

The Role of Wireless Telecommunications in the Age of Digital Media: USA

Andrew Lih
Assistant Professor
Hong Kong University, Journalism and Media Studies Centre

Abstract

The United States faces a double edged sword with the next generation of wireless data services. Consumers enjoy widespread competition from six major nationwide wireless operators, with a variety of standards offering a wide range of data and multimedia capabilities. The resulting competition in price and features has the potential to bring about better customer value and a faster pace of innovation.

However, the competition has resulted in a lack of critical mass for emerging mobile services. As different vendors implement features using different standards and progress at different paces, interoperability and standardization have become major hindrances in creating the "network effect" crucial to any widespread adoption of new services.

Given this environment, we analyze the conditions under which the United States operates, which services have emerged for digital news and content applications and what services show promise in the future.

Introduction

The advent of wireless communications technologies has important implications for the production of digital news and content. Starting from the first mobile pagers in the 1980s which delivered news headlines "to the hip," consumers today want more news on the fly – two way communications, full text stories, picture displays and, increasingly, video. This demand requires networks with greater speed, capacity, coverage and features, all at a reasonable price.

The wireless environment in the United States is perhaps the most diverse in the world, using a variety of standards, regional partnerships and deployment strategies. This brings about an interesting paradox – while competition is desirable to bring about price efficiency and good consumer value, it is a foil to interoperability and robust mobile-to-mobile services and operation.

World's Largest Mobile Phone Markets (Q2'2003)

Rank	Country	Estimated subscribers	Penetration
1	China	200.3 million	16 percent
2	United States	146.3 million	53 percent
3	Japan	76.3 million	57 percent
4	Germany	57 million	72 percent
5	United Kingdom	51.6 million	86 percent

Source: RCR Wireless News, Global Markets, June 9, 2003

How have the latest developments in the U.S. affected digital news and content? With the emergence of SMS interoperability, the development of 2.5G and 3G services, the grassroots appeal of WiFi, these technologies have enabled a whole new range of content for users on the go.

Overview of the US Market

The American wireless industry reached a turning point with the distribution of spectrum licenses in 1994. Until then, only two carriers existed for each market, so-called A block and B block license holders. In an attempt to introduce more competitors to the wireless market, The U.S. Federal Communications Commission allocated new personal communications services (PCS) licenses. It would then hold a series of auctions for the rights to serve various metropolitan and rural service areas across the country. By using a highest-bidder system, the federal government derived a high amount of revenue from selling the rights to the limited public airwaves, while getting a fair price from wireless companies. (The resulting \$40 billion was even enough to make a significant contribution to reducing the federal budget deficit.)

However, the auction method also resulted in a spotty patchwork of coverage for each carrier, making it hard to deliver seamless service across the nation. As carriers started using these licenses and implementing second generation (2G) digital technology in the 1990s, they employed different standards, splitting the U.S. market four ways when vendors decided to use different standards – the European-derived GSM standard, the TDMA standard, Motorola’s iDEN system, and the modern CDMA standard. The only inherently common service was the voice call. Each standard sported different features, such as text messaging, walkie-talkie-like push-to-talk features, and high speed packet data. With carriers hosting spotty networks and incompatible standards, the early days of 2G were confusing for the consumer in the U.S, and even to this day.

Only in November 2003 has phone number portability been introduced, allowing consumers to switch carriers while retaining their phone number. However, handsets are usually not interchangeable between carriers, even for those using the same signaling standard. For example, GSM phones are often SIM-locked, meaning only a specific carrier’s chip can be used in a phone. CDMA phones come in different frequencies, both 900 Mhz and 1900 Mhz PCS. iDEN is proprietary to Nextel and Motorola.

