

The Third Wave: Why Network Availability and Quality Are Key to Wireless Service Provider Success

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Contributing Analyst: Darryl Sterling, Analyst: Charles Gerlach

charles.gerlach@reedbusiness.com

+1.312.224.2674

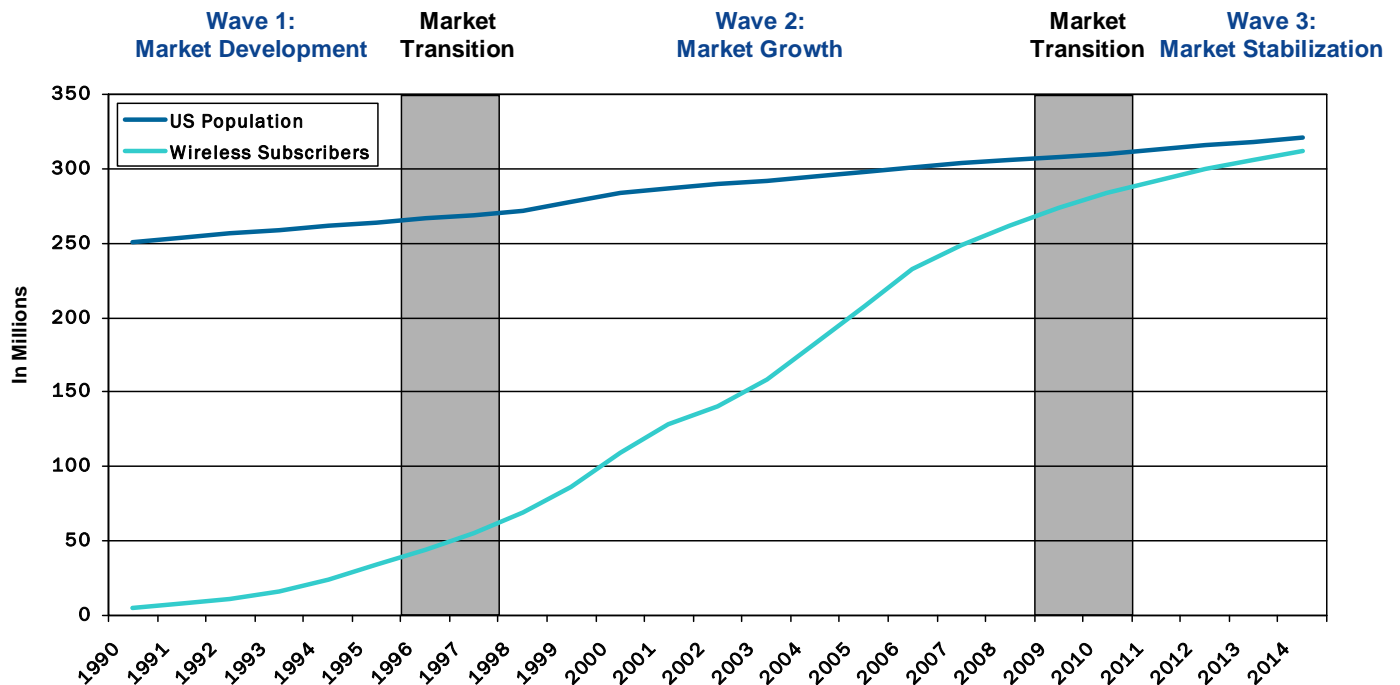
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Executive Summary

After more than 20 years of rapid growth, the US wireless industry is about to enter its next phase of development, which In-Stat calls the Third Wave. Several key indicators suggest the industry is now facing a new set of challenges that will enable wireless services to become even more embedded in the daily lives of US citizens. By year-end 2007, the US wireless industry will reach over 80% penetration of the US population. This phenomenon, combined with roll-out of third generation network technologies, the proliferation of wireless and mobile devices, and the breadth of multimedia content, software, applications and services that are now being pumped through the network, demands new business strategies from service providers that wish to remain competitive in the maturing market.

