</sup> is even lower than Canada's density (3.1 inhabitants per square kilometre) and it has a low percentage of prepaid subscribers. It has nevertheless a much higher wireless penetration rate than Canada: 91% cellular subscribers per 100 inhabitants vs. 53%.<sup>30</sup> How can we explain such a difference?

To come to terms with the Canadian situation it is necessary to recognize that the traditional measures of wireline density do not apply to mobile telephony. Raw penetration rate figures are not proportional to the actual use of mobile telephony. As we have indicated above, the combination of GSM technology and prepaid subscriptions distort all international comparisons. The new telecommunications market is more complicated to measure than traditional ones. There is not a single criterion that allows us to assess the development level of a market. This is why it seems useful to also consider the number of minutes of use (MOU) per subscriber and per month.

This new measurement shows Canada ahead of the rest of the world – with the big exception of the US – in terms of cellular telephony usage. It is therefore tempting to conclude that Canada has a relatively average cellular telephony penetration, but that it makes a very high usage of this telecommunications medium.

To be complete, this new portrait must not conceal the fact that Canada is still lagging behind the US by a 2 to 1 ratio. This difference is easy to explain. The average revenue per minute of use is 57% higher in Canada than in the US. Canadian subscribers pay much more for their wireless usage than their US counterparts (Canadian pricing will be addressed in section 3.7 – Market Trends: Canada). Furthermore, one has to understand some nuances of the Canadian high wireless usage. Canada and the US are the only countries where the mobile party pays for incoming minutes of calls; in the rest of the world it is the calling party who pays. Consequently, figures used to calculate MOU are somewhat overstated in the US and Canada.

<sup>29</sup> Australia's population density at June 2001 was 2.5 people per square kilometre. Australian Bureau of Statistics - <http://www.abs.gov.au/Ausstats/abs@.nsf/Lookup/361F400BCE3AB8ACCA256CAE00053FA4>

<sup>30</sup> Mobile cellular subscribers, OECD, 2005 – Exact figures are 52.51% for Canada and 91.39% for Australia - [http://www.itu.int/ITU-D/icteye/Reporting/ShowReportFrame.aspx?ReportName=/WTI/CellularSubscribersPublic&RP\\_intYear=2005&RP\\_intLanguageID=1](http://www.itu.int/ITU-D/icteye/Reporting/ShowReportFrame.aspx?ReportName=/WTI/CellularSubscribersPublic&RP_intYear=2005&RP_intLanguageID=1)

**MOBILE MARKET STRUCTURE AND PERFORMANCE IN SELECTED COUNTRIES**

Country	MOUs	Revenue per Minute (\$)
<b>Mobile Party Pays</b>		
USA	798	0.07
Canada	403	0.11
<b>Calling Party Pays</b>		
UK	146	0.21
Germany	81	0.28
Italy	126	0.21
Sweden	141	0.17
France	235	0.17
Spain	150	0.22
Finland	279	0.11
Japan	147	0.27
South Korea	322	0.10
Australia	178	0.17

*FCC, September 26, 2006<sup>31</sup>*

How can Canadian mobile services developers take advantage of this relatively high cellular usage? As we will see later, this usage has been until now almost entirely voice-centric. The subscribers' attachment to their mobile devices implied by their frequent usage is now well established. This is a non-economic and very intangible factor, but it may be decisive when the time comes to design a strategy to diversify mobile functionality and services. This is where mobile data services may find their way to the mass market.

### 3.2 MAIN INDUSTRY PLAYERS

Mobile markets are national in the sense that they are subject to national regulation and national spectrum policy. As well, they are very much dependent on the mobile carriers that still exert a tight control over their subscribers. Phone number portability has given back some freedom to the subscribers, but it remains to a large extent a formality since the carriers often give mobile handsets for free or with a large rebate in exchange for a long term contract. This is why we speak of a Walled Garden market which represents a power that is being challenged by mobile manufacturers who are often the source of innovation.

The policies of mobile carriers vary very much in terms of innovation: Asian carriers are the most creative and North American the least, with Europe somewhere in between. Traditional wireline telecommunications carriers had long been known as champions of research and development (R&D). The best symbol of this commitment was without any doubt the AT&T Bell Laboratories with its seven Nobel prizes and a series of inventions that still sway our times (transistor, laser, UNIX operating system, C programming language...). When competition was introduced in the telecommunications sector during the 1980s and 1990s, the new entrants such as MCI and Sprint

<sup>31</sup>Original source: *Interactive Global Wireless Matrix 4Q05*, Merrill Lynch, Telecom Services Research. Quoted in *11th Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services*, FCC, September 26, 2006, 127 pages. Cf. p. 107.

in the US, Mercury in the UK and Unitel in Canada did not invest in R&D and outsourced all the technological planning of their networks to the manufacturers in order to contain costs and to focus on marketing. As a consequence, the incumbent carriers reduced to a great degree their own investment in R&D.

Economist Martin Fransman studied closely the disinvestment in R&D made by the telecommunications carriers and ended up finding what he calls a “rather dramatic point: carriers have become not R&D intensive: Indeed, sectors that are not normally thought of as high tech – such as automobiles, beverages, and personal care – have R&D intensities that are the same or higher than the telecoms companies.”<sup>32</sup> The phenomenon is more marked in North America than in the rest of the world. What is troubling is that Industry Canada granted some spectrum licences to wireless carriers under the condition that they would spend “at least 2% of certain PCS and cellular revenues on research and development.” In its last annual report, Telus, the only Canadian carrier that publishes its R&D data, was spending 0.2% of its general operating revenues in R&D.<sup>33</sup> Even though Telus asserts that it invests a higher proportion of its wireless revenues in R&D to comply with Industry Canada’s requirements, this level of R&D remains low.

#### TELECOM CARRIERS 2005

	R&D (\$ million)	Sales (\$ million)	Employees	R&D/Sales	R&D per employee (\$)
NTT	1,152	88,418	199,100	1.3%	5,800
France Telecom	949	63,301	196,452	1.5%	4,800
Deutsche Telekom	258	29,765	106,604	0.9%	2,400
Vodafone	404	57,615	57,442	0.7%	703
AT&T	*130	43,862	189,950	0.3%	700
Telus**	18.5	8,681	31,955	0.2%	60

Source: All data comes from the companies’ annual report unless specified.

\* Data provided by BusinessWeek, July 31, 2006 (not available in the Annual Report). \*\* Figures for 2006.

#### SPECIALIST TELECOM SUPPLIERS 2005

	R&D (\$ million)	Sales (\$ million)	Employees	R&D/Sales	R&D per employee (\$)
Ericsson	3,956	25,190	63,781	15.7%	62,025
Lucent	1,177	9,441	30,500	12.5%	38,590
Nokia	4,945	44,206	58,874	11.2%	83,992
Motorola	3,700	36,800	69,000	10.1%	53,623
Nortel	1,960	10,523	35,370	18.6%	55,414
RIM	158	2,065	4,700	7.6%	33,538

Source: Companies’ annual reports.

<sup>32</sup> Martin Fransman, *Telecoms in the Internet Age*, Oxford University Press, Great Britain 2002, 290 pages. Cf. p. 223.

<sup>33</sup> Precisely \$18.5 million over \$ 8,681.0 million. Telus Annual Report 2006.

**INDUSTRY SECTORS**

Telecoms Carriers	2.6
Automobiles	4.2
Beverages	2.2
IT Hardware	7.9
Media and Photography	4.2
Personal Care	3.3
Pharmaceuticals	12.8
Software and IT Services	12.4

*This series of three tables comes from Martin Fransman. They have been updated wherever possible.*

Source: Martin Fransman, *ibid.* cf. p. 218

This dramatic decrease of the carriers’ R&D has a direct consequence: carriers now depend on the telecoms manufacturers for their technological innovation. This is particularly obvious in the wireless segment of the telecommunications industry where manufacturers’ marketing directly addresses the end users. When someone wants to buy a smartphone, he or she makes a choice between BlackBerry and Palm, and not between Rogers, Bell or Telus. The carrier’s branding has become secondary. This is less the case in Asia where the carriers have maintained some R&D activity with a strategic approach to technology and the markets.

**Bell Canada’s Hidden Research**

BCE and Rogers’ annual reports do not mention any R&D activities. Though by searching carefully in the BCE website, it is possible to find this mention of R&D in the “Community” section: “Bell is leading the way on innovation in Canada. Annually, we spend approximately \$1.5 billion on research and development, much of which is eligible for Scientific and Experimental Development (SR&ED) tax credit.” If this were to be true, BCE would be spending more on R&D than NTT... Actually Bell does some development on products, but this development is scattered in various departments that seldom communicate between themselves. This is the result of deliberate tactics by some Bell engineers who hid some R&D activities in their operating budget in order to save it from the massive and repeated budget cuts performed since 2002.

**3.2.1 Mobile Phone Carriers**

Among the world’s 10 largest mobile carriers, Vodafone, Telefónica and Orange are multinational companies that expanded largely beyond their borders. This fact was instrumental in the creation of a competitive market in Europe, Asia and Latin America since the newcomers had no vested interest in a landline network outside their original country. To get a notion of the magnitude of these forces, it should be noted that all Canadian carriers combined have 17.8 million wireless phone subscribers (September 2006).<sup>34</sup>

34 CWTA data – www.cwta.ca

**WORLD'S LARGEST MOBILE NETWORK CARRIERS (VOICE AND DATA)**

#	Compagnie	Main Markets	Subscribers (million)	
			Carrier	Group
1	China Mobile (China)	China, Hong Kong	296.0	296.0
2	Vodafone (United Kingdom)	Most of Europe, Australia, USA, New Zealand	191.6	553.0
3	China Unicom (China)	China, Macau	141.1	141.1
4	América Móvil (Mexico)	USA, Latin America	112.7	113.9
5	Telefónica Móviles (Spain)	Spain, UK, Germany, Most of Latin America	109.7	134.6
6	T-Mobile / Deutsche Telekom (Germany)	Germany, Netherlands, USA, UK, Poland	103.6	103.6
7	Orange / France Telecom (France)	France, UK, Netherlands, Spain, Slovakia, Poland, Romania	73.2	92.6
8	MTS (Russia)	Russia, Ukraine, various CIS countries	69.0	70.5
9	Telecom Italia (Italy)	Italy, Brazil	61.1	61.1
10	Cingular / AT&T (United States)	United States	58.7	58.7

*Source : List of mobile network operators, Wikipedia (June-November 2006). When a company has holdings in other carriers, its total number of subscribers is indicated in the column "Group".*

In the wireless data segment of the market, DoCoMo leads the way by far even though the US companies are rapidly gaining ground. China has a presence due to the mere size of its market. All top ten carriers recorded more than \$2 billion revenues in 2006. If we consider the results of the 10 top carriers, Vodafone Japan and Korea's SK Telecom respectively hold the eighth and ninth ranked positions both with more than \$2 billion revenues in 2006. This indicates two trends: that Japan and Korea clearly benefit from the coherent strategy they adopted very early, and the wireless data market has taken off in the US.

**TOP 5 WIRELESS DATA CARRIERS (2006)**

Company	Revenues	Subscribers
NTT DoCoMo	\$10.2 billion	51,670
China Mobile	\$7.8 billion	273,786
KDDI	\$6.6 billion	23,616
Verizon Wireless	\$6.6 billion	54,835
Cingular Wireless	\$3.8 billion	57,308

*Source: Chetan Sharma, Worldwide Wireless Data Trends, August 2006 (estimated)*

**3.2.2 Mobile Phone Manufacturers**

2006 was an exceptional year for mobile handset vendors: one billion units were sold worldwide. This represents an increase of more than 10% over the previous year and, more important, these handsets are becoming more intelligent and more complex (camera capacity, wider and better screens, appearance of scroll, ball or functions keys on the keyboard, etc.). The vehicle of this change is precisely wireless data that is to be initiated, processed and stored in more and more comprehensive devices that are more computers than telephones.

The handset market is crucial since the wireless data market is very dependent on the handset manufacturers. The old cellphone that was quite rightly considered as a “terminal” is being replaced by an intelligent mobile, which becomes the centre of the new environment. As the mobile handset becomes an all-purpose computer where telecommunications becomes just one application among others, the traditional mobile vendors’ position may soon be threatened.

This is very important to remember when one considers the global top five handsets vendors – Nokia, Motorola, Samsung Electronics, LG Electronics and Sony Ericsson. Together they make roughly 85 percent of all mobile phones in 2006 – up 6% percent from the previous year. Some 45 vendors are left fighting for a remaining shrinking share, which most analysts say is untenable and implies more consolidation is to come.

**THE TOP 5 VENDORS CONTROL THE MOBILE HANDSET MARKET**  
(FIGURES IN MILLION OF HANDSETS SHIPPED – 2006 DATA ARE ESTIMATES)

Vendor	Country	2006		2005	
		Units	Percent	Units	Percent
Nokia	Finland	347.5	34.1%	264.9	31.8%
Motorola	USA	217.4	21.3%	146.0	17.5%
Samsung	Korea	118.0	11.6%	102.8	12.3%
Sony/Ericsson	Japan/Sweden	74.8	7.3%	51.1	6.1%
LG Electronics	Korea	64.4	6.3%	54.9	6.6%
Others	n/a	197.8	19.4%	213.1	25.6%
Total		1,019.9	100.0%	832.8	100.0%

Source: IDC's Worldwide Quarterly Mobile Phone Tracker – January 2007

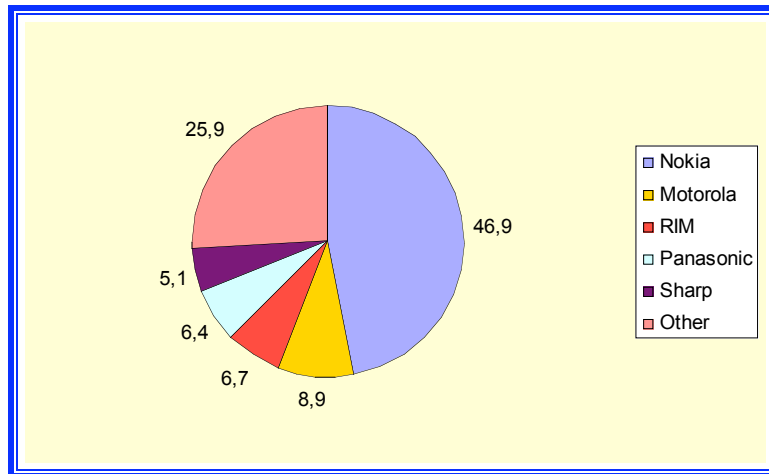
Contrary to what the figures seem to show, the game is not over as outside manufacturers coming from the computer sector may step in to radically alter the game, the first being Apple with its iPhone handset that will reach the market in June 2007. Other manufacturers such as Hewlett-Packard, Dell, Palm, Sidekick and of course Research In Motion (RIM) are vigorously attacking this market. The software giant Microsoft is reported by various analysts to be tempted to do the same. Its foray into the MP3 market undertaken with Zune, in reaction to the Apple's iPod, may be an indication of Microsoft's intentions in the handset market (see below our section on "Smartphone Manufacturers").

Another disturbing factor is the meteoric rise of the Asian markets. Chinese and Indian manufacturers are quickly developing their expertise and the current winners may well have to give up some market shares to smaller Asian players. In this context the future of RIM, Canada's main vendor in the handset sector, seems very open. Its weak position vis-à-vis the top five telecommunications vendors, is not as desperate as it first looks. It is not just one contender among 45; it represents a potential disruption for the entire mobile telecommunications sector.

### 3.2.3 Smartphone Manufacturers

To get a better understanding of the mobile market, one has to isolate its smartphone segment. Smartphones are the converging points of standard mobile phones and Personal Digital Assistants (PDA). Smartphones are being manufactured by computer companies as we just mentioned, but as well by mobile phone vendors, mainly Nokia. Worldwide, an estimated 100 million smartphones were shipped in 2006, which represents about a 10 percent share of the mobile phone market.

### WORLD SMARTPHONES VENDORS MARKET



Source: IDC, *Worldwide Quarterly Mobile Phone Tracker*, September 2006.

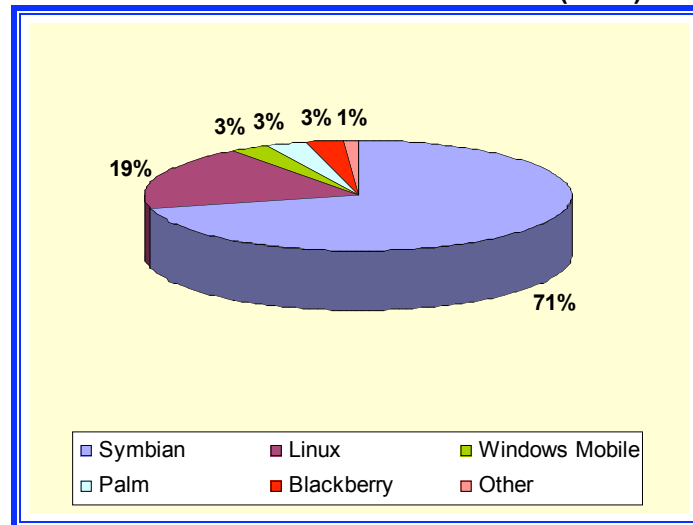
Telecommunications vendors still dominate the smartphone market, but computer vendors such as Research In Motion (RIM) and Sharp are making their appearance under the radar screen. It is still a weak signal, but it should not be underestimated. The big players such as Dell and Hewlett-Packard should be closely watched as they will increase their presence on the market. We already mentioned Microsoft as a probable new player in the smartphone vendor market, but household electronic appliance vendors such as Sony and Sharp should be strong contenders. Sharp only entered the smartphone business in late 2005 and its rapid growth may well be indicative of a new trend: household appliance vendors have joined the competition for the smartphone market alongside telecommunications and computer vendors.

#### 3.2.4 Mobile Operating Systems

In a computer world, the market driver is the operating system. Worldwide the smartphone operating system market is dominated by Symbian. One has to know that Symbian is an offspring of Nokia and is currently owned by Nokia (47.9%), Ericsson (15.6%), Panasonic (10.5%), Samsung (4.5%), Siemens AG (8.4%), and Sony Ericsson (13.1%). As an operating system, Symbian is huge in Europe, but it has yet to really catch on in North America. The second most popular OS is Linux Mobile that draws a lot of interest in China. This may well prove attractive to North American and European smartphones vendors.



### THE BATTLE OF OPERATING SYSTEMS (2006)



Sources: Gartner (September 2006)

In North America the competition is rather three-fold between Windows Mobile, Palm and BlackBerry. In an informal poll on SearchMobileComputing.com, 15% of respondents said BlackBerry is the most prevalent mobile platform in their organization. BlackBerry ranked third overall, coming in behind Palm OS at 36% and Windows Mobile at 26% with Palm losing ground and BlackBerry growing fast.<sup>35</sup> When it comes to corporate email, BlackBerry comes first with a 70% market share (see Section II).

Is this enough to give BlackBerry momentum in the world market? A report from Nomura Holdings notes that RIM's current in-house OS will reach the end of the road, in terms of the processing power that can be squeezed out of it, within three years.<sup>36</sup> RIM must think about the upgrade of its system and contrary to Symbian, it cannot share costs between several vendors. Will RIM be able to rebuild its OS on its own or will it be obliged to change its platform? It could join Windows Mobile or Symbian or else choose Linux Mobile. In any case, RIM strategy in the coming months will determine if BlackBerry is to remain confined in its current niche market (even though it is an important one: North American corporations) or if it will be part of a wider world market. Time is running short for the choice.

#### 3.2.5 Mobile Infrastructure

The infrastructure segment of the wireless market is equally under attack from the computer manufacturers. Cisco is the perfect example of the new kind of "telecommunications" players that have emerged from the computer world and that took over telecommunications thanks to the Internet.

35 Andrew R. Hickey, Mobile Computing News: Mobile Platforms: BlackBerry -- mobile email's 'gold standard', SearchMobileComputing.com, 24 May 2006 -

[http://searchwebservices.techtarget.com/originalContent/0,289142,sid40\\_gci1190130,00.html](http://searchwebservices.techtarget.com/originalContent/0,289142,sid40_gci1190130,00.html)

36 Dan Jones, Site Editor: RIM to Go Symbian?" Unstrung, 09.05.06 -

[http://www.unstrung.com/document.asp?doc\\_id=102926&print=true](http://www.unstrung.com/document.asp?doc_id=102926&print=true)

**TOP 10 COMMUNICATIONS EQUIPMENT AND SYSTEMS FIRMS**  
(USD million for 2005)

Vendor	Country	Revenue	Employees	R&D	Net Income
Nokia	Finland	38,136	56,571	4,667	4,104
Motorola	USA	33,327	68,000	3,249	2,751
Cisco Systems	USA	24,801	38,413	3,220	5,741
Ericsson	Sweden	19,020	53,638	2,750	2,857
Alcatel	France	15,118	55,718	1,929	648
Nortel Networks	Canada	10,782	34,150	1,906	- 8
Lucent Technologies	USA	9,412	31,800	1,177	2,022
L-3 Communications	USA	7,733	44,200	72	444
Qualcomm	USA	5,230	7,600	946	1,998
Avaya	USA	4,682	14,900	389	361
Total	---	168,242	404,990	20,305	20,917

Source: OECD Information Technology Outlook 2006, cf. p. 49

The “computerization” of the network manufacturers is much more advanced than in the handset business since the wireless network manufacturers are essentially the same as the wireline network manufacturers. This situation may well change with the advent of Wi-Fi, WiMAX and the similar technologies. An upheaval as important as in the handset sector may occur in the near future. Here again the role of wireless data is key to the change of paradigm since traditional centralized networks are ill adapted to their needs.

### 3.3 WORLD WIRELESS DATA

As the growth of cellular telephony plateaued very early in Western Europe, reaching a penetration rate above 100%, and the average revenue per user (ARPU) grew lower with latecomers, carrier attention naturally switched to non-voice mobile services. Despite all the hype about the mobile Internet, mobile commerce and games, the main driver of mobile services was text messages. And here we have to make a distinction between the various types of texts messages being used: regular email, short text messages (SMS) and instant messaging (IM). SMS took the lead in almost every country, as it was well adapted to the regular cellphone digit-only keypad.<sup>37</sup>

Asia was the surprising forerunner of mobile services with Japan actually "inventing" the concept through the DoCoMo leadership and Korea adopting a well conceived catch-up strategy. North America remained isolated in its stagnation, far behind Asia and Europe. A variety of possible reasons have been offered for this North American delay, the most often heard being the so called technical backwardness of the European telecommunications infrastructures: “Every other region in the world had lousy landline [service], dominated by government monopolies; then along came wireless, which was more reliable and faster and cheaper than setting up wireline. Canada has a good wireline system.”<sup>38</sup> This assertion ignores the fact that European infrastructure was as modern as in North America and that countries like Switzerland and Sweden have had for a long time (and still have) a landline telephone penetration rate even higher than Canada and the US.

<sup>37</sup> The major exception is Japan where people prefer to use regular email.

<sup>38</sup> IDC researcher Lawrence Surtees, interviewed by Leonard Eichel: “Experts divided about wireless pricing and penetration levels in Canada”, *Report on Wireless*, Volume 10, Issue 21, 11/03/2006.

Another reason sometimes heard is that the US and Canada are the only two countries where the PC penetration rate is higher than the cellular penetration rate (we will come back to this subject in section 3.6 on the US). The slower computer adoption pace in the other industrialized countries would have allowed an early telephone-based mobile Internet acceptance. This may be partially true for Japan that always had a relatively low PC penetration, but much less for Switzerland, Sweden and the UK that all have a high cellular penetration rate (above 100% in the cases of Sweden and the UK) and are as well heavy computer users.

The most convincing reason for the Canadian mobile backwardness is the wireline telephone rate structure: European carriers used to charge for local calls as mentioned by the same expert quoted above: “in all those countries, you’d pay for your local wireline calls, so the notion of paying for calls was not a psychological inhibitor. In Canada, we weren’t used to that.”<sup>39</sup> But this only explains why the European and Asian countries were so prompt to adopt mobile telephony, not why Canada is still lagging behind the rest of the OECD 25 years after the introduction of mobile devices and even less why it lags behind the US which was in a very comparable situation.

#### ICT PENETRATION IN A SELECT GROUP OF COUNTRIES (2006)

Technology	Switzerland	US	Sweden	Australia	Canada	UK	Korea	Japan
PC/100 hab	82.3%	76.2%	76.1%	68.9%	69.8%	60.0%	54.5%	54.2%
Tel/100 hab	71.0%	60.6%	71.5%	58.6%	64.3%	56.4%	55.3%	46.0%
Cell/100 hab	84.6%	62.1%	108.5%	82.8%	46.7%	102.2%	79.4%	76.1%

Source: *Pocket World in Figures, The Economist, 2007 Edition.*

Mobile services only represent a fraction of the global revenues of mobile carriers, but this is the fastest growing segment of their markets. As mobile voice ARPU keeps falling all over western Europe and Japan, the only way for carriers to maintain their profitability is to aggressively develop new value added services. In Japan, the most advanced country in terms of mobile services, they already represent 28% of the total mobile revenues (voice + data). In North America, mobile services represent about 10% of the total mobile ARPU. The stability of North America ARPU that appears clearly in the following table may be a better explanation for the delay in developing mobile services than the cultural reasons. However, even with a falling ARPU, Japan's ARPU remain much higher than in North America and Europe.

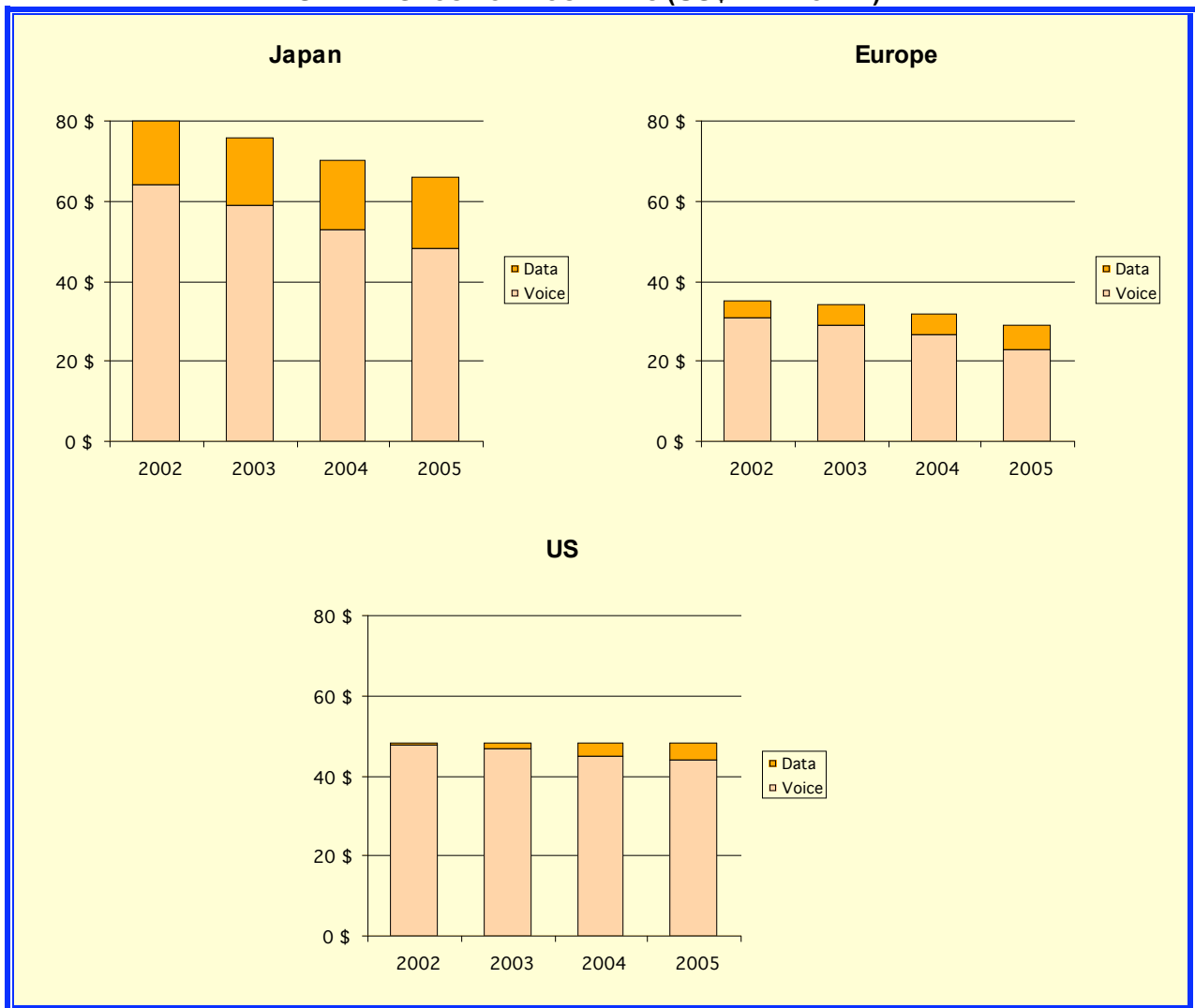
Another promising avenue is the rise of Machine-to-Machine (M2M) services. This potential market is only now being discovered. Billion of machines and living animals can be linked to central servers without any human direct intervention – human beings can retrieve the information gathered only when and if needed. Some mobile phones have already been equipped with RFID readers to enable them to perform purchase activities such as in Caen (France) where a field trial allowed people to shop in department stores (Galeries Lafayette, Monoprix and other retail partners) using RFID-based contactless debit card imbedded into their cellphones.<sup>40</sup> In

<sup>39</sup> IDC researcher Lawrence Surtees, idem.

<sup>40</sup> Ingenico <http://www.ingenico.fr/produits/nouvellestechologies/contactless.asp>

Georgia Sprint Nextel has installed non-GPS devices in cellphones that allow the local Department of Transportation to monitor the traffic coverage between Atlanta and Macon – the system tracks the position of each phone about twice a second when it is being used and once every 30 seconds when it is not.<sup>41</sup> This market is still nascent, but there were already 92 million M2M units in service at the end of 1994 and this number is expected to reach 500 million modules by 2010.<sup>42</sup>

**MOBILE VOICE VS. MOBILE SERVICES AVERAGE REVENUE PER USER (ARPU)  
IN A SELECT GROUP OF COUNTRIES (US\$ PER MONTH)**



*Mobile 2006: Market and Trends, Facts & Figures, IDATE*

As noted above (see chapter II, section 2.3 – Wireless Data Services), text messaging is the most popular wireless data application. Whether under its email, SMS or IM type, text messaging gave birth to a series of mobile services, including mobile marketing, TV voting, news and

41 Greg Bluestein, "Companies look to mobile phones to monitor roads" Athens Herald, November 11, 2006.

42 Mobile 2006: Market and Trends, Facts & Figures", IDATE, Montpellier, France, cf. p. 38 - [www.idate.org/](http://www.idate.org/)

infotainment services, personalised alert services and much more. These services were all available on regular 2G networks (they could even be delivered on the antiquated analog networks as the Japanese understood). With the recent advent of 3G networks, a new series of services is available that requires broadband capacity: multimedia services, web browsing, TV streaming, video games, etc. It is probable that with the development of a variety of multimedia services, the share of messaging in the mobile data ARPU will diminish. In Japan, the most advanced mobile data country, consumer messaging revenue only accounts for 30% of the data revenues.

The increasing influence of mobile video in Europe is already driving the uptake of many mobile sports, services around TV shows and celebrities, leisure and information. The European market already accounts for US\$1.6 billion or 40% of the world revenues (2006). It is expected that the European football (soccer) championship EURO 2008 to be held jointly in Austria and Switzerland will generate a great interest in mobile video services based on the popular event (similar fall-outs are expected in China with the Beijing Olympic Games to be held the same year).<sup>43</sup>

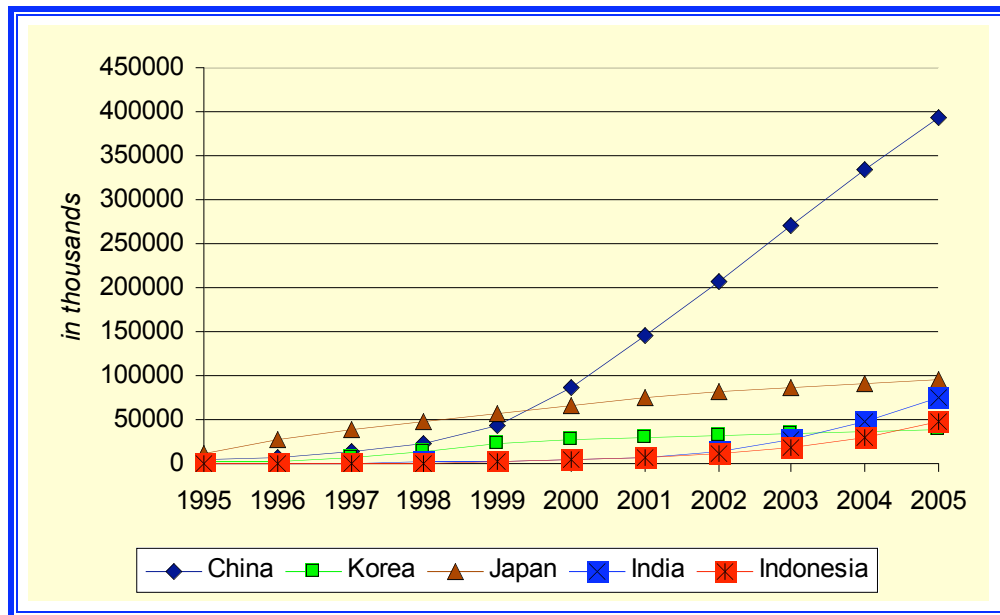
### **3.4 ASIA: THE INVENTION OF WIRELESS DATA**

In a few years Asia has become the prevalent continent in terms of telecommunications and mobile was at the forefront of this trend. Japan and Korea opened the way not only in Asia, but as well in the rest of the world. Not only are those two countries the cellular telephone world leaders but as well they pioneered the deployment of 3G networks and the commercialization of wireless data (see the two following sections). They are now joined by the heavyweight of the region China, and soon India and Indonesia. The continent as a whole now has 863 million subscribers, or one-third of the world subscribers and this ratio will still increase in the following years since it represents 41% of the wireless world growth rate.

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43 Juniper Research. Quoted in "Mobile Video to Boost Mobile Content Market to \$9.5bn by 2011", Cellular News, 4th January 2007 - <http://www.cellular-news.com/story/21223.php>

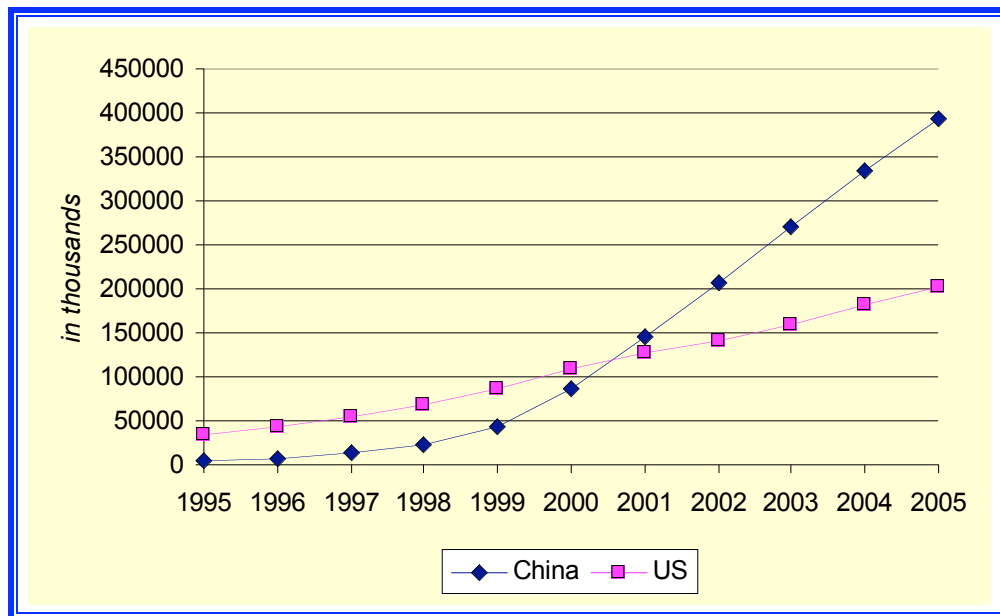
### ASIA TAKES OFF



Source: UIT Yearbook 2006 and UIT World Information Society Report 2006.

The year 2001 may be considered as the turning point since that was the year the China wireless market exceeded the US. Since then the mass-market for Chinese wireless is changing the magnitude of the world wireless. Moreover, China is embracing wireless data at a fast pace. Applications are still SMS based since the Chinese network is still 2G. The deployment of 3G has been delayed by policy disagreement on the selection of a 3G standard. This should change in 2007.

### THE YEAR CHINA WIRELESS MARKET EXCEEDED THE US: 2001



Source: UIT Yearbook 2006 and UIT World Information Society Report 2006.

As well, Asia is the champion of wireless data. Until now, advanced services have been especially concentrated in Japan and Korea, but China is adopting SMS and SMS-based

applications at a fast pace. Another emerging Asian country is the Philippines where the average user sends 10-12 text messages a day. The Philippines alone sends on average 400 million text messages a day, more than the annual average SMS volume of countries in Europe, and even China. It is the only country in the world where data wireless ARPU exceeds voice wireless ARPU. SMS is hugely popular in India, where youngsters often send lots of text messages, and the companies provide alerts, infotainment, news, cricket scores updates, railway/airline bookings, mobile billing as well as banking services on SMS. As a result, Asia is the leading continent in terms of SMS with 434 billion messages sent in 2004 (64 billion in Europe and 50 billion in North America).<sup>44</sup>

### 3.4.1 *The Japanese leadership*

Mobile Internet was born in Japan not because this country had some technological advantage over the rest of the world, but because of a better understanding of the disruptive nature of the wireless phenomenon. DoCoMo launched its mobile Internet service called i-mode in February 1999, on a 2G network that transmitted data at 9.6 Kbps, a very low speed even when compared to a regular dial-up modem that transmits at 56 Kbps. But this drawback was minimized by the use of DoCoMo's packet switched network that allowed the mobile terminals to remain always on. It was possible to "push" email to the users without obliging them to connect to the system and to wait for a dial tone. Moreover, packet switching allowed a billing-system based on volume of data transmitted and not on time usage. For the users, this represented big savings. The i-mode technology was at the same time slow and able to take advantage of the full potential of the packet-switching platform.

But the secret to the "invention" of the mobile Internet lies somewhere else. In 1992 in the wake of the liberalization of the mobile market, NTT spun off its wireless department under the uninspiring name of NTT Mobile Communications Network. The offspring rapidly attracted all the innovative engineers and maverick managers repelled by the stiff discipline of the parent company. In this vivacious culture medium, it became obvious that the commercialization of voice only services would not allow the cellular carrier to differentiate NTT from its new competitors. Lifelong NTT engineer Keiichi Enoki succeeded in convincing the company's hierarchy to take advantage of the Mobile Communications Network packet-switching platform to launch data applications. Faced with his company's executive scepticism, he cried out: "The device is not for you, it is for your children and grandchildren."<sup>45</sup> An electrical engineer by training, Enoki was fully aware of his own limitations. Engineers are seldom successful in content management. So he hired Mari Matsunaga, a market savvy editor-in-chief at Recruit, a publishing company. Ms. Matsunaga had no experience, nor particular interest, in technology – she did not even own a cellular phone. But she was known for her talent in transforming money-losing magazines into consumer popular success. She was hired in July 1997 to spearhead the i-mode project and she rapidly turned the old engineering culture upside down.