World’s Largest Mobile Phone Operators (Q3’2003)

Rank	Operator	Country	Subscribers	Technology
1	China Mobile	China	123.6 million	GSM
2	China Unicom	China	69.6 million	GSM, CDMA
3	NTT DoCoMo	Japan	44.4 million	PDC, PHS, W-CDMA
4	Verizon Wireless	United States	34.6 million	AMPS, CDMA, 1x
5	Telecom Italia Mobile	Italy	25.6 million	TACS, GSM, GPRS
6	T-Mobile Deutschland	Germany	25.0 million	GSM, GPRS
7	Vodafone	Germany	23.3 million	GSM, GPRS
8	Cingular Wireless	United States	22.6 million	AMPS, TDMA, GSM
9	AT&T Wireless	United States	21.5 million	AMPS, TDMA, GSM
10	Telcel	Mexico	21.3 million	AMPS, TDMA, GSM

Source: RCR Wireless News, Global Carriers, October 6, 2003

Because of this confusion, many popular wireless data devices such as the RIM BlackBerry and other PDA-based online services used slower, older, but more reliable systems instead. These data networks, such as cellular digital packet data (CDPD), Mobitex (by Cingular) and DataTAC (by Motient), were based on analog systems or older two-way paging networks. While these were technically inferior, their reliability was proven and sported a national footprint, something the 2G networks could not deliver.

Next Generation

The U.S. mobile operators have taken different approaches to creating their next generation (2.5G and 3G) service offerings. Some have borrowed heavily from experience in forward-looking efforts such as Japan's successful DoCoMo i-mode, while others have stuck to providing gateways to popular and well-used Internet content, such as AOL Instant Messenger or MSN Hotmail. They are all fighting for the right services and tariffs for the new generation of camera-enabled, color screen devices.

United States Largest Mobile Operators (Q3'2003)

Carrier	Market Share	2G Standard	Aliases
Verizon Wireless	24.3%	CDMA	Bell Atlantic, NYNEX
Cingular Wireless	15.9%	TDMA, GSM	SBC, PacBell, BellSouth
AT&T Wireless	15.1%	TDMA, GSM	Cellular One
Sprint PCS	10.7%	CDMA	Sprint Spectrum
Nextel	8.2%	iDEN	
T-Mobile	8.0%	GSM	Voicestream, Omnipoint, Powertel
Other	17.8%	N/A	Leap, Alltel, others

The advent of MVNO (Mobile Virtual Network Operators) makes the landscape even more competitive. MVNOs use the network facilities of an existing carrier and resell different services on top. Virgin Mobile USA has proved to be an innovative MVNO in the United States and a savvy marketer, directly addressing the needs of the youth market with prepaid phone accounts and text messaging.

At the same time, Wi-Fi wireless LAN hotspots placed in well trafficked areas have become increasingly common and economical alternative to expensive third generation (3G) deployments. It is crucial to understand the nature of consumer desires and willingness to adopt these services as operators prepare to bet multibillion dollar wagers on the 3G betting table.

Technologies

2.5 G solutions

After many years of Internet growth in the United States, the mobile carriers saw the potential to offer the same types of data services to consumers on their handsets. In Q2 of 2001, the major carriers moved forward with their high speed packet data offerings for so-called 2.5G service for "fast modem" speeds. CDMA adopters SprintPCS and Verizon used 1xRTT as their standard, allow 40-60 kbps of speed, while GSM carrier T-Mobile used the GPRS standard. The issue was more

complicated for Cingular and AT&T Wireless, as each had a heterogeneous network of TDMA and GSM users, an artifact of many acquisitions and mergers over the years. They took the opportunity to make a network-wide change to GSM, and thereby, GPRS. Nextel, perennially the odd-man out with its own Motorola iDEN protocol would also offer packet data service over iDEN.