Where the market was once driven by growth-oriented service provider strategies, including the expansion of distribution channels, the acquisition of subscribers, and the adoption of technologies that significantly increase capacity, new market conditions suggest service providers now need to adopt new strategies to better support the emerging market. The era of aggressive subscriber growth is over.

Figure 1. US Wireless Subscriber Penetration, 1990–2014



Source: Annual Estimates of the Population for the United States, Population Division, U.S. Census Bureau; CTIA Semi-Annual Wireless Industry Survey; In-Stat Analysis, 7/07

In this new era, success in the US wireless industry will be determined by network availability and quality, and measured by customer satisfaction, network usage, and low churn. Why? First, wireless network technologies are now mature enough that they are beginning to compete for usage with their wireline counterparts. Although this may not be as serious an issue for full service telecom providers like Verizon and AT&T that operate wireless and wireline network facilities, wireless will continue to make up an increasing portion of an individual's day-to-day bandwidth consumption.

As wireless competes with and supplements wireline bandwidth consumption, there will be increasing pressure on wireless network providers to offer the same quality and availability of bandwidth that consumers have come to expect on wireline networks. Considering the increasing amount of content and number of devices that can potentially attach to wireless networks, there is a strong market demand for a consistent and reliable supply of bandwidth. This fundamental market need puts more emphasis on carriers to increase network availability and quality that can drive additional subscriber voice and data usage.

What evidence exists that supports the claim that wireless subscribers want higher quality bandwidth? According to In-Stat survey data (June 2007), the primary reasons why wireless subscribers left their previous service providers was due to poor coverage, dropped calls, and network outages. Wireless service providers have invested in a number of initiatives that address these specific customer issues, such as network build out and upgrades. And, over time, this has led to lower churn, higher overall satisfaction, and more long-term customer.

However, carrier initiatives have only partially addressed the needs of customers as they pertain to the shortcomings of the network. While service providers have invested in coverage and network technology upgrades, they have invested very little in technologies or strategies that improve network management and maintenance, which are the main drivers of dropped calls and network outages.

If, considering previous service provider investments, the rule of thumb is that service provider strategies that address specific reasons for customer dissatisfaction, specifically, pricing plans, customer service response and billing problems, have a tremendous impact on service provider competitiveness, then investments in network availability and quality solutions should also have a noticeable impact on service provider performance.

The purpose of this paper is to explain the importance of network availability and quality in the context of the maturing US wireless market, and how wireless service providers can leverage network management solutions to improve overall financial performance through decreasing operating expenses, and increasing labor efficiency and capacity.

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Introduction: The Three Waves of Market Growth

In order to create a better understanding of key drivers behind the growth of the US wireless market, In-Stat created a framework that looks at the market historically from customer, technology, and service provider strategy perspectives. In the First Wave of market growth (between 1985 and 1996), the industry was primarily concerned with creating the basic value proposition of wireless service. For service providers, this involved acquiring spectrum, and building out analog cellular wireless technologies in key markets for people to use the service. For customers, the primary driver of adoption was the basic value proposition of the service with respect to usage and price.

The Second Wave of market development (between 1997 and 2009) has been the golden age of digital technologies in the US market. Two competing families of digital PCS and cellular technologies (CDMA and GSM) eventually cannibalized numerous other wireless technologies, including analog cellular, paging, cellular digital packet data, local multipoint distribution service, multichannel multipoint distribution service and, to some extent, integrated digital enhanced network, among others. This stage of market growth was also enabled by the auctioning of US spectrum in 1997.

For service providers, this was the gold rush stage for acquiring subscribers, driven by competitive pricing plans and the expansion of distribution channels. Furthermore, the increase in bandwidth offered by digital network technologies allowed service providers to increase network capacity and coverage, and to drive growth through offering new services through service portals (i.e., the walled-garden strategy). As the market became invigorated by new spectrum and technology, competitive factors had an increased bearing on the direction of the market. The market consolidated from as many as 7 service providers per market to an average of a little more than 4 today. Within the last 5 years, service providers even went through a period of cost reductions and cost structure optimization to further improve their competitive positions.