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44 "Mobile Factbook 2006", Portio Research, Chippenham, Wiltshire, United Kingdom, cf. p. 11. <http://portioresearch.com>

45 Linda Zambenini: "High Speed Management, Tacit knowledge, Creative Chaos, and Cultural Changes: The Incredible Transformation of NTTDoCoMo under Keiichi Enoki, Mari Matsunaga, and Tadeshi Natsuno", Palo Wireless, <http://www.palowireless.com/imode/paper.asp>, 01/19/2001- Both Mari Matsunaga and Takeshi Natsuno wrote their own book on the DoCoMo saga respectively called "The i-Mode Incident" and "i-mode Strategy - Why Doesn't the World Catch Up?" But typically none of them have been translated into English yet.

In a gesture full of bravado, Ms. Matsunaga decided to throw away the boardroom table and to bring in several couches and one fridge always full of beer and white wine that the DoCoMo insiders called right away "Club Mari". She explained: "Ordinary meeting rooms have high conference tables and chairs. You can't relax there. So I said, get rid of the tables and get sofas with low centres of gravity so people could make themselves at home and get the alpha waves flowing. The idea was to get fresh air blowing in from outside."<sup>46</sup> Internet became a taboo word because in Japan it sounded too technical. Ms. Matsunaga was not interested in technology but in content and so were the people she wanted to reach. She was not after a niche of geeks but after the mass-market. Content was king but not any type of content: it had to be cheap. In this respect, she was lucky enough to find inside the i-mode team another outsider Takeshi Natsuno who had run his own PC Internet firm and developed a business model based on the idea of lump sum billing of all the micro-purchases of products and services via i-mode.<sup>47</sup>

The i-mode success was instant: in year one, 50,000 new customers were signing up every day. Today, there are more than 84.9 million i-mode subscribers in Japan, of which 47.1 million (55.5%) are DoCoMo subscribers.<sup>48</sup> Until recently, there were only three carriers in Japan – DoCoMo, Vodafone and KDDI. In order to foster competition, the Ministry of Internal Affairs and Communications allowed three new entrants to join the market: IP Mobile started its service in October 2006, followed by eMobile in March 2007, and BB Mobile in April 2007. They had no choice but to adopt the i-mode platform and to compete with the incumbent to offer new services. Key to this success is the role of the carriers who work very closely with both the handset manufacturers and the content suppliers thus developing multiple synergies between these three categories of stakeholders. In practice, the Japanese mobile industry is carrier-led.

In Japan, the carriers dictate their conditions to the manufacturers for how they must design the handsets and when they must launch them. In exchange they assume all financial, technological and ethical responsibilities vis-à-vis the end users. For instance, they have set fixed monthly rates for unlimited access to the Internet, an option rejected by all North American carriers for fear of overload but that happened to be very popular with consumers. As a result of this strategy, Japanese carriers "own" their subscribers. The typical Japanese subscriber first selects his or her preferred carrier based on its services offering and then chooses the equipment. This prevailing carriers' branding is made possible by an ongoing investment in R&D.<sup>49</sup>

Key to the i-mode success is the special care given to content. While Europeans and Americans sought about for a killer application, DoCoMo believed that richness and variety were the keys to success. The i-mode is about enhancing daily life and offers a huge range of services from banking to online shopping to network games.<sup>50</sup> This is where Mari Matsunaga's input proved to have been decisive. In her mind, the i-mode portal was a convenience store where clients could

46 "The analog woman behind a digital revolution", The Yomiuri Shimbun / Daily Yomiuri – 09/30/2000 - <http://www.timclark.net/media/44.TheYomiuriShimbun.html>

47 Linda Zambenini: High Speed Management, Tacit knowledge, Creative Chaos, and Cultural Changes (The Incredible Transformation of NTTDoCoMo under Keiichi Enoki, Mari Matusunaga, and Tadeshi Natsuno), Palowireless.Com, 01/19/2001 - <http://www.palowireless.com/imode/paper.asp>

48 Operating data, November 2006, DoCoMo website - <http://www.nttdocomo.com/about/operating/index.html>

49 Lara Srivastava: "3G Mobile Policy: The Case of Japan", International Telecommunications Union (ITU), 2001. Cf. p. 24 and p. 40.

- "UMTS Development – from an International Perspective", AB Stelacon, Stockholm, December 2005. Cf. [http://www.pts.se/Archive/Documents/SE/UMTS\\_development\\_Appendix\\_2\\_060309\\_06-04.pdf](http://www.pts.se/Archive/Documents/SE/UMTS_development_Appendix_2_060309_06-04.pdf)

50 "Kei-ichi Enoki Managing Director, i-mode, NTT DoCoMo", Sun Microsystems News, 28SEP2001 - <http://www.sun.com/2001-0829/feature/profiles/enoki.html>



find services provided by all sort of third parties – the store itself does not "produce" services apart from dispatching them. The carriers provide all sorts of tools to the service providers: its secure billing system, the consolidation of service charges in the carrier's own invoice, a listing in the carrier's portal, etc. DoCoMo collects a very reasonable 9% commission on charges passed through its system. This model seems to be a success as DoCoMo has about 5,000 official sites.

Unofficial sites, on the other hand, are independent mobile sites that anyone can create. There are no restrictions other than legal ones and the carriers do not block user access to any site. As unofficial sites must bill their clients themselves, they usually rely on advertisement financing and provide free services. The over 100,000 unofficial sites now account for over 50% of the total traffic. As unofficial sites aren't listed in the carrier's portal, users first had to enter the url themselves. This is now changing as recent i-Mode camera phones can read and open a url from a special barcode called a QR code. QR codes are published in magazines and on fliers. QR codes are also starting to appear on Japanese business cards - when scanned with a camera phone the contact information in the barcode is added to the phone's address book.<sup>51</sup>

Even the unofficial sites are monitored to make sure they comply with laws on pornography, hatred or spam. The presence of the carriers is being felt all along the value chain, but their presence is beneficial because DoCoMo had succeeded in creating a culture of proximity with the content providers. All carriers carefully educate the new services providers to ensure that the experience for the user is of sufficient quality. They make sure each content provider presents a plan that is well thought out and detailed. Even those of the mobile users that were never before exposed to the Internet must be able to enjoy a quality experience when they use the i-mode service. All this care requires time and money, but Japanese carriers seem to have long-term rather than short-term profitability criteria. They prefer to give up their profits in exchange for market share. This is why we end up with paradoxical situations where the carriers subsidize telephones that will never or very seldom be connected to the network. Some impoverished or money-conscious youngsters just use their handsets as cameras, music players and photo albums and the mobile carriers, far from discouraging this behaviour, encourage it in order to make sure their handsets remain the most popular personal electronic device on the market.

The most explicit step in this direction may be the introduction by DoCoMo in July 2004 of the contactless smart card chip "FeliCa" (from the English word "felicity") which was developed by Sony Corp. and Royal Philips Electronics for close proximity, low-data-rate transactions. The FeliCa equipped handset thereby became an ID document as well as a means of payment - a mobile wallet. The wallet can be used to make electronic purchases at stores or vending machines equipped with FeliCa readers; can act as boarding passes on certain domestic air flights; and can authorize entry through corporate security doors - all with a wave of the handset. The service can function off-line. It is estimated that by the end of 2006, there were 20 million FeliCa equipped handsets in Japan – 15 million serviced by DoCoMo, and an extra 5 million by Vodaphone (recently purchased by Softbank) and KDDI.<sup>52</sup>

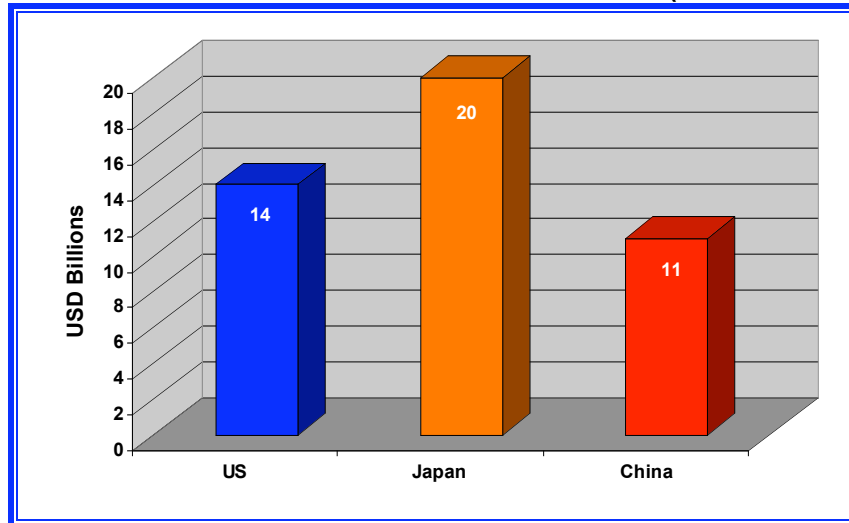
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51 QR Codes uses plain old "visible light" to transmit information instead of radio frequency as in RFID. The phone's built-in camera essentially takes a picture of a symbol usually printed on paper, is decoded by a software application and transmitted through the Internet to a website. It is limited to line of sight transmission and the phone must be aimed at the symbol, while RFID readers "see" through obstacles, and automatically detect the tags. QR Codes are preferred to RFID in consumer applications because of their simplicity.

52 John Boyd: "Here Comes The Wallet Phone", IEEE Spectrum, November 2005.  
 - UMTS Development – from an International Perspective”, AB Stelacon, Stockholm, December 2005. Cf.  
 63. [http://www.pts.se/Archive/Documents/SE/UMTS\\_development\\_Appendix\\_2\\_060309\\_06-04.pdf](http://www.pts.se/Archive/Documents/SE/UMTS_development_Appendix_2_060309_06-04.pdf)

The result of this policy is that Japan is the world leader in wireless data: US\$20 billion or 28% of its revenues coming from data services in 2006 amounting to almost \$17 data ARPU. The number one carrier worldwide is DoCoMo with over US\$10.2 billion (it was followed by China Mobile with US\$7.8 billion and KDDI with US\$6.6 billion).<sup>53</sup>

#### WIRELESS DATA REVENUES: JAPAN VS. US VS. CHINA (2006 ESTIMATES)



Source: Data extrapolated from Chetan Shama Consulting – First Semester 2006.

#### 3.4.2 The Korean All-Encompassing Plan

In some respects, Korea's mobile industry may look like Japan's: there are three main operators: SK Telecom dominates with a 50.9% of market share, then follows KTF with 32.1% and LG Telecom with 17.0%.<sup>54</sup> Broadband is widespread and wireless data is very popular. But the road that led to this success is very different.

First of all the role of government was much more decisive. Early in the 90s, the government of Korea identified telecommunications as a priority and fostered the deployment of a fibre optics backbone and then to the home. Today Korea is one of the very few countries in the world to mandate universal broadband service and the only one to have accomplished it. Today, Korea is the world's broadband leader by a large margin. In 2004, Korea had 24.9 broadband subscribers per 100 inhabitants. This equates to more than three-quarters of all households subscribing to broadband. In addition to the world's highest broadband penetration rate, Koreans have some of the fastest residential connections in the world at the lowest rates. Korean users also enjoy high speed Internet service, with 100 Mbps fibre optic connections retailing for around US\$32 per month.<sup>55</sup>

As a matter of consequence, R&D was heavily subsidized through the Electronics and Telecommunications Research Institute (ETRI). In the wireless subsector, ETRI made an unexpected choice in favour of CDMA technology in the early 1990s, and launched a giant

53 Chetan Sharma, Worldwide Wireless Data Trends – mid year update 2006, September 5, 2006.

54 Data for 1995. Korea IT Times, April 2006/Vol. 22. Cf. p. 57 – <http://ittimes.co.kr>

55 S. Derek Turner: "Broadband Reality Check II (The Truth Behind America's Digital Decline)", Consumer Federation of America, August 2006. Cf. p.14.

project to deploy 3G into the network by 1996. ETRI entered into a close partnership with then relatively unknown US-based Qualcomm – the firm that invented CDMA. It has to be remembered that Qualcomm had developed CDMA technology for military purposes and it had never been commercialized nor had it the capacity to do so. ETRI and Qualcomm struck a deal in order to enhance and adapt CDMA to the civilian market, based on profit sharing: 80 per cent of licensing royalties from CDMA phone sales in Korea would go to Qualcomm. The other 20 per cent would belong to ETRI.

Under the leadership of ETRI/Qualcomm, a CDMA group was created with the participation of four domestic manufacturers, namely Hyundai Electronics Industries, LG Information and Communications, Samsung Electronics, and Maxon Electronics. Since the beginning, the goal was to achieve convergence between the PC and the mobile handset, between the fixed and the mobile Internet. This emphasis on the PC world is another major difference between Korea and Japan. Rapidly Korea became the test-bed for all CDMA products and services. This proved to be beneficial for both Korean carriers, which received new products before the rest of the world, and Korean manufacturers, which could use their preferred relationships with domestic carriers to find out what the public wants.

The Korean government initially allocated three PCS licences and two cellular licences in a mobile market that had previously been dominated by the landline incumbent KMT. The high level of competition among the five (now consolidated to three) operators has kept prices comparatively low and voice quality high. The allocation went through an auction process held in 2000 that brought back about US\$1 billion for each licence. Not only was this sum realistic compared to the irrational exuberance that seized the European auction being held at the same moment but the government invested this money entirely in the telecommunications sector – while its European counterparts allotted the licence incomes to their general revenues.

This government role did not amount to direct intervention in the selection of winners and losers. On the contrary, the government induced Korea's mobile operators to compete on innovative value-added services. Korea's handset manufacturers have also helped maintain market competition by quickly integrating new service offerings into hardware designs of new phones. Number portability between carriers had been established as soon as January 2004 (number portability was introduced in the US in November 2003 and will only be introduced in Canada in March 2007). A specific of the Korean market is the ban on handset subsidization by the carriers put forward by the Fair Competition Board. Carriers were used to locking subscribers into two-year, exclusive contracts in exchange for giving the handsets away for free. All these measures were taken in the name of competition.

Notwithstanding the policies put forward, the key factor to the Korean success is what is known as the Mobile Triangle. By this expression, the Koreans refer to the underlying relationship between the three main branches of the mobile market: the government, mobile operators, and equipment manufacturers. Together the three stakeholders cooperate to promote the mobile industry, through settling on standards, policies, and business models that can help lead to the best possible outcome for all participants. As an example, mobile operators keep in close contact with equipment manufacturers to develop new services. At the same time, the government plays a role by establishing price controls or fostering competition. The triangle is dynamic with all three elements in constant touch with one another.

Koreans being well known amateurs of songs and music, it was predictable that the driver of mobile data in Korea be music. The carrier SKT states that 70% of the telephones sold in 2005 were equipped with MP3 players and its competitor LGT states that 80% of its models have MP3

players. During the same year, 16 million handsets with MP3 players of more than 100 different models were sold, which is five times more than the sales of separate MP3 players. All three carriers have launched a music portal for downloading and streaming music, which can be reached from both mobile handsets and fixed PCs. For instance, SK Telecom's music portal Me!On allows users to download and play songs through various devices. As of September 2005, the operator offered about 850,000 songs and now has nearly 5 million subscribers to this service.

The success of the music portals incited the carriers to launch games portals that were equally successful. The games are essentially mini-applications that run on a "games platform" on the mobile phone operating system. Each mobile operator in Korea uses a different games platform so game manufacturers create the game once (usually in C or C++) and then "port it" to each of the different games platforms. To facilitate the universality of the games, the Korean government has required the providers to use a government-sponsored version called WIPI (Wireless Internet Platform for Interoperability). Moreover, the government has recently initiated a mobile exchange that passes Internet traffic from the fixed network to the mobile network, despite the resistance from the carriers that wanted to keep control over content on their networks. Once again, the goal of the project was to create competition in mobile Internet content. In addition, a Federal Games Institute was opened in 2000 to distribute technologies, support development of next generation games technologies and extend cooperation between research organizations.<sup>56</sup>

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56 Elizabeth Fife, Mark Hillebrandt, Francis Pereira and Chung Kim: "The Diffusion of Networked Gaming in the United States and Korea", Center for Telecom Management, University of Southern California, Los Angeles, CA, USA and Center for Telecom Management, Sungkyunkwan University, Seoul, Korea. Cf. p. 12.

**Avatars**

Korean culture has also changed drastically with the growing popularity of avatars. Avatars are cartoon representations of people that are used in virtual chat worlds and on mobile phones as screen savers. Different from traditional chat programs where users employ only a small picture or cartoon to represent themselves, avatar users communicate in virtual worlds. One of the most popular avatar sites is Neowiz's "SayClub" (<http://sayclub.com/>) that has over 20 million subscribers, equivalent to nearly half the population of Korea.

What makes the avatar phenomenon so interesting is how much users are willing to pay to outfit their avatar with clothing and accessories. When a user signs up to a virtual world, their avatar comes only with underwear. Each additional item of clothing or accessory must be purchased and applied to the avatar. Users can buy designer avatar clothing, with licensing fees being paid to actual trademark owners such as Gucci. This has led to situations where Korean avatar owners spend more money on clothing for their avatar than they do for themselves. Daewoo Securities has estimated the avatar market in Korea to be worth US\$ 114 million in 2004, up from US\$ 64 million the year before.

The avatar phenomenon, in some ways, seems to be a logical extension of Korea's history with group dating for young singles as a way to meet other people. By using avatars in virtual worlds, users often feel freer to open up, talk, and interact with each other. Indeed, often these avatar relationships can blossom into real-world relationships for users. However, some have questioned whether the avatar phenomenon is going to be a net positive for Korea. Some believe that avatar worlds are simply expensive "fantasy lands" that push users further into isolative behaviour.

"Ubiquitous Network Societies :

The Case of the Republic of Korea", ITU, April 2005

As in Japan, what made mobile content successful was the setting of a business model that proved to be beneficial for the entire mobile value chain (e.g. content providers, carriers and manufacturers), with all segments of the market taking a share. An example is SKT's arrangement with content providers and its games platform provider. When a user purchases an online game, 85 per cent of the revenue goes to the content creator or provider. Next, 5 per cent of the revenue goes to license the games platform. Finally, SKT takes a 10 per cent share to cover costs of hosting, and promoting the games on its portal. In addition, SKT bills users separately for data charges incurred through downloading the game.<sup>57</sup>

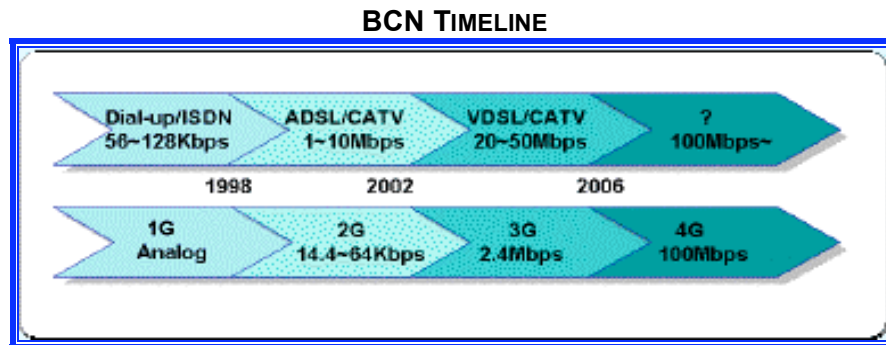
In November of 2002, SK Telecom introduced multimedia services under the service name June. The service offered Video-On-Demand (VOD), and Music-On-Demand (MOD) content that appealed to different consumer segments. In July 2005, Korea was the first country to launch a commercial mobile television service. Today, the June service offers regular TV programs in real-time and special features from cable TV broadcasting programs, such as news, music, and games, through a mobile handset. The service also supports MMS (Multimedia Messaging Service,) allowing users to send and receive streaming video, audio and text, via their cellular

57 Taylor Reynolds, Tim Kelly and Jeong Jin-Kyu: "Ubiquitous Network Societies : The Case of the Republic of Korea", ITU, April 2005 - <http://www.itu.int/osg/spu/ni/ubiquitous/Papers/UNSKoreacasestudy.pdf>

phones. The number of subscribers to the June service reached seven million, or 30% of all users, as of January 2006.<sup>58</sup>

What future lies ahead for the Korean data wireless sector? The Government's answer is an ambitious – but extremely flexible and constantly updated – plan called Broadband Converged Network (BCN). This means the complete merger of fixed and wireless broadband infrastructures through infrastructure competition of the mobile, fixed and CATV operators offering a vast array of technologies. Mobile operators are currently rapidly deploying the following generation of mobile infrastructure – HSDPA – with a bandwidth of 3.6Mbps. Fixed operators already offer universal 20-40 Mbps DSL or fibre and plan to offer 50-100 Mbps as well to all Korean homes by 2010.

In addition, all three fixed operators offer wireless broadband (WiBro) that is a variation of WiMAX which offers broadband access in a car moving up to 100 km/h and permits handover between cells. WiBro has been introduced as the fixed operators' response to the fixed-mobile convergence challenge. According to the BCN timeline, Korea is now at the threshold of a new venture that will be comprised, from the mobile perspective, of a 4G technology that will connect all citizens to information everywhere, from everywhere, through a seamless infrastructure.



*Source: UIT, April 2005.*

For the consumers, the BCN vision means that mobile phones will replace keys, wallets, credit cards (this is a work in progress) as well as connect all home appliances. An intelligent home network will combine communications, broadcast video and gaming based around a Linux-based operating system. In what the Koreans call the Post-PC world, mobile chips will be incorporated in a whole range of home appliances as well as personal apparel, watches, necklaces, etc. One of the key components of the post-PC environment will be the location-based services that will be ubiquitous in the networks and the various devices where mobile chips will be embedded.<sup>59</sup>

Whether this ambitious plan is going to work is open to question. The WiBro deployment already suffered a setback when at the end of 2006 Korea had to concede it only attracted a little more than one thousand subscribers (906 for KT and 151 for SK Telecom). The third carrier that won a license to provide WiBro services, Hanaro Telecom gave up in April 2005. Nobody argues about WiBro's technological superiority, but a reason for what is now regarded in Korea as a

<sup>58</sup> "The Role of CDMA2000 in the Success of Wireless Broadband", CDMA Development Group, May 2006 - [http://www.cdg.org/resources/white\\_papers/files/EV-DO%20Case%20Study%20May%202006.pdf](http://www.cdg.org/resources/white_papers/files/EV-DO%20Case%20Study%20May%202006.pdf)

<sup>59</sup> Taylor Reynolds, Tim Kelly and Jeong Jin-Kyu: "Ubiquitous Network Societies: The Case of the Republic of Korea", ITU, April 2005 - <http://www.itu.int/osg/spu/ni/ubiquitous/Papers/UNSKoreacasestudy.pdf>

(temporary?) failure may be the carriers' reluctance to promote a technology that directly competes with their cellular networks. The carriers bet high stakes on the upgrade of their network to HSDPA that is considered as a full 3G platform (some even qualify it as 3.5G). If WiBro grows, sales of data communications on cellular networks may dwindle.

Many in the industry think the carriers only decided to participate in the WiBro business as a kind of insurance – to prevent a scenario where other firms venture into the service and threaten them. WiBro's failure until now appears to be commercial rather than technological but it raises doubts on the whole Korean BCN – and its potential for export (Telecom Italia had decided to launch WiBro in Europe).<sup>60</sup> WiBro is not the first technology to go through transition problems (e.g. the launching of 3G in Japan or in Europe), but it may slow the pace of deployment of its sibling technology, WiMAX in other countries including Canada.

### 3.5 MARKET TRENDS: EUROPE

Since the beginning there existed a love story between western Europe and mobility – both voice and data. Western European countries such as Italy, UK, Norway, Portugal, etc. were the first to hit and even exceed the 100% penetration rate ceiling (see following table). As mentioned earlier, overall mobile penetration in western Europe hit that amazing 100 per cent rate during the year 2006.

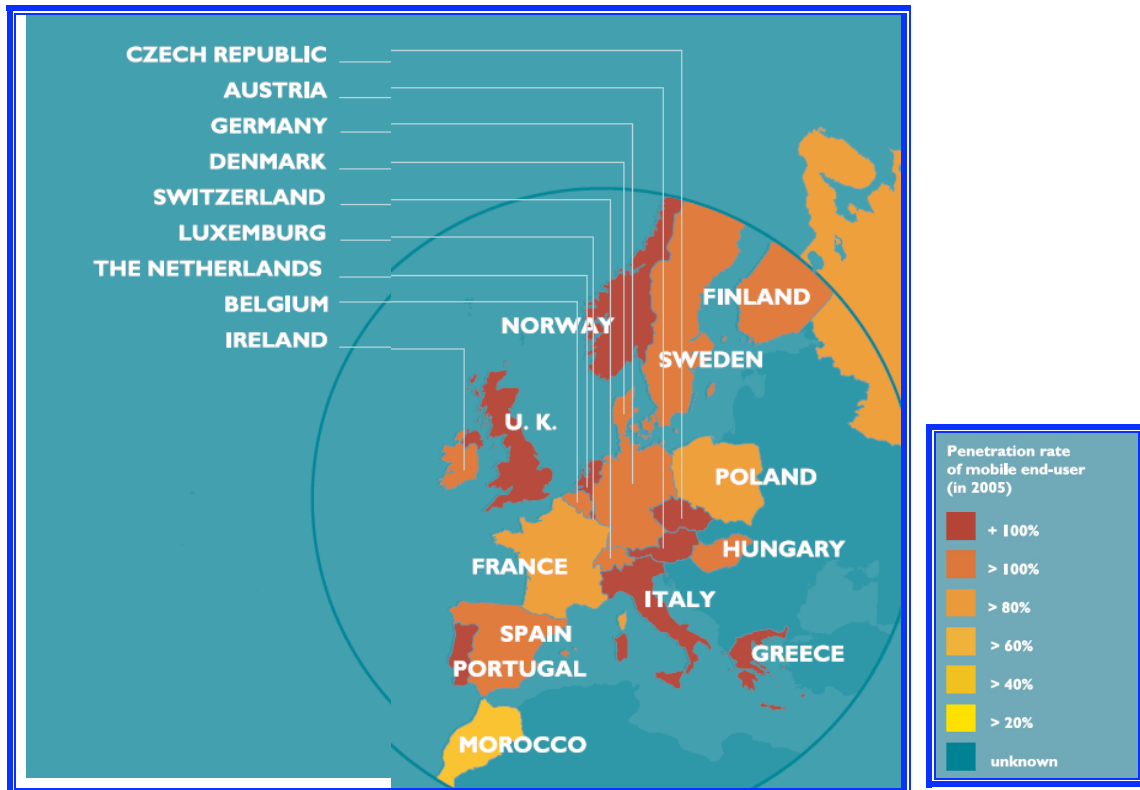
A 100% penetration rate can be achieved because all wireless networks in Europe are GSM-based. The brain of GSM handsets is a SIM card that contains all the required information on the subscription characteristics (phone number, plan being used, etc.). This SIM card can be changed if a customer wants a second subscription to another carrier. Many Europeans use multiple SIM cards on their phone to take advantage of the best carrier's plan (for instance one carrier may be cheaper to use during business hours and another one during the evenings) or to avoid roaming charges when they travel (a French subscriber may buy a Spanish SIM card with a Spanish carrier when he or she goes to Spain).

This practice makes it difficult, if not impossible to compare European and North American statistics but it clearly indicates the level of competition of the mobile industry in Europe. Full network compatibility helped create a situation where subscribers are really in control of the technology. Such a freedom is prevented in North America because of the existence of non-compatible networks. In Canada, Rogers is the only user of the GSM platform but its phones' SIM card are locked in order to prevent users from buying US SIM cards when they travel south of the border and oblige them to pay very high roaming fees instead.

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60 “WiBro in Crisis as Service Flops in Korea”, The Chosun Ilbo (Biz/Tech section), Feb.6,2007 - <http://english.chosun.com/w21data/html/news/200702/200702060012.html>

**THE MOBILE PENETRATION RATE HITS THE 100% CEILING**



Source: *The Netsize Guide, 2006 Edition.*

Apart from raw data, the best indicator of this infatuation is the semantic shift from "cellular" to "mobile" that took place in most European countries as early as the middle of the 1990s – in French people speak of "portable". This indicated the personalization of the device that was taken away from the engineers' definition that referred to its supporting infrastructures (cellular) to one where it is defined by its functionality (mobility). Consumers do not purchase some complex and constraining grid of antennas but a device that follows them in their day-to-day travel from home to office to stores to friends' places without quitting on them when they enter their car or take the bus. The change in the name given to the device does not only refer to the popularization of mobile telephony but to an appropriation phenomenon. This personalization of mobile technology has not taken place yet in North America<sup>61</sup>

In the US, a cellphone is a tool. In Europe, a mobile phone is a lifestyle.  
*Michael Mace (former executive at Palm and Apple)*

Europe achieved this success notwithstanding the biggest fiasco in the history of mobility: the third generation (3G) mobile licence auctions of 2000. Contrarily to Japan, Europe established a link between the development of mobile multimedia services and the upgrade of the network to 3G. All countries planned an early transition, most of them by organizing auctions to allocate

61 Manuel Castells, Mireia Fernandez-Ardevol, Jock Linchuan Qiu, and Araba Sey: *The Mobile Communication Society: A cross-cultural analysis of available evidence on the social uses of wireless communication technology*, A research report prepared for the International Workshop on Wireless Communication Policies and Prospects: A Global Perspective, held at the Annenberg School for Communication, University of Southern California, Los Angeles, October 8th and 9th 2004. Cf. p. 78-9.



radio spectrum. The first country to do so was the United Kingdom in March/April 2000 with the explicit goal to attract as many new entrants as possible in order to raise the prices of the licences as much as possible. In this regard, the Government's goal was achieved since nine new entrants bid strongly against the four incumbent 2G mobile operators. The auction indeed had been transformed into market frenzy and the five licences were sold for a record-breaking €39 billion (CAD\$60 billion) or the equivalent of €652 per capita. This was much above the estimated value of the licence and heavily indebted the British operators – they were forced to sell off assets, borrow from the banks and issue bonds while their credit ratings took a drop. British Telecom (BT)'s chairman and CEO both resigned following the 3G's disaster – the latter frankly admitted to the media: “We spent £10 billion too much.”<sup>62</sup>

Far from learning from the British example, the other European governments went on with the same ascending auction process. Germany raised €50.5 billion or €610 per capita. Credit ratings agencies began to warn carriers that they would start to aggressively review their ratings, effectively giving them leeway to back away from making further investments. The following auctions saw the prices rapidly going down as operators concluded secret arrangements or simply abstained from participating. France even cancelled its auction and replaced it with a “beauty contest”. Indeed, in Finland the incumbent Sonera returned its 3G license to its government without any charge!

#### THE 3G AUCTION FIASCO IN EUROPE

Country	Date	Method	# licences	€ per pop.
United Kingdom	04, 2000	Auction	5	648
Germany	08, 2000	Auction	6	610
Italy	10, 2000	Auction	5	212
Netherlands	07, 2000	Auction	5	171
France	02, 2001	Beauty contest	2	169
Austria	11, 2000	Auction	6	103
Belgium	03, 2001	Auction	3	44
Portugal	12, 2000	Beauty contest	4	40
Switzerland	12, 2000	Auction	4	19
Spain	03, 2000	Beauty contest	4	13
Norway	12, 2000	Beauty contest	4	11
Sweden	12, 2000	Beauty contest	4	0

62 Sir Peter Bonfield to the Sunday Times, 18 February 2001. Quoted in John Ure, director of the Telecommunications Research Project at the University of Hong Kong: Deconstructing 3G and reconstructing telecoms?, Telecommunications Policy 27 (2003) 187–206.

*Source: Jörn Kruse: Competition in Mobile Communications and the Allocation of Scarce Resources: The Case of UMTS, Economic Advisory Group Telecommunications, DG Competition, September 11, 2002*

Mobile operators spent over US\$100 billion to acquire 3G licences in Europe but in a very uneven way: participants to the first auctions that took place at the peak of the telecom bubble were penalized while participants to the last ones were favoured and paid very little or even nothing as in the case of Sweden. If we take into account the bankruptcies, write-offs and closures on one side and the loss of taxation on the other, the 3G's catastrophe is said to have cost around \$1,000 billion.<sup>63</sup> This happened because the governments that organized the auctions were pursuing two contradictory goals: economic efficiency and raising money for their national treasury. Some countries ruined their operators with what amounts to a disguised tax while others gave away their spectrum to companies that had obviously displayed a collusive behaviour. By comparison DoCoMo and the two other Japanese mobile operators obtained their 3G licences for free – or the price to prepare a business plan that had to meet the basic requirements imposed by the Government.

High auction prices were based on the assumption that consumers would spend more on new wireless data services, mainly multimedia services. This would not be the case. First of all, European carriers targeted business customers instead of consumers as in Japan. Doing so they could never commercialize multimedia services as a mass-market product and remained confined to specialized niche markets. As Swedish analysts would later recognize, “operators seldom succeed in establishing new technology exclusively for business customers.”<sup>64</sup> Then, 3G networks cost much more to deploy than anticipated. Europe was going through a telecom crash at the same moment North America was going through its own .com crash. Money was scarce and few entrepreneurs were ready or able to launch new services. Moreover, the European carriers had adopted the Wireless Application Protocol (WAP) as their common standard for mobile applications and WAP was not compatible with html. The vast resources from the web were not accessible by mobile users – as in Japan where DoCoMo had adopted a simplified version of HTML called c-HTML that was easy to develop for and was quickly adopted by independent and hobbyist developers.

The key to success came despite all expectations from short message services (SMS). We can call it the killer application of mobile services. Oddly enough, nobody ever claimed the invention of SMS: it was a bureaucratic invention brought to market by another bureaucratic decision in 1995 when the European carriers set up a cross-platform and inter-carrier messaging system. The actual popularization of the service did not start until 2000 when the younger fringe of the population started using it as a sort of electronic whisper reserved for their own use. The limited number of characters imposed the invention of an abbreviated slang that would create a feeling of a secretive community that had at all times been appealing to the young. The result was astonishing: there are now more than 1,000 billion SMS messages exchanged everyday in the world.<sup>65</sup>

SMS is not just about chat. Its phenomenal success quickly gave birth to a series of commercial applications. For instance, users can receive alerts on pre-selected topics (pre-selected to avoid spam), from share prices, sports scores, weather, flight information, news headlines, lottery

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63 “The Telecoms Crash” (Part 1), *The Financial Times*, 5 September 2001. Quoted in John Ure, director of the Telecommunications Research Project at the University of Hong Kong: *Deconstructing 3G and reconstructing telecoms?*, *Telecommunications Policy* 27 (2003) 187–206.

64 “UMTS Development – from an International Perspective”, AB Stelacon, Stockholm, December 2005 - [http://www.pts.se/Archive/Documents/SE/UMTS\\_development\\_Appendix\\_2\\_060309\\_06-04.pdf](http://www.pts.se/Archive/Documents/SE/UMTS_development_Appendix_2_060309_06-04.pdf)

65 “Mobile Factbook 2006”, Portio Research, Chippenham, Wiltshire, United Kingdom, cf. p. 4. <http://portioresearch.com>

results, jokes and horoscopes. Essentially, any information that fits into a short message can be delivered by SMS. As in Japan, once a mass-market of consumer applications existed, the corporate world adopted the new media. SMS started to be used to extend the use of corporate email systems beyond an employee's desk and office PC. 160 characters is sufficient for communicating most delivery addresses such as those needed for a sales, service or some other job dispatch application such as mobile pizza delivery and courier package delivery. Job dispatch applications can optionally be combined with global positioning in order to allow the nearest available employee to be deployed to help a client.

SMS triggered wireless data in Europe using simple 2G networks while mobile operators were in full disarray following the telecom crash. Contrary to Japan, the discovery of mobile data was not due to the farsighted strategy of the carriers but to the consumers who even had to fight the carriers. As consumers perceived their mobiles as necessary, they were ready to embrace various ways of protest. In France, Italy or Spain users rallied through SMS and stopped using their mobile telephones during one day to complain about the cost of this means of communications. In France, these protests succeeded and led to a reduction of SMS prices in 2004.<sup>66</sup>

Once 3G networks started to be deployed in 2003 and 2004, the multimedia services found a fertile ground to grow, particularly under the form of Multimedia Messaging Service (MMS). This new application allows users to send text messages that are not limited to 160 characters, such as SMS and more importantly to include photos, music, and video. This functionality changes the nature of the media and allows development of an entirely new set of applications based on interactive marketing and advertisement. During the 2004 to 2011 timeframe the volume of MMS across the region is expected to rise from 233 million at the end of 2004 to over 6.6 billion messages by 2011.

Now mobile services in western Europe constitute more or less 15% of the carriers' revenues. This is far from Japan's 25%, but the market is thriving and carriers are beginning to develop dynamic strategies in favour of consumers such as the launching of flat rates plans to access the Internet. In 2005, the French carrier Bouygues was the first to launch a "consumer friendly" formula: €9.90/ month for unlimited data download and browsing. Flat rate pricing is at the same time simple and reassuring for consumers who know in advance what they are going to spend on their mobile data bill. Carriers are increasingly pursuing revenue sharing agreements with content and application providers. For instance, in Japan as we noted above, 91% of revenue from applications goes to developers. In contrast, the best-case revenue sharing scenario in Europe is a 50/50 arrangement between operators and developers.<sup>67</sup>

#### **Wireless Payments in Europe**

Crandy is a mobile phone-based payment system which enables consumers to pay parking tickets, get a drink at their local dispensing machine without any cash hassle or make P2P transactions. Crandy provides merchants with low transaction fees, loyalty programs & viral marketing possibilities. Crandy is a German mobile payment system with 350,000 users in 5 European countries. Now it starts in the US with a variety of functions. Users can register at 866-283-0005. This opens their free mobile bank account & they will receive a registration sms. From then on their mobile number is their Crandy account number. Crandy works with every existing mobile phone. There are no added hardware or software modification necessary & there are no annual or

66 Manuel Castells, Mireia Fernandez-Ardevol, Jock Linchuan Qiu, and Araba Sey: idem. Cf. p. 77.

67 "Carriers - Business and Revenue Models", EBS, Georgia (Atlanta) - [http://www.ebstrategy.com/mobile/revenue\\_models/carriers.html](http://www.ebstrategy.com/mobile/revenue_models/carriers.html)

registration fees involved. Crandy users can top up their Crandy account by credit card & then transact money anonymously to other Crandy users. They can purchase at various vending machines & they can soon pay their parking tickets using Crandy – in Europe an established method of payment. Mobile parking with Crandy is used in Gent/Belgium & Cologne/Germany. NCS offers Mcells to the US market, an e-Wallet which banks can easily connect & consequently add to their existing payment systems. Mcells works as a white label ASP-solution, which is hosted in a secure, bank standard-compliant Data Center in Germany. As of now the US is trailing behind in M-Payment & M-Commerce. Europe & Asia are moving faster in these markets. The US is catching up. According to Mastercard & Ipsos, more Americans are carrying less cash. A survey from Visa shows that especially younger Americans may finally be willing to use their mobile phones as a method of payment. Of 800 respondents, 77% said it would be difficult to get through the day without their mobile phones, & that they are twice as likely to carry their mobile phone than cash – a factor that jumps to 4 times in the 18-34 group. ½ of all respondents said they prefer electronic payment methods so they do not have to carry cash, while 61% of the of the respondents age 25 to 34 said they were interested in making purchases via their mobile phones.