U.S. Mobile Operators – 2.5 G

Carrier	Standard	2.5G offerings
AT&T Wireless	TDMA, GSM	mMode, GPRS
Cingular Wireless	TDMA, GSM	Wireless Internet Express, MMS, GPRS
Nextel	iDEN	TotalConnect, PacketStream, iDEN
Sprint PCS	CDMA	PCS Vision, 1xRTT
T-Mobile	GSM	t-zones, GPRS
Verizon Wireless	CDMA	BroadbandAccess, 1xRTT

It wasn't readily apparent what services customers would be using over these faster packet speeds. At the same time, the WAP Forum created a small Web browser for WAP content. As we shall see later, this was not an immediate success.

3G solutions

The biggest question for the global wireless market is the deployment strategy for the next generation high speed network, 3G. Promising speeds of up to 200 to 300 kilobits per second, reality has begun to set in that actual speeds will be much lower. While some carriers have touted the "launch" of their 3G services, such as Sprint PCS, Verizon and AT&T Wireless, though these networks obtain an average of 40-60 kilobits per second speed, only a fraction of the peak 144 kilobits per second in their technical standards.¹

One reason for the slow 3G rollout is that spectrum space is limited and only one carrier, Sprint PCS, has enough for a nationwide rollout at that speed². Even worse, one whole block of spectrum has been taken by a company that is currently bankrupt, NextWave Communications, and has not developed use of the airwaves. There was supposed to be relief, with the U.S. government auctioning off additional licenses to provide more spectrum space for the carriers. However, in March 2003, 3G in the U.S. faced a set back as the government failed to determine how to vacate a portion of the spectrum for 3G licenses³. The 1700 Mhz band, which is currently occupied by military radio systems, was slated for reallocation, but the current political climate and the ongoing War on Terrorism caused a delay in the process. As a result, much needed spectrum will not be reconfigured and auctioned off until 2004 at the earliest.

U.S. Mobile Operators – 3 G standards

Carrier	Standard
AT&T Wireless	EDGE, UMTS
Cingular Wireless	EDGE, UMTS
Nextel	WiDEN
Sprint PCS	CDMA2000
T-Mobile	EDGE, UMTS
Verizon Wireless	CDMA2000

It will be difficult to determine whether the billions of dollars in investment will be worth a mere doubling of bandwidth over current 2.5G speeds. Indeed, some have suggested skipping 3G altogether and jumping to 4G, allowing over 1 megabit/second speed. Similarly, there has also been widespread interest in WiFi as an alternative with its multimegabit speeds.

Wi-Fi

Perhaps the bright spot in the U.S. market has been the emergence of WiFi as a foil to 3G. With a theoretical throughput of 11 megabits/second, and a real world speed of 1-2 megabits/second, the wireless Ethernet technology promises much faster data rates than even the most advanced 3G protocols. And since the technology is being built into nearly every modern laptop computer, 3G faces a particularly hard time finding a niche. WiFi deployments have focused on fixed “hotspots” such as airports, hotels, convention centers and coffee shops, with Starbucks and McDonald’s, in particular, embracing the technology.

U.S. Mobile Operators – WiFi

Carrier	WiFi Offerings	Other data
AT&T Wireless	GoPort and Cometa	CDPD (RIP, June 2004)
Cingular Wireless	-	Mobitex
Nextel	RadioFrame (Q3’03)	-
Sprint PCS	PCS Wi-Fi Access	-
T-Mobile	T-Mobile Hotspots	-
Verizon Wireless	Wi-FiAccess	CDPD (RIP, Dec 2005)

The rise of WiFi has been a surprise to the traditional cellular companies, as smaller operators have come in and started hotspot enterprises. These Wireless Internet Service Providers (WISPs) such as Boingo, iPass, Wayport and Airpath have moved to provide services for hotels and other business venues. In response, large vendors such as AT&T, T-Mobile and Cometa (AT&T, IBM, Intel) have also moved quickly into the space.

T-Mobile has been the most aggressive, acquiring WISP startup MobileStar and gaining a presence in Starbucks coffee shops across the country. Verizon has leveraged its numerous pay phone booths in New York City as base stations for its WiFi system, providing service for free to Verizon DSL broadband customers.