Last, the market went through a stage of mass adoption, where demands increased for better network coverage and quality, and knowledge of how to use the technology expanded along with subscribers' basic understanding of the value proposition of wireless.

Table 1. Characteristics of the Three Waves of US Wireless Industry Maturity

Market Segment	Wave 1: Market Birth	Wave 2: Market Growth	Wave 3: Market Stabilization
Customers	<ul style="list-style-type: none"> ▪ Early adopters ▪ Establish basic value proposition of service ▪ Learn how to use service 	<ul style="list-style-type: none"> ▪ Mass adopters ▪ Expand basic value proposition to include new features, services and applications ▪ Expand knowledge of how to use service ▪ Demand for better network coverage and quality 	<ul style="list-style-type: none"> ▪ Late adopters and experienced users ▪ Expanded value proposition to include full scope of multimedia content, services and applications from the Web ▪ Know how to use the service and in what contexts ▪ Assumed and understood level of network reliability
Technology	<ul style="list-style-type: none"> ▪ Analog ▪ Cellular 	<ul style="list-style-type: none"> ▪ PCS ▪ 2G Networks: CDMA, CDMA 1x, GSM, GPRS and EDGE ▪ 3G Networks: CDMA EV-DO, WCDMA/HSDPA ▪ Cannibalization of multiple alternative wireless technologies, including Paging, CDPD, LMDS, MMDS, iDEN, analog, etc 	<ul style="list-style-type: none"> ▪ 4G Networks: WiMax ▪ Mobile Video
Service Provider Business Strategy	<ul style="list-style-type: none"> ▪ Establish the market 	<ul style="list-style-type: none"> ▪ Competitive pricing ▪ Expand distribution channels to grow subscriber base ▪ Increase network capacity and coverage ▪ Drive economies of scale and scope (consolidation) ▪ Reduce and optimize cost structure ▪ Drive revenue growth through service portals (walled gardens) 	<ul style="list-style-type: none"> ▪ Expand network utility to compete with wireline ▪ Expand offerings to include full scope of multimedia content, services and applications ▪ Drive additional revenue from network assets ▪ Improve quality and efficiency of business operations

Source: In-Stat Analysis, 8/07

By 2009, In-Stat believes the US wireless market will start its transition toward its Third Wave of growth, during which the market will stabilize. As the years of double digit subscriber and revenue growth come to an end, service providers will once again have to reorient their strategies around the context of the market. Unlike in the first two waves of market growth, the Third Wave is less focused on the introduction of new spectrum and technologies, and more focused on providing blanket, high-quality bandwidth coverage demanded by very experienced and demanding subscribers. New technologies and applications, such as WiMAX and Mobile TV have already been introduced, but at this point they appear to be supplemental to the core 3G data networks.

As the market exceeds 80% wireless penetration, service providers will focus on keeping the customers that they already have and offering a wider breadth of services. The main strategy for customer retention in this phase of the market has been improving network quality and efficiency, and expanding their service offerings to include the full scope of multimedia content, service and applications that are available on the Internet. This strategy has been reinforced by the initiatives of service providers to expand coverage and upgrade network technologies to 3G data capability, which provides the highest network speeds and the most bandwidth.

The market for customers will also significantly change. Service providers are now dealing with a large base of experienced consumers who have a solid expectation about the value proposition of their wireless service and what they can expect for the price.

The combination of maturing subscribers, technologies and business strategies suggests that the US wireless market is about to enter a period of stabilization where the metrics and indicators that have been formerly used to evaluate the potential of the market are no longer relevant.

What strategies can be employed by wireless service providers in the next few years to address the supply and demand needs of the Third Wave?