*James Cowen, AQUBANC ClipSheet, October 12, 2006*  
[http://www.aqubanc.com/documents/clipsheets/2006/2006-1012\\_AQUBANC\\_ClipSheets.pdf](http://www.aqubanc.com/documents/clipsheets/2006/2006-1012_AQUBANC_ClipSheets.pdf)

## 3.6 MARKET TRENDS: USA

### 3.6.1 *The Origin of US Delay*

Cellular telephony was born in the US when Bell Labs engineer Amos Edward Joel invented in 1970 an automatic "call handoff" system to allow mobile phones to move through several cell areas during a single conversation without loss of conversation. It took years of hearings at the FCC before the technology was approved in 1982. This regulatory procrastination explains why Japan could launch the first commercial cellular service in 1979.

The second error made by the US regulator was in the allocation of the licences. The 1982 Report and Order authorizing cellular telephony specified that there would be two competing cellular carriers in each region, one owned by the incumbent wireline company, and the other one by a non-wireline company. Outside the major cities, these pure-players were selected through lotteries. As a result of this strange system, a number of local speculators with no interest in telecommunications won licences with the intention of reselling them to "serious" operators. This delayed again the adoption of cellular telephony in the US and resulted in breaking up the market artificially.

Finally, the first pilot cellular system began operating in Chicago in October 1983 and commercialization began in January 1984. The success was immediate even though the price was very high. The first portable cellular telephones shipped by Motorola had a suggested price of \$3,000 - \$4,000.<sup>68</sup> But when the time came to digitize the cellular network, the US could not agree

<sup>68</sup> The Role of NSF's Support of Engineering in Enabling Technological Innovation - Phase II, Chapter 4: The Cellular Telephone, Cf. pp. 93-4. <http://www.sri.com/policy/csted/reports/sandt/techin2/contents.html>

on a single standard and, since the start, 2G networks were divided in two standards: Time Division Multiple Access (TDMA) developed by Bell Labs, and Global System for Mobile Communications (GSM) developed by the European Union. Even though these two standards were based on the same time division technology, they were not compatible. To add more complexity, another standard was soon added that used a totally different technology: Code Division Multiple Access (CDMA) developed by Qualcomm for military purposes. As indicated above, the CDMA technology was commercialized with the help of Korea.

As a matter of consequence, this standards' proliferation negatively affected the competitiveness of the US cellular market (difficulty for the consumers to switch handsets and carriers) and slowed the digitization of the network. As a result, the first generation AMPS system remained the most popular mobile technology in the US throughout the 1990s while Asian and European carriers were actively modernizing their networks.<sup>69</sup>

It was often said that the US delay was caused by the high quality of its wireline network (see section 3.3 - World Wireless Data). In our opinion, this series of mishaps better explains why the country that invented cellular technology ended up being among the late comers when the time came to commercialize it. When it comes to wireless data, the same delay can be observed. We already noted the usual explanation that relates the high PC penetration rate to the reluctance to adopt the mobile Internet (see again section 3.3 - World Wireless Data). While this factor may have played some role, we are not convinced it is a deciding one. Rather, the cause for the US delay is likely to be found in two crucial factors:

The cultural failure of its carriers that gave up R&D in the 1980s and 1990s as examined above (section 3.2 - Main Industry Payers). Innovation was entirely taken charge of by the manufacturers' R&D while the carriers were confined in the role of gate keepers of the network. The 2001 telecom crash that put an abrupt end to the funding of the wireless start-ups before they could find a market for their products and services. In 2000, at the height of the ICT boom, there was about \$4 billion invested in the US mobile content industry, mainly in Silicon Valley. This came to an end with the crash.<sup>70</sup>

### 3.6.2 The US Takeoff and its Meaning

US mobile content market now amounts to more than \$15 billion (compared to \$8.6 billion for 2005).<sup>71</sup> This market is dominated by Verizon with approximately \$3.1 billion, followed by Cingular at \$2.9 billion, Sprint Nextel at \$2.8 billion, and T-Mobile US at \$1.2 billion. One has to underline a strong foreign competition in the US: T-Mobile belongs to Deutsche Telekom and 45% of Verizon is owned by British Vodafone. There are more than 229 million US wireless subscribers who are spending an average of \$6.80 per month on data services. According to IDC,

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69 Joshua S. Gans, Stephen P. King and Julian Wright, *Wireless Communications* (Handbook of Telecommunications Economics), Volume 2 (forthcoming), p. 9.

[http://profile.nus.edu.sg/fass/ecs/jkdw/WirelessCommunications\\_Final.pdf](http://profile.nus.edu.sg/fass/ecs/jkdw/WirelessCommunications_Final.pdf)

70 Ryan Kim, Next up: Silicon Valley goes mobile, San Francisco Chronicle, December 12, 2005.

<sup>71</sup> Wireless data service revenues for 2006 represented precisely \$15.2 billion. This represents a 77% increase over 2005, when data revenue was \$8.6 billion. Data revenues now total roughly 13% of all wireless service revenues. CTIA news release: March 28, 2007 -

[www.ctia.org/media/press/body.cfm/prid/1680](http://www.ctia.org/media/press/body.cfm/prid/1680)

messaging contributed nearly half the data revenue. The firm's research also found that about 20 percent of US subscribers currently purchase at least one ringtone every quarter.<sup>72</sup>

What is to be remembered is that average revenue per user (ARPU) of \$6.80 represents 13% of the total US ARPU. No company can ignore a market which brings in more than 10% of its revenues. Past this point the industry enters what Geoffrey Moore describes vividly as a “tornado” where the success of one company begets the success of others companies.<sup>73</sup>

In our opinion, the US mobile content industry entered this period of “tornado” growth in 2005 when Electronic Arts purchased Jamdat Mobile for \$680 million. When the world’s largest electronic games developer is ready to pay \$680 million to buy a \$79 million in revenues mobile games developer, it is a sign that something big is happening.<sup>74</sup> This was not the only deal. This same year Walt Disney Internet Group was partnering with Vodafone to provide Disney Mobile services to Vodafone’s customers on international markets. Indeed, after a few years of dead calm, scores of start-ups and survivors of the dot.com era were emerging to produce software and applications downloadable on cellphones. In 2005 alone, venture capitalists invested \$1.3 billion in more than 150 companies – half of them in Silicon Valley.<sup>75</sup>

After a long delay, the powerful US innovation machine has taken off in the mobile content sector. What is interesting to note is that this take-off happened in the computer industry and mainly in Silicon Valley. Contrary to what happened in Europe and in Asia, the mobile content industry did not grow out of the telecommunications industry, but out of the computer industry. Based on our working hypothesis of systematic growth across the entire ICT sector being driven by the computer industry, wireless content appears set to be the next US success story.

There is another element that reinforces this perspective and it is the neighbouring cinema industry. The cooperation between Hollywood and Silicon Valley has already borne fruit in the gaming industry. Everything leads us to believe this will be the same in the mobile content industry. Mobile content will soon be completely transformed by the US input which is definitely centered around the computer industry. This will transform the mobile content structure that we know today and that was built in Asia and in Europe out of the telecommunications industry.

If this is the case, we may well see a repetition of what happened in the 1980s when the Europeans invented videotext, a system that allowed users to send emails and engage in online commerce. Videotex experienced some success in France under the name of Minitel before collapsing in a few months in 1995 when the Internet became popular. What happened? The Europeans had bet on the telecommunications industry because it was organized hierarchically alongside national structures. When the computer industry took over the telecommunications industry, first through digitization, and then through the Internet, Videotex suddenly appeared outdated, antiquated and inflexible. The Internet attacked Videotex from outside the telecommunications industry and imposed a new fluid environment based on the absence of hierarchy and borders.

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<sup>72</sup> IDC study, U.S. Wireless Carrier Data Services 3Q06-3Q07 Vendor Analysis: QView Summary and Analysis (Doc #204832), January 23, 2007.

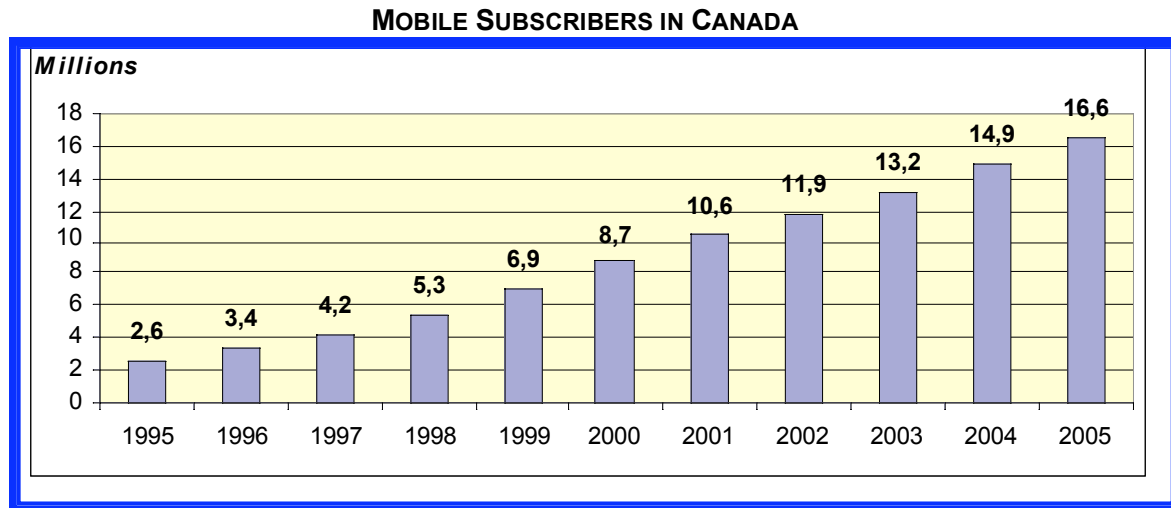
<sup>73</sup> Geoffrey Moore, *Crossing the Chasm: Marketing and Selling High-tech Products to Mainstream Customers*, HarperCollins Publishers, New York, 1991, revised 1999, 213 pages.

<sup>74</sup> Nikhil Hutheesing, *Electronic Arts Jams With Jamdat*, *Forbes*, December 8, 2005.

<sup>75</sup> Ryan Kim, *idem*.

### 3.7 MARKET TRENDS: CANADA

Canada introduced cellular service in 1985 as a duopoly where a national cellular operator would compete in each region with the local telephone company. Duopoly is a far cry from full competition but it allowed rapid coverage of Canada from east to west; not only cities, but all major Canadian highways were covered by a continuous cellular corridor from Halifax to Vancouver. This is in contrast to the situation in the United States, where frequencies were sold by auction to local entrepreneurs, giving rise to many local networks. In 1995, Industry Canada awarded national licences via a comparative selection process to two new entrants, Microcell and Clearnet. This triggered an unprecedented growth.



Source: CWTA - [www.cwta.ca/](http://www.cwta.ca/)

#### 3.7.1 Is Canadian Pricing Adequate?

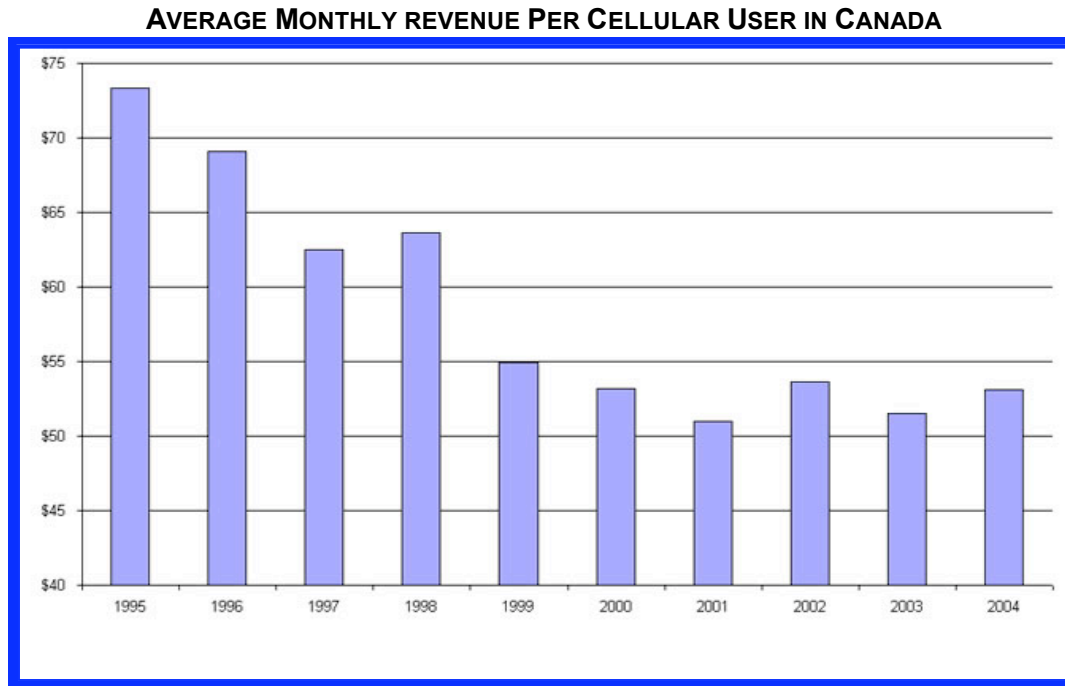
##### a) Voice

Microcell was instrumental in leading the 1990s outburst of cellular penetration. Called Fido, its initial mobile plan was \$40 for 400 minutes, a big reduction from the going average rate of near \$75 (see following table). Almost as important as price, this plan was easy to understand. What was until then a niche market aimed at mobile workers (real estate agents, sales people, mining engineers, etc.) became a consumer product and penetrated for the first time the youth market. Fido's customer service was deliberately crisp, spirited, youth oriented.

Microcell had an explicit strategy of substitution of the fixed telecommunications service by wireless. This was City Fido's *raison d'être* when it was launched in Vancouver in October 2003 – soon to be followed by Toronto and Montreal. City Fido service was not just another price plan. Its unlimited local calling feature combined home and mobile service, and offered the convenience of one phone, one number and one bill. This policy led some users to give up their landline for mobile or cable telephony. At the end of 2005, there were an estimated 615,000

households with only a mobile phone, around 285,000 more than a year earlier- with a peak in Vancouver where Microcell had first introduced its City Fido service.<sup>76</sup>

The increase in the number of subscribers went together with a decrease in prices since 2000, though the downward trend seems to have stabilized.



*Source: CWTA - [www.cwta.ca/](http://www.cwta.ca/)*

Canadian average prices for a basket of wireless services as computed by the ITU (and the OECD) are in the lower range of the industrialized world, but in the real world the end user's position is not as good as it seems. First of all, Canadian carriers have not promoted the use of prepaid service as in most of the world (in doing so Canada followed the US model that has an even lower number of prepaid users). Prepaid mobile service was designed to attract low-income and casual users who could not afford a regular postpaid service and as well those who wanted to be able to manage and control their monthly bills. By doing so, Canadian carriers were able to maintain a high profitability, but they deliberately neglected the lower end of the population or simply the money-conscious users. This situation did change with the arrival of Mobile Virtual Networks Operators (MNVOs) such as Virgin which targets this segment of the population – in particular youngsters and students without stable income. Now, prepaid promotion is beginning to appear more prominently on Bell Mobility and especially Rogers Wireless websites.

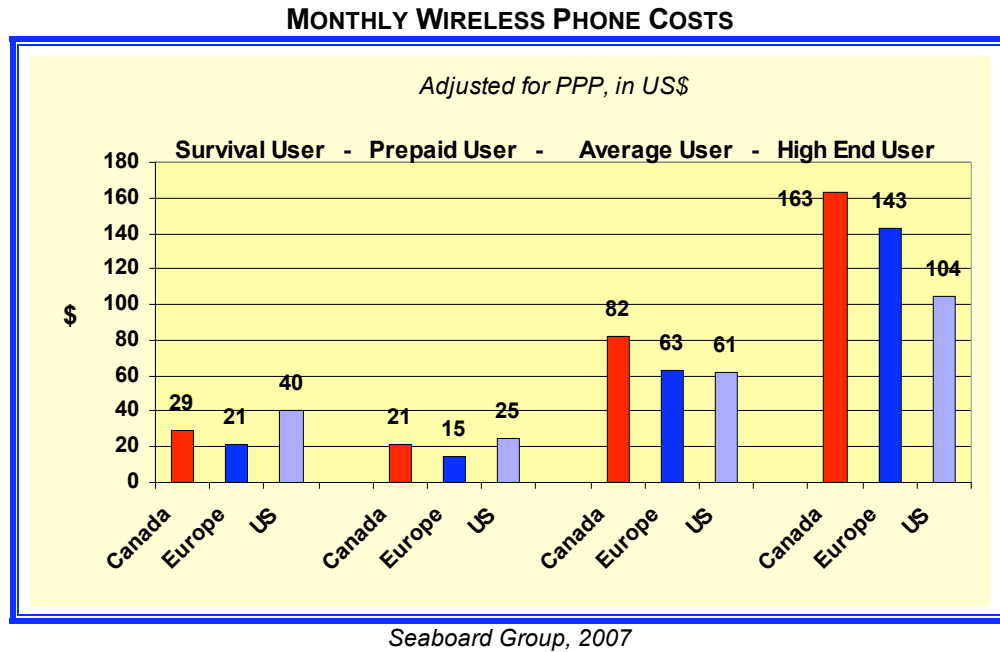
Moreover, international comparisons are based on published price for a calling plans. This ignores the multiple components of the real price paid by the end user such as detailed billing voice mail, roaming charges, cross-border charges and in the case of Canada a unique “innovation” that is called “system access fee”. For instance, there is no domestic roaming fee in the US.<sup>77</sup> The ITU statistics do not differentiate between low, medium and high volume users.

<sup>76</sup> Rogers purchased Microcell in September 2004 and killed the unlimited local calling feature of City Fido in March 2005. The substitution trend was slowed down but did not entirely disappear.

<sup>77</sup> “Today all of the nationwide operators offer some version of a national rate pricing plan in which customers can purchase a bucket of minutes to use on a nationwide or nearly nationwide network without



High volume users in Canada pay 56% more than in the US. The main reason for this difference is the extremely aggressive policy of the US carriers towards their best clients (US carriers typically offer service plans for up to 6,000 local minutes per month while Canadian carriers limit them to 1,000 local minutes per month – Telus goes up to 2,500). The only users who pay less in Canada than in the US are the low users as well called the “survival” users, which is not the most efficient way to promote wireless usage!<sup>78</sup>



The only realistic methodology for international comparisons in our opinion is that which takes into account the actual bills paid by several groups of customers (from the low end to the high end of wireless usage), not the pricing plans published on the wireless operators’ websites. This is the case for research by both Toronto-based Seaboard Group and Boston-based ETI Economics and Technology even though their methodologies somehow differ. To capture the full picture of the bill for services, the Seaboard results are inclusive of taxes, fees, roaming charges and surcharges. On the contrary, Boston-based ETI excludes taxes and government surcharges. Both come to the conclusion that Canadian rates are higher than the US ones, especially for heavy users.

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incurring roaming or long-distance charges. A more recent example is the introduction and spread of “family plan” packages, in which subscribers sign up for two lines and then have the option of adding additional lines at reduced prices, with all lines sharing the available minutes on the plan jointly.” FCC 11th Report on Wireless Competition released on September 29, 2006, p. 41-2.

<sup>78</sup> IGB Grant and Kevin Restino, Lament for a Wireless Nation, Seaboard group, Montreal and Toronto, February 2007. See as well Neil Quigley and Margaret Sanderson, Going Mobile – Slowly How Wireline Telephone Regulation Slows Cellular Network Development, C.D. Howe Institute Commentary, No. 222, December 2005.

**COMPARISON OF CANADIAN AND US WIRELESS SERVICES PRICES**

	Basket 1	Basket 2	Basket 3	Basket 4	Basket 5	Basket 6
Carriers	150 MOU 60 N/W 90 Anytime 15% LD 10 SMS	450 MOU 180 N/W 270 Anytime 15% LD 50 SMS	800 MOU 320 N/W 480 Anytime 15% LD 100 SMS	1,200 MOU 480 N/W 720 Anytime 15% LD 200 SMS	1,200 MOU 480 N/W 720 Anytime 30% LD 200 SMS	1,800 MOU 720 N/W 1080 Anytime 30% LD 200 SMS
<b>Canada</b>						
Rogers	\$42.95	\$54.95	\$83.95	\$146.95	\$151.95	\$200.95
Bell	\$60.20	\$68.95	\$98.70	\$146.95	\$146.95	\$212.95
Telus	\$46.70	\$49.95	\$86.95	\$116.95	\$132.95	\$175.95
CDN Average	\$49.95	\$57.95	\$89.87	\$136.95	\$143.95	\$196.62
<b>US (CAD\$)</b>						
Alltel	\$51.05	\$56.58	\$56.58	\$81.18	\$81.18	\$120.54
AT&T	\$50.43	\$55.35	\$71.96	\$79.95	\$79.95	\$104.55
Sprint/Nextel	\$38.75	\$55.35	\$71.96	\$79.95	\$79.95	\$104.55
Verizon	\$51.05	\$58.43	\$78.11	\$86.10	\$86.10	\$110.70
US Average	\$47.82	\$56.43	\$69.65	\$81.80	\$81.80	\$110.09
Average CDN compared to US Average	+ 4%	+ 3%	+ 29%	+ 67%	+ 76%	+ 79%

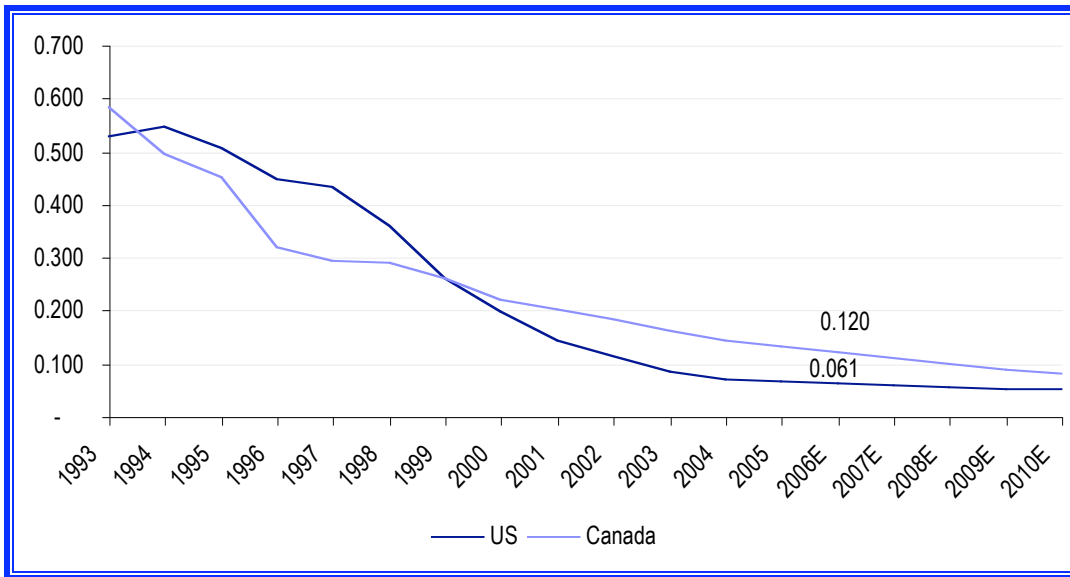
Source: ETI Canada/US Wireless Pricing Model. Excludes taxes and government surcharges.<sup>79</sup>

In general, per minute billing and access fees in Canada are higher than in the US. Typical of this upward trend was the decision to switch to per minute billing in 2002 from the prior per second billing, and then the following year to delay the evening start time from 6PM to 8PM. US carriers have ceased to charge long distance charges and roaming fees to their subscribers, making it easy for them to adopt their mobile handset as their main telecommunications tool. As their voice revenues tend to diminish, they are forced to multiply their mobile data services, thus joining Japan and Korea as the leaders of innovation.

Canadian carriers have yet to discover price flexibility as they make the move towards both low-range voice subscribers (prepaid plans) and high-range users. Financial analysts used to say that while Canadian wireless users have a rather hard time, investors in Canadian wireless carriers hit the sweet spot. USB Securities Canada analysts demonstrated that this has not always been the situation. During the actual competitive era, when Microcell and Clearnet were active, Canadian rates were lower than US ones (see the following chart and section 3.7.2 - *Nature of Canadian Competition*, particularly chart entitled “Wireless Profitability Trend”).

<sup>79</sup> Lee L. Selwyn and Colin B. Weir, “Comparison of wireless services price levels in the US and Canada”, prepared for MTS Allstream’s Submission in response to Gazette Notice No. DGTP-002-07: Consultation on a Framework to Auction Spectrum in the 2 GHz Range including Advanced Wireless Services, 25 May 2007 (Appendix 5).

**CANADIAN OPERATORS CHARGE HIGH VOICE PRICES**



Source: UBS Securities Canada, July 2006.

**b) Data**

There is no study on mobile data pricing in Canada. However a purely practical comparison of the various plans offered by Canadian and US wireless operators shows a dramatic difference between Canadian and US pricing.

**COMPARISON OF CANADIAN AND US WIRELESS DATA PLANS**

Plan/Data Volume	Bell*	Rogers	Rogers	Telus	Telus
	Email & Internet: Blackberry	Business (Data 210)*	Business (Blackberry Email)*	Business (Connect)	Business (Email & web 100 for PDA)
100MB	\$100	\$100	\$100	\$100	\$100
250MB	\$100	\$210	\$350	\$100	\$100
1GB	\$2,350	\$3,960	\$4,100	\$375	\$2,350
Additional Data	\$3/MB	\$5/MB	\$5/MB	\$3/MB (connect 100) \$1/MB (connect 375)	\$3/MB
US Roaming	\$6/MB	\$50/MB (\$10/MB if also Email plan)	\$10/MB	\$3/MB	\$3/MB
Additional Charges	System access, E911, voice, activation	System access, E911, voice, activation	System access, E911, voice, activation	System access, voice, dial-up, VPN, activation	System access, E911, text, voice, premium site pay-per-use

\* Requires 3 year term

Cingular	T-Mobile	Sprint
\$34.99 / Unlimited	\$29.99 / Unlimited	\$49.99 Unlimited**
		\$39.99 / 5Mbps***

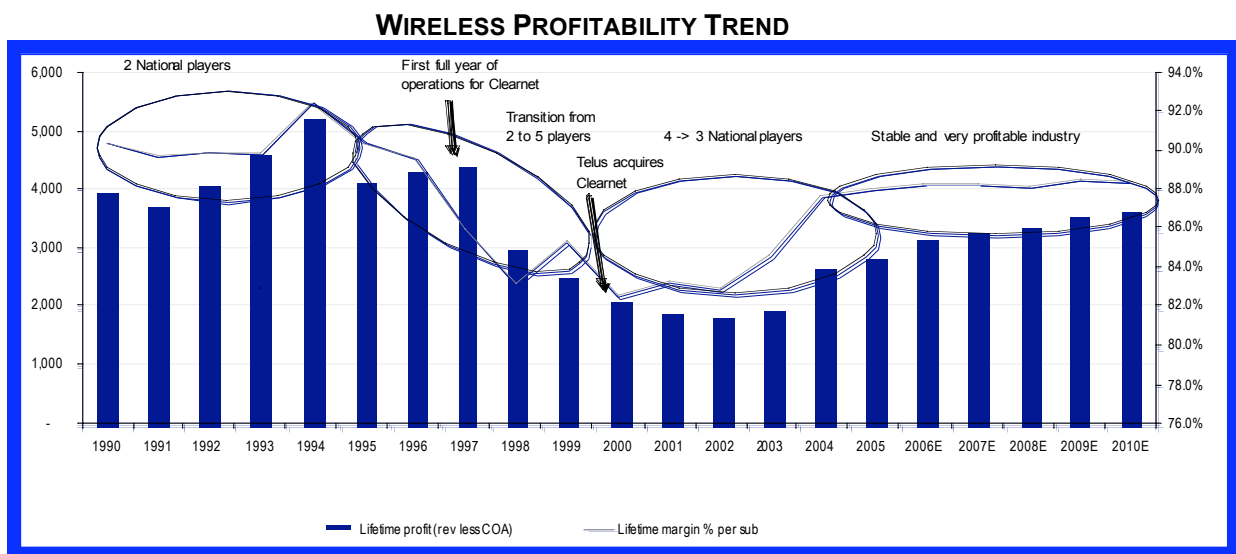
\*\* Comes with unlimited voice package.

\*\*\* Comes with unlimited voice package. \$0.01 for each KB of usage over 5MB

Manufacturers have been struggling for years to induce mobile operators to simplify their voice and especially data rates. Horror stories abound about people accidentally ending up with several hundred dollar monthly mobile bills for involuntary use of their handsets. RIM and Ericsson have been particularly explicit in their support of flat rates all over the world. Some carriers seem to have listened in the US and in Europe. German-based T-Mobile in particular has become the champion of a flat rate for wireless data plans outside Asia. Until now Canadian operators have resisted the change.

### 3.7.2 Nature of Canadian Competition

The 4-player market place formed by Rogers, Bell and the other telephone companies united within the Stentor Alliance, Microcell, and Clearnet, went through a period of upheaval. In 1999 Telus, whose network covered BC and Alberta, withdrew from the Stentor Alliance in order to compete against Bell and its former allies. In 2000, it acquired Clearnet and in this way became a national player. In 2004, Rogers purchased Microcell. A new 3-players market developed and led to the stabilization of the prices and the growth of profitability. In 2006, mobile operators achieved a margin of 29.2 percent, some 10 points higher than fixed operators.

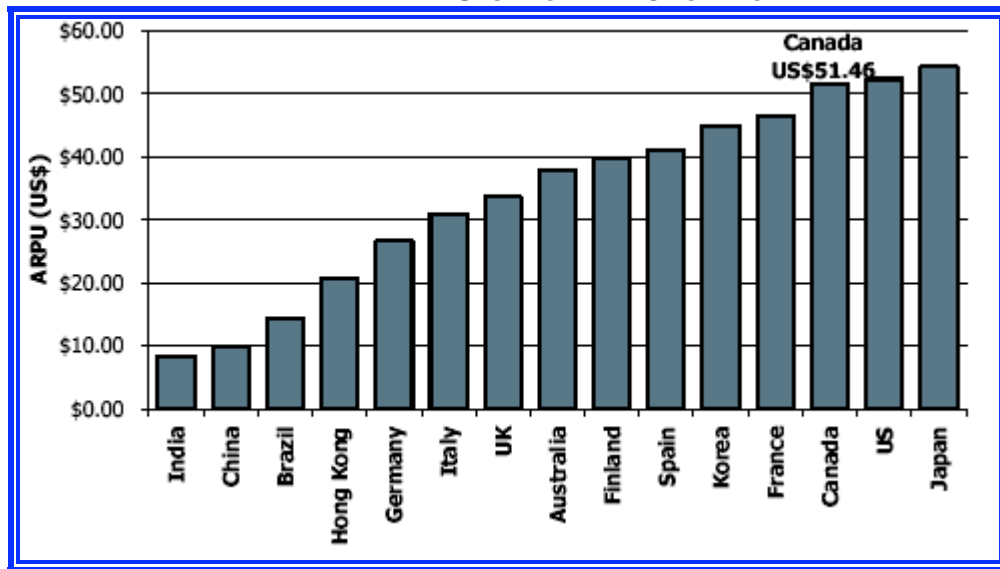


Source: UBS Securities Canada, July 2006.

Consequently, Canada is one of the very few countries where the carriers' average revenue per user (ARPU) is growing – along with Korea (\$3 in 2005) and to a lesser degree with Mexico, Taiwan, Brazil and Chile (\$1). All the other countries including the US had a decreasing ARPU during the same period, even Japan where the high level of data ARPU, does not compensate for the decrease of voice ARPU.<sup>80</sup>

<sup>80</sup> Chetan Sharma, Worldwide Wireless Data Trends, August 2006.

**CANADIAN ARPU IS HIGH AND GROWING**



Source: Dvai Ghose and Sanford Lee, *Challenging the myths about Canadian wireless*, CWTA Public Forum on Advanced Wireless Services Spectrum Auction, April 23, 2007.<sup>81</sup>

Having a high and growing ARPU is the dream of all wireless carriers. The problem begins when this revenue flow is obtained at the expense of the subscribers. This seems to be the case in Canada where the carriers grant to the subscribers half the minutes of use of their US counterparts while receiving equivalent revenue. In other words, Canadians pay on average almost twice as much as US subscribers for each minute of use of their mobile phone.

**CANADA/US ARPU AND MOU COMPARISON**

	ARPU	MOU*
<b>Canada</b>	\$56.60	420 mn
<b>US</b>	\$57.50	820 mn

Source: Lemay-Yates Associates Inc., 2007<sup>82</sup>  
 MOU figures are for 2006 in Canada and 2005 in the US.

The apparent “complacency” of the Canadian market place only begins to be affected by the arrival of several MNVOs. MVNOs are a new breed of wireless network operators who do not own their own wireless infrastructure but lease wireless capacity from "actual" operators and then repackage it for a specific market segment. The first added value that MVNO provides is billing and customer care functions. When the market matures, MVNOs can be the initiators of changes as they try to differentiate themselves from traditional operators by introducing new data services.

The world's first MVNO was Virgin Mobile, launched in the UK in 1999. In the UK, Virgin Mobile uses the T-Mobile network. In the US, the Sprint network is the carrier. Virgin Mobile arrived in Canada in spring of 2005, and uses the Bell Mobility network. There are other MVNOs in Canada: Primus Canada, Videotron, Sears, Loblaws/President’s Choice, TelePlus Enterprises, BeyondMobile, Amp'd Mobile, KORE Wireless, etc.

<sup>81</sup> This document is part of Bell’s Submission in response to Gazette Notice No. DGTP-002-07: Consultation on a Framework to Auction Spectrum in the 2 GHz Range including Advanced Wireless Services, 25 May 2007 (Appendix 5).

<sup>82</sup> Quoted in Quebecor Submission in response to Gazette Notice No. DGTP-002-07: Consultation on a Framework to Auction Spectrum in the 2 GHz Range including Advanced Wireless Services, 25 May 2007.

Even though these companies usually do not disclose their market data, Virgin's founder and Chairman Sir Richard Branson revealed in July 2006 that Virgin Canada then had 250,000 subscribers (far more than many people thought), expected to reach 400,000 by year-end, and one million by 2008. Virgin's strategy to offer prepaid service with attractive conditions (prepaid minutes have a "shelf life" of four months, compared with a month or so for its rivals) seems to have struck a chord among young people. In Canada, approximately 80% of all subscribers are on postpaid plans.<sup>83</sup> However, limited Canadian use of prepaid plans seems to exert a positive impact on the penetration rate.

### 3.7.3 Preliminary Assessment of the Canadian Mobile Environment

Financial analysts say that Canadian wireless is wonderland for investors who have invested in the three main operators. Here again we come back to this surprisingly high volume of voice usage. If Canadian users speak more on their mobile phones than any other foreign users (apart from US users), why struggle to launch mobile data services? Voice is so lucrative. This relatively high profitability comes at a cost: wireless penetration is lower than average and prices are high. Mobile data pricing in particular, is restrictive, complex and costly. The profitable voice segment of the Canadian mobile market may have deterred mobile operators from innovating in the short-term in the data segment.

There is as well a structural reason for the Canadian late start in mobility. Two of the mobile carriers are landline carriers as well and have no reason to make their mobile offering so attractive that it may encourage users to give up their fixed telephones. This was the strategy adopted by Microcell with City Fido, but Microcell was a pure mobile player. Bell and Telus are not. The inertia of Rogers is more inexplicable. Being a cable operator, it has nothing to lose by launching a mobile telephone service that would replace the wireline service. It chose not to adopt this strategy and as we saw earlier, on the contrary, it killed City Fido as an alternative to local wireline telephone service.

#### **The state of the Canadian wireless industry is not as dire...**

When the Telecommunications Policy Review Panel made its report public in March 2006, wireless carriers reacted by hiring the consultancy firm Wall Communications to prepare a report in order to defend the status quo. Through a clever treatment of the facts Wall ends up justifying the complacency of the Canadian wireless industry. Indeed, the Canadian wireless penetration rate is not as low as global figures seem to show, asserts Wall, since it amalgamates prepaid service and postpaid service. If we were to compare only postpaid subscribers, "Canada advances 13 places in terms of its ranking with other OECD countries."

The same thing for the growth rate in Canada: according to Wall it looks lower than in the US but it is due to the fact that wireless was introduced two years later in Canada, i.e. in late 1983 in the US and in 1985 in Canada:

"Consequently there is no gap in the rate of growth of wireless subscribers in the two countries." This mechanical assessment of market trends does not take into account the catastrophic start of cellular telephony in the US due to the lottery system that fragmented the market. Moreover, it negates all market

<sup>83</sup>

Mark Evans, Prepaid wireless regaining fans, Financial Post, July 21, 2006.

responsiveness to the various incentives provided by the economic and social environment, including the main players' marketing efforts. High prices and low usage in Canadian telecommunications compared to their US counterparts are simply explained by "the fact that most wireless service providers in the US began marketing big minute-bucket national plans over the last several years, which in addition to providing users with a large volume of local calling minutes also allow users to avoid roaming and long distance charges." This sums up to say that US wireless subscribers pay less because their mobile carriers charge them less (and more intelligently)! Not surprisingly this self-justification exercise dismisses the work performed by the Telecommunications Policy Review Panel that "under extremely tight deadlines" examined only "limited and selective data". And it concludes with an ode to the status quo: "it is premature to conclude that there is an obvious need to develop a more efficient and vibrant wireless industry in Canada."<sup>84</sup>

One explanation may be the strategy to offer telephone service over cable TV. But this leaves open all territories that are not covered by Rogers cable network where wireless telephone service could become an alternative to wireline service. Another explanation could be the acquisition of Sprint Canada/Call-Net by Rogers in May 2005 that provided the company with a fixed telecommunications network. None of these two answers are satisfying though. Generally being the most innovative wireless carrier and the only one with no dominant vested interest in traditional landline telecommunications, Rogers may well be tempted to take advantage of its new broadband UMTS/HSDPA network to offer unlimited wireless telephone service, compete with the landline carriers on voice service and offer a variety of advanced data services.

Industry Canada intends to release 105 MHz of wireless spectrum in the 2-GHz range in 2008 to be used in what is designated as Advanced Wireless Services (multimedia applications and broadband access). In this perspective, Industry Canada initiated in February of 2007 a consultation process in order to address a broad range of issues such as the assessment of the current state of convergence of telecommunications and broadcasting, as well as of mobile, fixed services and multimedia on the same infrastructure, and whether to adopt measures to enable market entry by new players.<sup>85</sup> Is Industry Canada going to allow new entrants in the mobile market?