Perhaps WiFi’s biggest impact on the industry is not its technology, but its pricing models. Because of the nature of WiFi equipment and the protocols, flat-rate daily and monthly rates are the standard pricing methods. This is largely an artifact of WiFi’s ties to the Internet industry where usage is not metered. This is in stark contrast to 2.5G and 3G billing methods, which resemble telephony rates and typically charge for each kilobyte transferred on the network.

Which approach will be most effective with consumers? For bulk users, WiFi’s pricing is more attractive because of its “all you can eat” model, but it is a fairly high barrier to entry for new users. This is somewhat mitigated by the free usage at places such as Starbucks and McDonald’s. However, billing per kilobyte has proved to be effective in drawing in new users, at low risk, for systems such as DoCoMo’s i-mode.

U.S. Wi-Fi Internet Service Providers - Prices

Service	WiFi Offerings
AT&T Wi-Fi (Cometa)	\$2.99 for 24 hours \$11.95 monthly, unlimited
AT&T GoPort	\$9.99 for 24 hours \$29.99 for 5 connects (24 hrs) \$49.99 for 10 connects (24 hrs) \$69.99 monthly, unlimited
Boingo	\$21.95 per month (promotion) \$39.95 per month (regular) \$7.95 per day
iPass (and partners)	\$8.95 monthly fee, \$0.20/minute (CentralHouse) \$4.99 monthly fee, \$0.14/minute (i2Roam)
McDonald's (Wayport)	\$4.95 for two hours
T-mobile	\$0.10 per minute (60 minutes minimum) \$9.99 for 24 hours \$39.99 for monthly, unlimited \$29.99 per month, 12 month contract (\$359.88)
Wayport	\$25 for 3 connections (hotel checkin day, etc.) \$50 for 8 connections \$100 for 20 connections \$49.95 for monthly, unlimited \$29.95 per month, 12 month contract (\$369.40)

Indeed most mobile carriers have been taking a vertical integration approach and hedging their bets on the future – WiFi for stationary high speed service, 2.5 G for moderate speed on the fly and 2G for reliable voice communications. It remains to be seen how (and whether) 3G fits into the picture. It may indeed be picture phones that provide the killer application for 3G networks, though WiFi is also making its way into more handset designs.

WiFi also faces a tough road as its coverage is quite spotty, and limited to high traffic areas. Billing is also inconvenient, as WISPs use different methods for authentication, often requiring a cumbersome login/password process that many mobile phone users accustomed to seamless operation will find inconvenient.

Applications

What have these wireless industry developments meant for digital news and content? For consumers, anything from text messages to motion video are now available, with many people holding video as the holy grail. In 2003, carriers such as Sprint PCS now have full streaming video available, with a number of news feeds to choose from. But the economics of this model don't bode well for the carriers.

Text Messages

During the Internet's so called dot-bomb, people found that much of the advanced multimedia on the Web were bells and whistles – it was content which required more bandwidth and computing power, but didn't add much richness to the experience. In the aftermath of the dot-bomb, e-mail and instant messaging were rechristened as core competencies of the Internet, even though both are fairly low tech.

The same can be said for the mobile phone market. SMS text messaging, ringtones and logos have been enormously successful worldwide, proving to be the killer app for the youth market. Even more, it has become a cash bonanza for mobile carriers. The revenue for each megabyte transferred over the wireless network is several orders of magnitude higher for SMS-oriented services. This has been especially attractive to operators in Asia and Europe, where a single GSM standard and high usage among youths has provided a healthy secondary revenue stream.