Defining a Mature US Wireless Market

In order to develop an appropriate strategy to address the market context of the Third Wave, In-Stat aggregated, forecasted, and analyzed several sources of publicly available market data, and service provider operating and network build out data. The main goal of the analysis was to determine the key data points and factors that drive the ability of US wireless service providers to drive profitability, and network quality and availability.

Table 2. US Wireless Industry Operating Data, 2003–2006
Top 4 Service Providers ¹

	2003	2004	2005	2006	CAGR	NOTES
Subscribers (millions)	90.6	151.1	174.8	198.1	29.8%	
Monthly Churn Rate	2.39%	2.36%	2.04%	1.98%	NA	Based on weighted average by subscribers
Avg. MOUs	627	749	822	897	12.7%	Excludes AT&T/Cingular data; based on weighted average of Sprint Nextel, T-Mobile USA and Verizon Wireless
Average Revenue per Unit	\$51.78	\$52.82	\$51.57	\$50.40	NA	Based on total service revenues and total subscribers
Avg. Revenue per MOU	\$0.083	\$0.071	\$0.063	\$0.056	-12.1%	
Cash Cost per Unit	\$39.45	\$36.85	\$36.38	34.81	-4.1%	Based on total cost of services and total SG&A
Avg. Cost per MOU	\$0.063	\$0.049	\$0.044	\$0.039	-14.9%	

CTIA Semi-Annual Wireless Industry Survey

	2003	2004	2005	2006	CAGR	NOTES
U.S. Subscribers (millions)	158.7	182.1	207.9	233.0	13.7%	
Top 4/Total Subscribers	57.1%	83.0%	84.1%	85.0%	NA	Evidence of industry consolidation
Average Revenue per Unit	\$49.91	\$50.64	\$49.98	\$50.56	NA	

Note: (1) The top four U.S. wireless service providers are AT&T/Cingular, Verizon Wireless, Sprint-Nextel and T-Mobile USA.
Source: Company earnings reports and filings; CTIA Semi-Annual Wireless Industry Survey; In-Stat Analysis, 7/07

Key Findings from Operating Data Analysis

From an operating data perspective, the three most important variables that determine future service provider revenue opportunity are subscribers, minutes of use (MOUs) and average revenue per MOU. Assuming that the maximum penetration of the US market is 100% and that the entire industry will eventually consolidate around the top 4 service providers, we can only expect an average annual subscriber growth rate of 7.1% between 2007 and 2012. Assuming MOUs per subscriber grows at approximately 4.5% per year for the same period (resulting in a total of almost 1,200 MOUs per month per subscriber in 2012), and average revenue per MOU declines at a modest rate of 6.0% per year (bottoming out at \$0.039 per minute in 2012), the increase in MOUs is offset by the decline in revenue per MOU—over time ARPU therefore declines.

Accounting for Data Usage

However, ARPU can not be legitimately forecasted by only taking MOUs into consideration, especially since data revenues are becoming a larger and larger portion of overall service revenues.

Due to the way US service providers report operational and financial data, it is extremely difficult to develop a methodology for assessing a unit price for data usage. In 2006, data revenues accounted for 12.7% of service revenues, but no information was provided in publicly available company reports with respect to the average quantity of data transmitted per subscriber, or the average speed or average amount of time required for each individual customer to transmit data.

Therefore, for purposes of this study, it is assumed that data usage is bundled into the price of an MOU, and that, over time, data becomes an increasingly large portion of the price per MOU. Furthermore, it is also assumed that the combination of competitive pricing and increasing network capacity will drive ARPUs down, regardless of increases in voice and data usage.

New Concepts for Revenue Growth and Churn

Under these market assumptions, ARPU peaks at \$50.82 per month in 2007 and declines to \$45.17 per month in 2012. Taking into consideration overall industry subscriber growth, this means total industry revenues peak in 2012 at \$158.3 billion, and start declining—assuming no other new services or technologies are introduced into the market that drive significant increases in subscribers or service usage (e.g., iPhone, Ultramobile PCs, Mobile TV). Sufficient data currently does not exist to reliably forecast the revenue impact of these new devices and services within this study's time frame. There are uncertain revenue growth opportunities after 2012.