A Coalition for Wireless Competition, launched by Quebecor, MTS Allstream and Mipps., was created in May 2007 in order to lobby the government on the benefits of increased competition in wireless services. The most vocal member of the coalition, Quebecor's chief executive officer Pierre Karl Péladeau, is urging the government to change the rule of the auction in order to facilitate new entrants: "There is a flagrant lack of competition in this sector and the reality of the market is that none of these companies is forced to offer better products or better prices."<sup>86</sup> The "Big Three" responded by an intense public relation and lobbying campaign opened by a vibrant

<sup>84</sup> "An examination of Issues raised in the Telecommunications Policy Review Panel's March 2006 Report regarding the Canadian Mobile Wireless Services Industry", Wall Communications, Prepared for the Canadian Wireless Telecommunications Association, September 29, 2006, 37 pages. Excerpts are taken from pages 8, 10, 18 and 26.

<sup>85</sup> Industry Canada, Consultation on a Framework to Auction Spectrum in the 2 GHz Range including Advanced Wireless Services, Notice No. DGTP-002-07, February 2007.

<sup>86</sup> Vito Pilienci, "Quebecor boss seeks opening of Canadian cellphone market", The Ottawa Citizen, April 18, 2007.

speech entitled “Lies, Damned Lies and Statistics” made by Rob Bruce, Rogers’s president, and largely echoed by media.<sup>87</sup> The controversy is still raging now.

The government's last spectrum auction in 2001 lasted three weeks and saw cellular companies spend more than \$1.48 billion on licences. Bell Mobility and Rogers Wireless Communications captured a majority of the licences available across the country. Both Microcell (Fido) and Clearnet Communications also secured licenses in the 2001 auction but were unable to compete and were bought by competitors; Microcell by Rogers and Clearnet by Telus. This prompted telecom analyst Lawrence Surtees to say: "It raises an issue about how many (providers) is enough," said Mr. Surtees. "So far we have shown that Canada may not be able to support four or five big national providers."<sup>88</sup>

Whatever the outcome of the auction, it is desirable that Industry Canada encourages the best use of the available spectrum. One of the factors impeding the introduction of additional competition is the shortage of available bandwidth. Existing carriers currently occupy large blocks of spectrum that are left unused or under-used and prevent competitors from entering the market (the clearest example being Inukshuk, a joint-venture Bell/Rogers, that has the potential to bring high speed outside the big cities). This is not the only example: Canadian carriers use more spectrum than their US counterparts to serve much smaller populations.<sup>89</sup>

#### **3.7.4 Mobile Content in Canada**

In Canada, mobile content is in the early stages. According to Rogers, the only company to provide regular official data on wireless data, mobile content accounted for 11% of its revenues. The other Canadian operators are standing in the 8 to 8.5% range.<sup>90</sup>

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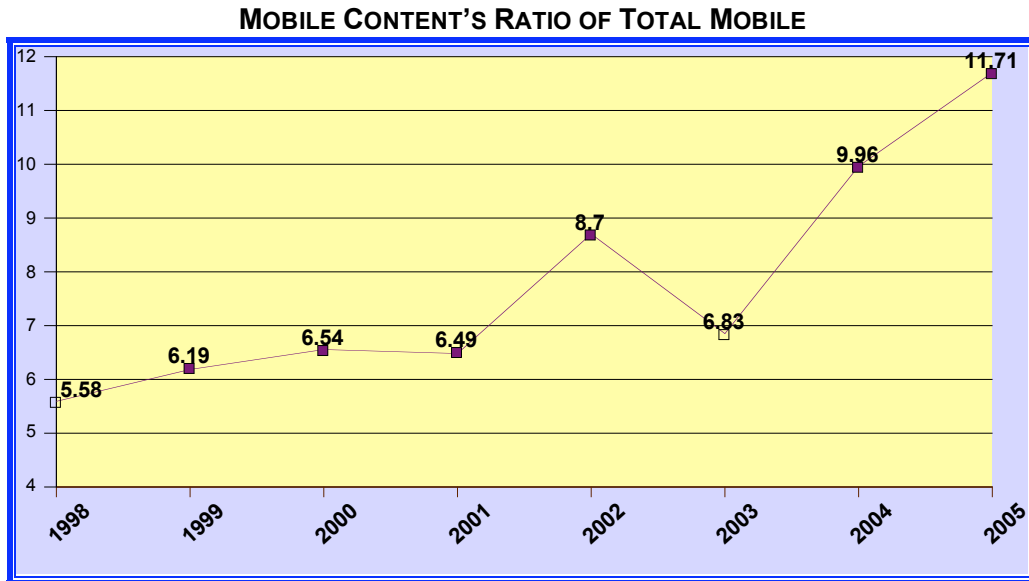
<sup>87</sup> “Lies, Damned Lies and Statistics” Debunking Canada’s Wireless Myths By Rob Bruce President, Rogers Wireless, "A CWTA Public Forum: Advanced Wireless Services Spectrum Auction, Ottawa, April 23, 2007.

<sup>88</sup> Vito Pilienci, *idem*.

<sup>89</sup> Lemay-Yates Associates Inc., Canadian and US Mobile Spectrum Holdings, report prepared for Mobilexchange’s Submission in response to Gazette Notice No. DGTP-002-07: Consultation on a Framework to Auction Spectrum in the 2 GHz Range including Advanced Wireless Services, 25 May 2007.

<sup>90</sup> Rogers Annual Report 2006. Telus revealed in an interview that its own data average revenue per user (ARPU) amounts to 8 per cent of total ARPU – Simon Avery and Catherine McLean, "Wireless data services? Hold the phone", *Globe and Mail*, December 28, 2006.





Source: CRTC Telecommunications Monitoring Reports 2006 and 2003

On the world scene Canada is lagging behind most of the industrialized nations: in Japan, wireless data is considered to be 28% of its overall wireless revenues and in Europe on average 15%. The only nation that scores even less than Canada is Sweden. At first sight, this result for a country that has long disputed Canada's position as number one in telecommunications density (landline) may seem surprising. Sweden is one of the few European countries that targeted business customers instead of the general public and consequently failed to create a mass-market.<sup>91</sup>

This is one of the few industries where at any given point in time you're never certain what you're paying.

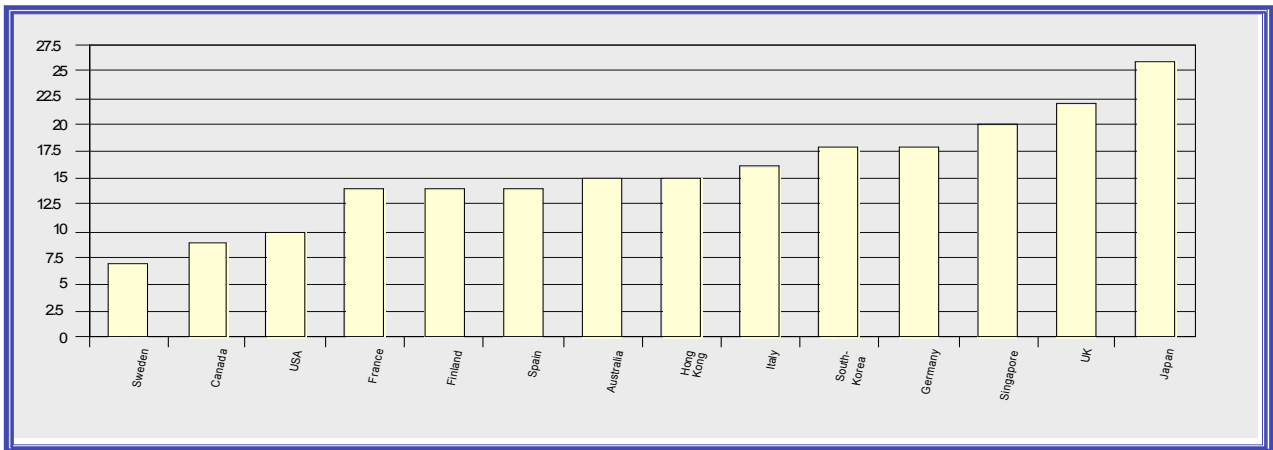
*Tony Olvet, IDC Canada analyst<sup>92</sup>*

One of the reasons for Canada's failure to develop a wireless data market may well be the considerable complexity of mobile data pricing. Mobile data is one of the few telecommunications services where it is impossible to know what is being charged, with the exception of the BlackBerry which has a fixed rate for unlimited use (\$60/month); the situation is the same in the US. In Asia and in Europe, carriers offer broad plans and in various cases already are proposing flat rate plans. In Japan, carriers started using flat rate plans for unlimited volume of data traffic as early as 2003.

<sup>91</sup> Stelacon, UMTS Development from an International Perspective, Stockholm December 2005, 72 pages. Cf. p. 59.

<sup>92</sup> Simon Avery and Catherine McLeans, "Wireless data services? Hold the phone", *Globe and Mail*, 28/12/06

**WORLDWIDE WIRELESS DATA AS PERCENTAGE OF REVENUES PER USER**



Source: 11<sup>th</sup> Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, FCC, September 26, 2006

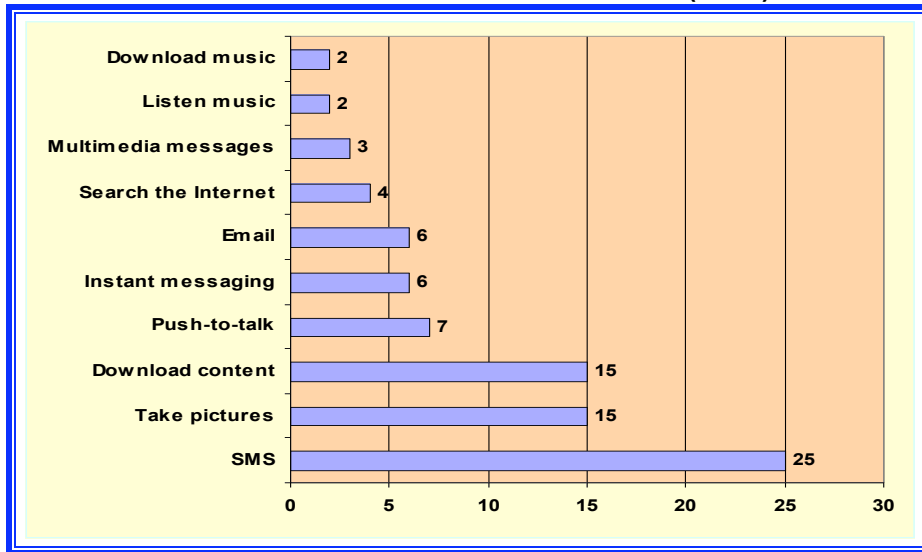
It should be remembered that one of the reasons for Canada's success in the traditional wireline market was the general use of flat rate for local calls while the rest of the world including some of the large US cities (such as New York City) were using measured service. Today, Canadian carriers use a complex way to measure wireless data while Asia is discovering the virtues of flat rate. The high cost and unpredictability of the wireless data pricing is a major factor in Canada's delay.

**a) Main usages of Mobile Data in Canada**

SMS is the most popular mobile content application in Canada (25%), followed by downloading content (15%). People often use their mobile handset to take photos (15% as well) but they do not often send them through the network (6% only).<sup>93</sup> These results are very similar to all surveys performed in the US and in Europe. They are typical of a nascent market with very little variety of choice.

93 Usage of Wireless Communications in Canada, Decima Research/Canadian Wireless Telecommunications Association (CWTA), April 2006. Decima poll survey of 1,510 people.

**USAGE OF MOBILE SERVICES IN CANADA (2006)**



*Decima poll survey, April 2006. Decima poll survey.*

**b) SMS**

Nearly four billion SMS messages were exchanged in Canada in 2006 and the market has seen more than 100% growth each year since 2002. This growth followed the launch in April of 2002 of a Canadian inter-carrier SMS capability – at the time a North American first due to the intervention of the Canadian Wireless Telecommunications Association (CWTA). The capability was extended in January 2003 to cross-border inter-carrier SMS, enabling wireless phone customers to exchange text messages between U.S. national wireless service providers and the major Canadian wireless service providers.

**NUMBER OF SMS IN CANADA (MILLION)**

2002	2003	2004	2005	2006 (E)
174	352	710	1,382	3,893

*Source: Netsize Guide (2006 Edition) and, Canadian Wireless Telecommunications Association (CWTA)*

**c) Music**

All three of Canada’s largest wireless carriers provide wireless music options in their portfolio of services. These music services currently rely on MP3-enabled phones, which allow the download of music in MP3 or other audio file formats. This music is generally presented in ring tone format but the future lies in the download of entire songs or classical pieces. For the time being most mobile music is downloaded via the fixed Internet and synchronized with an MP3 device such as an iPod that is not connected to wireless networks. With the advent of Apple's iPhone, and other mobile handsets with MP3 capacity this may rapidly change.

#### d) Video and TV

Mobile television services began in August 2005 on Bell, Rogers and TELUS networks. Some programs are streamed live to the handset while others consist of downloaded content. The champion of mobile television is CHUM TV that partnered with Yahoo to offer on-demand access to certain of its shows and added Mobisodes of 12 of its shows. One year later, there were 11 licensed Canadian broadcasters making programming available through the mobile television services of all three mobile phone carriers.<sup>94</sup> In February 2007, Bell became the first Canadian company to phone in Hollywood movies to mobile phone subscribers on a pay-per-view basis. The Mobile Movie program includes selected Disney and Sony movies as part of distribution deals with Buena Vista International Television and Sony Pictures Television International to video-capable cellphone subscribers for \$6.00 a play, plus a subscription fee.

A meaningful initiative is the launching in 2006 of Mobifest, Canada's first mobile film festival. Its promoter Duncan Kennedy is a producer and distributor of made-for-mobile movies, based in Toronto. Previously Mr. Kennedy was President of Tribeworks, a San Francisco based multimedia services company which he co-founded in 1998. Mobifest recognizes excellence and innovation in made-for-mobile filmmaking. The festival has two components: an interactive website where audiences can vote on their favourite mobile movies, and an awards ceremony. Mobifest 2007 already received over 300 submissions from 15 countries and generated over 100 million media impressions.

Following a request from the government, the CRTC published a comprehensive report on the future environment facing the entire broadcasting system including mobile television. One of the major issues raised by mobile television is of course to determine whether it should be regulated or not as traditional television is (for the time being it is not regulated). Without making a formal recommendation on the issue, the CRTC was nevertheless able to conclude that "mobile television does not directly compete with regular television broadcasting, but may represent an opportunity for broadcasters and program producers to reposition their program material for another market." This commentary comes after a thorough analysis of the nature of mobile television:

*"Given mobile television's growth, it appears that consumers are willing to trade picture quality for access to video services anytime, anywhere. Experiments have shown that simply down-sampling broadcast material to accommodate the resolution of mobile television is not the best way to provide this service. Mobile television services are more suited to broadcasting news, short video clips, previews, music video, etc., rather than longer programs such as full feature films. Content must be properly re-packaged to accommodate this new delivery medium."*<sup>95</sup>

Will the carriers promote new media or will they be content with following the demand? A promising sign is the decision to charge a flat rate for mobile TV though rates remain relatively high (Telus \$15, Bell \$20 and Rogers \$25) and come as an addition to the price for mobile data. This "Walled Garden" attitude may foster the development of an environment where content owners and creators will simply distribute their own material via the open Internet, bypassing the need for any form of commercial relationship with other distributors. It is already possible to download individual TV programs to a computer thereby undermining traditional broadcasting and by-passing Canadian content regulations. Advertising revenues are being siphoned off from

94 The Future Environment Facing the Canadian Broadcasting System, CRTC, 14 December 2006. Cf. Paragraph 264.

95 The Future Environment Facing the Canadian Broadcasting System, CRTC, 14 December 2006. Cf. Paragraph 75.

existing broadcast TV. User generated websites such as MySpace, Facebook or YouTube are introducing revenue sharing formulae independent of the broadcasters and cable TV operators.

Some traditional media already decided to team up with the new media, such as Comcast and social networking website Facebook which decided in February 2007 to kick-off a program that includes contests asking users to submit short video segments about their lives. Throughout the contests, Facebook users will be encouraged to upload, view, share and rate the videos. The same month BBC struck a more comprehensive deal with user-generated content site YouTube to provide content for special “channels” on the Google-owned website. The deal calls for YouTube to include three BBC channels of which two are entertainment channels showing short-form videos, while the third will be a dedicated channel for BBC News clips.

Until now, mobile carriers have been exerting a greater control over the delivery of services to their subscribers than their landline counterparts and have been able to restrict access to third party services. However, the development of bi-mode handsets, cellular/Wi-Fi will presumably change this situation and introduce an “Open Gateways” model where every user can freely select live or stored shows from a live or stored multimedia database. This model is being actively promoted by mobile manufacturers (in particular Nokia), computer manufacturers (in particular Apple), and software providers (in particular Microsoft).

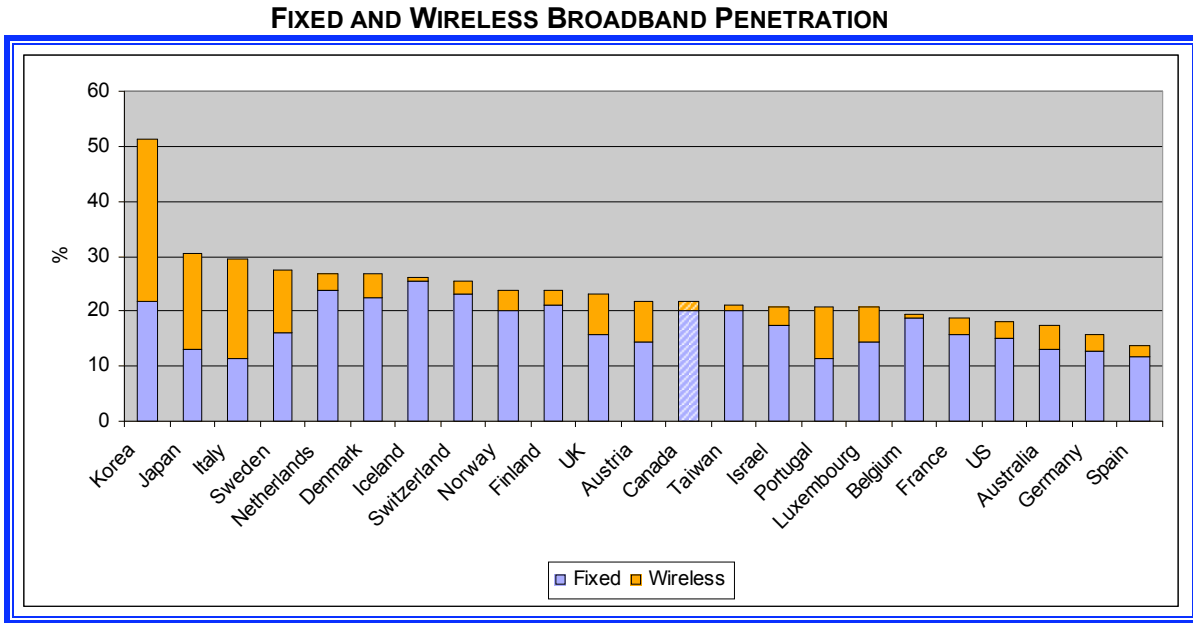
Some signs of change are already visible. In December 2006, Cingular Wireless launched a similar deal with social networking website MySpace in order to allow its subscribers to download a Java application that lets them manipulate MySpace for \$2.99 per month plus standard use charges. In February 2007, mobile giant Vodafone signed an exclusive partnership deal with social networking web site MySpace allowing its customers to access and update their MySpace pages from their mobile phones. Internet freedom of choice is beginning to surface in the mobile environment.

### **3.7.5 Mobile Broadband and Digital Divide**

Since the advent of the Internet the issue of digital divide has always been at the centre of the Canadian Government. Industry Canada designed a national Connectedness Agenda that encompassed several development axes such as Canada Online, Smart Communities, Canadian Governments Online, etc. (there were six of them called the “pillars” of the Connectedness Agenda). First, the Connectedness Agenda made sure that all Canadians could access the Internet without having to pay high long distance charges. Then with the popularization of high speed Internet, the government took an interest in the deployment of broadband access in remote regions. It invested CANARIE to build the next generation Internet (CA\*net 3) then called the world's first all optical, broadband network. Most of the actions taken by the government were based on fixed networks with the exception of satellite projects (National Satellite Initiative). Provincial governments developed their own programs based on the same assumption. The carriers quickly understood the benefits of such programs and cooperated fully to expand their broadband networks all over Canada.

The result of these partnerships between the federal government, the provincial governments and the carriers was that Canada quickly took the lead in the deployment of broadband access to its population. In the last few years however Canada fell behind several countries. One of the main reasons for this slipping is the absence of a national mobile strategy at a time when more and more countries consider wireless as an integral part of their broadband strategy. Indeed wireless

and wireline are converging and must be treated as such. For instance, the number of landline narrowband accesses to the network is diminishing year after year in Canada. Does it mean our traditional telecommunications system is falling apart? Obviously not, but we use more and more wireless access as a complement and even as a substitute. What is true for traditional wireline is also true for broadband access. The International Telecommunications Union (ITU) has endorsed this approach and computes wireline and wireless broadband as a whole, as we can see in the following table.



Source: Digital.life, ITU, 2006, 132 pages. Cf. 78

This is not to say that Canada is performing badly. In its last publication of the ICT Opportunity Index, the ITU has put Canada at the 11th rank which lies at value 337, well above the average ICT Opportunity Index which lies at the level of 148 – this is obviously a good performance. But the problem comes from the trend: in 2001, Canada was ranked 3rd at the ITU ICT, in 2002 it was ranked 4th, in 2003 and 2004 it was ranked 6th and in 2005 it slipped to the 11th position. Where will Canada be in 2006?<sup>96</sup>

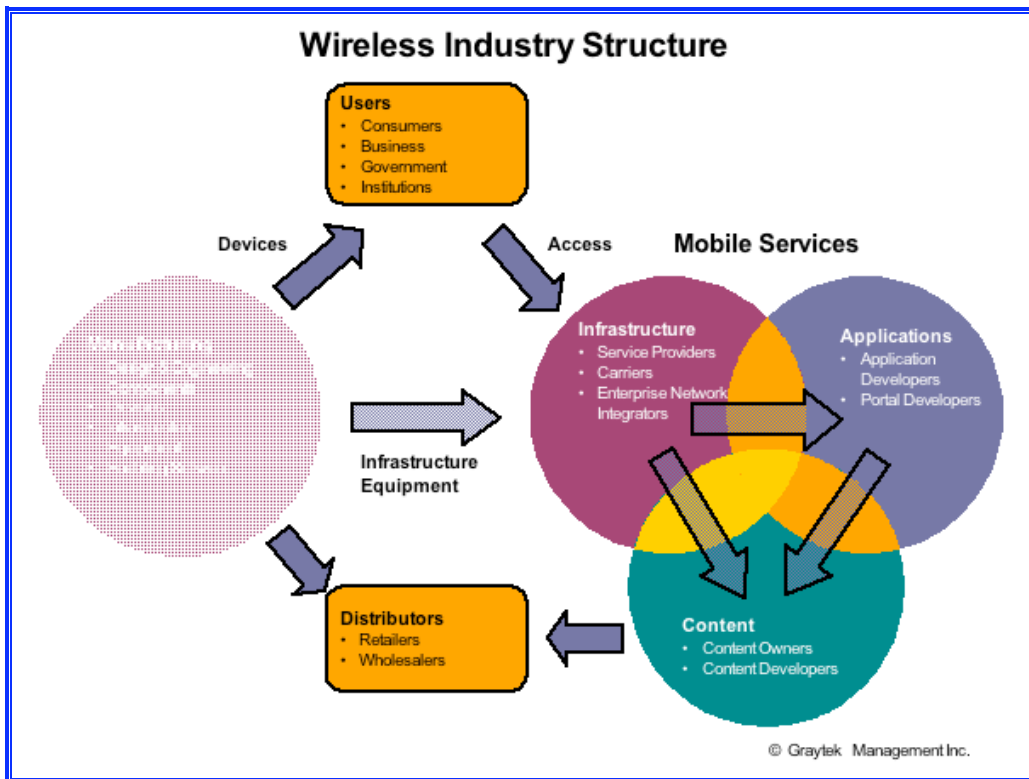
The broadband network is not indispensable to the development of mobile contents as shown in the case of Japan. But in the Canadian situation, it shows a lack of interest or motivation towards mobility in general. This is a unique situation in the history of Canadian telecommunications. In the past, Canada took the lead in many circumstances: launching of the first national space commercial network, digitization of the switching systems (DMS), and deployment of fibre optics. This denial attitude had consequences on the CRTC that until very recently refused to recognize wireless networks as a competitive alternative to landline networks.

<sup>96</sup> “Measuring the Information Society: ICT Opportunity Index and World Telecommunications/ICT Indicators”, International Telecommunications Union (ITU), Geneva, 2007, 134 pages. Cf. p. 9.

## 4 INDUSTRIAL FRAMEWORK

According to our definition (*see Chapter 1 - Introduction*), the term “mobility” is used in the broad sense: all infrastructure, content, and applications that are designed to be used by individuals in motion. The services target both users’ personal activities (games, news, commercial services, etc.) and their activities at work (access to corporate intranet, medical files, security systems, etc.). In some cases, the same services will be used for both entertainment and work.

Mobile Services form part of a broad wireless industry structure, in turn a subset of the ICT Sector, that also includes manufacturing of wireless devices and infrastructure equipment, as well as distributors of manufactured goods, applications and content who provide little, or no, added value.<sup>97</sup> The following diagram illustrates the wireless industry structure and the position of mobile services within that structure.<sup>98</sup>



97 The study has generally followed the NAICS structure for the ICT Sector – Manufacturing, Intangible Services (Mobile Services) and Goods Related Services (Distributors). The exceptions are enabling software, typically embedded in manufactured goods, which has been treated as part of Manufacturing, and content, representing a growing convergence between the ICT and Content Sectors, which has been treated as part of Mobile Services.

98 It should be noted that Research and Development is an activity that takes place in varying degrees across the value chain

The study profiled more than 220 companies across the wireless industry and covered all major elements of the wireless value chain<sup>99</sup>. Each company was categorized according to the elements of the value chain in which they appeared to operate in a substantial manner. There was an emphasis on mobile services companies in keeping with the overall purpose of this study. The overall profile of sample companies is illustrated in the following table:

**OVERALL PROFILE OF SAMPLE COMPANIES**

Value Chain Position	Large Canadian Companies	Foreign Multi-National Enterprises	Canadian Small/Medium Enterprises <sup>100</sup>	Total
Mobile Services	16	26	153	195
Infrastructure				
Carriers	5	2	6	13
Service Providers	5	4	23	32
Enterprise Network Integrators			5	5
Applications				
Application Developers	2	12	99	113
Portal Developers	1	1	2	4
Content				
Content Owners	3	3	5	11
Content Developers		4	13	17
Manufacturing	5	18	51	74
Design & Engineering		3	9	12
Components		2	9	11
Devices	3	5	5	13
Infrastructure Equipment	2	7	14	23
Enabling Software		1	14	15
Distributors		1	2	3
Retailers			2	2
Wholesalers		1		1
Total <sup>101</sup>	21	45	206	272
Actual # of Companies	14	36	172	222

The following table illustrates the geographic distribution of companies profiled. As can be clearly seen, the predominance of wireless companies is located in a small number of major cities across Canada, particularly Ottawa, Toronto, Vancouver and Montreal.

<sup>99</sup> See Appendix A for a summary of the sample companies by value chain.

<sup>100</sup> For purposes of this study, a company is considered an SME if it has total employment of less than 500 in all locations worldwide.

<sup>101</sup> It should be noted that the total number of companies in this table exceeds the number of companies profiled as a number of companies are substantially positioned in more than one part of the wireless value chain.



## GEOGRAPHIC DISTRIBUTION OF SAMPLE COMPANIES

Province/City	Large Canadian Companies	Foreign Multi-National Enterprises	Canadian Small/Medium Enterprises	Total
British Columbia	0	1	39	40
Greater Vancouver Area	0	1	35	36
Alberta	1	2	13	16
Calgary	0	1	10	11
Edmonton	1	0	3	4
Ontario	9	22	82	113
Greater Toronto Area	7	14	36	57
Ottawa	1	6	38	45
Quebec	2	11	32	45
Montreal Metropolitan Community	2	9	23	34
Quebec City		1	4	5
Other	2	0	6	8
Saskatchewan	1	0		1
Manitoba	1	0	1	2
Newfoundland & Labrador	0	0	1	1
Prince Edward Island	0	0	4	4
<b>Total</b>	<b>14</b>	<b>36</b>	<b>172</b>	<b>222</b>

## 4.1 MOBILE SERVICES

### 4.1.1 Infrastructure

There are three broad categories of infrastructure providers:

- Carriers.** These are essentially the cellular operators who provide the underlying public wireless infrastructure upon which value-added service providers operate. In Canada, the dominant cellular operators are Bell Mobility, Telus Mobility, and Rogers Wireless. Bell Mobility operates CDMA2000 1X, CDMA2000® 1X Ev-DO, and DataTAC© networks in Canada. Telus Mobility operates CDMA2000 1X, CDMA2000® 1X Ev-DO, and Mike networks in Canada. Rogers Wireless operates GSM/GPRS/EDGE, and Mobitex networks in Canada.

Other Canadian wireless carriers extend the reach of wireless services to underserved areas through the use of satellite and radio technology, often linked to the main cellular networks. Such companies include Globalstar, Mobile Business Communications, Mobile Satellite, Westcan wireless and Cancom Tracking. In addition, there are a number of small companies providing fixed wireless broadband services to rural and metro-adjacent communities (e.g. Storm Internet) on a local basis.

- Service providers.** These are the wireless service providers who provide value-added wireless services layered on carrier networks. These include the cellular operations of the major carriers, who are providing an increasing array of mobile services (e.g. Internet access and messaging). Other service providers that have agreements with the major wireless carriers include Virgin Mobile Canada and cable companies such as Quebec-based Videotron. Such

service providers, who are often referred to as Mobile Virtual Network Operators (MVNOs), extend a range of wireless services, from basic voice to Internet access and messaging, across Canada. Other unlikely entrants in this category include Loblaw's Cos. and 7-Eleven.

There are a variety of smaller service providers typically providing variations on hosted wireless messaging services. In a number of cases, these service providers are also application developers who are providing a range of advanced services. These include, hyperWALLET Systems (wireless payments), TruePath Mobile Technology (mobile media management), and International Datacasting (broadcast content). Wireless Payments Services (a Bell/Rogers/Telus joint venture) is currently developing a mobile payments platform for future mobile payments applications.

- **Enterprise Network Integrators.** These are the firms that provide private wireless networks to governments and corporations (e.g. municipal WiMAX networks). Most of the leading enterprise network integrators appear to not specialize in wireless. Rather wireless is just a part of a broader service offering. Canadian wireless network integrators who specialize in wireless include BelAir Networks, Prestige Telecom and ONESTOP Toronto.

#### 4.1.2 Content

There are two broad categories of content providers:

- **Content Owners.** These include media (e.g. TV programming delivered to mobile devices through IPTV) and governments (e.g. topographical and street maps for use in mapping and navigational applications). While there is a wide range of content owners in Canada, the major media companies appear to be in the very early stages of planning with respect to making their content available to mobile users.

There are a number of content owners in Canada who are embracing the mobile services market, mostly in the area of entertainment and games, including CHUM TV, Corus Entertainment (a Shaw Communications spin-off), Dose (a division of CanWest), and Zoom Media.

##### **Mobile is different**

Nothing can happen in this marketplace without having the carrier involved and that is one big difference between this model and the Internet model... There has to be a business model – with mobile, you can't give it away for free like the early days of the Internet. There's a true revenue model and the people that survive will make a lot of money.

*Andrew Fox, VP of strategic relationships,  
Oasys Mobile (formerly Summus)*

- **Content Developers.** These are companies that develop content for use on mobile equipment (e.g. citydazz – an emerging content developer for mobile tourism). Games companies (e.g. Airborne Entertainment, AirG, Electronic Arts) are also in large measure content developers. Increasingly, users are creating/developing their own content (e.g. photos and video clips) often using mobile devices and making it available to other users.

Other Canadian content developers include, Humagade, My Thum Interactive, and U Turn Media. Increasingly, companies are moving to “push” advertising on mobile devices and companies such as Fourth Wall Media are developing content specifically for this market. Equally interesting is the birth of peer-to-peer (P2P) content on a mobile platform. Toronto-based [murmur]<sup>102</sup> produces tales of urban sites that relate to personal memories, or entertaining accounts of local lore that can be heard from a cellphone. The creators of [murmur] believe that everyone has a story. This project has given Torontonians an opportunity to share them with their neighbours and the world. Some stories were recorded on site, allowing background noises to add dimension. Others were recorded by the [murmur] team in a studio. Each narrative is its own adventure into unexpected anecdotes about the city. There are currently four [murmur] locations: Toronto, Vancouver, Montreal and San Jose (California). A fifth one is projected in Edinburgh (UK).

In the nascent consumer market there is often some confusion between content distributors/aggregators and content developers. For instance, Airborne Entertainment is both a developer and an aggregator. The two functions may tend to separate in the future.

We can already distinguish two main contenders for mobile content distribution or aggregation: the carriers and the mass media. Until now North American carriers were not able to follow the example of DoCoMo and did not succeed in entering the content world. The best example of this failure is provided by Bell Canada that outsourced the management of its Sympatico fixed portal to Microsoft. Will the carriers be able to do better in the mobile environment where the media culture is even less defined? Canada’s interactive media guru and mobile content pioneer Roma Khanna answers a vibrant “no”: “Taste making is much more important than gate keeping” she argued.<sup>103</sup>

### 4.1.3 Applications

- **Application Developers.** These are developers of pre-packaged and custom-developed mobile applications for a wide range of enabled industries, including industries within the ICT sector. For example, Ericsson is developing applications in such areas as IPTV, telehealth and mining. These also include mobile games developers whose products are part application and part content (e.g. Magmic). Other application developers include: MessageVista which provides wireless messaging solutions to a range of enterprises (e.g. financial services) and consumer markets; webtech Wireless which offers integrated hardware, software and services for fleet management and telematics; ComVu which provides live video broadcast service for 3G mobile phones and other portable platforms; and Nurun, a broad-based developer of wireless solutions targeted at the consumer.

Some companies such as Flick Software, which develops wireless applications for a variety of industries, find that mobile applications are often viewed as part of a broader business solution. They must typically market their software through major systems integrators that have established client relationships in their targeted application space.

<sup>102</sup> [murmur] was initially developed with the assistance of the Canadian Film Centre, Habitat New Media Lab. See <http://murmurtoronto.ca/>

<sup>103</sup> “Mobile TV generation: 23 too old?”, Indiantelelevision.com, October 20, 2005 - <http://www.mobixinteractive.com/en/1/premipcom23.html>

Companies such as TrueContext provide application toolkits for mobile application development, a form-based toolkit in the case of TrueContext.

This is by far the largest area of activity examined in this study with fully 67% of the mobile services companies and 50% of the overall companies in the sample set being involved in application development activities.

One should not forget a small but dynamic non-profit sector that actively promotes mobile content. Let us mention MyBus an interesting initiative by two Simon Fraser University Computing Science undergraduate students to launch in March 2007 a free text message service to find out when your bus comes, no matter where you are or what bus you need (<http://www.mytxt.ca/>). Île sans fil/Hub des Artistes Locaux (HAL) encourages Montrealers to discover local artists and media producers via wireless jukeboxes capable of streaming high-resolution video and audio (<http://www.ilesansfil.org/>). Notably, it allows for rich media dissemination on a geo-locative basis (unique content relevant to individual hotspots).

- **Portal Developers.** These are developers of portals providing wireless access to content and services (e.g. AirG which provides a social networking portal for mobile users). Other portal developers include Nurun (custom portals), U Turn Media and AOL Canada.

## 4.2 OTHER WIRELESS INDUSTRY AREAS

### 4.2.1 *Manufacturing*

These include firms involved in wireless design and engineering; manufacturing of wireless components; manufacturing of wireless devices and infrastructure equipment; and the development of enabling software (typically embedded in the wireless devices or infrastructure equipment). It should be noted that while R&D may take place in Canada, much of the manufacturing actually takes place off-shore.

Leading Canadian mobile manufacturers include Ericsson (mainly distribution and support of wireless devices and infrastructure), Nortel (mainly design and engineering, as well as enabling software development), RIM (manufacturing of wireless hand-held devices and embedded software), etc. There is a range of other wireless device manufacturers in Canada, often packaged with application specific embedded software (e.g. Sendum and its Mobile Asset Tracker device), and/or assisted GPS solutions (e.g. RxNetworks LBS product aimed at enabling wireless carriers to offer enhanced value-added services). There is a range of design and engineering firms, and wireless component manufacturers supplying device and infrastructure equipment manufacturers.

RIM also licenses its server software to competitive device manufacturers and is performing an important role as an enabler of the mobile services industry through both email and content.

### 4.2.2 Distributors

These include both retailers and wholesalers of both manufactured goods (principally wireless devices and infrastructure equipment) and mobile services (particularly content and pre-packaged applications).

Leading Canadian distributors include major retailers (e.g. Future Shop, Bell, Telus, Rogers) and wholesalers (e.g. LG Electronics). Retailers operate through physical stores (e.g. the phone shops of major carriers). Some companies sell directly to the public over the Internet (e.g. games developers such as Magmic).

## 4.3 WIRELESS USERS

These include consumers, business, government and institutions.

Among the sample companies for this study, by far the largest number targeted business in the broadest sense, where this included companies in a variety of industries, government and institutions. Some 50 or more of the sample companies targeted business in general, while close to 150 companies made over 330 references to more than 30 specific industries they were targeting. About 80 of these references were to the telecom industry and another 30 were to carriers and cable operators, clearly indicating a strong potential for linkages across the wireless value chain. Outside of the ICT sector, the largest concentration of business users referenced (more than 30) were in the transport industry.

About 50 companies clearly targeted consumers, more than 55 targeted governments at various levels (with a strong emphasis on defence and law enforcement) and about 30 targeted institutions (mainly healthcare and to a lesser extent education). There is a clear consensus in the mobile content industry about the lack of government's mobile strategy. Industry Canada does not consider the mobile content companies as part of an industrial sector: some are part of the multimedia sector, some others are included under ICT consulting, etc. As a consequence of this lack of recognition, the very possibility of defining a strategy in the future is hypothetical – this is a far cry from the situation that is prevailing in Japan and Korea.

Also, the federal government does not use mobile content to offer its services to citizens or companies. Some trials have been held – none of them resulted in a regular service. What is even worse: these trials were not coordinated, there is no record of these trials, and the knowledge capital that could have been amassed from these trials has been wasted. An example of this waste is provided by Canada Post which held an interesting trial in Calgary on interactive marketing between January and December 2005 under the name of fetch<sup>TM</sup>. This new service developed by Innovapost, the technical division of Canada Post, aimed at providing information about consumer goods over cellphones, without providing the advertisers too much personal information. Many news releases were issued. Canada Post presented its service at many public events where it raised a great deal of attention. Once the trial was over, no report was made available and the authors of this Mobile Services report were unsuccessful in attempts to contact the organizers of the trial.