Revenue per megabyte for a Range of Wireless Services (US dollars)

Service	Kbytes consumed	Example Pricing	Revenue per megabyte (USD)
1 min voice call	144 kB	\$0.10 (US)	\$0.71
SMS message	0.1 kB	\$0.15 (UK)	\$1,573
SMS ringtone/logo	0.2 kB	\$2 (UK)	\$13,981
Complex ringtone/logo	2.0 kB	\$3 (UK)	\$1,536
Java download (game)	15 kB	\$3 (Japan)	\$204
MMS message	10 kB	\$0.50 (Germany)	\$51
5 mins WAP browsing	15 kB	\$0.45 (Italy)	\$31
5 mins web browsing	425 kB	\$1.28 (Italy)	\$3.07
4 minute MP3	1850 kB	\$5 (est)	\$1.78
90 min full motion film	691,200 kB	\$10 (est)	\$0.01

Source: Sound Partners, http://www.soundpartners.ltd.uk/Service_Profitability.htm

The United States is just starting to realize this. Text messaging functionality was not even consistent among the mobile operators, with each one calling it a different name. During marketing campaigns in 2001, AT&T called theirs "2-way text messaging"; VoiceStream, "e-notes"; Cingular, "Mobile to Mobile Messaging"; Verizon and Nextel, "Mobile Messaging"; and Sprint, "Short Mail." If one mention "SMS" to Americans, they are likely to look puzzled. Because of the variety of standards, only recently has there been text messaging interoperability among the operators.

Mobile users wanting the latest news, sports, weather or other text items usually must rely on their specific carrier to provide text services, or rely on whatever special joint agreements the carrier has with other data providers. However, in 2Q'2002 the major wireless operators agreed on text messaging interoperability, providing a major boost to consumers⁴. As a result the number of messages sent in the U.S. has skyrocketed. According to the Cellular Telecommunications & Internet Association, messaging volume has gone from 33 million messages in June 2001 to more than 1 billion sent in December 2002. In 2003, roughly 90 percent of American cell phones were able to accept text messages⁵, and roughly 60 percent able to send messages, according to Jupiter Research. The numbers look promising, but only 12% of cell phone users have ever sent a text message, lagging far behind users in Europe and Asia.

Companies such as New York-based UPOC (<http://www.upoc.com>) have emerged to help build mobile messaging communities across carriers. The UPOC service provides a single username for users that can be addressed via SMS or WAP methods. Users can then join specific interest groups, usually without incurring any other charges than the normal carrier-specific SMS or WAP fees. UPOC helps hide the differences among the various text messaging systems by putting users one level

above the carriers' technology. The business model of the UPOC service lies in delivering marketing messages and wireless coupons to customers, which they can opt into or out of.

Web Browsing with WAP

The Wireless Access Protocol was introduced with much hype in 1998 to provide mobile users access to Web-based content over circuit switched connections (9.6 kbps) or faster GPRS systems (roughly 40 kbps and lower latency). Partners Ericsson, Motorola, Nokia and Phone.com created the specification as a way to allow users Web access on the run.

However, WAP quickly acquired an unfavorable reputation because it required recrafting Web pages into its Wireless Markup Language (WML), which did not always render well on cell phones, and had limited support for graphics. In the United States, the combination of WAP and GPRS was put forth as the functional equivalent of Japan's i-mode, but the results were drastically different.

I-mode was created in a climate where DoCoMo worked closely with handset vendors and content partners to create a so-called "walled garden" – a vendor-maintained collection of content, customized and optimized for the consumer. I-mode users have a starting point in the middle of a rich collection of content, coherently assembled by DoCoMo. Content providers knew what capabilities they could depend on, because DoCoMo had dictated the exact features it wanted in its phones. The now-famous i-mode revenue model was a boon to all parties and especially the content partners, who received a 91% cut of the per-kilobyte fees paid by users. This symbiosis allowed DoCoMo and its partners to benefit from the consumer appetite for ringtones, logos, pictures, news and entertainment content.

WAP in the US, on the other hand, was an open marketplace, with a variety of handsets, a mix of content from the carriers and an assortment of Web sites which supported WML. Some sites worked well on some cell phones, others did not. There was no obvious way for content providers to make money on WAP, since the carriers received all the revenues from access fees. Without much direct payback from developing WAP sites, further development of content specifically for WAP-enabled phones was lackluster.

However, in April 2002, AT&T Wireless brought the i-mode model to the United States with its mMode offering. By working with DoCoMo, AT&T attempted to use WAP and GPRS as the technical standard, while creating a "walled garden" of its own with specific US content partners. With its name and revenue sharing model, AT&T has signed high profile partners such as Time Warner, Sony and Disney, while including instant messaging hooks with AOL and Yahoo!. So far, mMode has had moderate success, but it has been held back due to limitations of the WAP standard and the lack of a large user base.

AT&T mMode pricing, November 2003 (US dollars)

Plan	Monthly fee	Included data	Additional kilobytes
Mini	\$2.99	-	2 cents
Mega	\$7.99	1 megabyte	1 cent
Max	\$12.99	4 megabytes	0.8 cents

Ultra	\$19.99	8 megabytes	0.6 cents
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However, the new WAP 2.0 version of the protocol holds promise as it has been reengineered using an XML framework, allowing it much more flexibility than its predecessor. As a result, AT&T's mMode is relaunching with WAP 2.0 in Q4'2003, hoping to take advantage of the advanced graphical and interactive features of the new standard.

Handhelds

Perhaps more than any other market in the world, personal digital assistants (PDAs) users in the U.S. are a significant group for mobile applications. Popular for businesses, hospitals and personal use, PDAs have increasingly gained WiFi networking or other wireless communications capabilities via legacy networks (CDPD, Mobitex) or 2.5G offerings (1xRTT, GPRS). In Q3'2003, over 1.2 million units were sold in the United States, accounting for half of all worldwide sales in PDAs⁶.

Devices such as HP/Compaq, Palm, Dell, Sony, Research In Motion have proven popular, with many new models with builtin WiFi or GPRS support. Hybrid PDA/smartphones such as the Danger Hiptop and Handspring Treo add even more wireless handheld users to the mix. With larger screens and faster processor speeds than most mobile phones, handhelds can often run full-fledged Internet browsers such as Microsoft's Internet Explorer or other Java-enabled applications.

Location-based Services

In 2001, the United States Federal Communications Commission started the E911, or enhanced 911, initiative to allow emergency dispatch operators to be able to pinpoint emergency calls made from mobile phones. The result was a requirement for carriers to be able to pinpoint the location of any given caller down to 50 to 100 meters.

US carriers grudgingly developed the technology (at their own expense) to fulfill this requirement, using a combination of Global Positioning System (GPS) and cell phone tower triangulation methods. The residual benefit of having to comply with the FCC order is the opportunity to provide location-based services (LBS) for person-to-person services, navigation services and proximity-sensitive marketing. AT&T, has started an opt-in Find Friends service, in conjunction with startup Kivera, using the LBS features of its GSM system. It has also offered a go2 system for providing directions to restaurants and other landmarks, as well as Brand Finder and ATM finder, for finding automated teller machines.⁷

For the U.S.'s automobile-centric culture, traffic reports are important LBS services for people on the run. One example is the use of GPS in conjunction with a PDA to provide real-time traffic conditions. On Microsoft Windows Pocket PC devices, Pharos has created Smart Navigator, that uses the location of the handheld to provide traffic recommendations between the user's current position and the desired destination⁸.

Mobile blogs.

Web logs have emerged as an important part of the media ecology worldwide, with an even more significant impact in the United States. These chronological, Web-based digests have become important to reporting on the ongoing war on terrorism, following political campaigns and providing alternative viewpoints. Presidential candidate Howard Dean has used web logs to help become the number one Democratic fundraiser. Much of the web logging on the campaign trail has been by volunteers in various cities, using laptops and wireless connections.