## 4.4 WIRELESS SUPPORT INFRASTRUCTURE

Following is an indication of the range of support services available to the ICT sector in Canada, highlighting those that are particular to the wireless industry:

- Leadership (e.g., leaders who demonstrate recognition of the potential of the wireless industry and the importance of mobile services);
  - Information and Communications Technology Council (ICTC), which has identified wireless as a strategic technology and is currently completing a wireless road-mapping initiative.
- Champions (e.g., champions providing a catalytic influence on mobile services growth);
  - Duncan Kennedy, Executive Producer of Mobifest, Canada's first mobile film festival
  - Carolyn Lewko, President of WIP Connector and Chair of WINBC
  - Mike Lazaridis, President and Co-CEO Research In Motion
- Physical Infrastructure (e.g., infrastructure upon which mobile services is dependent);
  - Extensive wireless coverage across populated areas of Canada is provided by the cellular operators
  - WiFi access is becoming increasingly prevalent in major populated areas (e.g. Winnipeg alone now has close to 10,000 wireless access points, about 50% open and 50% secured).
- Information Networks (e.g., informal and formal information networks that provide cohesion to mobile services);
  - Canadian Interactive Alliance/Alliance interactive canadienne (CIAIC) - <http://www.ciaic.ca/>
  - Canadian Wireless Telecommunications Association - <http://www.cwta.ca/>
  - Mobifest - The festival for mobile filmmakers - <http://mobifest.ca/>
  - Mobile Monday Toronto - <http://www.mobilemondaytoronto.com/>
  - Mobile Monday Vancouver - <http://momovan.org/>
  - MobileMuse Vancouver - <http://www.mobilemuse.ca/>
  - Ottawa Wireless Cluster - <http://www.ottawawirelesscluster.com/>
  - Toronto Wireless User Group - <http://torwug.org/default.asp>
  - Wireless Industry Partnership (portal) - <http://www.wipconnector.com/>
  - Wireless Innovation Network BC - <http://www.winbc.org/>
  - WiTec Alberta - <http://www.infoport.ca/wireless/bins/index.asp>
  - Other information networks with a specific wireless interest include: ICT Council (<http://www.ictc-ctic.ca/>); Canadian Advanced Technology Alliance (<http://www.cata.ca/>)
- Innovation (e.g., universities, research institutions supporting mobile services, manufacturers, operators, and content owners);
  - NRC-IIT – Wireless Systems development support (Cape Breton) - [http://www.nrc-cnrc.gc.ca/clusters/technology\\_clusters\\_e.pdf#search='wireless%20clusters%20in%20canada](http://www.nrc-cnrc.gc.ca/clusters/technology_clusters_e.pdf#search='wireless%20clusters%20in%20canada)
  - Ericsson Canada, the main Ericsson research facility outside of Sweden, has a worldwide mandate for research in multimedia messaging.
  - University: It should be noted that there appears to be a disconnect between industry and academia with no university-based R&D, or curriculum, to address the content issue for either fixed or mobile services. In general, Canadian Universities do not seem to have strong relations with the corporate world, in terms of telecommunications, with the possible exception of Waterloo.
- Marketing Support (e.g., organizations providing marketing support to mobile services); and
  - KAZAM Technologies - <http://www.kazamtech.com/>

- Partnerships (e.g., public and private sector partnerships within the wireless industry, particularly with respect to mobile services).
  - Wireless Payment Services (private sector partnership between Bell Mobility, Telus Mobility and Rogers Wireless) - <http://wpspay.com/>
  - Ericsson Canada has a private sector partnership with Rogers Wireless; and cooperation agreements with the International Institute of telecommunications and various Canadian universities.
  - Corus Entertainment is partnering with MobiTV (to test push technologies) and QuickPlay Media (to test on-demand delivery) on wireless platforms.
  - Canadian RFID Centre (CEC) is a collaborative partnership involving ICT suppliers and users to foster the development and deployment of RFID.
  
- Other areas of industrial support infrastructure for which there is a range of support services available, but for which wireless industry specific services were not identified in this study include:
  - Skilled Personnel (e.g., educational and training institutions supporting mobile services);
  - Entrepreneurship (e.g., organizations supporting entrepreneurial drive and sound business practices);
  - Business Services (e.g., legal, accounting, M&A, office location/relocation, human resource consulting, marketing consulting, information technology services);
  - Financing & Investment (e.g., organizations providing various sources of investment capital);
  - IP Licensing – at the intersection of the wireless industry and the support infrastructure are organizations that own and license IP rather than developing products and services themselves (e.g. Wi-Lan and, more recently, Mosaid).

## 4.5 CONVERGENT INDUSTRY AREAS

We are now in an age of convergence where not only technologies are converging, but also entire industries are converging and new technology-enabled industries are emerging almost overnight. Convergence represents the latest stage of building the infrastructure, content and applications required to drive and develop both a competitive information economy and a prosperous information society.

In terms of the wireless industry in general, and mobile services in particular, convergence is occurring in a number of ways:

- Within the ICT sector convergence is taking place between wireless, sensor, GPS and vision technologies. This is leading to a range of industrial wireless applications in such industries as transportation, environment and natural resources. The most evident application identified in this study is fleet management identified by 10-15% of the sample companies.
  
- Convergence with adjacent industries is taking place between the ICT, broadcasting and media industries with such offerings as IPTV, increasingly multi-functional hand-held devices and the looming death of traditional land-line telephony. It is most visible in the range of products and services addressing the consumer market.

- Convergence is also occurring with other technology sectors (e.g. life sciences) with a number of companies providing wireless medical devices and applications to the health care industry, particularly in the area of patient monitoring and tracking.



## 5 CASE STUDIES

### 5.1 LIST OF COMPANIES

In depth interviews were conducted during the year 2006 with the following companies and case studies developed subsequently.

Company	Name	Function
<b>Corus Entertainment</b>	Lucie Lalumière	VP & GM Interactive
<b>Ericsson Canada</b>	Pierre Boucher	Director Research & Innovation
	Mike Sisto	Vice President sales – Eastern Canada
	Marc LeClerc	Manager of the Montreal Mobility Expert Center
<b>Flick Software</b>	Jason Flick	CEO
<b>Globis Data</b>	Barrie Kirk	President and Founder
<b>Message Vista Communication</b>	Arash Sabet	President and Founder
<b>Nurun</b>	Jean-Pascal Mathieu	Vice president Strategy
<b>Oz Communications</b>	Jean Régnier	CTO
<b>Research in Motion (RIM)</b>	Duncan Bradley	Director for Global Market Intelligence
<b>True Context</b>	Alvaro Pombo	President and Executive Chairman of the Board
<b>Wavesat</b>	François Draper	Vice President, Strategic Development
<b>Wireless Payment Services</b>	Lynn McMillan	Director of Program management
	Jeff Chorlton	President

**Disclaimer:**

*Opinions expressed in the case studies and any errors or omissions therein are the responsibility of their authors and not of the interviewees or of the institutions with which they are affiliated.*

## 5.2 CORUS ENTERTAINMENT

Interview	Lucie Lalumière VP & GM Interactive, Corus Television
Basic data	<ul style="list-style-type: none"> <li>▪ Incorporation</li> <li>▪ Head office</li> <li>▪ Privately-owned</li> <li>▪ Sector of activities</li> <li>▪ Technology platform</li> <li>▪ Employees (total)</li> <li>▪ Employees (wireless)</li> <li>▪ Revenues</li> <li>▪ Clients</li> <li>▪ Markets</li> </ul>
Mission Strategy	<ul style="list-style-type: none"> <li>▪ 1999</li> <li>▪ Toronto, Ontario</li> <li>▪ ---</li> <li>▪ Media and entertainment</li> <li>▪ Multiple</li> <li>▪ 3,000</li> <li>▪ 1 (part time)</li> <li>▪ \$ 689 million</li> <li>▪ Consumers</li> <li>▪ Canada</li> </ul> <p>Corus Entertainment is an integrated media and entertainment company.</p> <p>1 - Corus Entertainment is focusing the majority of its resources on the CORE business.</p> <p>2 - At the same time, it implements EXPLORE strategies on new media platforms to remain an industry leader on all platforms. Podcasting is part of Corus Entertainment's EXPLORE strategy.</p>
Means	Corus is testing push technologies on the wireless platform via an agreement with MobiTV.
Benefits and issues	<ul style="list-style-type: none"> <li>▪ Corus foresees that the CORE business will remain the dominant revenue driver for at least the next five years.</li> <li>▪ Corus intends to create profitable business models for multiple new platforms (including wireless contents) that will allow it to build deeper relationships with its audiences and more effective advertising campaigns for its clients.</li> </ul>

### History of the firm

Corus Entertainment was built from the media assets originally owned by Shaw Communications Inc., and spun off as a separate, publicly-traded company in 1999. The company grew mainly by acquisitions. Corus Entertainment is a publicly traded company (TSX and NYSE). The JR Shaw family controls the majority of Corus Entertainment's voting shares (86% of the shares).

The many companies and businesses that make up Corus Entertainment include:

- Television: YTV, Treehouse, W Network, CMT, The Documentary Channel, SCREAM, Discovery Kids, Telelatino and TELETOON (40%); Western Canada's exclusive pay-TV movie service on six thematic channels under the Movie Central brand; three local over-the-air television stations; Corus Custom Networks advertising services for television and Max Trax, a residential subscription digital music service.
- Radio: 51 stations clustered in major markets (British Columbia, Alberta, Manitoba, Ontario and Quebec).

- Nelvana: Creator, producer and distributor of animated programming and related consumer products (Babar, Franklin and Beyblade).
- Kids Can Press: Canada's leader in children's publishing.

Corus Quebec Interactive is an Internet publicity representation agency that represents all the 60 Corus radio and television web domains in Canada. It reaches 1.9 million in English Canada and 469,000 visitors in French Canada.

In August 2006, Corus Entertainment's subsidiary Treehouse launched its new live-action preschool series *This is Emily Yeung* on mobile, online and on video-on-demand (VOD). The event was presented as being part of Corus' integrated multiplatform strategy. Interestingly enough the mobile show was launched before the broadcast premiere (September 2006).

### Technological Platform

- **Infrastructure:** Corus Entertainments's wireless contents are distributed through carriers' networks. Corus is also using Magnet Mobile Media to enable its interactive mobile services (e.g. SMS).
- **Technology:** Corus Entertainment currently uses California-based MobiTV's platform to deliver push contents to the end user. But it is as well exploring the possibilities of on-demand contents. In partnership with Toronto-based Quickplay Media, Corus develops a program of on-demand mobisodes. Trials are being made to determine whether to use streaming or downloading technologies.

### Business Strategy

- **Third Party:** Corus Entertainment's role is to be a content provider. For instance, it made a deal with MobiTV in 2006 to deliver push content to the carriers' subscribers. The content comes from Corus' specialized channels, mainly YTV and Treehouse (TV for children). Carriers give an unlimited access to Corus channels content as part of bundles with other channels (CBC Newsworld, The Weather Network, Fox News, BBC World, G4 Tech TV, etc.) for a fixed rate that varies from \$15 to \$20/month. Projects of on-demand mobisodes are being tested with Quickplay Media. Whether MobiTV or Quickplay Media, Corus's strategy always implies the presence of an aggregator between the content provider and the wireless carrier. Its deal with Magnet Mobile is also significant as it signals Corus' interest in developing interactive mobile applications for consumers and advertisers.
- Since then, several other deals were made. They all follow two major axes:
  - distributing content across multiple platforms in television, web and mobile (for instance, a deal was passed with marbledmedia to present the award-winning, live-action series *This is Daniel Cook*)
  - enhancing the interactive experience of the audience (for instance, a deal was made with Magnetic Mobile to use SMS to connect Corus broadcasted shows with audiences)

- **Clips or programs:** Corus is betting on delivering video clips rather than entire programs. But it is still too early to define a business model.

### **Nature of the Market**

- **Segments:** Within the consumer market, Corus Entertainment targets primarily children and their parents.
- **Size:** Even though there are not public figures, it is assumed that very few customers pay for mobile contents. Content programming is still at the experimental stage in Canada.

### **Issues**

- The Canadian Radio-television and Telecommunications Commission (CRTC) said in a public notice released in April 2006 that television programming broadcasted to cellular phones and other wireless handheld devices would remain exempt from federal regulation (Broadcasting Public Notice CRTC 2006-47). This extension of the December 1999 Exemption Order for New Media Broadcasting Undertakings was opposed by the majority of groups representing Canadian artists, Friends of Canadian Broadcasting, and the Commissioner of Official Languages were of the view that mobile television broadcasting services should be licensed by the Commission.
- Mobile content owners are faced with unsolved copyrights issues with Canadian artists associations.



A first in Canada, the lab as well serves as a window for Canadian businesses and universities wishing to partner with Ericsson to develop leading-edge applications. An illustration of this role is provided by the launching in May 2006 of a Mobility World Expert Center in Montreal. This Expert Center is part of a global Ericsson's program aimed at accelerating the creation of innovative new applications and services, by content and applications providers, as well as operators.

In first place, the Expert Center allows content and applications providers have the opportunity to propose new ideas to Ericsson and to develop new services in specific areas. They will also get assistance in realizing these ideas and taking them to the market as products that can be sold to operators not only in Canada but all over the world.

The Expert Center also gives to the operators a channel to establish close contact with the developer community, enabling faster conceptualizing and development of future services. An Expert Center allows operators to get a glimpse of technologies, services, and concepts launched all over the world, leveraging on the Ericsson Mobility World network that is present in 35 countries.

The main focus of the Montreal Expert Center is on IP Multimedia Subsystem (IMS). Application developers will be able to take advantage of Ericsson's IMS based solutions, as well as the Service Development Studio (SDS), a toolset that enables services to be developed and tested in a PC environment, and provides an authentic end-to-end test environment. Both the client side (mobile and PCs) and the server side of the service can be developed, debugged and tested using SDS.

Marc LeClerc, manager of the Montreal Expert Center, explains the reason for choosing IMS applications and services, and how the center's environment will support that goal:

*So far, operators and suppliers such as Ericsson have focused on a few high-volume IMS services, including push-to-talk, combinational services, and IPTV. But to reach the enormous potential number of applications, IMS needs help from small, developing companies and creative individuals. So to broaden our reach to a greater number of IMS developers, we are now extending our Ericsson Mobility World concept with our IMS eco-system, as a way of establishing a dynamic environment for bringing the whole industry together and speeding up the development of all kinds of services. In this way, we hope to solve the chicken-and-egg problem.*

The Montreal Expert Center will also leverage and strengthen the relationships with the International Institute of Telecommunications (IIT), which has become a key partner for Ericsson in interoperability testing with both the Open Mobile Alliance (OMA) and Parlay organizations. The IMS lab is already connected to the IIT network, which is based in Montreal.<sup>104</sup>

### **Technological Platform**

Ericsson infrastructure encompasses both UMTS (Universal Mobile Telephone System), based on W-CDMA technology, and CDMA2000, which is an outgrowth of the earlier 2G CDMA standard IS-95. CDMA2000's primary proponents are outside the GSM zone in the Americas, Japan and Korea.

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<sup>104</sup> “Dynamic eco-system accelerates IMS”, Ericsson Canada's internal document, July 04, 2006.

This is made possible by the presence in the International Institute of Telecommunications (IIT) of the world's unique 3G experimental network that combines UMTS (W-CDMA) and CDMA2000.

Ericsson applications are based on the Symbian OS but this is not an exclusive strategy. In the future, other operating systems such as Windows can be considered. R&D is currently being performed on IP Multimedia Subsystem (IMS)-based applications.

### **Business Strategy**

- Content and application development: Ericsson Canada develops applications that take advantage of 3G networks. As such, Ericsson is involved in several projects in IPTV, telehealth and the use of IT in the mining industry. There is promising R&D being performed with Sherbrooke University on telehealth.
- Partnership: Ericsson develops contents and applications in partnership with universities and specialized IT and content enterprises.

### **Nature of the Market**

Ericsson traditionally sells to mobile carriers: mainly Rogers in Canada (but as well Teleglobe, Telesystem, Microcell...) and carriers in 140 countries. Since 2000, Ericsson started targeting the business sector as well.

### **Issues**

- Ericsson Canada is threatened in its very existence by the Canadian delay in wireless penetration and quasi-absence in multimedia wireless.
- Its main asset is its long-term partnership with Rogers Wireless.
- Ericsson Canada fosters the development of multimedia applications through partnerships with universities and specialized enterprises.





## Technological Platform

Open standard: Flick Software has created an open standard software which utilizes Palm OS, Windows CE and Symbian Operating systems. It can work with any carrier network (“We are agnostic vis-à-vis carrier platform” says Jason Flick).

Infrastructure: 40% of Flick Software’s applications are entirely based on carriers’ platforms. The majority of the applications are hybrid.

## Business Strategy

- **Indirect approach:** Flick Software sells to ICT providers of back-office solutions and helps them to add mobility to their offer. This proved successful since mobility requires specific architectural designs, different user interfaces, different communications expectations, etc. These ICT providers are organized by market segments: construction industry, electrical industry, law enforcement, etc. They actually “own” their clients. Flick Software’s strategy is to empower ICT providers with mobile components integrated in their overall solutions (mostly software components, but in some cases hardware as well).
- **Direct approach:** The health sector is the only segment of the market where stand-alone devices are needed because ICT systems are not yet integrated. Mobile islands are being created that give Flick Software a temporary opportunity to enter this market without an intermediary.
- **R&D:** The majority of contracts begin by building a prototype. It can take up to a year working on a prototype before the deployment of the solution.

## Nature of the Market

- **Segments:** Software companies that sell to SMEs.
- **Geography:** Canada and the US. The potential of growth is mainly in the US.

## Issues

- Flick Software has got the technology ready but it needs to grow.
- Flick Software is searching for “White Angel” investment.
- Difficulty in measuring ROI: criteria differ from industry to industry. Healthcare metrics in the homecare sector is based on the number of visits to patients an organization can organize in a day, not on the money it can save. In other cases, the mobile solution is a differentiator to improve the customer experience and not a cost cutting tool.
- The mobile technology is common to most solutions (same protocols, users interfaces, data frameworks...), but the sales, marketing and deployment solutions differ from vertical to vertical.

## 5.5 GLOBIS DATA

Interview	Barrie Kirk President	
Basic data	<ul style="list-style-type: none"> <li>▪ Incorporation</li> <li>▪ Head office</li> <li>▪ Privately-owned</li> <li>▪ Sector of activities</li> </ul>	<ul style="list-style-type: none"> <li>▪ 1998</li> <li>▪ Kanata, Ontario</li> <li>---</li> <li>▪ Application and content developer</li> <li>▪ Cellular network</li> <li>▪ 6</li> <li>▪ n/a</li> <li>▪ Consumers</li> <li>▪ Canada</li> </ul>
Mission	To provide real-time graphic-based traffic information services.	
Strategy	In Canada, Globis Data addresses the consumer market. Outside Canada, it will go through information providers and mobile operators.	
Means	Globis Data sells subscriptions to the consumers and sells advertisement on its website.	
Benefits and issues	Globis Data's solution depends on the success of its cooperation with various stakeholders.	

### History of the firm

Globis Data Inc. was founded in 1998 by Barrie Kirk, P.Eng. who was a former Bell-Northern Research (BNR) manager who started his consulting business in 1992. The concept of traffic probe and management was born out of a contract on Digital Audio Broadcasting (DAB), by Heritage Canada. The first in-vehicle traffic information system was called Digital Radio Intelligent Vehicle Services (DRIVES) and used the digital audio compression system layered on top of a transparent broadcast channel. The DRIVES traveller information service proved successful but the DAB platform never took off in Canada (contrary to Europe where DAB has developed as a way to offer not just more radio broadcast channels but different services, including multimedia services and other forms of data service). As a result, Globis Data switched its DRIVES traveller information service to a multiple platform system that relied on cellular network.

Traffic congestion data traditionally comes from already existing systems such as highway loop detectors and highway video cameras. However highway loop detectors and highway video cameras are not very reliable and they do not exist everywhere – most inner city streets are not covered. Globis Data makes the best possible use of this traditional data and it developed its own source of traffic congestion data, based on assisted-GPS mobile phone probes. Assisted-GPS uses

the data provided by “pinging” each cellphone to determine its location, determining the distance travelled since the previous ping and the elapsed time, and then calculated speed based on distance/time. Actual speeds are then converted to one of three congestion values that are displayed as colour-coded zones on a real-time traffic map. Assisted-GPS has the added benefit that it does not need any equipment located at the side of the road or in switching offices and cell-tower locations.

Globis Data is the only company in the world to have developed and demonstrated the assisted-GPS mobile phone system and in March 2004 it filed a patent application with the U.S. Patent and Trademark Office (since then Globis filed in Canada and in Europe; national filings in other countries are planned in 2007). A prototype of the system was tested on the Ottawa-Gatineau highways in 2004 with the funding of Transport Canada under its Intelligent Transportation Systems (ITS) R&D Plan (part of the Strategic Highway Infrastructure Program). A key aspect of the project was the cooperation of the four partners who were working with Globis on this project:

- Bell Mobility used its Location Based Services (LBS) platform to provide location data on the Assisted GPS cellphones that Bell is also providing for the project.
- The University of Waterloo developed the algorithms that define the way that cellphone location data is converted to traffic speed.
- Profilium developed and supplied the software to request the cellphone location data from Bell Mobility’s LBS platform.
- MIxpertS developed the software that implements the algorithms and creates the DRIVES Ottawa/Gatineau traffic map.

Based on 14 cellphones, the Ottawa/Gatineau trial allowed Globis to assess the robustness of the assisted-GPS algorithms and to compare actual and computed speeds. The testing program consisted of a series of tests with various numbers of cellphones driven around the test area under various traffic conditions. Drivers and observers reported actual traffic speed and made odometer and time reports that subsequently provided a calculated speed. The observed speeds and the calculated speeds were then compared to the map colour for each segment. The results were very positive, and identified need for more sophisticated algorithms for arterial roads with traffic lights.

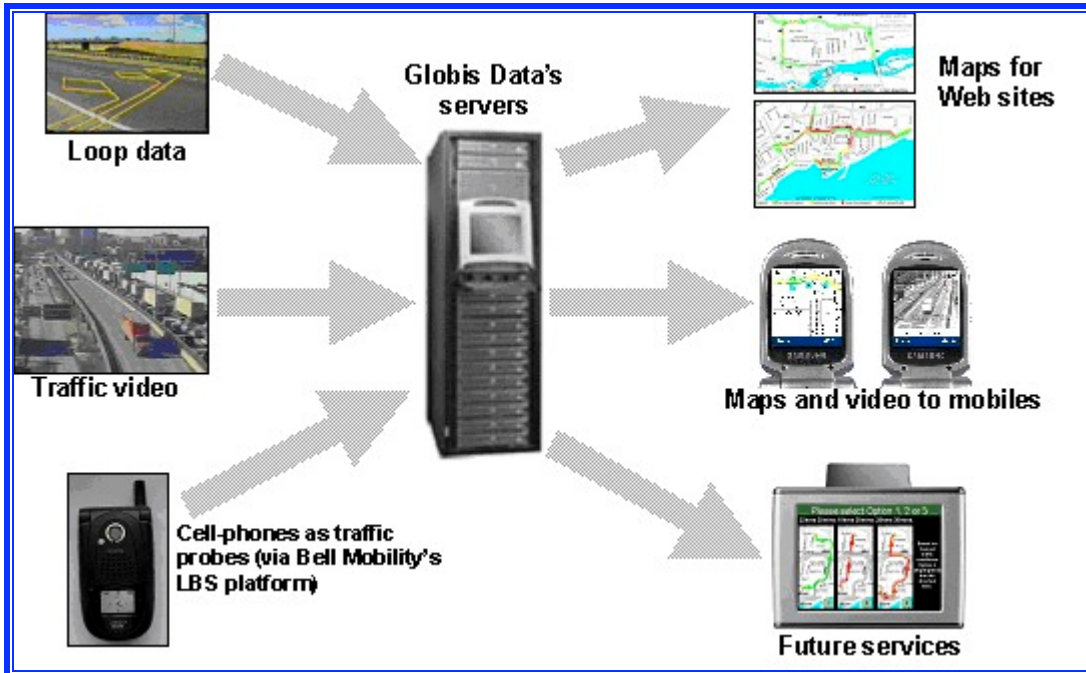
A transitional DRIVES real-time traffic information system based on highway loop detectors has since been deployed on an experimental base in Toronto and Montreal where they are currently available to everyone (see [www.drivestoronto.ca](http://www.drivestoronto.ca) and [www.drivesmontreal.ca](http://www.drivesmontreal.ca)). These traffic maps primarily use loop data provided by the Ministry of Transportation of Ontario, Transports Québec, and the City of Toronto. In 2007, Globis is testing again its assisted-GPS technology with 500 cellphones. The outcome of this new trial will be the full commercialization of DRIVES.

## Technological Platform

### ► Input

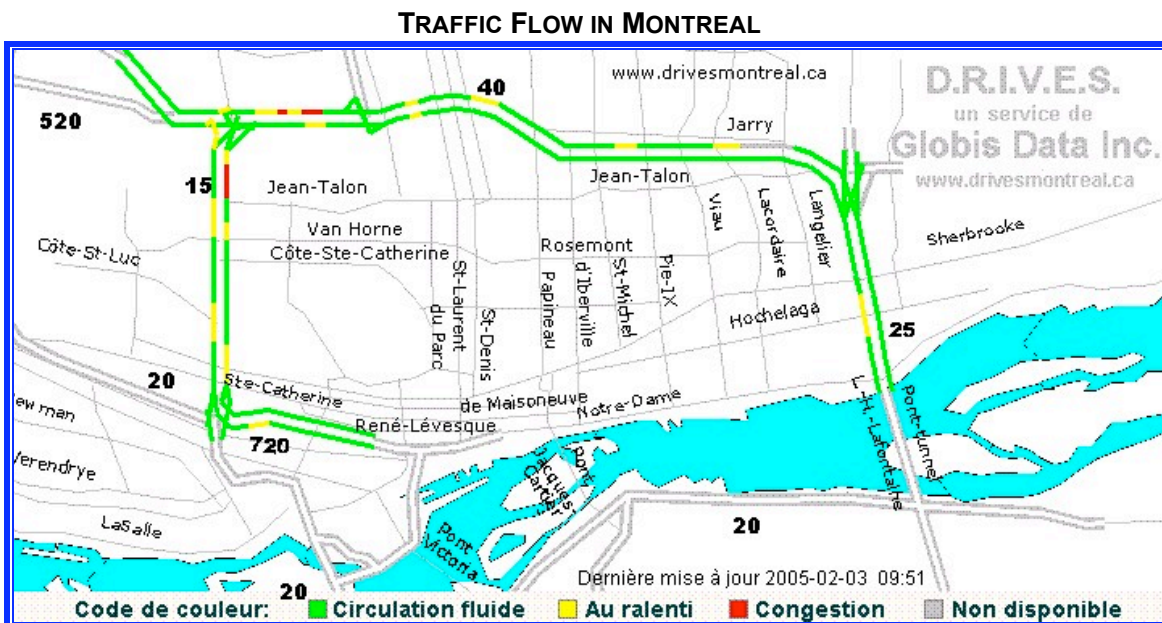
The complete DRIVES real-time traffic information system will be based on three data sources:

- Existing cameras installed on the side of highways;
- Existing traffic loops embedded in the pavement of the highways;
- Globis-developed assisted-GPS mobile phones to measure the speed of the traffic.



► **Output**

The DRIVES system incorporates live traffic maps with user-controlled pan, tilt and zoom; the maps are linked to real-time, streaming video from traffic cameras. The combination of a live traffic map and streaming traffic video provides drivers with the information they need to optimize their routes and avoid congestion. Commercial services will be available in mid 2007.



Source: Globis Data

## Business Strategy

- ▶ User subscriptions: Globis Data intends to sell its services through mobile carriers. Users will have the choice between three options:
  - Standard subscription: the user pays full price to get access to the real-time traffic information service;
  - Discount subscription: the user allows Globis to ping its cellphone in order to feed its assisted-GPS probe system in exchange for a discount;
  - Pay-per-use.
  
- ▶ web advertising: advertisement on the websites displaying the Toronto and Montreal maps and accessible from fixed-PCs.
  
- ▶ Co-branding: Globis licensed the use of its data to the Weather Network/Météo Média.

## Nature of the Market

- ▶ **Users:** Three types of users are targeted:
  - Drivers, including commuters and people who drive extensively as part of their work, will be able to identify and avoid congestion.
  - Businesses, particularly fleet operators, will benefit from their vehicles spending less time stuck in traffic.
  - Government departments and agencies responsible for highway and traffic management will have a new option for gathering traffic information for real-time traffic management and traffic planning studies.
  
- ▶ **Geography:** major cities, corridors, border crossings.
  
- ▶ **International:** Outside of Canada, Globis Data is marketing its DRIVES Traffic Server platform to traffic information providers and mobile operators. The business models vary by country and include licensing, franchising, and direct sales. Globis is currently negotiating with partners in the US and in Europe (United Kingdom and France).

## Future Services

Globis Data plans to launch a number of enhanced traveller information services, including:

- Predictive Travel Time
- Integration with navigation systems
- Intelligent Border Crossing
- Traffic alerts
- Incident detection
- Highway management / usage studies
- Broadcast TV / radio
- Text messaging to cell-phones
- Programmed personalized services
- Vancouver / Whistler 2010 Olympics travel conditions
- Cross-platform infotainment integration

## Issues

The key issues facing Globis Data are:

► **Relationships with stakeholders:** As important as technology is the integration of various levels of governments with various agenda. Globis developed very fruitful relations with the ministries of Transport in Quebec and Ontario, and the Toronto city hall (the Montreal city hall is not involved in highway management). But local governments do not have money for significant expansion of their systems. This accelerated Globis' development of its own sources of data (assisted-GSP).

Two other stakeholders were instrumental in Globis' development: Bell Mobility provided all the technical information and support needed for the use of its LBS platform and Transport Canada granted the subsidies for the two trials.

► **Financing:** The lack of financing is an ongoing problem in Canada. Investors take a long time to make a decision and when they invest the typical funding is in the \$5 million range, while in the US it is in the \$20 million range.

This difficulty is common to the whole ICT sector. Investors always have difficulties understanding the intangible economy. In the mobile sub-sector the difficulty is even higher because it is less known.

## 5.6 MESSAGE VISTA COMMUNICATION

Interview	Arash Sabet	
	Founder and President	
Basic data	<ul style="list-style-type: none"> <li>▪ Incorporation</li> <li>▪ Head office</li> <li>▪ Privately-owned</li> <li>▪ Sector of activities</li> <li>▪ Technology platform</li> <li>▪ Employees</li> <li>▪ Revenues</li> <li>▪ Clients</li> <li>▪ Markets</li> </ul>	<ul style="list-style-type: none"> <li>▪ 2004</li> <li>▪ Richmond Hill, Ontario</li> <li>---</li> <li>▪ Service Provider and Application provider</li> <li>▪ SMS</li> <li>▪ From 2 to 5</li> <li>▪ n/a</li> <li>▪ Private organizations</li> <li>▪ Canada + Africa, China, India, Australia, Europe and Middle East</li> </ul>
Mission	To provide to enterprises wireless short message solutions (SMS), text messaging and gateway connectivity.	
Strategy	Business: Approach by vertical markets. Consumers: Universal approach.	
Means	Internet marketing and Google campaigns.	
Benefits and issues	<ul style="list-style-type: none"> <li>▪ Low prices, ease of use and universal coverage (190 countries and 570 wireless operators).</li> <li>▪ The main roadblock is the lack of awareness among companies.</li> </ul>	

### History of the firm

Initially founded in 2004 as a consultation and software development company, the company was renamed to MessageVista Communication in 2005 on to commence its mission in mobile and SMS business. MessageVista is headquartered in Richmond Hill (Greater Toronto Area), Ontario, Canada and as well has an office in Dubai, United Arab Emirates.

MessageVista is connected to most of the countries in the world, from North America to Africa, China, India, Australia, Europe and the Middle East. Its customers can reach to the subscribers of more than 550 networks worldwide very quickly and easily at a very affordable cost. In countries such as Afghanistan MessageVista is often the only SMS company able to deliver messages.

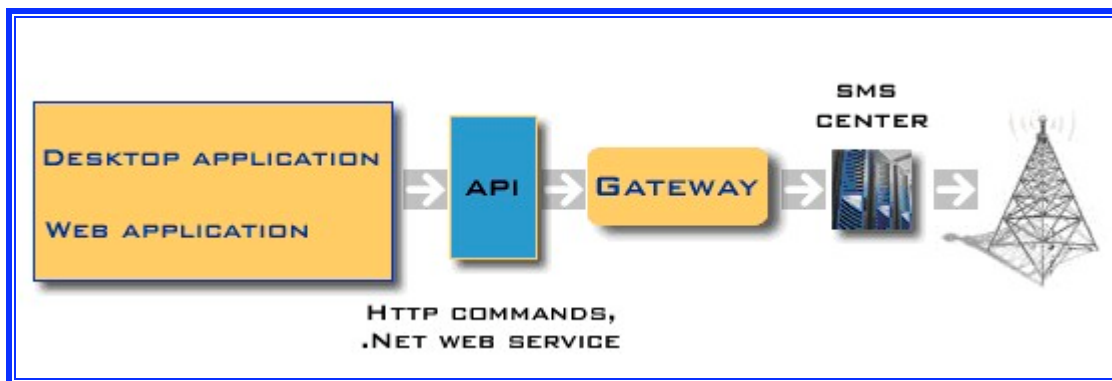
### Technological Platform

- **Products:** TrueContext's mExperience platform includes four services:
  - zTexter is a Windows application to send short messages to any cellphones under the coverage of MessageVista Communication network. This application communicates with MessageVista's gateway through a .NET web Service operating on MessageVista's website to submit the short messages to the

gateway to have them sent out. This software has been introduced as an open source project.

- TextIsSMS is an 'Absolutely Free SMS' service. To keep this service up and running permanently, each subscriber has to visit the program's sponsors' websites by clicking on their ads. The sponsors are actually paying the costs of delivering the subscriber's text messages.
- Kaadoos is a 2-way GSM SMS gateway with WAP capability that helps businesses to possess and control their own short messaging system in their site. Kaadoos gateway supports different protocols in GSM worlds to connect to one or multiple SMS centers or relay centers. Where a SMS center is not available, the gateway can start communicating with GSM network using GSM modems. In this case, the only required item is an active and working SIM card. This gateway can save lots of money in sending or receiving messages for business in the long run as businesses do not have to purchase credits from gateway companies or aggregators and also pay monthly fees.

- **Standard:** Open Source.
- **Infrastructure:** MessageVista offers a variety of gateway access methods to assist programmers and application developers to send short text messages to any cellphones worldwide. These methods include HTTP commands API (Application Programming Interface) and .NET web services.



Source: MessageVista Communication

## Applications

- **Security companies:** Security companies can connect their residential and commercial control panels to gateways like MessageVista gateway by HTTP protocol to send notifications of any occurring, burglary alarm, fire or tamper.
- **Stock market:** People can receive a notification on their handsets if a particular share price reaches a specific price.
- **Server monitoring:** Companies can monitor their servers (web servers, web sites, email servers, database servers, etc.) by a dedicated software which is connected to a gateway like MessageVista gateway.
- **Controlling house appliances:** By sending instructions to a gateway like MessageVista by a cellphone (MO), control signals can be sent to the owner's house to turn on and off appliances, lights, etc.



- **Voting and polling:** By sending a short message to a specific number or a text containing a particular keyword, people can vote or poll on particular occasions, events and draws. A famous example of this service is 'American Idol' and 'Canadian Idol' shows.
- **Child controlling:** By incorporating GPS companies services with a gateway like MessageVista's and having GPS providers monitor a specific GPS, parents can easily receive a notification if their children cross the boundaries of a city.

### Business Strategy

Lack of funding hampers MessageVista growth strategy. The company is obliged to reach its various markets through free of inexpensive means. In this regard, it succeeds in making the most out of the Internet.

- **Internet Advertising:** MessageVista makes intensive use of all Internet platforms to publicize its services and recruit clients. Apart from the corporate website, it uses product websites that are self-sufficient: clients can subscribe, pay (through Paypal) and download the necessary software to customize and start using the SMS system.
- **Support:** MessageVista personnel is available for technical support and can offer management consulting on the optimum ways to run a wireless business.
- **Advertising:** MessageVista uses advertising to subsidize free SMS to the consumer market.

### Nature of the Market

MessageVista is a virtual company that does not require any physical interaction with its clients. It can deal with a soccer team in South Africa that wants to announce its schedule or with a hotel operator in Dubai who wants to keep in touch with his clients. A special emphasis is put on the Middle East: MessageVista opened a sales office in Dubai.

### Issues

- MessageVista's great strength is its ability to negotiate deal with a great variety of cellular operators including in the most difficult markets (Afghanistan). No single cellular operator has such a global reach.
- MessageVista's software and its API provide its clients with a powerful and simple tool that allow them to program their applications themselves.
- The corporation is still in the start-up phase and needs financial backing to market its services worldwide. The solution and the underlying infrastructure are in place. It requires marketing muscle.

## 5.7 NURUN

Interview	Jean-Pascal Mathieu Vice President Strategy
Basic data	<ul style="list-style-type: none"> <li>▪ Incorporation</li> <li>▪ Head office</li> <li>▪ Privately-owned</li> <li>▪ Sector of activities</li> <li>▪ Technology platform</li> <li>▪ Employees (total)</li> <li>▪ Employees (mobile services)</li> <li>▪ Revenues</li> <li>▪ Clients</li> <li>▪ Markets</li> </ul> <ul style="list-style-type: none"> <li>▪ 1993 (then called Intellia)</li> <li>▪ Montreal, Quebec</li> <li>▪ Subsidiary of Quebecor (since 1996)</li> <li>▪ Application provider</li> <li>▪ Cellular network</li> <li>▪ 600 +</li> <li>▪ 4 to 10</li> <li>▪ n/a</li> <li>▪ Private and public organizations</li> <li>▪ Canada, US, France, Italy, Spain, and China</li> </ul>
Mission	Help clients create mutually beneficial relationships with their key stakeholders, therefore improving their business performance – through interactive media and information technology.
Strategy	Nurun is entering the mobile market as the accomplishment of interactive marketing.
Means	Nurun created two labs (Paris, France + Atlanta, Georgia) in order to explore the best ways to implement wireless solutions.
Benefits and issues	<ul style="list-style-type: none"> <li>▪ The decision to buy is taken at the point of need and only mobile marketing allows one to reach the client at the point of need.</li> <li>▪ Nurun uses Asia as a window store for its European and North American clients.</li> </ul>

### History of the firm

Nurun was founded in 1993 under the name Intellia by Alexandre Traillefer in order to take advantage of the nascent Internet environment to launch business-to-business electronic commerce. In 1996 it became part of the Quebecor Group that was (and still is) the largest printing company in Canada and a dominant player in the new global economy. In 1999, 160 employees Intellia made a reverse takeover on 700 employees Informission. Informission had taken advantage of the Year 2000 bug to grow quickly and had offices in Montreal, Quebec City, Toronto, Ottawa, Orlando, Seattle, Houston and Paris. In January 2000, Quebecor bought Cythere a French company headed by Jacque-Hervé Roubert who became the CEO of Intellia/Informission – he still hold the post. In April the same year, the new company became Nurun.<sup>105</sup>

Nurun is now the leading web agency in Canada and the third largest in Europe. It designs web sites and offer strategic advice on digital media. It provides interactive communication and

<sup>105</sup> In November 2000 Alexandre Taillefer left Nurun to create a new company called Hexacto – specializing in mobile contents (game publisher for Pocket PC, Smartphone and Palm platforms).

technology services in North America and Europe. Nurun employs more than 600 professionals, and helps companies and other organizations develop interactive strategies, including without limitation strategic planning and interface design, technical platform implementation, online marketing programs and client relationships. Nurun's clients include organizations and multi-national corporations, such as L'Oréal, the Groupe DANONE, Cingular Wireless, Club Med, Pfizer, SkyTeam, Thomas Cook, Pleasant Holidays, Telecom Italia, Europcar, Wanadoo, Canal+, the Government of Quebec and the State of Georgia. With headquarters located in Montreal, Nurun employs more than 600 professionals working together in Canada, the United States, France, Italy, Spain and China.

In April 2004 Nurun acquired Ant Farm Interactive, an interactive marketing agency located in Atlanta, Georgia. The transaction strengthened Nurun's positioning in the U.S. market and enhanced its capabilities in the fields of interactive marketing and online customer relationship management. The Atlanta office has now become one of Nurun's two centres of excellence in mobile services, the other one being Paris. Cumulatively the two centres constitute an integrated laboratory where four full time employees work on interactive marketing in a mobile environment. To these core teams is added a bank of hours that allows them to tap into Nurun marketing and computer specialists throughout the world.

### Business Strategy

- ***Solution vs Technology***: Nurun stopped linking solutions to devices. In the past, people were assessing the future of SMS, MMS jointly with the best tool to carry them: smartphone, Palm or iPod. This way of thinking led to venturous attempts – some fortunate, some not – but prevented the creation of a real strategy.
- ***Interactive Marketing***: Nurun has had a long history of success in interactive marketing over the web. Mobile services allowed Nurun to develop an offer linked to the point of need. Typically consumers make the majority of the decisions to purchase when they need it – not when they see an advertisement. By allowing the consumer to express his or her needs on the spot, without delay, mobile solutions initiates a “virtuous circle” where people anticipate their needs less and less because they know they will always be able to call, to download a map or to get an instant alert. Nurun tries to fill the consumer expectations on the point of need.
- ***Applications***: The QR Code (derived from "Quick Response") allows its contents to be decoded at high speed. QR Codes reading software are most common in Japan where its inclusion on camera phones has led to a wide variety of new, consumer-oriented applications, aimed at relieving the user of the tedious task of entering data into their mobile phone. QR Codes storing addresses and RRLs are becoming increasingly common in magazines, in window stores and on commercial billboards. Mobile services using QR Code puts the consumer in direct contact with any commercial site: he can locate a store, send a SMS to a vendor, compare prices, etc.

### Nature of the Market

- **Travelers**: Nurun's first target is the travel market. There is an obvious need for the traveler to get an alert when a plane is delayed, as well when an airline issues a discount, or to consult the onboard menu and make a selection between various dishes.
- **Asian Consumers**: Asian consumers are the most advanced user of mobile services. Nurun has two ways to tap this market:

- by developing mobile applications for the Chinese, Korean and Japanese subsidiaries of its European clients;
- by deploying mobile applications in European stores aimed at Japanese tourists.

Nurun expects this second market will spread to neighbouring stores and get gradual acceptance in European commerce.

Community Interaction: A consumer who goes out of a restaurant or a hotel may want to share his experience with his friends and family, or his business relations. Mobile services allow him to tag the restaurant or the hotel and send an alert to a preset list, or to link that tag to a GPS localization alert that would be triggered every time one of member of the list goes by the place. The whole relation between the consumer and the commerce owner is being rebalanced in favor of the consumer. Equally interesting, some well-known personalities or travel guides may want to sell their tagged advices.

### **Issues**

At the time of the interview (November 2006) several contracts were under negotiations, but none were concluded. Nurun executives expected the first contracts to be signed in China rather than in Europe or in the US. Canada is not even considered.

The Asian model is a good guide of the best practices in the mobile services environment. Nurun takes advantage of its presence in China to learn and at the same time push forward its mobile services offer.

## 5.8 OZ COMMUNICATIONS

Interview	Jean Régnier Chief Technical Officer (CTO)
Basic data	Incorporation 1990
	Head office Montreal, Quebec
	Privately-owned ---
	Sector of activities Application Developer
	Technology platform SMS
	Employees 230
	Revenues Private Company
	Clients Wireless operators, handsets manufacturers
	Markets 90% outside Canada
Mission	The OZ mission is to extend the power and convenience of the PC-based IM, email and social networking phenomenon to the mobile phone..
Strategy	OZ helps carriers provide mobile IM, email and social networking to the customer market.
Means	OZ delivers embedded & branded consumer mobile messaging solutions to the operators that are built for consumer handsets, thus ensuring easy access to messaging at an affordable cost.
Benefits and issues	Wireless operators can take advantage of the IM, email and social networking phenomenon of their existing networks to offer a new service and the consumers can connect their mobile email to their PC email.

### History of the firm

The development of privately held OZ Communications went through three stages. The company was created in 1990 by Skuli Mogensen in the Iceland capital of Reykjavik to develop high-end 3D graphics software for the TV and film industries. Very early on, it started working with Montreal-based Softimage. In 1994, OZ's 3D graphic software was licensed to Softimage then acquired by Microsoft, and the company turned its focus to the Internet, developing a sophisticated real time communications technology. It started working with Ericsson in 1998 on advanced real time communications technologies. At first, the company boomed along with many others during the dot-com era, growing to a staff of more than 200 people in 2000 with offices in Stockholm, Boston, San Francisco and Santa Monica. This same year it opened its Montreal office and signed an agreement with Microsoft to become its preferred development resource for development work and consulting services.

Even though OZ had succeeded in testing its instant messaging solution with 18 operators around the world, it did not make any significant sales. The company's product was still complex and hindered by the inability of available handsets to handle its messaging technology. When the dot.com bubble burst, it hit hard the Icelandic company whose workforce fell to less than 60 employees. It was on the verge of bankruptcy when it moved its headquarters from Reykjavik to Montreal in 2003 while retaining its core researchers in Reykjavik. The born again Canadian company took advantage of its past experience to work on the interface of its instant messaging

solution. Its first significant deal was with T-Mobile USA on the Nokia 6800. OZ provides the billing application and it provides dynamic IM protocol conversion to proprietary IM protocols such as AOL and Yahoo Instant Messenger. In 2004, it succeeded in attracting the interest of venture capital and started growing again. Today (end of 2006), the company has 230 employees coming from 18 countries and has already loaded its mobile messaging (IM and Email) solutions on over 70 million devices. In December 2006, the company closed its second round of financing. It has offices in Seattle (US), London (UK), Liverpool (UK), North Carolina (US), Reykjavik (Iceland) and Hong Kong (China).

### Technological Platform

- **Products:** OZ standards based products include the OZ Mobile IM Gateway, a carrier-grade IM billing and protocol gateway, the OZ's Mobile IM Client solution which includes the most advanced J2ME IM client available, and the OZ IMPS Server, a robust and fully featured IM server based on the Open Mobile Alliance (OMA) Instant Messaging Presence Services (IMPS) specifications. Its solution provides consumers with access to their AOL, MSN and Yahoo! email accounts on their mobile phone.
- **Standard:** OZ participated in the creation of that Wireless Village (now called Open Mobile Alliance (OMA)) OZ is still an active member. The OMA has nearly 200 companies including the world's leading mobile operators, device and network suppliers, information technology companies and content and service providers. The fact that the whole value chain is represented in OMA marks a change in the way specifications for mobile services are done. Rather than keeping the traditional approach of organizing activities around "technology silos", with different standards and specifications bodies representing different mobile technologies working independently, OMA is aiming to consolidate into one organization all specification activities in the service enabler space.

### Business Strategy

- **Financing:** OZ Communication is a privately owned company. In 2004, it raised US \$27.3 million from Silicon Valley-based venture capital VantagePoint Venture Partners. A second round of funding in 2006 allowed the company to raise US \$34 million from the Caisse de dépôt et placement du Québec, VantagePoint Venture Partners, and Fonds de Solidarite (FTQ), which brings the company's total to around \$61 million.
- **Indirect Approach:** OZ has chosen to help carriers provide mobile IM and email to customers rather than trying the direct-to-consumer approach with pre-installed or downloadable solutions makes it easy for consumers to access their AOL, MSN and Yahoo! IM and email accounts on their mobile phones., OZ already has the proper business arrangements in place among the leading mobile operators, the handset manufacturers and the email providers portals; going beyond the simple client-provider relationship and establishing strong partnerships.
- **Clients:** OZ clients and partners include Bell Canada and Telus Corp. in Canada and T-Mobile USA Inc., Sprint Nextel Corp. and Cingular Wireless LLC, Alltel, Boost Mobile and Virgin Mobile USA in the United States. OZ also has 3 Scandinavia, Telenor and Telefónica Móviles España as European customers.

OZ also has partnerships with the world's most popular IM and email portals - AOL Online Inc., Microsoft Corp.'s MSN and Yahoo Inc.

Handset manufacturers who work with OZ include Nokia Corp., Motorola Inc., Sony Ericsson Mobile Communications AB, Pantech & Curitel and Samsung Electronics Co. Ltd.

OZ receives revenues from licensing models.

### Nature of the Market

- **Size:** The consumer mobile messaging segment is expected to reach more than \$67 billion in revenue by 2009, according to the Yankee Group. As of December 2006, the OZ Mobile IM and Mobile email clients were deployed on about 70 million phones. OZ's end-user market includes more than 860 million consumers who have mobile IM and mobile email accounts through a host of providers, including MSN, AOL and Yahoo!
- **Segments:** OZ makes a distinction between markets where both the mobile and the PC penetration rates are high (North America and Scandinavia) and markets where the PC penetration is low but the mobile penetration is high (Western Europe). In the first markets, operators have strong interests to work in harmony with the huge PC-based client base that makes use of portals such as MSN, AOL and Yahoo! In the other markets, the carriers can start building their own community branded (IMPS) solution directly or they can implement a portal solution. OZ is focused on the consumer market and not the business/enterprise market segment.

The main users of mobile IM are young, middle-class youth and adults, who are familiar with IM and email on their PC. The ability to stay connected with friends and family while on the go is very important to this group so having easy and affordable IM and Email access on their mobile phones is very important.

- **Geography:** OZ main market is currently in North America and Europe, but inroads have already been made in Asia. 90% of its revenue is outside Canada.

### Issues

- **Challenge:** Many mobile carriers fear that instant messaging (IM) will dent into their SMS revenues – 80 to 90% of the wireless data revenues come from SMS. OZ challenge is to showcase to carriers that IM is a natural extension of SMS – especially for European carriers.
- **Threat:** If the Handset Manufacturers (OEMs) develop their own IM and email clients for the mobile phones.
- **Opportunity:** OZ Communications has announced a new mobile messaging solution which allows consumers to access their favorite social network sites on their cellphones, further extending the popular social networking sites like News Corp.'s MySpace, Flickr, Friendster, YouTube and Blogger to the mobile phone. The growing use of cellphones embedded with digital cameras will encourage their use as a device to share photos and video on the spot and update their blogs on mobiles. OZ will offer the product in the first half of 2007 and is in talks with leading wireless carriers, phone makers and social networking sites for the service. The product will be pre-loaded on a variety of new handsets and will also be available for download on some compatible handsets.

IP Multimedia Subsystem (IMS) is a next-generation network for carriers from the 3GPP that uses the IP protocol as its foundation. The IMS was conceived to offer full support for every type of communications session in today's world whether over wireless or landline, including instant messaging (IM), push-to-talk, videoconferencing and video-on-demand (VOD). IMS offers OZ many interesting opportunities for new services.



## 5.9 RESEARCH IN MOTION (RIM)

Interview	Duncan Bradley Director for Global Market Intelligence
Basic data	<ul style="list-style-type: none"> <li>▪ Incorporation</li> <li>▪ Head office</li> <li>▪ Public company</li> <li>▪ Sector of activities</li> <li>▪ Technology platform</li> <li>▪ Employees</li> <li>▪ Revenues</li> <li>▪ Clients</li> <li>▪ Markets</li> </ul>
	<ul style="list-style-type: none"> <li>▪ 1984</li> <li>▪ Waterloo, Ontario</li> <li>▪ NASDAQ and TSX</li> <li>▪ Equipment manufacturer, software vendor &amp; services provider</li> <li>▪ Cellular network</li> <li>▪ 4,800</li> <li>▪ \$ 2 G (2005/2006)</li> <li>▪ Cellular carriers</li> <li>▪ World</li> </ul>
Mission	To provide platforms and solutions for access to time-sensitive information through email, phone, short messaging service (SMS), Internet and intranet-based applications.
Strategy	RIM sells hardware, licenses software and provides services to cellular carriers. Service revenue is generated through a monthly access fee charged to the carrier for each of their end users. In exchange, RIM gives the end user access, via the carrier, to the BlackBerry architecture for the wireless transmission of data.
Means	RIM sells its equipment and solutions through 110 carriers all over the world. It fosters the production of software applications and solutions by Independent Software Vendor (ISV).
Benefits and issues	BlackBerry is an entirely integrated handheld that covers the whole range of data and voice needs, the first secure push browser. Its 'push' technology means end users do not have to retrieve their email or data - it finds them. This allows business people to stay connected to their office.

### History of the firm

Research In Motion (RIM) was founded in 1984 by Mike Lazaridis and Douglas Fregin while engineering students respectively at the University of Waterloo at the University of Windsor. After eight years, RIM had 16 employees, sales of about \$500,000 a year, and three or four business lines. In 1992 Jim Balsillie was recruited as Chairman and Co-CEO of Research In Motion (RIM). RIM' made its IPO on the Toronto Stock Exchange in October 1997 and began trading on the NASDAQ in February 1999.

Work on what would become the BlackBerry began accidentally in 1989, when Hewlett-Packard awarded RIM a contract to upgrade its palmtop computers as wireless email devices for the Canadian company's employees. The following years were spent in improving the original system

and in 1997, RIM's efforts finally paid off in the form of a smaller, more efficient BlackBerry that quickly became a huge commercial success.

### Technological Platform

BlackBerry uses a proprietary operating system (OS), which makes heavy use of open standards such as Java 2 Micro Edition (J2ME), General Packet Radio Service (GPRS) and AES encryption.

### Business Strategy

- **Distribution:** The contact with the end-user is established through the telecommunications carriers for both equipment sales and services billing.
- **Licensing:** Mobile manufacturers can purchase a license to equip their devices with the integrated ability to use the BlackBerry Enterprise Server to transmit email and other types of data.
- **Service development:** RIM created what it called a BlackBerry ecosystem in order to spur on Independent Software Vendor (ISV) to develop an extensive range of both horizontal and vertical enterprise applications. RIM's ISV program provides intelligent tools that allow developers to focus on solutions rather than programming lines of codes. Over 500 ISV took advantage of the ISV program.
- **Research and development:** With a team of approximately 1,000 R&D employees, RIM's R&D expenditures is \$157.6 million, or 7.6% of revenue, in fiscal 2006.

### Nature of the Market

- **Segments:** RIM's market is mainly business, but the launching of the multimedia device Pearl in September 2006 marks a departure from its traditional approach. RIM is promoting multimedia developers such as Ottawa-based Magmic.
- **Geography:** RIM operates offices in North America, Europe and Asia Pacific. At the end of fiscal 2006 approximately 25% of the BlackBerry subscriber account base was outside of North America.

### Issues

Maintain its lead over the other platforms through various means:

- Use of integrated instant messaging or third party's systems such as YahooChat or GoogleTalk.
- Use of Bluetooth technology to multiple applications such as barcode reader.
- Incite service developers to create custom applications and contents for the BlackBerry platform.



The first two years were spent building a solution that would be very simple and very resistant at an affordable cost. This learning curve was subsidized by venture capital and several contracts with small companies. Even though the contracts were limited in scope they allowed TrueContext to learn how clients buy products and how to adapt to their requirements. In 2003 a contract was signed with Rogers that gave birth to *mFORMS*, a packaged end-to-end mobile forms solution encompassing the operating system, software application, wireless data network and mobile device.

Since then TrueContext opened sales offices in Toronto, Vancouver, Montreal, Seattle, San Francisco and London. Further expansion is planned in South America.

### Technological Platform

- **Products:** TrueContext's mExperience platform includes four services:
  - mXForms support for over 35 form controls including: signature capture, check-boxes, dropdown lists, free-form text entry, and sketches.
  - mXDocs automatically pushes the latest manuals, price lists, and other documents.
  - mXManager supports for over 35 form controls including: signature capture, check-boxes, dropdown lists, free-form text entry, sketches and much more.
  - mXDesigner provides everything customers and partners like Independent Software Vendors (ISVs) and Value Added Resellers (VARs) need to rapidly mock-up, develop, test and deploy mobile forms based solutions. The mXDesigner Forms Toolkit is an Integrated Development Environment (IDE) for your PC. It installs in minutes and provides users with the skills of an intermediate web developer the ability to rapidly develop, test, deploy and update mobile forms for devices running platforms such as Windows, Windows TabletPC, Windows Mobile, RIM BlackBerry, SymbianOS and PalmOS and mobile-browser enabled handsets.
- **Standard:** TrueContext quickly abandoned the Palm platform that did not evolve quickly enough and adopted Windows.
- **Infrastructure:** TrueContext's applications are entirely based on carriers platforms.

### Business Strategy

- **Partnership:** TrueContext provides its mExperience platform all over Canada through an exclusive agreement with Rogers Wireless. Hewlett-Packard operates the hosting facilities of the mExperience platform. Microsoft provides the operating software. It benefits from the agreement by connecting mExperience to its back office solutions (CRM, intershare points, etc.).
- **Support:** Rogers provides the first line of support, Hewlett-Packard the 2<sup>nd</sup> line of support and TrueContext the 3<sup>rd</sup> line of support.
- **Customization:** mExperience services are delivered under a standard format with simple tools (mXDesigner ) that allow the customer to customize its forms and documents himself.

### Nature of the Market

- **Segments:** Service SMEs organized by verticals:

- Service & Installation (HVAC, Plumbing, Mechanical, Electrical & Construction Contractors, Hi-Tech)
- Regulatory Compliance (Building, Food, Health, Fire, Emergency Services & other by-law enforcement)
- Field Inspections (Home, Insurance, Utilities)
- Consumer Goods (Distribution, Merchandising, Store Detailing, Direct Store Delivery)
- **Geography:** Canada was TrueContext priority. It was necessary to demonstrate the benefits of the solution in the home market. Now has come the time to diversify in three directions: the US, Europe and South America.

## Issues

- Most companies have to be educated that a simple solution exist to manage their mobile employees. A great part of TrueContext's effort is spent on "telling the story". There is a need to educate the decision makers.
- The Government of Canada is very helpful with its tax credit or export policies but comes short of its role when the time comes to purchase. TrueContext achieved three trials with different government departments (Public Works, Health and Fisheries). Each trial was a success but none of them led to a full-scale deployment.

## 5.11 WAVESAT

Interview	François Draper Vice President, Strategic Development
Basic data	<ul style="list-style-type: none"> <li>▪ Incorporation           ▪ 1993</li> <li>▪ Head office            ▪ Montreal, Quebec</li> <li>▪ Privately-owned       ▪ Several key institutional and private venture-capital funds</li> <li>▪ Sector of activities   ▪ Fabless semi-conductor chip designer</li> <li>▪ Technology platform   ▪ Fixed and mobile WiMAX</li> <li>▪ Employees            ▪ 68 (World) 62 (Canada)</li> <li>▪ Revenues             ▪ Less than \$50 million</li> <li>▪ Clients                ▪ Private and public organizations</li> <li>▪ Markets               ▪ Mainly international: Asia, East Europe and USA</li> </ul>
Mission	Wavesat is a fabless semiconductor company developing WiMAX chipsets, software and reference designs, enabling OEMs and ODMs to be first to market with high performance and cost effective WiMAX compliant solutions.
Strategy	Wavesat is designing chip for both fixed and mobile WiMAX markets.
Means	<ul style="list-style-type: none"> <li>▪ Wavesat relies on a few big players to penetrate new markets.</li> <li>▪ The company is focusing initially on core developing markets and eventually more on industrialized markets.</li> </ul>
Benefits and issues	With the help of its key partners, Wavesat is building a WiMAX ecosystem among telecommunications operators and new entrants.

### History of the firm

Founded in 1993, as a Canadian corporation, Wavesat has a successful and diversified business history in delivering, supporting and servicing telecommunication manufacturers with satellite and mobile amplifier units.

In 1997, Wavesat had the vision to start mastering Orthogonal Frequency-Division Multiplexing (OFDM) chips. This technology uses frequencies so that the various modulated data streams contained in a channel are orthogonal to each other, thus eliminating cross-talk between the sub-channels. OFDM chips replaced the complex filters used until then. By applying OFDM principles to broadband, Wavesat greatly increased the efficiency of wireless access systems.

The same year, Wavesat set up a Broadband Wireless Access (BWA) in order to develop an expertise in non-line-of-sight (NLOS) solutions.

In 1999, Wavesat introduced its first generation OFDM product based on digital signal processing technology called the Tiger modem. Due to the patented highly efficient algorithms developed by

the company, the modem transmits and receives a full 25-megabit data stream in non-line of sight access systems using 6 MHz of bandwidth only. This technology was reported to the IEEE in 2001 for standardization purpose.

Wavesat introduced in 2001 a new modem called the Dragon, based on a semiconductor device containing programmable logic components and programmable interconnects (field programmable gate array or FPGA). This platform changed the transport stream of IP packets, and dramatically reduced cost, size and power requirements. It was followed in 2002 by a version that supported time division duplexing (mainly used in unlicensed frequency bands) and advanced error correction technology.

In 2003, Wavesat produced the first commercial single chip modem, the DM110. This chip is currently being used in wireless backhaul and access products around the world.

Later this same year, Wavesat sold its lucrative satellite and mobile subsystems business to component manufacturer Mitec Telecom, to focus purely on its Broadband Wireless Access (BWA) division set up in 1997 and which has developed a world-class expertise in non-line-of-sight (NLOS) solutions.

The significant revenues from the Mitec transaction along with investments from Canadian venture capital companies insured Wavesat with the necessary funding to deliver a full spectrum of 802.16 chipsets and to lead the market as a fast developer and a reliable supplier of BWA solutions.

This increased R&D effort led to a technological breakthrough in 2004: the world's first Evolutive™ WiMAX DM256 chip was launched. Based on Wavesat's sixth generation OFDM technology and developed in cooperation with several broadband wireless access equipment manufacturers, the DM256 inaugurated the era of standards-based low-cost products.

### **Business Strategy**

Wavesat's product competitive advantage resides in its EVOLUTIVE concept, flexible product architecture and accompanying reference designs providing integrated baseband-RF solutions. Wavesat's solutions, promoting cost-effective platforms greatly contributes to accelerate WiMAX adoption in the customer premise equipment market.

The EVOLUTIVE concept is unique in the industry, and is aimed at ensuring a smooth transition from fixed to basic mobility. It features backward compatibility to provide a future-proof solution and empowers carriers to enhance their business model with a seamless move from fixed broadband to basic mobility.

Wavesat also develops the software part with its WiMAX chip – its main competitor Intel doesn't provide software.

### **Perspectives**

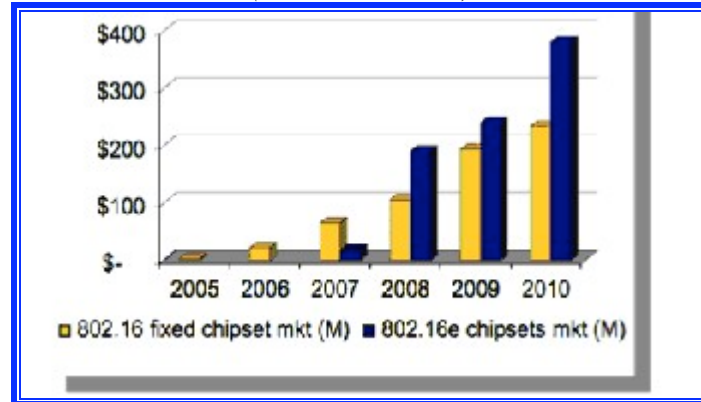
In the longer term, Wavesat will be well positioned to take advantage of the full mobility OFDMA WiMAX semiconductor market through partnerships with WiMAX players at the

service and application layers. Wavesat also plays an influential role at the IEEE and WiMAX mobility working groups.

Wavesat has entrenched its leadership in the WiMAX market with more than 50 design wins. The company's current customer base is drawn from the United States, Eastern Europe, China, Taiwan, India and Korea and consists of wireless OEMs, Asian-based ODMs, and major infrastructure providers. Wavesat also partners with industry leaders.

### WiMAX SEMICONDUCTOR FORECAST \$M US

*(Wavesat estimate)*



Source: Wavesat

The above figure illustrates the WiMAX market opportunity based on an average selling price of \$35 and 15 percent yearly price erosion. The combined fixed and mobile opportunity will reach \$600 million in 2010, while the overall WiMAX infrastructure market is estimated at more than \$5 billion.

Wavesat anticipates a bright future for the fixed WiMAX in the short term, since it allows 30% more bandwidth than mobile WiMAX. Wavesat will launch around June 2007 a new WiMAX chip for the mobile WiMAX market in Korea. This country is a leader in the specifications of the WiMAX standard and has already adopted technological parameters for its diffusion.

The mobile WiMAX will also be attractive for Wavesat but in the 2008-2009 timeframe, when the technology will be more mature. The company intends to supply all the main profiles (around 13 in total in the WiMAX Forum) of the WiMAX technology. Mr Draper of Wavesat thinks that the growth of WiMAX Internet high speed applications will take off much faster than 3G and 3.5G networks because of cheaper cost of upgrades, faster speed transmission and broader capacity.

Another critical reason is the fact that WiMAX will favour the convergence of technologies and services. It will increase the triple play initiatives in Voice, data, and video, since WiMAX is applicable at the top of the Internet Protocol, which is not the case for 3G-3.5G networks. Thanks to this characteristic, WiMAX has a great potential as a substitute to DSL or cable modem when those technologies are not available in certain areas.

In North America, a factor that will push the diffusion of WiMAX is the proliferation of dual mode chip that are Wi-Fi and WiMAX compatible to be used in fixed-mobile convergence phones, handsets compatible with 3G, 3.5G networks and also WiMAX. These handsets will be intelligent enough to connect automatically to the cheapest network available in a given area.



Initially, the most promising WiMAX markets for Wavesat are the countries that do not have vast 3G and 3.5 G network deployment and have rapid population growth, such as the “BRIC” (Brazil, Russia, India, Indonesia and China). According to Mr. Draper of Wavesat, WiMAX is a complement to and not a substitute for technologies such as 3G and 3.5G. These competing technologies will continue to be used in order to upgrade existing infrastructures in place.

### **Obstacles to the adoption of WI-MAX**

Sprint Nextel will invest several billion dollars in a WiMAX national US network. According to this company, WiMAX can deliver four times the amount of data at one-tenth of the cost of the 3G 3.5G technology. However, this huge cost saving will only appear when high volumes of WiMAX penetration are obtained, i.e. not before several years of deployment.

Not many companies are able to do so. Mobile WiMAX networks require high capital expenditures and wireless operators already invested massively in very costly 3G-3.5G license acquisition (more particularly in Western Europe). Such operators are not in a hurry to invest in a new network. However, new entrants may push incumbent wireless operators to implement WiMAX networks.

Another obstacle in the adoption of a new network/technological standard such as WiMAX is the position of dominant manufacturers. As these companies have a vested interest in 3G and 3.5 platforms that were developed in their R&D facilities and still have a huge financial clout, they are able to promote the adoption of their standards by providing attractive financing to telecommunications operators.

### **Product Development**

Wavesat does system design and offers support services. It is characterized by a high R&D-to-sales ratio, very short product development cycle, and short life duration of products. The company is engaged in a massive R&D effort, over 80% of its sales, to stay at the cutting edge of the industry. But Wavesat does not manufacture its own semiconductor wafers: it is a fabless chip designer that relies on Original Equipment Manufacturer (OEM) and Original Devices Manufacturer (ODM) to mass produce its chips.

Since Wavesat is a small player, the building of a technological ecosystem is critical. A large part of the company's activities goes to the development and promotion of international WiMAX standards. Another way to foster the creation of a WiMAX ecosystem is to team with powerful business partners such as Siemens, Texas Instruments, Freescale and Analog Devices.

Wavesat was awarded the 2005 Frost & Sullivan's Technology Leadership Award for the Evolutive WiMAX DM256: *«In addition to being the first company in the world with working OFDM chips, Wavesat's chipsets are the most efficient, delivering superior performance in harsh channel conditions and reducing cost of RF implementation.»*

Wavesat was also awarded a 2005 InfoVision Award for the design of the Evolutive WiMAX DM256 Series in the category *Enabling Silicon and Component-Level Technologies*.

## 5.11 WIRELESS PAYMENT SERVICES (WPS)

<b>Interview</b>	Lynn McMillan, Director of Program Management Jeff Chorlton, President																		
<b>Basic data</b>	<table> <tr> <td>Incorporation</td> <td>Nov. 2005</td> </tr> <tr> <td>Head office</td> <td>Toronto, Ontario</td> </tr> <tr> <td>Non profit corporation</td> <td>Subsidiary of Rogers, Bell, and Telus</td> </tr> <tr> <td></td> <td>Mobile payment</td> </tr> <tr> <td>Sector of activities</td> <td>Cellular network</td> </tr> <tr> <td>Technology platform</td> <td>18</td> </tr> <tr> <td>Employees</td> <td>Cellular carriers</td> </tr> <tr> <td>Clients</td> <td>Canada</td> </tr> <tr> <td>Markets</td> <td></td> </tr> </table>	Incorporation	Nov. 2005	Head office	Toronto, Ontario	Non profit corporation	Subsidiary of Rogers, Bell, and Telus		Mobile payment	Sector of activities	Cellular network	Technology platform	18	Employees	Cellular carriers	Clients	Canada	Markets	
Incorporation	Nov. 2005																		
Head office	Toronto, Ontario																		
Non profit corporation	Subsidiary of Rogers, Bell, and Telus																		
	Mobile payment																		
Sector of activities	Cellular network																		
Technology platform	18																		
Employees	Cellular carriers																		
Clients	Canada																		
Markets																			
<b>Mission</b>	To develop standardized, secure and easy-to-use mobile payment capabilities that work with existing debit and credit capabilities offered by Canada's financial institutions and across all national Canadian wireless carriers.																		
<b>Strategy</b>	WPS intends to cooperate with Canadian banks to provide a common payment platform to the consumer market.																		
<b>Means</b>	Canada's wireless carriers cooperate on the development of common, inter-carrier services.																		
<b>Benefits and issues</b>	Accelerate the circulation and reduce the cost of money (less coins, less banknotes).																		

### History of the firm

Wireless Payment Services Inc. was incorporated as a non-profit subsidiary of Bell, Rogers and Telus. The organization plans to expand to include smaller players later. Also, WPS is looking at moving to a for-profit model in the future.

Initial services were supposed to be launched in early 2007, but there seems to have been some delay in service deployment.

### Technology Deployment

Phase one should allow prepaid wireless users to buy additional minutes on their existing accounts with their debit or credit cards. Unlike existing mobile payment solutions, which require new payment methods or additional hardware, this solution will extend access to payment methods already widely used by Canadian consumers and merchants over commonly adopted wireless devices.

Phase two of the project will look at additional opportunities for wireless users to make purchases using their mobile phones. WPS is focused on developing back-end payment processing (e.g. virtual wallet). Future services will likely include:

- Online mobile purchases
- Peer-to-peer movement of money (e.g. cell to cell)
- Peer-to-machine movement of money (e.g. cell to parking meter, restaurant, etc.)
- Micro payments (<\$100)

### **Business Strategy**

The ability of Canada's wireless carriers to cooperate on the development of common, inter-carrier services has been a driving factor in the adoption of new wireless services. The adoption of a common SMS platform triggered the use of text messaging in Canada. The same is happening with MMS. Now, WPS expects the adoption of a common wireless payment platform to have the same impact on m-commerce.

WPS has unified the three main Canadian mobile carriers and is negotiating with the Canadian banks. As the Canadian banking system is highly consolidated (five major banks), there is an opportunity for Canada to establish a unified wireless payment system before the US (multiplicity of carriers and thousands of banks).

Banks issue credit cards, own the ATM system and control point of sales terminals. But they are not interested in micro-payments which are too expensive for them. As wireless technology makes micro-payment profitable for telecommunications carriers, there is a window of opportunity to enter this market.

### **Nature of the Market**

- ▶ **Commerce:** Small commerce ("depanneurs", grocery, newsstands, vending machines, etc.).
- ▶ **Government:** Most ministries are delivering permits (driving licences, hunting permits) that can be paid by micro-payments. Municipalities are part of this market (parking payments).

### **Issues**

- ▶ **Money Management:** Mobile payment services increase the velocity of money all through the system and reduce the cost of money (fewer coins, fewer banknotes). The management of money becomes more competitive. Banks will benefit from wireless payment.
- ▶ **Security:** Mobile devices provide security measures lacking in traditional payment methods. The user authentication for m-commerce can be readily achieved with PIN or password, together with user ID and the cellphone number. A stolen handset is useless without the PIN.

## 5.12 OTHER INTERVIEWS

In addition to the case studies, several other organizations were interviewed in order to obtain further insight into the mobile services market:

Company	Name	Function
<b>Atlas Interactive</b>	Carine Masse	Business Development V-P
<b>Bell Mobility</b>	Almis Ledas	VP Corporate Development
<b>Canadian Museum of Science &amp; Technology</b>	Stacy Wakeford	Director Exhibitions and Programs
<b>Desjardins</b>	Daniel Boyer	Director New Payments
<b>Medical Intelligence</b>	Carola Andrea Monge	Business Development V-P
<b>Nortel Networks</b>	John Hoadley	Next Generation Wireless Access
<b>Profilium</b>	Jay Gould	Director of Business Development
<b>Radio-Canada</b>	Christiane Asselin	Directrice, Nouvelles plateformes et développement des affaires.
<b>Rogers Wireless</b>	Howard Slawner	Director, Regulatory Matters
<b>SeaBoard Group</b>	Kevin Restivo	Senior Analyst, Telecommunications
<b>Telus Communications</b>	Ann Mainville-Neeson Craig McTaggart	Director, Broadcast Regulation Senior Regulatory Legal Counsel
<b>Trio Capital</b>	André Tremblay	Manager Partner
<b>UBS</b>	Jeff Fan	Executive Director Analyst Telecom + Media
<b>Wireless Industry Partnership (WIP) Connector</b>	Caroline Lewko	CEO

## 6 CONCLUSIONS: WHAT IS THE FUTURE FOR MOBILE CONTENT & SERVICES IN CANADA?

The wireless industry is marked by a cultural divide between the telecommunications industry which invented the cellular technology and the computer industry which is infiltrating the entire spectrum of information and communications technologies. Wi-Fi and WiMAX are among many platforms coming from the computer world that threaten the traditional cellular networks and are further eroding the telecommunications culture.

Mobile content was born in the telecommunications environment but its nature is definitely on the computer side. The arrival of media content and peer-to-peer content are linked to free access to the network and are definitely more compatible with an Internet-like environment. Up to now, few carriers have been able to transform their corporate culture to accommodate the Internet culture. Japanese and Korean carriers did succeed in making this “quiet” revolution – they were followed by carriers mainly from Asia but as well from some European countries. This model did not spread to North America.

Is the Japanese model, as epitomized by DoCoMo, reproducible in North America? Mobile content is definitely taking off in the US – 2007/08 may well see an equivalent phenomenon in Canada. But will it take the same form as the Asian and West European models?

The following sections examine the key findings of this study in terms of trends, issues and implications pertaining to mobile services (infrastructure, content and applications). Without being prescriptive, the study suggests possible courses of action by key stakeholders in order to move closer to leading countries in the mobile services arena.

### 6.1 MARKET TRENDS, ISSUES AND IMPLICATIONS

#### 6.1.1 *Mobile Data Services*

It appears that 2007 is the year when mobile data services will take off in Canada. Mobile data services have reached the 10% mark of Canada’s wireless revenues – Rogers passed it last year, the other wireless carriers will pass it in 2007.<sup>106</sup> Once a product passes 10% of net revenues, it is no longer a passing fad and its continued proliferation becomes irreversible. Companies cannot treat such a revenue source as a temporary anomaly and have to embrace it forcefully and fight for it. In 2007, Canadian carriers have reached this threshold. There appear to be a number of signs to confirm this prediction:

- An agreement between Telus and Amp’d Mobile for the distribution of mobile content to the Canadian market (music, 3D mobile gaming, live sports and concert video streaming, mobile communities, personalization features, etc.)

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<sup>106</sup> Rogers’ revenues from wireless data services grew approximately 54.5% year-over-year to \$459 million in 2006 from \$297 million in 2005, and represented approximately 10.6% of network revenue compared to 8.2% in 2005. Rogers’ Annual Report 2006.

- Launching in December 2006 by Rogers of the first Canadian high speed wireless network (HSDPA) which will facilitate the development of mobile services
- Launching of Mobile Movies by Bell Canada in February 2007, the country's first service offering full-length, pay-per-view movies on mobile phones. Content deals were secured with Disney and Sony.
- Canadians send more than 18 million text messages per day<sup>107</sup>

The rapid growth of mobile services does not go without missteps. For instance, in January 2007 Telus started offering pay-per-download adult content to its domestic clients through their cell phones. According to Jim Johannsson, the media relations director for Telus, the company had found about 20 per cent of search terms entered by clients on their mobile browsers were intended to find adult content, with 13 of the top 25 websites accessed being pornography websites.<sup>108</sup> The financial rationale may have been sound, but the popular opposition was acrimonious and Telus withdrew its service two months later. However, even if unfortunate, the incident underlines the growing interest in mobile content.

The technology is clearly available, the content and services are rapidly being developed and the market is ready. The question is whether the services will be sufficiently affordable to realize their growth potential and help move Canada into a leadership position.

## 6.2 INFRASTRUCTURE TRENDS, ISSUES AND IMPLICATIONS

### 6.2.1 *Canada's Paradox*

Canadian wireless infrastructure is characterized by a paradox: On the one hand, it is growing rapidly and appears to be highly competitive yet it is not among the world champions. This is a departure from Canada's traditional leadership in wireline infrastructure where Canada has always been the first or among the first three countries in the world. Factors contributing in varying degrees to this situation include:

#### ► **Low Penetration Rate**

For more than a century, Canada has been a world leader in telecommunications, building an impressive fixed (mainly wireline) infrastructure across the country. Since the advent of mobile (wireless) communications a mere couple of decades ago, Canada has lost its leadership position and has fallen far behind the leading countries, particularly Japan, Korea, the US and European countries (even though European countries have an artificially high penetration rate due to interchangeable SIM cards – actually a sign that common standards and unlocked phones have helped foster competition) and its position continues to weaken. It is important to note that this is evidenced by a number of reports from organizations such as the ITU, the OECD, the CD Howe Institute and others. For example, according to the ITU, Canada is now ranked 30<sup>th</sup> in the world in terms of mobile subscribers per 100 inhabitants, behind Turkey and just ahead of Mexico. A Wall Communications report commissioned by the CWTA is less critical but nevertheless

<sup>107</sup> CWTA Wireless Facts & Figures: <http://cwta.ca/CWTASite/english/industryfacts.html>

<sup>108</sup> Unnati Gandhi, Is Telus willing to accept the scorn with its porn?, The Globe and Mail - 13/02/07

characterizes Canada as a “smart-follower” of the US which is in turn trailing Asia, and to a lesser extent Europe, particularly in the rapidly emerging area of mobile data services.<sup>109</sup>

### ► High Use

Canada has a relatively high level of average monthly minutes of use (MOU) compared to most other countries – though it lags behind the US by a wide margin (1 to 2). This is illustrated in the following table.