A new phenomenon of *moblogs*, or mobile logs, has emerged with the advent of wireless packet data networks. Picture phones using MMS or picture email can post directly to web sites with the touch of a button with sites such as TextAmerica, (<http://www.textamerica.com/>)

Photos

Following the enormous consumer success of digital cameras, picture phones have already made a big splash in the market place. In the first half of 2003, 25 million camera phones shipped worldwide, compared with just 20 million digital still cameras.⁹ Camera phones will account for 13 percent of global handset sales, totaling 65 million camera phones worldwide. Once seen as a high end capability, the simple picture/video camera is quickly becoming as ubiquitous as a microphone or audio speaker. Many consumers will likely buy phones with a camera “thrown in” without their specifically choosing it.

Nearly all the U.S. mobile carriers support picture phone messaging using MMS or other methods, with the exception of Nextel which focuses mainly on corporate and industrial users and has a limited range of Motorola manufactured handsets. Because of the extra bandwidth required for satisfactory performance, most offerings are bound to the carriers’ 2.5 G services. Most of the picture messaging services range from 30 to 50 cents per message¹⁰.

- Sprint PCS Vision “Pictures”, (1x)
- AT&T mMode Pix service (GPRS)
- Cingular Photo Messaging Internet Express (GPRS)
- T-Mobile T-Zones (GPRS)
- Verizon Wireless PIX (airtime)

Video

The pioneers in using wireless video have been AT&T Wireless, Sprint PCS and T-Mobile, with all of them allowing motion video and sound to be transmitted over their 2.5G networks. With T-Mobile’s Nokia 3650 video phone, 10 seconds of video and audio can be sent to an email address using their GPRS network.¹¹

However, AT&T Wireless and Sprint PCS have started to turn mobile phones into viewing platforms by supporting streaming video.

AT&T Wireless offers video through their mMode service using Real Networks’ content, similar to what can be found on the Internet through their RealOne player on the Web. Since Real has been one of the most popular ways of delivering compressed

video over the Internet, the range of content available is quite large. While the Real content consists of stored clips, and not live TV, the quality is of fairly high quality. and the base charge is \$6 per month, in addition to any of the carrier's data charges.¹²

Sprint PCS, in August 2003, also started supporting RealPlayer from Real Networks. However, in November 2003, it announced the availability of MobiTV, which provides actual live TV feeds from MSNBC, CNBC, Discovery Channel and The Learning Channel among others for a fee of \$10 per month, in addition to data charges from Sprint PCS¹³. While the live feeds do lag roughly 30 seconds behind the live television feed, it has delivered quite acceptable quality and has been praised by early users. MobiTV is a J2ME application, meaning it can be run on a variety of phones that support the popular Java platform.¹⁴

Summary

Given these advances, this is quite a dramatic development in the history of cellular networks in the United States. What were once strictly telecommunications networks for person-to-person communications have begun to take on attributes of broadcasting networks. This will most certainly have implications for future content, as cable, telecommunications and Internet service providers are virtually indistinguishable from each other.

The other question is bandwidth, and whether video messaging, streaming and broadcasting will indeed provide the incentive to move to faster networks and larger deployment of 3G type speeds, at 3G prices. Much of this depends on when the United States FCC will be ready to auction off new spectrum for the wireless carriers. However, the rise of WiFi as an unmetered, open standard being adopted in a grassroots manner is putting the onus on 3G to prove its worth. WiFi today is successful only in isolated patches across the country, but it has already provided a glimpse of the future – bandwidth which will be so cheap a commodity that it will be hard to justify the escalating pricing schemes.

As wireless bandwidth becomes a commodity, resulting mobile content will become more innovative as individuals will be free to experiment with pictures, video and location based services. Cameras, color screens and packet data will be on nearly every cell phone by default, creating millions of citizen reporters, storytellers and artists. As the recent popularity of digital still cameras have illustrated, pictures will be the killer application, as compelling use of video remains elusive for ordinary users.

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