**MOBILE MARKET STRUCTURE AND PERFORMANCE IN SELECTED COUNTRIES**

Country	MOUs	Revenue per Minute (\$)
<b>Mobile Party Pays</b>		
USA	798	0.07
Canada	403	0.11
<b>Calling Party Pays</b>		
UK	146	0.21
Germany	81	0.28
Italy	126	0.21
Sweden	141	0.17
France	235	0.17
Spain	150	0.22
Finland	279	0.11
Japan	147	0.27
South Korea	322	0.10
Australia	178	0.17

FCC, September 26, 2006<sup>110</sup>

### Rate Structures

Several interrelated aspects of Canadian mobile pricing result in behavioural abnormalities relative to other countries. This raises the question of whether Canadian pricing constitutes an obstacle to a higher mobile penetration or is an advantage.

Canadian rates are higher than US ones, they are less flexible, and particularly punitive for the carriers’ premium market – high end users (56% more according to the Seaboard Group, more than 70% according to ETI Economics and Technology)<sup>111</sup>;

<sup>109</sup> A Study on the Wireless Environment in Canada, prepared for the Canadian Wireless Telecommunications Association, Wall Communications, Ottawa, September 29, 2006, 88 pages. Cf. p. 25, 26, 34 and 38.

<sup>110</sup>Original source: *Interactive Global Wireless Matrix 4Q05*, Merrill Lynch, Telecom Services Research. Quoted in *11th Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services*, FCC, September 26, 2006, 127 pages. Cf. p. 107.

<sup>111</sup> Are not the carriers repeating the same error they made in the landline market during the 1980s when they were charging punitive rates for long distance and private lines that were mainly used by large corporations? At the time Ted Rogers led the charge against what he called a “Soviet-style telecommunications monopolism” of Bell and the other members of Telecom Canada.” Now Rogers has fallen on side with the wireless carriers and may well end up upsetting its best customers.

Inbound call billing has prevented the end user from using their mobile handsets as much as they could have done. Most other countries do not charge for inbound calls but the calling party pays more than for “regular” phone calls (between two fixed telephones).

Canadians (as Australians, New Zealanders and most Americans living outside a few big cities such as New York City) have not been used to paying per minute for their landline calls. With the move to mobile communications, the rate structures changed and mobile users pay on a per minute basis for both incoming and outgoing calls. This is in sharp contrast to Japan and European countries where per minute charging for outgoing calls has been the norm.

As a likely consequence of these pricing differences, prepaid subscriptions have not been popular in Canada. Most of the other countries have encouraged prepaid subscriptions in order to reach the have-nots of the society. It is interesting to note that SMS was a key driver of data services in Europe as a way of avoiding high telecommunications costs.

The cultural shift required with the change from “free” to pay-per-minute calling, exaggerated by also paying for incoming calls, has undoubtedly slowed the rate of adoption of mobile communications in Canada. In fact, a recently released report on Number Portability by TNS Canadian Facts indicated that 91% of survey respondents are not considering discontinuing their landline phone and having only a cell phone, even though 87% indicated that they were satisfied with their current wireless provider. Thus it is also clear that Canadians would not be ready to adopt a per call rate structure for wireline basic telephone service as the distinction between wireline and wireless continues to blur.

What is more troubling is the fact that Asian, US and even the European carriers are discovering flat rate (or unlimited packages) for mobile service while Canada has suppressed the only plan that was heading in this direction (City Fido). Mobile TV rates are fixed, but they come above all other data communications fees. Will the Mobile TV example spread to the whole domain of data communications? This would represent a major move towards the development of a mobile culture in Canada.

In Canada, mobile data is billed based on volume, a very unpredictable measure for the end user. In doing so, Canadian carriers are losing what was their traditional advantage over their foreign counterparts: a price structure simple to manage for themselves and easy to understand for users. Such a rate structure is in the end profitable for everyone, as shown by the Japanese business model and as Ville Saarikoski demonstrated in his major work on the mobile Internet:

*“The ability to create scale free networks is not embedded solely in the technical features of the product, but very much a result of the techno-economic combination (e.g. packaged prices and flat rate pricing encourage the emergence of the scale free structure).<sup>112</sup>”*

The situation with mobile data appears to be even worse. Mobile data’s pricing is high and complex: make it simple! This was the message relayed on and on by every manufacturer and applications developer at the 2007 edition of Barcelona 3GSM, the world's biggest wireless trade show. Mobile carriers were submitted to a relentless trial by all the other

<sup>112</sup> Ville Saarikoski, “The Odyssey of the Mobile Internet”, University of Oulu, Finland, 2006, 252 pages. Cf. p. III.



mobile stakeholders. Will this intense pressure make them move? And maybe we have to raise another issue: can the carriers move?

#### Price Unclarity

With data, the unclarity of how much it costs is the biggest problem at the moment. And of course prices are high as well. That really needs to be solved.

*Kai Oistamo, head of Nokia's mobile phone division*

The tariffing, that's something operators may want to look at.

*Nigel Clifford, chief executive at Symbian*

Wireless data traffic pricing (is) not transparent, and even flat data tariff packages contain complicated restrictions.

*Miles Flint, President, Sony Ericsson*

*Interviewed by Lucas van Grinsven,  
Phone and software makers urge cheaper Web mobiles,  
REUTERS, February 12, 2007.*

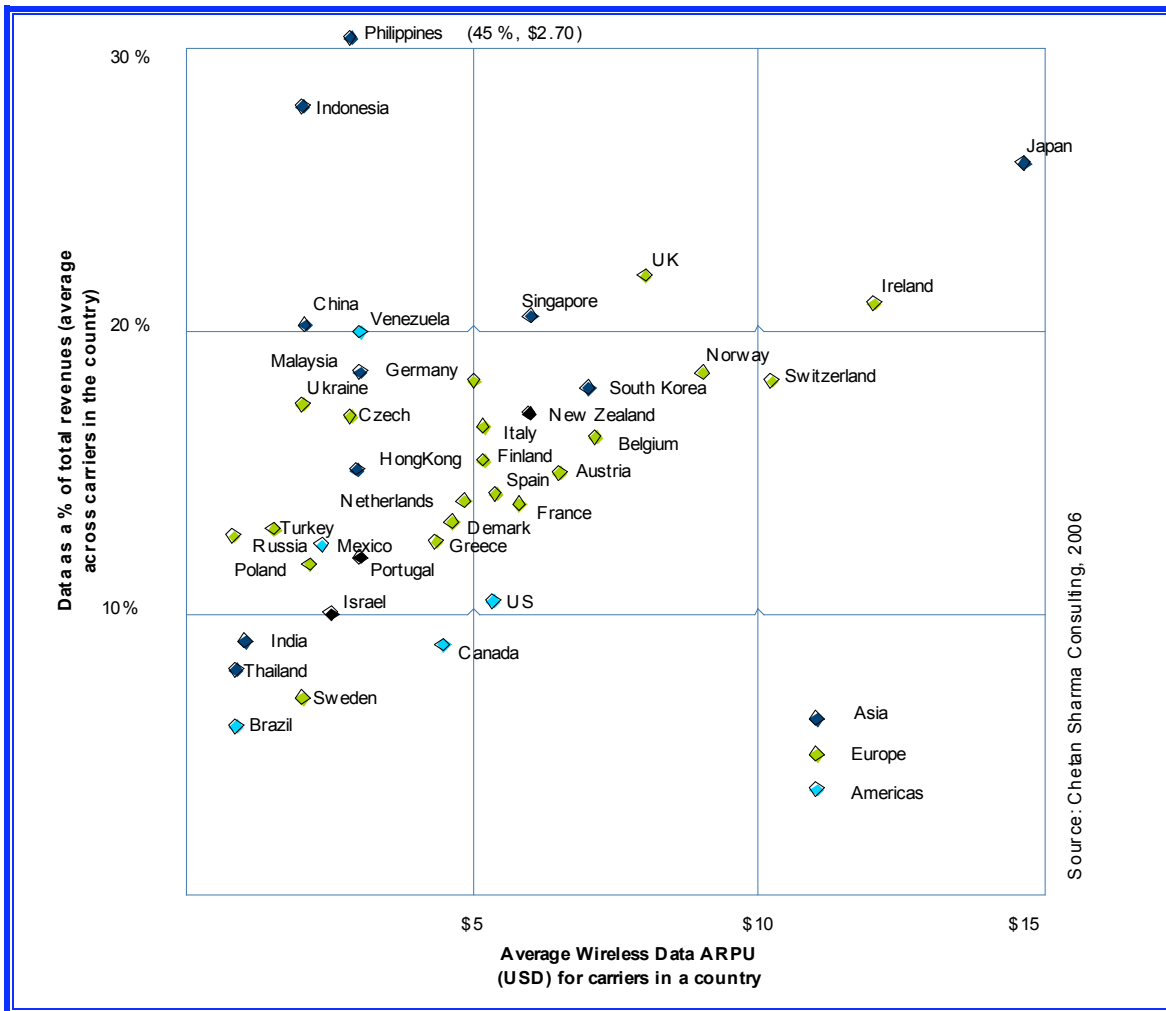
#### ► Focus on Voice

Canada's wireless focus is still largely on voice communications (~90% of usage is voice and approaching 10% is data). With at least 25% of the mobile voice market untapped, this represents low hanging fruit with immediate and predictable revenue streams that help recover mobile infrastructure investment costs.

In terms of mobile data communications, the emphasis has been largely on business use. This is similar to the early days of data communications over fixed infrastructure, where business provided a substantive source of short-term revenue opportunities. It was only with the more widespread availability of broadband infrastructure, driven by the Internet revolution over the last 5 years that consumer data communications use of fixed infrastructure has substantively increased. Consumer use of mobile data services, other than SMS, is still in its infancy.

This contrasts with much of the world (particularly Asia but now the US is rallying the group) where mobile data services were substantively targeted at consumers in the form of mobile entertainment. The effect has been to create a broad base of users willing to embrace the range of mobile business data services that are rapidly proliferating. Canada is among the last countries of the world to embrace mobile data services (see next chart). It is our opinion that the situation depicted here has already changed since Rogers was the first carrier to pass the 10% data ARPU and the others should do the same in 2007. However the passive attitude adopted until now by the "Big Three" must change if Canada is to again play a leading role in telecommunications.

**AVERAGE WIRELESS DATA ARPU BY COUNTRY (2005)**



Source: Chetan Sharma, Worldwide Wireless Data Trends, August 2006.

► **Leapfrogging**

Meanwhile, parts of the world which did not have anywhere near the same investment in fixed infrastructure as Canada (particularly in Asia, Latin America and Eastern Europe where wireless growth is occurring at a phenomenal rate) have moved directly to a mobile telecommunications infrastructure, thereby leapfrogging Canada, and to a lesser extent the US. This has positioned these countries to more rapidly embrace mobile voice, and more recently data, services. Consequently they are now much further ahead of Canada in the broad area of mobile services.

► **Multiplicity of Transmission Technologies**

Growth of mobile services in North America has been hampered by the multiplicity of technologies. In particular, the sharp divide created between CDMA and GSM is continuing through the evolution into 3G. To date, these incompatible cell phone standards have hampered the integration of cellular networks in a country which is already struggling

to provide adequate coverage over vast distances. The main handicap in Canada (and North America) appears to have been the costly and complex change from TDMA and iDEN to CDMA or GSM. It appears that Canada may have kept TDMA too long. While 4G is not defined yet, it seems the two standards are finally merging.

This multiplicity of transmission technologies provides a barrier to switching carriers and consequently is one of the factors hampering effective competition.

By contrast, other countries around the world have standardized on GSM and this facilitates interoperability of cellular devices through roaming agreements. In this regard, Rogers is better positioned to participate in global networks through its adoption of the GSM standard. On the other hand, one must not overemphasize the importance of the technological platform. For instance, Korea chose CDMA and Japan has always had several standards.

### ► Low Rate of Innovation

In general, there has been a relatively low rate of innovation in the cellular world in Canada, particularly due to inertia by the carriers and government. The former has had little short-term business incentive and the latter lacks any coherent wireless strategy.

Where the innovation has been occurring is primarily with the smaller start-ups. This is evidenced by the substantial number of companies which have been developing a wide range of devices, infrastructure equipment and increasingly innovative embedded software and customer-focused applications. Companies like Hexacto Games and Airborne Entertainment are among the world leaders in game creation and aggregation. The challenge has been to convince the carriers to embrace this new technology, something that is only now starting to happen in any systematic way.<sup>113</sup>

The pioneer in this regard has been RIM, the Canadian success story in terms of mobile innovation, which has created the market for messaging applications on handheld devices. This has certainly gained attention and the major carriers are now partnering with RIM. Another factor that is likely increasing the attention of the carriers is the rapid growth of unregulated WiFi and WiMAX networks which are threats, by potentially offering the ability to connect into existing broadband wireline infrastructure in order to circumvent the established mobile networks. Canada may hold a strategic advantage in the deployment of WiMAX networks thanks to the decisive role played by SR Telecom and Wavesat in the design and promotion of the WiMAX standard.

To be fair, Canadian carriers have introduced significant mobile services innovations, particularly in the past 18 months or so. In this respect they appear to be fulfilling their obligations to spend 2% of revenues on research. Is it enough? Let us recall this level of R&D intensity places them on a par with the beverage industry but significantly behind the automotive industry (see section 3.2 - Main Industry Players). However, the nature and extent of the service announcements clearly demonstrates the carriers are taking significant steps to head off competition that threatens to disrupt existing business models.

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<sup>113</sup> As a result both companies were purchased by foreign companies: Hexacto Games was purchased by Jamdat Mobile in July 2003 and Airborne Entertainment by Cybird in June 2005.

Most of the innovation in terms of the rapidly evolving consumer entertainment market is coming from content and application providers. Canadian media have been (and still are) particularly at the forefront of the fight for mobile services, alongside and often in conjunction with application developers. The Canadian application developers industry is very successful on the international scene as shown by the success of Airborne Entertainment, Hexacto Games, AirG, Dose, Electronic Arts, Gameloft, Humagade, and Magmic. The main drawback is the “Walled Garden” culture maintained by the carriers that is slowing development of a local market. In addition, one must take into account the fact that the broadcast industry is being slowed down by copyright issues brought on by journalists and artists. In fact, Telus entered into an agreement with US-based Amp’s Mobile for wireless content because they were unable to strike a deal with Canadian content providers.

### ► Lack of a Pure Foreign Wireless Player

Canada is one of the very few countries that do not have a foreign mobile carrier. Even the US and Japan have introduced foreign mobile carriers: German owned carrier T-Mobile in the US and British owned Vodafone in Japan.<sup>114</sup> By definition a foreign mobile carrier does not have any wireline infrastructure to protect and is free to develop new converged services without any fear of cannibalizing its legacy investment. In these countries this resulted in a more competitive environment. This is not the case in Canada. Rogers was the closest to a pure wireless player, until it acquired Sprint, and according to a majority of our interviewees the most innovative. However, it seems to have passed up the opportunity to radically change the rules of the game and take an aggressive leadership position in the converged environment.

In the past, Canada has had four competing carriers before regressing to three when Rogers acquired Microcell. Is there any room for a fourth carrier in Canada, perhaps taking advantage of increasing convergence between fixed and wireless networks, e.g. using WiFi and WiMAX technologies? Foreign examples show that the majority of countries have three mobile carriers – the main exception being the US. UBS analyst Jeffrey Fan has demonstrated that a fourth new entrant was possible when overall mobile market penetration was less than 25% and the new operator can enter the market with a superior technology (for instance 3G) and none of these prerequisites can be fulfilled by Canada.<sup>115</sup> If there is no room for a new entrant, who could break the peaceful oligopoly formed by Bell, Telus and Rogers? Can the municipalities follow the example of Toronto, Ottawa and Fredericton and launch their own mobile services? Can the manufacturers find a way to bypass the carriers to reach their clients directly?

The answer may rest with Quebec-based Quebecor that desperately wants to make an entry into the wireless market. It is probable that with its powerful regional presence – TV, cable TV, and print media – Quebecor could launch a viable cellular venture in Quebec. Are regional mobile operators a way out of the current oligopoly? From a mobile content perspective, Quebecor’s market entry would be a plus. Quebecor has been one of the few companies that actually succeeded in making a profit from convergence in the fixed

<sup>114</sup> Last year though Vodafone sold its Japanese subsidiary to Softbank – not a bank but a Japanese content provider.

<sup>115</sup> Jeffrey Fang, “Wireless disruptive forces – noises or reality?”, UBS Investment Research, November 2006, 56 pages. Cf. p. 42-3.

telecommunications market. It is well positioned to replicate this success in the mobile market.

An interesting initiative to be monitored closely is the creation of wireless competition not by multiplying infrastructure (experience has shown a fourth carrier may not be viable in Canada) but by opening the existing networks to competitors via “Equal Access Interconnection” and “Unbundling”. This is the position taken by MobilExchange and its president Mike Kedar, ex-Chairman and Founder of Popfone (Microcell) and Call-Net (Sprint Canada), a veteran of the introduction of long distance competition in Canada. Created in October 2003, MobilExchange acquires wireless licences on the secondary market and leases spectrum to wireless service providers.<sup>116</sup>

Another possible answer may be the recent Mobile Virtual Networks Operators (MVNOs) surge of activities. After a late start, Virgin’s inroad in the market is making a difference, especially among youngsters who appreciate its prepaid plans. Are MVNOs the best way to promote competition in the mobile market without dispersing the investment into the duplication of existing networks? Can MVNOs differentiate themselves from mobile incumbents by playing the mobile content card? The recent agreement between Telus and Amp’d seems to hint there is a possible solution that could suit both the carriers and the content providers.

#### ► Mobile culture

Mobile content is not a matter of technological choice; it is a matter of culture. The main advantage of DoCoMo was its creation of a mobile culture. No carrier in Canada really embraced this new mobile culture with perhaps the exception of Microcell. The best example of the importance of mobile culture (that has nothing to do with Japanese specifics but is rather youth oriented) is provided by the following example. DoCoMo noticed that some youngsters subscribed to its service to get a subsidized handset and then did not renew their subscription or simply stopped using its cellular service. A quick enquiry allowed the DoCoMo managers to find out that these special subscribers were using the non-network features contained in their handset such as the camera, music player and payment facilities provided by RFID.

What to do to avoid this “misuse” of the company’s subsidized handsets? DoCoMo decided not to do anything. It concluded that the adoption of mobile handsets by youngster without much money to spend on calls was part of the learning curve of mobility. This was considered as an investment in the development of future customer loyalty. DoCoMo’s competitors adopted the same policy. As mentioned above, mobility is not limited to network communications.

Another example mentioned below is Korea where gaming tends to be viewed as a social activity and networked gaming is very popular. In essence it is an integral part of social networking. By contrast, in North America gaming is generally viewed as a somewhat competitive activity and tends to take place more at home. Social networking in North America is an important, but usually distinct, activity and mobile gaming is less prevalent.

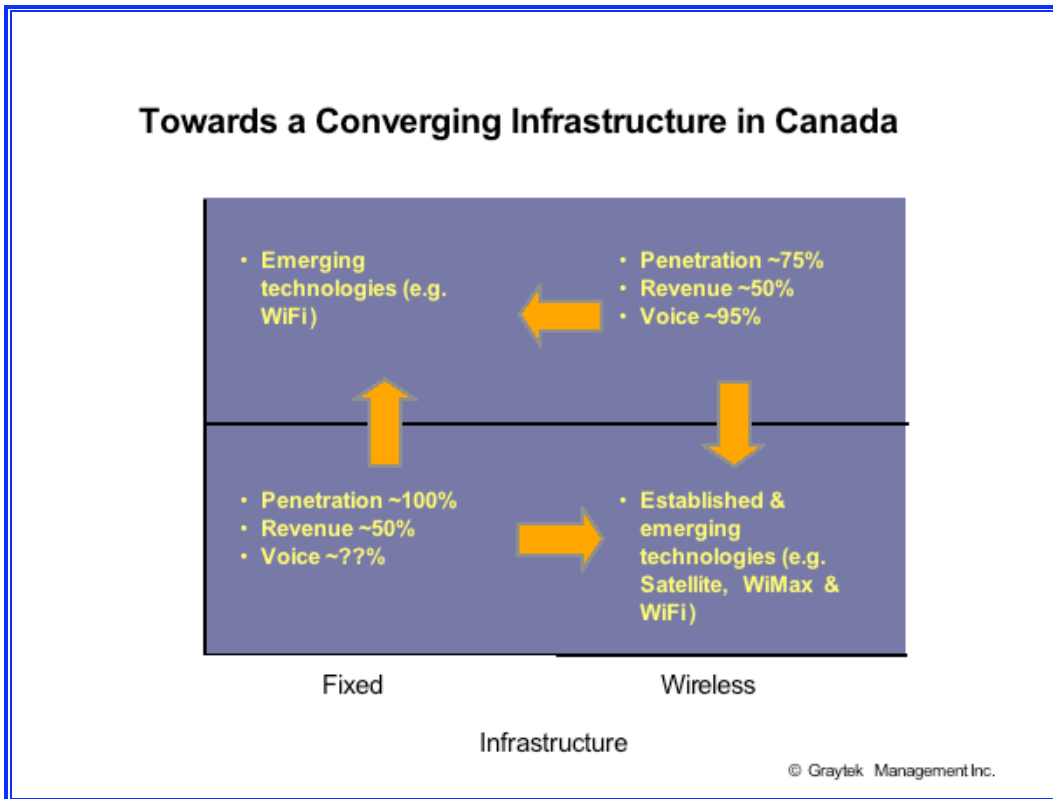
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<sup>116</sup> MobilExchange’s Submission in response to Gazette Notice No. DGTP-002-07: Consultation on a Framework to Auction Spectrum in the 2 GHz Range including Advanced Wireless Services, 25 May 2007.

The key to mobile culture is probably a complete renunciation of the “Walled Garden” protective attitude and the adoption of a proactive “Open Gateways” strategy. To do this the “Big Three” would have to follow the DoCoMo model and create a mobile ecosystem. How do we recognize an “Open Gateways” strategy? Just look at the way a mobile operator deals with content providers and application developers. While in Japan the operators deduct a fixed rate of 9% of the sales of third party services, in Canada it is negotiated on a case by case basis: “Someone like Walt Disney can set their own terms, while Joe’s Garage will have to take whatever they can get” according to a leading Telecom carrier executive. Not only is this high rate dissuasive to the content and application providers, but the lack of transparency is typical of the antiquated monopoly philosophy that considers a telecommunications network as a “Walled Garden” whose owners have no account to render.

### 6.2.2 Infrastructure Convergence

It is clear that the distinction between fixed and wireless telecommunications is blurring and the trend is towards a single converged telecommunications infrastructure servicing a wide range of fixed and mobile devices. This is illustrated in the following diagram:



Canada, along with other developed countries, has now achieved close to full penetration of fixed devices accessing essentially fixed telecommunications infrastructure. In reality, much of this infrastructure is wireless in the form of satellite and microwave links that are not generally

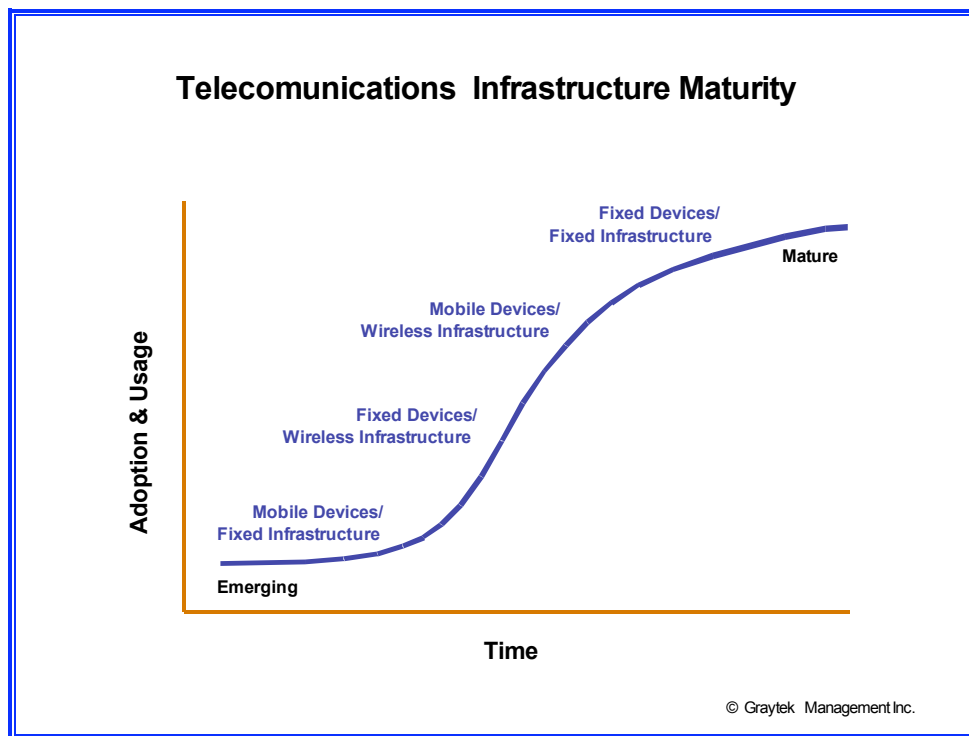
apparent to the user. Due to its vast geography, Canada has led the way in a number of areas of this wireless infrastructure, particularly satellite links to northern communities.

Until recently, mobile communications has developed independently largely based on a separate communications infrastructure using its own network of microwave equipment and, at least virtually, its own backbone infrastructure. However, this is now changing in two dimensions, largely brought about by expansion of infrastructure to provide easy and affordable broadband access to fixed and mobile devices such as WiFi enabled desktop and notebook computers.

This in turn is opening the way for Voice over IP mobile devices to access what was formerly an entirely separate fixed (and wireless) infrastructure serving fixed devices. The end result of this convergence will be a single mobile device that can seamlessly use whatever infrastructure is available and the distinction between fixed and mobile communications will fade. The business and regulatory implications of this convergence is only now becoming apparent and starting to be addressed. This convergence is at the heart of the growth of mobile content and services and offers the promise of the widespread and affordable broadband access upon which the development of such services will increasingly depend.

In essence, Wi-Fi and WiMAX have the potential to be disruptive technologies that could break the cellular carriers' oligopoly. These two platforms originate from the computer industry and not the telecommunications industry, their organization mode is bottom-up and not top-down, and they are open technologies (especially Wi-Fi that uses unlicensed spectrum).

The various elements of this converging infrastructure are at different points on the maturity curve and full convergence is still a way off (see following diagram). While convergence represents a threat to developed countries with a heavy investment in fixed infrastructure, it also provides an opportunity to embrace the new technologies and establish a leadership position.



### **6.2.3 Are we Headed Towards a Collision of Device Technologies?**

While infrastructure convergence is progressing apace, convergence (or some people would say a potential collision) is also taking place at the device level. To a large extent, desktop computers have already given way to notebook computers as users are increasingly looking for portability of their computing experience. This is now moving into the field of mobile telephony as cell phones are starting to provide computing capabilities and handheld computers are moving towards becoming full-function telephones. Many believe that the iPhone is largely a defensive measure by Apple to head off erosion of iPod sales in this chaotic and rapidly changing environment.

Looking more and more like PCs, smartphones need an operating system. The prevailing operating system is Nokia designed by Symbian that controls more than 70% of the world market. However, Symbian OS is almost unknown in North America where the battle is being waged between Palm OS, Windows Mobile and BlackBerry. The defining issue is whether the outcome will favour a telecommunications-based OS (Symbian) or a computer-based OS (Palm OS, Windows Mobile, BlackBerry or other new entrants such as Apple's OSX).

In other words, is there one mobile market or two? Now we can distinguish between a prevailing market based on cell phones and an emerging one based on smartphones. Is this a permanent feature or will the smartphone eliminate the cell phone? Their logic is different. Physically, the cell phone is based on dial keypad and the smartphone on a keyboard. Internally, this raises the issue of the operating system (OS). In a smartphone, the OS becomes central. If the smartphone replaces the cell phone, we will see the OS providers play a prominent role. Nokia already divested Symbian. Microsoft is entering the market with its Windows Mobile. Palm already gave up its Palm OS to replace it by Windows Mobile. Whoever is the winner of the OS battle, one thing is certain: mobile applications development will escape carriers' control and even the manufacturers' initiatives. Mobile content will be more and more linked to the OS development.

Also part of the convergence/collision issue is likely to be the cultural affiliation with computer style keyboards in North America versus the comfort of using keypad style devices among long-term cell phone users elsewhere. This may slow down, but is unlikely to prevent the disruptive changes in mobile interface technology that we are starting to see as this convergence takes hold.

## **6.3 CONTENT TRENDS, ISSUES AND IMPLICATIONS**

### **6.3.1 Content as a Driving Force**

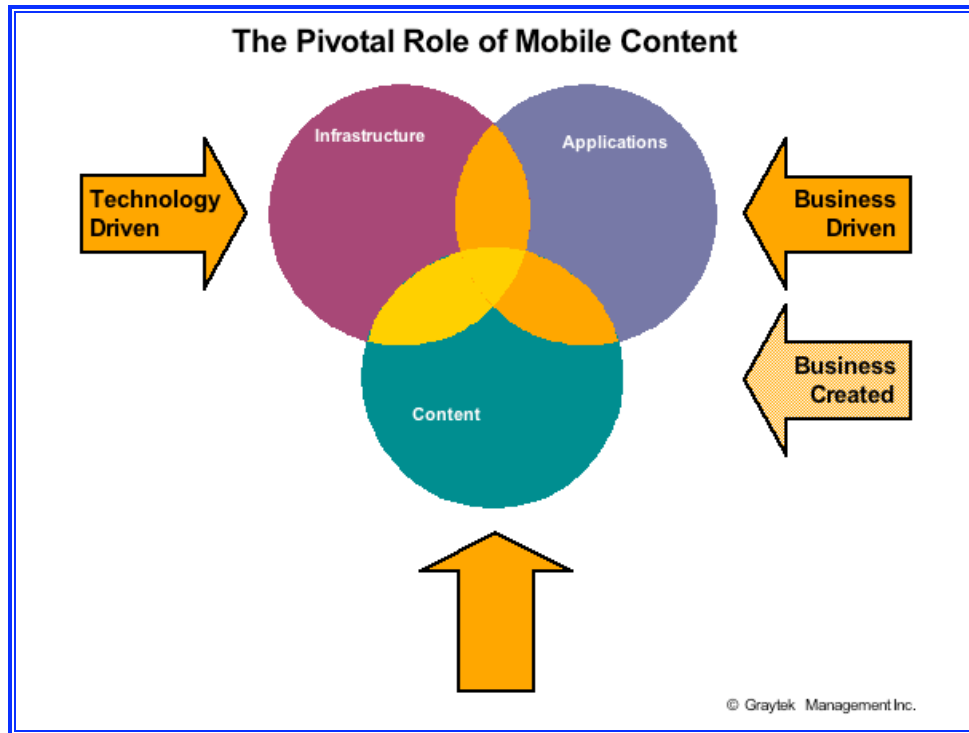
The early days of mobile content largely involved downloading of ring tones and wallpaper. It was generally given legitimacy through the iPod phenomenon where consumers started to carry their entire music collections on a device that fitted into their shirt-pockets, even though these devices were mobile not wireless. The pace has picked up with the growth of mobile internet access, the development of mobile gaming and the introduction of IPTV.

It became clear in this study that content has, until recently, been receiving relatively little attention in Canada, yet it is clearly perceived as a key driving factor in countries such as Japan. However, the tide is changing and carriers are aggressively introducing and promoting new consumer applications and content based services such as music, video and TV programs. Telus



went as far as making a comprehensive agreement with Amp'd Mobile, an upstart mobile carrier based in Los Angeles, whose focus is ringtones, downloadable content, and entertainment. It seems that 2007 may be a turning point if such applications and services gain market traction.

The following diagram illustrates the pivotal role of content in the emerging mobile services market.



It is clear that infrastructure development has, and continues to be technology driven, with little apparent understanding of the nature and extent to which it will be used. This leads to a relatively slow roll-out and adoption due to the difficulty of quantifying demand. Mobile data services are a case in point where extensive use of messaging does not generate a high volume of network traffic whereas the demand for high volume media traffic is not clear.

At the same time, business driven applications and business created content are starting to appear while the infrastructure needs (required to plan the roll-out of broadband infrastructure) are still unknown. At the moment there appears to be little connection between the infrastructure providers and the business community (both application developers and content owners).

One area where content creation is moving apace is that of consumer created content (the YouTube phenomenon). It is not clear whether this is a short-term anomaly or will lead to a long-term restructuring of the way technologies and markets are viewed. However, it is evident that user created content can act as a catalyst to increase awareness of potential and stimulate the demand for mobile data services.

In Canada, CBC launched Zed TV which billed itself as “open-sourced television” in March 2002. It used TV, the Web and Mobile Platforms to seek out and broadcast the best new short films, documentaries, animation, visual art, performance and music in Canada and around the world. Former Vice President Al Gore's new cable TV channel, which went live in August 2006,

promising to mix elements of the Internet and TV, is based in part on Zed TV. Despite claiming 45,000 registered users, streaming about 5,000 short-form videos gathered for the show's 300 episodes, and airing almost 3,000 individual works by emerging and acclaimed artists and performers since its inception, Zed TV was inexplicably cancelled by CBC in 2006.

**Mobile needs to be free**

Mobile cannot be confined; that goes against its very nature. It needs to be free to take any shape in order to find and empower users when and where they need it. But by virtue of its malleable nature, mobile is difficult to grasp and as a result, content providers--already cautious from scars garnered during the wild and wooly dotcom days--aren't so quick to chase what might seem like a PDA pipe dream.

Michelle Manafy, *EContent*; 8/1/2003

### 6.3.2 The Difficult Position of Content Owners

There are two main contenders for mobile content distribution or aggregation: the carriers and the mass media. Until now North American carriers were not able to follow the example of DoCoMo and have not succeeded in entering the content world. Will they be able in the future to do better in the mobile environment where the media culture is not well defined and the business case not clear? Canadian interactive media guru and mobile content pioneer Roma Khanna thinks not: "Taste making is much more important than gate keeping" she argued.<sup>117</sup> This does not mean that there is nothing to be done. To circumvent the traditional difficulty North American carriers have in addressing cultural issues, Telus concluded a deal with Amp'd to get access to mobile contents – betting on Amp'd's familiarity with the mobile culture.

In these circumstances, large content owners and distributors were facing many difficulties in making their content available to mobile users. The lack of coherent revenue sharing formulae was and still is the most visible obstacle, but it is not the only one. It is also due to the unsettled copyrights issue that inhibits the availability and distribution of content on the Internet as a whole (fixed and mobile). Another factor is the regulatory and privacy uncertainty.

Canadian content is available through companies such as CHUM TV mainly through its MuchMusic subsidiary. In January of 2004 MuchMusic launched Canada's first third-party online wireless content store ([shopmobile.muchmusic.com](http://shopmobile.muchmusic.com)) which was very successful. There was a perfect fit between MuchMusic and mobile users as explained by Roma Khanna, the Vice president, Interactive at CHUM Television:

*"Our audience loves music and loves to have control. Ringstones offer them both. They can personalize and customize their phones to reflect their own individual taste with both music and images. And they can trust that MuchMusic will bring them the latest and greatest offerings. We have started to add voice ringers from our VJs and hope to soon offer mastertones. That is where things will start getting really fun. Your phone is no longer just a practical device. It is now an extension of your personality."<sup>118</sup>*

117 "Mobile TV generation: 23 too old?", [Indiantelevison.com](http://www.indiantelevison.com), October 20, 2005 - <http://www.mobixinteractive.com/en/1/premipcom23.html>

118 Interview of Roma Khanna, *Wireless Telecom*, Issue Two, 2004.

In June of the same year, the MuchMusic Video Awards party was streamed in video onto a trial set of Nokia cell phones on-site – another first in Canada. But mobile TV will not be a simple recycling of fixed TV onto cell phones. One has to reinvent a new video syntax as put very clearly by Ms. Khanna:

*“TV does what TV does best, why replace it? The question is, what do cell phones do, what do mobile devices do, what do they do best and how can we customize an experience for that device that’s valuable for our audience? So it’s about interpreting what you do for a living and what you do on your TV channels for a new device.”<sup>119</sup>”*

Since then, as mentioned earlier, 11 media companies were broadcasting on a mobile platform at the end of 2006, mostly news and weather channels with a couple of children’s channels, and the start of feature movies and the move is accelerating. They are inventing a new language for mobile content, i.e. for media adapted to a small screen, but as well highly personalized and interactive. Nothing can be taken for granted with the new media, For instance, interaction counteracts the linear flow of a story. One has to invent a way to enhance the drama, not to interrupt it.<sup>120</sup> This indispensable apprenticeship is relatively costly, especially since it is not currently supported by an established business model.

Indeed, Canadian carriers have not proposed a “win-win” revenue sharing model as did their Japanese counterparts. In Japan, the carriers typically pay back 91% of the content generated revenues to the content providers. In Canada, the maximum paid to the content providers is 50% (we were told that in some cases the carriers went as far as asking the content providers to pay to get their products distributed on their mobile portals). No wonder that in such a context, content owners do not make much money on mobile platforms.

Another problem faced by the content providers is the copyright issue. They are faced with requests from the music and cinema majors, the artist and journalists unions who all want to receive money from wireless data revenues even though all Canadian providers currently lose money on their services. This was quoted as issue number one by Corus and the CBC.

Many people in the media world remember the costly lesson of iCraveTV which operated from Toronto on a fixed-Internet website between 1999 and 2000. The site offered streaming Internet broadcasts of the conventional television stations, both Canadian and United States. It was prosecuted by the US broadcasters because it did not address the copyright issue. This issue has still not been solved. In January 2007, as this report was being written, the Alliance of Canadian Cinema, Television and Radio Artists (ACTRA), which represents 21,000 members of the film, television and radio industry, went on strike on the issue of payment for electronic rights. The origin of the crisis comes from the DVD copies of films for which actors are not paid any extra money. But this first actors’ strike in Canada raises the question of the copyrights on the Internet whether fixed or mobile. The actors want to be paid for the reuse of their performances in new media. The producers want to pay for the actual performances of the actors whatever the use they later make of it. This issue is particularly crucial in the mobile content industry where the producers invest money without any short-term return.

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119 Daphne Lavers, “Wireless World With A Focus on Broadcasting”, Broadcast Dialogue (The Voice of Broadcasting in Canada) – No date (probably fall of 2004) -

[http://www.broadcastdialogue.com/article\\_view.asp?action=view&idnumber=531](http://www.broadcastdialogue.com/article_view.asp?action=view&idnumber=531)

120 “Mobile TV generation : 23 too old?”, Indiantelelevision.com, October 20, 2005 -

<http://www.mobixinteractive.com/en/1/premipcom23.html>

While this debate is taking place, it is clear that IPTV has the potential to become the next disruptive technology that will change the face of content programming – essentially wresting control from the content provider and giving the power to the consumer. The technology to extend this to the mobile consumer already exists and extensive adoption is likely only a matter of bandwidth and pricing.

Finally, the regulatory status of mobile content is still uncertain. Broadcast content continues to be tightly controlled by the federal government in an attempt to protect Canadian culture. This is being undermined to some extent by the availability of unregulated content through US web-sites and the growth of user generated content as a result of the YouTube phenomenon. Until now the CRTC has refrained from regulating the Internet and mobile content falls into this category. However there are still voices in Canada that ask for imposing regulation on new media.

Where does this leave Canada? Mobile content is not a single industrial sector but a complex ecosystem that crosses industry boundaries and emerges when several key stakeholders succeed in working together. The “natural” organization of an industrial ecosystem is the cluster which links companies to regional economic development, supporting organizations and infrastructure. This is why Ottawa, Vancouver, and Calgary have each created a mobile cluster. Toronto wireless cluster activities are less developed and revolve around local associations whereas there is no evidence of a mobile cluster in Montreal.

The mobile services share of the average revenue per user (ARPU) in Canada now stands around 8-11% and is growing fast, despite the minimal efforts of carriers to promote it. Economists spent a lot of time measuring the adoption of products by users and at what level of penetration their proliferation becomes irreversible. It appears that the threshold is 10%. Most other authors set this point between 5% and 20%. Beyond this point, increased adoption becomes self-sustaining.<sup>121</sup> Mobile content analyst Chetan Sharma has set the threshold at 10%. We suggest that what is true from the end user’s point of view is also valid from the vendor’s. Past a share of 10% of net revenues, a product becomes inevitable. Companies cannot ignore this source of their revenues as a temporary anomaly and have to embrace it forcefully and fight for it. In 2007, Canadian carriers in all likelihood will all reach this threshold. If we are right, 2007 will therefore be the year of widespread adoption of Canadian mobile content and applications.

## 6.4 APPLICATION TRENDS, ISSUES AND IMPLICATIONS

It is clear that the development of mobile applications is still in its infancy. While a wide range of applications serving many industries is either available, or under development, the companies producing them are typically very small and the market for such applications is generally not evident.

It is interesting to note that many of the mobile applications also come packaged with custom manufactured mobile devices, thereby blurring the line between manufacturing and services in the wireless value chain.

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<sup>121</sup> Michael J. Mauboussin, Alexander Schay and Stephen G. Kawaja, Network to Net Worth: Exploring Network Dynamics, Crédit Suisse/First Boston, May 2000, 30 pages. Cf. p. 17.

The majority of applications identified in the study were aimed at increased competitiveness, or increased efficiency in the case of government applications (essentially cost reductions and quality enhancements associated with such mobile applications as fleet management, inventory tracking and meter reading). Some were aimed primarily at wealth creation through the creation of new products and services (e.g. mobile gaming and social networking). A few were primarily targeted at quality of life improvements (e.g. mobile applications for patient monitoring and personal security).

Following are a few areas where mobile applications appear to have some traction and indicate Canada's potential with respect to such applications.

#### 6.4.1 Text Messaging

This is essentially a “killer application” of the mobile world and SMS accounts for ~80% of mobile data services revenues. It is an area worthwhile focusing on even when mobile device penetration exceeds 100%. SMS-based applications are continuing to proliferate and range from mobile marketing to social networking to mobile payments.

Compared to regular email, SMS is limited in size (160 characters) and does not work well between the PC world and the mobile handset world. Are these limitations representative of the Christensen paradox that seeks disruptive innovations in low-end but cheaper and easier to use technologies?<sup>122</sup> Finish analyst Ville Saarikoski noticed on the one hand that the most successful mobile content country, Japan did not introduce SMS until recently and has not used it widely since then. On the other hand Japan was an early adopter of full email.

##### **Disruptive Technologies versus Rational Investments**

The last element of the failure framework, the conclusion by established companies that investing aggressively in disruptive technologies is not a rational financial decision for them to make, has three bases. First, disruptive products are simpler and cheaper; they generally promise lower margins, not greater profits. Second, disruptive technologies typically are first commercialized in emerging or insignificant markets. And third, leading firms' most profitable customers generally don't want, and indeed initially can't use, products based on disruptive technologies. By and large, a disruptive technology is initially embraced by the least profitable customers in a market. Hence, most companies with a practiced discipline of listening to their best customers and identifying new products that promise greater profitability and growth are rarely able to build a case for investing in disruptive technologies until it is too late.

Clayton M. Christensen, Introduction to  
The Innovator's Dilemma, p. XX

In areas such as Asia, and Japan in particular, text messaging is typically via cell phones. This is largely due to the low computer penetration rates and high adoption of mobile phones. Incidentally, it is this emphasis on mobile phones that led to the rapid growth of mobile Internet in these countries.

<sup>122</sup> Clayton M. Christensen, *The Innovator's Dilemma*, HarperCollins Publishers, New York, 2000, 286 pages.

By contrast, there is a much higher adoption of computers in Canada and as a consequence text messaging is largely based on mobile devices with computer style keyboards, hence the rapid growth of companies such as RIM. As a result, Instant Messaging (IM) seems to be more popular in North America than SMS since it is already being used on fixed PCs.

In fact, Canada's main asset in the mobile world is RIM with its BlackBerry smartphone widely adopted by governments and large corporations all over North America. Indeed, BlackBerry has become a status symbol in government and corporate managers and BlackBerry's key application is pushed-email. Now, does it mean that the BlackBerry is on the wrong side of the Christensen paradox by embracing the prevailing email against the disruptive SMS? Or is it rediscovering the winning card that according to Ville Saarikoski allowed the DoCoMo success in Japan?

#### 6.4.2 Entertainment

This is the hot area of wireless growth at the present time, particularly with youth spending more time playing games and interacting with the Internet (content they have some control over) than passively watching network TV.

It is in the mobile games area that Canada has some strength, often as part of a mobile communities application. Significant companies include Airborne Entertainment, AirG, Dose, Electronic Arts, Gameloft, Humagade, and Magmic.

However, it is interesting to note differences in the gaming market around the world for a variety of reasons:

- **Cultural.** For example, in Korea, gaming tends to be viewed as a social activity and networked gaming is very popular. In essence it is an integral part of social networking. By contrast, in North America gaming is generally viewed as a somewhat competitive activity and tends to take place more at home. Social networking in North America is an important, but usually distinct, activity and mobile gaming is less prevalent.
- **Broadband Availability and Tariffs.** Networked gaming is less practical and more expensive in North America where broadband availability is more limited and premium priced.
- **Commuting Patterns.** In areas where long commutes by public transit are the norm, mobile gaming is a way to pass the time whereas this is not practical when driving a car to work.

In terms of other mobile entertainment areas, it appears that interactive TV involving short TV clips may hold more promise at present than multi-media download of full TV programming to small mobile devices. So far, Canadian forays into such entertainment areas have fallen short or failed.

There is also the question of why would someone want to publish content on a moderated TV station like Zed TV when they can publish it freely on YouTube. Promises of revenue streams are only meaningful if the implementation vehicle is well-publicized and becomes iconic.

### **6.4.3 Industrial Wireless**

Until recently, mobile services have largely involved a user (a real person) with a mobile device interacting with another user or with centrally provided mobile content and services. A promising trend is the rise of Machine-to-Machine (M2M) mobile services. This is a scenario in which objects, animals and even people can be tracked without any human intervention.

Industrial wireless is really an integration of user driven and machine-to-machine wireless applications into a more comprehensive range of industry driven solutions aimed at increasing the effectiveness and competitiveness of specific industries. In such applications the data is collected and processed automatically and can be made available to centrally located users as necessary. This allows for pro-active management and dispatch of resources from the central location.

Industrial wireless applications typically involve the convergence of a range of general purpose technologies such as GPS and RFID readers, as well as the development of industry specific devices and equipment such as sensors and sensor systems. In this regard, there is a blurring of traditional industrial lines as a single company may be involved in both ICT manufacturing and ICT services. In fact, companies in convergent technologies with another sector may not necessarily be viewed as an ICT company. Even advances in non-GPS enabled cellular devices are extending the range of possible applications of this nature.

Industrial wireless and machine-to-machine mobile applications is an emerging area in which Canada appears to have substantial strengths in terms of innovation and overall industry capacity, particularly in the areas of transportation, inventory tracking, fleet management, and service management, as well as more broadly in the areas of industrial wireless and health care. It should be noted that while vehicle-based applications are a rapidly growing area, particularly with regard to automotive telematics, the consumer aspect of automotive telematics is an area in which Canada appears to have limited capabilities and strengths at this time.

Canada also appears to have significant potential to leverage its strengths in other sectors (e.g. mining, oil & gas, forestry, environment) in the development and use of mobile applications, thereby creating opportunities for leadership in the area of mobile services.

### **6.4.4 Health Care**

Similar opportunities to industrial wireless exist for Canada in the area of health care, particularly with respect to patient monitoring. In this case, the integration of GPS, wireless, and perhaps specialized sensors to monitor vital signs are encapsulated into specialized devices (in this case likely patient bracelets). This allows health care professionals, and in some cases the patient, to be alerted to specific medical or patient security situations.

Again, this is an area where Canada appears to have significant capabilities and the potential to establish a leadership position. Examples of Canadian companies active in this application space include: Audiosoft (medical headset camera), BryTech (health monitoring, Colubris Networks (WiLan healthcare solutions), Jambo Rx (patient information, prescriptions and reminders), Kinetix Wireless (home health care), Medical Intelligence (patient monitoring bracelet), Echo Alert (patient monitoring), and Symbol Technologies (patient monitoring and health care management).

### 6.4.5 Financial Services

This is an area where Canadian carriers are collaborating to develop wireless payment solutions. It appears as though the major banks are also independently pursuing their own approaches to wireless payments. While it is possible that this will result in competitive products and services, there is the potential for collaborative solutions between the carriers and the financial sector. This could substantially strengthen Canada's position in the wireless payments arena and accelerate the adoption of mCommerce (and eCommerce) in Canada.

The largest threat in this area appears to be PayPal (eBay) which is already offering mobile payment capabilities through its widely used and highly regarded international payments application. As this report was being finalized, VISA announced a similar mobile international payments capability adding significant credibility to mCommerce. Hot off the press is the announcement that Vodafone will provide mobile PayPal services in Europe.

Technology Futures Inc. has released its list of key trends to watch for in 2007, and the consulting firm suggests that mobile commerce and e-payments will receive some market acceptance in North America this year. Much of this acceptance will be driven by increased use of smartphones. "Full acceptance of epayments in North America is still three to five years away, but the positioning and acceptance will reach market acceleration by the end of 2007,"<sup>123</sup> reads a news release announcing the trends.

While Canadian technology companies appear focused on mobile payments tools for use by individual financial institutions (e.g. Hyper Wallet) or a mobile payments platform initially targeted for use among the mobile carriers (e.g. Wireless Payment Services), the major competitors in the US are already delivering broad-based consumer payment applications (e.g. PayPal and VISA).

## 6.5 WHAT IS THE FUTURE FOR CANADIAN CARRIERS?

Canadian carriers are at the heart of a transformative change that is taking place in the telecommunications industry brought about largely by the rapid development and growth of mobile and broadband technologies. This change is placing consumers firmly in the driving seat, is upsetting established business relationships and practices, and is threatening the core underpinnings of the telecommunications industry worldwide. In Canada, it is entirely possible that the market cannot support more than 3 national carriers competing independently in a converged wireline-wireless environment. How carriers respond will be fundamental to the development of mobile content and services in Canada.

Carriers' core business is under attack from two fronts: their network and their dial tone. Computer manufacturers are tempted to bypass the carriers' access networks by proliferating unlicensed access points in the form of Wi-Fi and WiMAX base stations. But once the access network is bypassed, what is going to become of the backbone? The mesh concept allows every handset to become its own base station and repeater, even when switched off. Even if the carriers retain control of the backbone, they will have lost the contact with the end user. The other front is the dial tone. What is a dial tone? It is the telephony signal that indicates that the switching

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123 DECIMA, Report on Wireless/January/07



system is working and ready to accept a call. In a computerized world, the dial tone is being replaced by the operating system (OS). The OS vendors are ready to take the control of the network and to flatten its hierarchical organization – the control of the network has slipped away to the handset. In both cases, mobile carriers lose the contact with the end user.

How then can a carrier differentiate itself from its competitors? Infrastructure manufacturers that now have the monopoly of telecommunications innovation are taking charge of its network. Now manufacturers are selling the same platforms to every carrier. Mobile content is not a solution either. The structure that gives access to the content is developed by software vendors: operating system (OS) and specialized applications such as mail, security, geo-localized services, etc. The main asset of an OS or an application is to be universal and not limited to one specific carrier, whether mobile, fixed or converged. The content itself is owned by the media, game developers and other content owners. Media companies as well are interested in selling rights to as many carriers as possible and do not want to make exclusive deals.

#### **Digital rights management**

"Digital rights management (DRM) continues to dog storing media on a smartphone. While Verizon and other operators in the U.S. and worldwide have lots of plans that offer streaming media and more to come, stored media is the most popular way to get high quality audio and video, and the phones both lack the capacity -- that will change -- but, more importantly, lack the DRM infrastructure to allow legal music to be played."

*Glenn Fleischmann, industry observer and journalist  
interviewed by Andrew K. Burger,  
The Bumpy Road to Mobile Media Convergence,  
TechNewsWorld, 18/02/07*

Canadian carriers do not perform their own R&D, except in the area of mobile services. Most, if not all, of telecommunications R&D is being carried out by the manufacturers. This is a complete reversal from the traditional situation best embodied by the “tri-corporate” BCE culture where all innovation was designed by a planning committee formed by Bell Canada, Nortel (then Northern Telecom) and BNR representatives. First, Nortel absorbed BNR and then, when BCE divested Nortel, Bell was left without any R&D. And it did not try to create its own R&D department – the same is true for Telus, Allstream, and Rogers. The end result is that Canadian carriers have to rely on manufacturers for network planning and optimization. This situation also raises the question: what is the future of carriers? Two solutions are possible that are not mutually exclusive: the Japanese model and the Dutch model.

- In Japan, DoCoMo has set an open platform under the name of iMode where all content and application providers are invited to innovate – and are rewarded (they keep more than 90 cents out of each dollar made).
- The Dutch model is set by Telfort which outsourced its network operations to Ericsson. Its former CEO Ton aan de Stegge, tried to rationalize this move with a play of words: “The network is not our core business, but core to our business.”<sup>124</sup> What is left to the carriers that outsource their networks are the functions of packaging, marketing and billing services.

Is there a way for such a carrier to innovate? We think so, but this brings us back to the Japanese model of facilitating the creation of a strong ecosystem that attracts content and application providers. This is not R&D in the traditional engineering sense, but it is still R&D focused on

<sup>124</sup> Marcel Noordman, Squeezing the guy in the middle, Ericsson Business Review, October 25, 2006, p. 27.

content and application, in a word: culture. Will mobile or converged carriers be able to perform marketing and even cultural R&D?

There is a paradigm shift from a telecommunications hierarchical network to a computing peer-to-peer grid. This creates a window of opportunity for new entrants. Will Canada be able to seize the opportunity or will it be marginalized by the change? Until now, Canada's main asset was its telecommunications industry based on the BCE group (Bell Canada and Nortel Networks). This does not work anymore since Bell no longer innovates and Nortel is in a transition period. Who is going to benefit from the window of opportunity? Carriers? Manufacturers? The content (fixed and mobile) industry?

Revenue sharing between the carriers and the content and applications providers is a highly contentious issue. Interviewees have indicated a range of revenue sharing formulae in which Canadian carriers can take up to 50% or more of the profits generated by mobile content, depending on the size and clout of the content owner, under the claim they should be remunerated as distributors. The carriers' position is that they have developed strong relationships with many content providers from national media companies to small start-ups. Models used include revenue sharing, subscription based and ad supported, among others. The situation is muddled by ACTRA concerns about copyright protection and royalty payments. These tensions are likely to remain at least for the short term and will probably only be fully resolved if/when there is a clearer distinction between provision of bandwidth and of value-added services where the carriers must justify their share of the content revenue based on such value-add-on.

In Japan, DoCoMo deducts 9% of the profit to cover its administrative costs. In this respect, Canadian carriers, and for that matter content providers and ACTRA, appear to be short-sighted since their approach hampers the creation of the complex ecosystem required to nurture a mobile content industry. How is it possible to remedy this situation? Manufacturers are partially filling the shortfall: RIM is creating a web of subcontractors around Waterloo and Ericsson is trying to do the same in Montreal.<sup>125</sup> RIM and Ericsson's role are the two great assets of the Canadian mobile content industry while Nortel is leading the way in the development of 4G infrastructure technology. Is it enough? It is unlikely to be sufficient since the carrier's role in obtaining access to the end user remains crucial – for the time being. What role government could play in order to encourage the carriers to change their attitude towards content and application developers which are often SMEs? A better revenue sharing formula is the prerequisite to the emergence of a thriving Canadian mobile content culture. A fair revenue sharing mechanism could be a condition in the allocation of the next auction spectrum in the 2 GHz range including Advanced Wireless Services (AWS).

As Internet access goes mobile, Internet Service Providers (ISP) have to change their business model or new entrants will emerge. DoCoMo is already the largest ISP, ahead of all fixed ISPs including AOL. How is this change going to impact Canada? In June 2004, Bell Canada outsourced its fixed portal to Microsoft. The following month Rogers Cable did the same with Yahoo! In so doing, Canadian carriers run the risk of losing touch with the content environment culture. Will they be able to do better with mobile portals? This is very unlikely. The loss of contact with the fixed content world does not prepare them well for the establishment of a mobile content ecosystem. Who is going to take the lead in the creation of Canadian mobile portals?

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<sup>125</sup> Until recently, Ericsson Canada was served by its New York-based Expert Center focusing on IP Multimedia Subsystem (IMS) applications. Starting in 2006, this activity was brought to Montreal.

Amidst all of this upheaval comes the important question of network neutrality. The federal government is currently moving away from a regulated environment in order to foster competition. At the same time, due to rapidly changing technologies, the existing carriers are at risk of becoming essentially utility providers of bandwidth (for example, VOIP is already eroding traditional fixed communications revenues, and mobile VOIP is set to erode the more lucrative mobile services revenues). In such an environment, it will be tempting for carriers to bias backbone network performance in favour of their own VOIP offerings (currently priced to limit erosion of existing revenue streams). The carriers have already demonstrated their willingness to bias bandwidth use (e.g. Telus restricted access to websites during a labour dispute, Rogers limited bandwidth for legitimate applications, and Shaw attempted to levy charges for competing VOIP services). Not surprisingly, it seems that the carriers are lobbying hard to avoid the shackles of network neutrality, a position that is increasingly at odds with the rest of the world and that will undoubtedly slow the rate of deployment of mobile content.

#### **Network Neutrality**

Canadian telecommunications companies, like Bell and Telus, are increasingly determined to play a greater role in how Internet content is delivered. As the carriers of the content, they believe they should be gatekeepers of the content, with the freedom to impose fees for their role.

Bernier's troubling stand on net neutrality  
– article by Michael Geist in the Ottawa Citizen

There is also a fear that as carriers become essentially utility providers of bandwidth they might manage bandwidth by increasing prices, both in terms of maximum speed and monthly volumes, adding additional pricing tiers, and possibly bundling services with the bandwidth in order to protect their own services revenues.

The counter argument of the carriers is, of course, that the market will control itself through competition, that existing regulations and laws provide adequate protection and that, at this time there are no demonstrable problems. Their view is that additional network neutrality legislation is unnecessary and will hinder development of mobile content and services. This view appears to be echoed by the CRTC.

There is an anti-discrimination clause in the Telecommunications Act ... though it is not clear whether creating multiple tiers of service is an example of discriminatory behaviour.

I would be surprised if we did not have to deal with this issue.

We are aware of the problem and believe we have the legal equipment to deal with it, but we do not have a case in front of us. Somebody has to file a complaint.

Richard French, Vice Chair of Telecommunications, CRTC  
– article by Tyler Hamilton in the Toronto Star

The fundamental long-term question is whether the current oligopoly can withstand competitive pressures from the likes of Yahoo, e-Bay and Google that threaten the core of their business models with or without network neutrality.

At this point, the government has not stated its position with regard to network neutrality in these and other circumstances.

## 6.6 SO WHAT CAN BE DONE?

Mobile data services represent a low percentage of overall wireless revenues for carriers – from 8 to 11% in Canada versus 28% in Japan. However, it is the fastest growing area of the wireless market. It is an area of great opportunity for Canada and this report identifies many emerging suppliers of advanced mobile content and applications.

At the moment, it appears that growth of these services in Canada is being hampered by inertia both by the government (which lacks a coherent wireless strategy), the carriers (which appear to be still too focused on existing voice services), and the content owners (who are concerned about copyright and intellectual property issues).

Canada is barely at the starting gate in terms of the latest trends related to content distribution in general, and mobile content in particular. It is a key purpose of this report to stimulate a broad debate on how Canadian stakeholders can work in concert to establish a leadership position with respect to the emerging market for mobile content and services. The ideas discussed below are intended to seed such a debate with thoughts of what can and needs to be done in this regard.

There are a number of key issues facing the development of mobile services, some of which are endemic to the ICT sector as a whole (e.g. lack of available financing). These include:

- Lack of market clarity. In the absence of available infrastructure required to support content-rich mobile services, it is difficult to gauge demand for such services. As with any emerging technology, much of the demand is likely to be “latent” demand that will only become evident once the services are available. What can be inferred from non-wireless content delivery, and mobile services in other jurisdictions, is a user reluctance to pay for content and hence a dependence on advertising revenues by companies addressing the consumer market.
- Non-connected content delivery in North America (e.g. iPod), and connected services successes in other jurisdictions (particularly Japan and Korea), suggest two main models:
  - Users are ready to pay for content that they can relate to personally (music, games, video clips).
  - Users are very reluctant to pay for undifferentiated generic content (news, weather, traffic) and hence there is a dependence on advertising revenues by companies addressing this type of content.
- Outdated and inadequate policy and regulatory regime. Fixed and mobile telecommunications are regulated by the CRTC and Industry Canada (spectrum allocation). With the convergence of fixed and mobile infrastructure, as well as the growing need for mobile network interoperability, it becomes increasingly important for the two regulatory fields to be harmonized. Policies and regulations were conceived in wireline environment and do not adequately address the current wireless environment (where Canada is now a follower rather than a leader), let alone a converged world where wireless communications predominates and will become increasingly linked to a broadband backbone infrastructure.

- Tariff structures out-of-synch with market realities. A key advantage of fixed telecommunications in Canada has been the flat rate pricing for local calling. The per-minute pricing for mobile calls, as well as paying for incoming calls and the overall complexity of the tariff structure, has been an inhibiting factor in the adoption of mobile services. As mobile has overtaken fixed communications and other countries have adopted flat rate mobile pricing, tariff structures have become a liability to Canada and the situation is likely to get worse with the move to broadband mobile services.
  
- Carriers are struggling to keep up. Canada achieved its position of telecommunications leadership with a single carrier supported by government in a national imperative to provide universal access at affordable rates. Canada is now in a position of having 3 competing national carriers (fixed and mobile) operating with little government support in a fast paced global race to keep up with rapidly changing technology developments. At the same time, they are attempting to recapture their investments in previous generations of fixed and mobile infrastructure as it rapidly becomes obsolete. It is no wonder that Canada is falling behind.
  
- Content owners are in an uneasy position. Content owners are faced with difficult issues related to developing business models for mobile content. This is due to a number of factors, including:
  - The lack of market clarity issues addressed above;
  - Lack of a clearly defined playing field for mobile content, particularly with respect to the absence of clearly defined revenue sharing formulae with carriers (Japanese carriers take a well published transparent 9% mark-up on the sale of mobile services by third parties while Canadian carriers negotiate mark-ups that are often in the 50% range);
  - Delay of carriers to embrace mobile content compared to other jurisdictions such as Japan, Korea and northern Europe;
  - An apparent unwillingness of content owners to take risks;
  - Intellectual Property issues that are at the root of the current ACTRA strike (the first strike in their history); and
  - Uncertainty regarding potential content regulations relating to the protection of Canadian culture, not an immediate issue, but one that will become more sensitive as Internet content delivery in general, and mobile content delivery in particular, proliferates.
  
- Application developers are fighting to survive. Most of the mobile application developers are small companies struggling to get their products to market – the first sales are the hardest. They are generally starved for cash by an investment community that does not understand content-based services and have to rely on relationships with carriers, government agencies and content owners in order to get their products to market. Given the newness and uncertainties surrounding mobile services, developing these relationships takes a considerable amount of time and effort. Increasingly start-up companies are focusing on developing their products to the point where they can profitably sell out to foreign multinationals, mainly in the US.

### 6.6.1 *By Industry*

The major forces in the mobile services arena are the carriers. Through their core competencies in voice and the provision of communications infrastructure, they have market clout in the age of voice. But times are changing. The future is mobile content and applications delivered over the Internet, and voice is becoming just another application on the Internet. Past evidence has shown that the carriers cannot adapt quickly enough, if at all, to become successful content aggregators or application developers. In order to remain commercially viable in the long term and help foster a vibrant mobile content and services industry, the carriers and major content owners will likely need to make a cultural shift in their thinking and approaches; for example:

- Embrace the mobile services environment. This will mean acknowledging that mobile phones connected to fixed infrastructure, likely through WiFi/WiMAX networks and using VOIP, is becoming a reality. In fact, other disruptive infrastructure technologies are on the horizon that could seriously undermine current carrier business models. Trying to protect landline and wireless revenues in this environment will be futile. Also continuing to focus on the last 25% of the potential voice market means falling further behind the competitiveness curve in the longer term race.
- Move towards a more open network that minimizes/avoids duplication. This will likely require accelerating infrastructure convergence in areas of:
  - Existing fixed and mobile infrastructure
  - Cross-carrier interoperability
- Recognize that broadband content will drive revenues. This will mean carriers embracing the content owners and encouraging them to deliver mobile content and content owners coming to terms with issues with regard to protecting copyright and intellectual property in a mobile services environment. In order to be successful, it will need to be done in an open and collaborative manner that recognizes the value of the content and does not try to control/impede the content owners through onerous rules and pricing structures.
- Provide innovation support for smaller mobile services companies. Recognize that application innovation is for the most part taking place in smaller companies with deeply rooted understanding of the markets they are serving. These companies typically have the capacity to innovate but not the resources to commercialize their products. The carriers are in a position to partner with these smaller companies in order to help them establish market credibility and achieve commercial viability. While this is happening to some extent in generic (e.g. messaging) application areas, there is little evidence of carrier support for the broader range of mobile applications.
- Recognize and acknowledge the importance of the consumer in driving mobile content. It is these consumers, mostly in the under 25 age group that have the potential for embracing the broader range of mCommerce and entertainment applications that are currently taking hold in the market place.

### **6.6.2 By Government**

As Japan and Korea continue to show the world the growing economic importance of the mobile Internet, perhaps governments should consider actions that enable their firms and citizens to benefit from the mobile Internet, such as:

- Develop a national wireless strategy with a particular focus on the development and delivery of mobile services (i.e. infrastructure, content and applications). Such mobile services exist now and are every bit as important to Canada's future as emerging industries based on advances in biotechnology and nanotechnology.
- Foster the development of wireless champions in general and mobile services champions in particular. These champions should come from both the wireless and content industries.
- Provide leadership through the development and mobile delivery of government services, particularly involving mCommerce.
- Develop policies and programs to encourage full convergence of fixed and wireless infrastructure, including the roll out of broadband access for fixed and wireless devices. In particular to encourage the rationalization of wireless standards for the development of 4G networks.
- Develop policies and programs to encourage wireless application development related to Canada's strengths in enabled sectors (e.g. industrial wireless, machine-to-machine wireless, health care financial services).
- Address existing content regulations (including copyright and intellectual property concerns) in the light of the growing move to mobile content and establish the rules for equitable and competitive revenue sharing with content providers.

### **6.6.3 By Associations**

Associations can perform an important role in establishing the mobile content and services ecosystem. However, many existing associations are umbrella organizations supporting a number of industries. What is likely needed are:

- More people with intimate knowledge of the industry, clients and development, particularly regarding mobile content and services, and who are valued for this knowledge.
- An increase in the number of specific wireless associations.
- Increased short-term support for wireless companies, including business development in general, bringing companies to meet local companies, and help with the first sale.
- Long-term support by understanding company needs, taking a cluster perspective and helping put supporting infrastructure, services, and education in place.





## APPENDIX A – SAMPLE COMPANIES (VALUE CHAIN SUMMARIES)

### A.1 MOBILE CONTENT & SERVICES COMPANIES

Company	Infrastructure			Content Owners		Applications	
	Carriers	Service Providers	Enterprise Network Integrators	Content Owners	Content Developers	Application Developers	Portal Developers
8D Technologies						X	
Advent Wireless		X					
Airborne Entertainment					X		
AirG					X		X
AirIQ						X	
Airwide Solutions						X	
AmikaNow!						X	
AOL Canada		X					X
AppsGo Concepts						X	
Atlas Telecom Mobile						X	
Audisoft						X	
Aurora Bar Code Technology						X	
BelAir Networks			X				
Bell Mobility	X						
Bight Games				X	X		
BitFlash Graphics						X	
bitHeads						X	
Bluestreak Technology						X	

Company	Infrastructure			Content Owners		Applications	
	Carriers	Service Providers	Enterprise Network Integrators	Content Owners	Content Developers	Application Developers	Portal Developers
Boldstreet Wireless		X					
Bollyvista Canada				X			
Boomerang Tracking						X	
Bridgewater Systems						X	
Brytech		X					
B-Wireless Communications		X					
Call Genie						X	
Cancom Tracking	X	X					
Cascada Mobile						X	
CellWand Communications						X	
Certicom						X	
CHUM Limited				X			
Citrix Systems Canada						X	
Cloakware						X	
Colligo Networks						X	
ComVu Media						X	
Consilient Technologies						X	
Corus Entertainment				X			
Destiny Media Technologies						X	
Dexit		X					
Digital Dispatch						X	
Diversinet						X	
DM Solutions Group						X	

Company	Infrastructure			Content Owners		Applications	
	Carriers	Service Providers	Enterprise Network Integrators	Content Owners	Content Developers	Application Developers	Portal Developers
DMTI Spatial						X	
Dose				X			
DY Mobile					X		
EION Wireless						X	
Electronic Arts				X	X		
Emergensys						X	
Empower Technologies						X	
EQO Communications		X					
EXCHANGE MOBILE Telecommunications		X					
Exponentia						X	
FatPort		X					
Fawkes Technologies						X	
FleetMind Solutions						X	
Flick Software						X	
Flowfinity Wireless						X	
Fourth Wall Media					X		
Gameloft						X	
Generation Mobile					X		
GEOCOMtms						X	
Globalstar Canada	X						
Globis Data		X				X	
Google/Reqwireless						X	
GPSPursuit						X	
Grey Island						X	

Company	Infrastructure			Content Owners		Applications	
	Carriers	Service Providers	Enterprise Network Integrators	Content Owners	Content Developers	Application Developers	Portal Developers
Systems International							
Hatsoft						X	
Historica				X			
HotButton Solutions						X	
Humagade					X		
hyperWALLET Systems		X				X	
Iamota Corporation						X	
iAnywhere Solutions						X	
IBM Canada						X	
Idokorro Mobile						X	
iGotcha		X				X	
Impact Mobile						X	
Infowave Software						X	
International Datacasting		X				X	
Intrinsyc Software						X	
Jambo Mobile						X	
JohnSoft Systems						X	
Kangaroo Media		X					
Kinetix Wireless						X	
Kingston Software						X	
Lipso Systems						X	
Logiciel Radio IP						X	
Magmic Games						X	
Magnet Mobile						X	
marblemedia					X		

Company	Infrastructure			Content Owners		Applications	
	Carriers	Service Providers	Enterprise Network Integrators	Content Owners	Content Developers	Application Developers	Portal Developers
Medical Intelligence		X					
Meline Systems			X				
Message Vista		X				X	
Mighty Oaks Wireless Solutions			X				
MindHabits					X		
Mixperts						X	
Mobidia						X	
Mobile Business Communications	X						
Mobile Computing						X	
Mobile entertainment					X		
Mobile Knowledge						X	
Mobile Lottery						X	
Mobile Reach Media						X	
Mobile Satellite Ventures	X						
Mobilito						X	
m Qube Canada						X	
MTS Allstream	X	X					
Murmur				X	X		
MyThum Interactive					X	X	
Nakina Systems						X	
Netiistix Technologies Corp						X	
New Step Networks						X	
Nomad Logic						X	
Nurun						X	X

Company	Infrastructure			Content Owners		Applications	
	Carriers	Service Providers	Enterprise Network Integrators	Content Owners	Content Developers	Application Developers	Portal Developers
ONESTOP Toronto			X			X	
Optimal Geomatics						X	
OZ Communications						X	
Pagenet Canada	X	X					
Persen Technologies						X	
Phantom Fiber						X	
PointShot						X	
Prestige Telecom			X				
Prime Message						X	
Profilium						X	
Q8 Intelligent Systems					X		
Quikplay Media						X	
Redknee						X	
RepeatSeat						X	
RES Inc		X			X	X	
Rogers Wireless Communications	X	X					
SaskTel Wireless	X	X					
Sensor Wireless						X	
SilverBirch Studios					X		
Skywave Mobile Communications		X					
SmartSight/Verint						X	
Solutions into Motion						X	
Solutrea Canada		X					
Soma Networks						X	

Company	Infrastructure			Content Owners		Applications	
	Carriers	Service Providers	Enterprise Network Integrators	Content Owners	Content Developers	Application Developers	Portal Developers
SpaceWorks Entertainment				X			
Storm	X	X					
Syscan International						X	
TELUS geomatics						X	
TELUS Mobility	X	X					
TenDigits Software						X	
Tira Wireless						X	
TrueContext						X	
TruePath Mobile Technology		X				X	
Tvidia		X				X	
U Turn Media group					X		X
Universal Music				X			
Vendtek Systems						X	
VeriSign Canada						X	
Verrus Mobile Technology						X	
Versatile Systems						X	
Videotron Telecom		X					
Virgin Mobile		X					
Voice Mobility						X	
web Werkz						X	
webMed Technology						X	
webTech Wireless						X	
Westcan Wireless	X	X					
Wireless Edge						X	

Company	Infrastructure			Content Owners		Applications	
	Carriers	Service Providers	Enterprise Network Integrators	Content Owners	Content Developers	Application Developers	Portal Developers
Wireless Island	X						
Wireless Payment Services		X				X	
Wmode						X	
Zeligsoft						X	
Zi Corporation						X	
ZIM Technologies						X	
Zoom Media				X			

## A.2 MANUFACTURING COMPANIES

Company	Design & Engineering	Components	Devices	Infrastructure Equipment	Enabling Software
Advantech AMT		X		X	
Alcatel-Lucent				X	
Atsana Semiconductor		X			
Audisoft	X				
Bluetree Wireless	X				X
C-com Satellite Services				X	
Cell-Loc Location Technologies				X	
Colubris Networks				X	
Curo Interactive			X		
Dataradio		X			



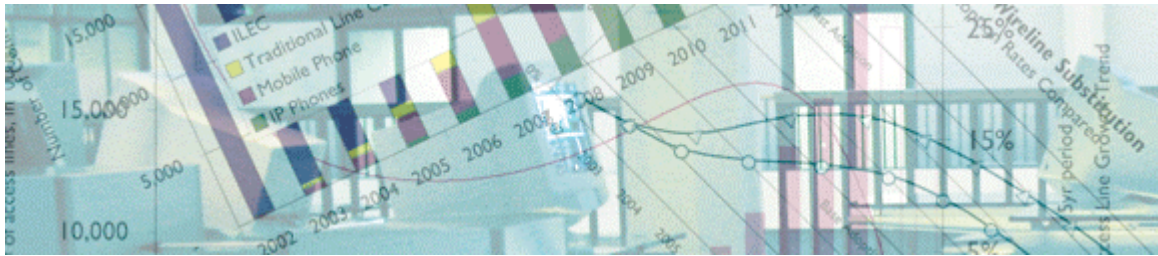
Company	Design & Engineering	Components	Devices	Infrastructure Equipment	Enabling Software
Dragonwave				X	
Dynastream Innovations			X		
Empower Technologies					X
EMS SATCOM		X			
Entrust					X
Ericsson Canada				X	
Espial Software					X
Filbitron Systems Group	X				
GestureTek			X		X
Harris Canada				X	
Hewlett Packard			X		
In Motion Technology				X	
InterDigital Canada	X				
Intermec Technologies		X		X	
Kangaroo Media			X		
LG Electronics			X		
Mitel			X	X	
Mobile Knowledge			X		
Motorola			X	X	
Nakina Systems					X
Nokia			X	X	
Nortel Networks			X	X	
Okulus Network		X			
Openwave Systems					X

Company	Design & Engineering	Components	Devices	Infrastructure Equipment	Enabling Software
phoenixantennas	X			X	
Plaintree Systems				X	
Precidia Technologies				X	
PsiNaptic					X
QNX Software Systems					X
Research in Motion			X		
S5 Systems					X
SAMSys Technologies	X				
Sensor Wireless			X		
Sierra Wireless		X		X	
Sirit	X				
Skywave Mobile Communications				X	
SmartSight/Verint	X				
Solutrea Canada	X				
Spotwave Wireless				X	
SR Telecom				X	
TenXc Wireless				X	
Tinyview					X
Tranzeo				X	
Tundra Semiconductor	X	X			
VoiceAge Corporation					X
Wavesat Wireless		X			
Whitenoise Laboratories Inc.					X

Company	Design & Engineering	Components	Devices	Infrastructure Equipment	Enabling Software
Wireless Dynamics	X	X			
Wireless Edge					X
Wmode					X
Zarlink Semiconductor	X	X			

**A.3 DISTRIBUTORS**

Company	Retailers	Wholesalers
Allcan Electronic Distributors	X	
LG Electronics		X
StudentTones	X	



## Lament for a Wireless Nation - A Cross-National Survey of Wireless Service Prices: Canada, the United States and Europe

**March 2007 - IGB Grant +1 514-849-3508 & Kevin Restivo +1 416-619-4926**

### KEY HIGHLIGHTS:

This wireless pricing study is a follow up to a study conducted by the SeaBoard Group 18 months ago.

Our 2007 study is a comparison of cellphone prices offered by service providers in different 10 cities across Canada, the U.S. and Europe.

Our conclusions? Heavy users in Canada pay, on average 1.5x more than a customer with similar usage, opting for equivalent plans, in the United States.

Other major findings are as follows:

*\* A heavy cellphone user (he or she who uses approx. 1,200 minutes a month & certain data services) in Canada pays roughly 56% more than the same user in the United States. Average users pay about 33% more than his American counterpart.*

*\* If you are a light user of cellphone services, what we refer to as a 'survival user', you pay 27% less per month than the average American. The news for the light user isn't all good – that same user would pay 42% less if he or she lived in Stockholm.*

*\* If you are a heavy cellphone user and are searching the continent for the best deal, consider moving to Athens, Georgia – there you can sign up for an unlimited North American calling plan for approximately US\$95/month – about half the cost of a Canadian plan which doesn't include the benefit of unlimited long-distance calls.*

Canadian wireless penetration rests at 58%, second last in the OECD. It's a full 20 percentage points behind the United States, the country's main trading partner.

SeaBoard believes relatively high cellphone prices in Canada suppress demand for wireless services.

We suggest that the government has the necessary tool at hand with which it could fashion a more competitive, more dynamic market – the forthcoming spectral auctions.

We propose some measures that might increase the market's dynamism and thereby propel Canadian's adoption of wireless services to the benefit of the providers and the nation.

***These are highlights of a full report on the industry available to subscribers. Accredited media or prospective clients who would like to obtain copies of the report please send an email to [Sales@SeaBoardGroup.com](mailto:Sales@SeaBoardGroup.com)***