Over the same period from 2007–2012, we expect monthly industry churn to decline at a rate of 6.1% per year (bottoming out at 1.35% per month in 2012). This reduction in monthly churn reduces annual churn from 22.4% of the year-end base in 2006 to 15.9% of the year-end base in 2012. Up until now, monthly churn has had a significant impact on service provider financial performance due primarily to the cost of acquiring and reacquiring customers. Therefore, high churn in the past essentially meant higher operating costs to service providers.

In the Third Wave, where there are fewer customers to acquire, the potential for driving growth through the limited number of subscribers that are left to acquire is offset by the profit potential of retained customers. In fact, the benefit of retaining customers is further emphasized if the costs of supporting each individual customer (e.g., Cash Cost per Unit) can be reduced faster than ARPU. In the past, churn may have been perceived as a cost lever, but in the future it will be perceived as a profit lever.

Table 3. US Wireless Industry Operating and Network Data Forecast, 2007–2012

Top 4 Service Providers

	2007	2008	2009	2010	2011	2012	Assumptions
Subscribers (millions)	217.7	235.9	253.0	269.3	284.8	299.4	Top 4 control 100% by 2012
Cell Sites (thousands)	173.9	190.3	206.6	222.9	239.3	255.6	
Subscribers/Cell Site	1,251.6	1,240.0	1,224.7	1,207.8	1,190.1	1,171.5	
MOU	962	1,018	1,065	1,105	1,138	1,165	YoY growth rate is 4.5% per year
Avg. Revenue per MOU	\$0.053	\$0.050	\$0.047	\$0.044	\$0.041	\$0.039	YoY price declines by 6.0% per year
ARPU	\$50.82	\$50.55	\$49.73	\$48.48	\$46.93	\$45.17	
Monthly Churn	1.86%	1.74%	1.64%	1.54%	1.44%	1.35%	YoY churn rate declines by 6.1% per year
Annual Churn	21.4%	20.2%	19.0%	17.9%	16.9%	15.9%	Total disconnects/year-end subscribers

CTIA Semi-Annual Wireless Industry Survey

	2007	2008	2009	2010	2011	2012	Assumptions
Subscribers (millions)	248.7	262.1	273.5	283.4	292.0	299.4	Based on 100% penetration max adoption
Cell Sites (thousands)	205.6	215.6	225.6	235.6	245.6	255.6	Assume 10,000 site builds per year
Subscribers/Cell Sites	1,209.6	1,215.5	1,212.3	1,202.8	1,189.0	1,171.5	

Source: Company earnings reports and filings; CTIA Semi-Annual Wireless Industry Survey; In-Stat Analysis, 7/07

Subscriber ROI, Prepaid and Customer Acquisition Costs

In the Third Wave, service providers will break even on more customers and prepaid subscribers will make up a larger part of the subscriber base. Both of these phenomena will have a significant impact on service provider profitability. In the past, service providers invested a significant amount of money in the acquisition of each customer, in the hopes that the customer would stay with the same carrier for a length of time that would allow the carrier to break even. Considering that annual churn (based on year-end subscribers) was as high as 27.1% as recently as 2003, service providers were not even breaking even on a significant part of their acquired customer base. However, with the annual churn rate at 21.4% in 2006, In-Stat believes the likelihood of service providers breaking even on acquiring each customer will increase.

According to In-Stat analysis, in 2006 it took US wireless service providers an average of 2 years to break even on a customer acquisition. An In-Stat survey of wireless subscribers conducted in June 2007 indicated that the average number of subscription years per customer with the same carrier was 1.8 years. Over time, we expect these numbers to continue to converge. In the future, service providers will be more likely to break even on every customer they acquire because subscribers will be less likely to change service providers, and will stay with their provider longer. Therefore, the breakeven period in years will continue to decline on its current trajectory.

Table 4. Subscriber Breakeven Analysis, US Wireless Industry Averages, 2003–2006

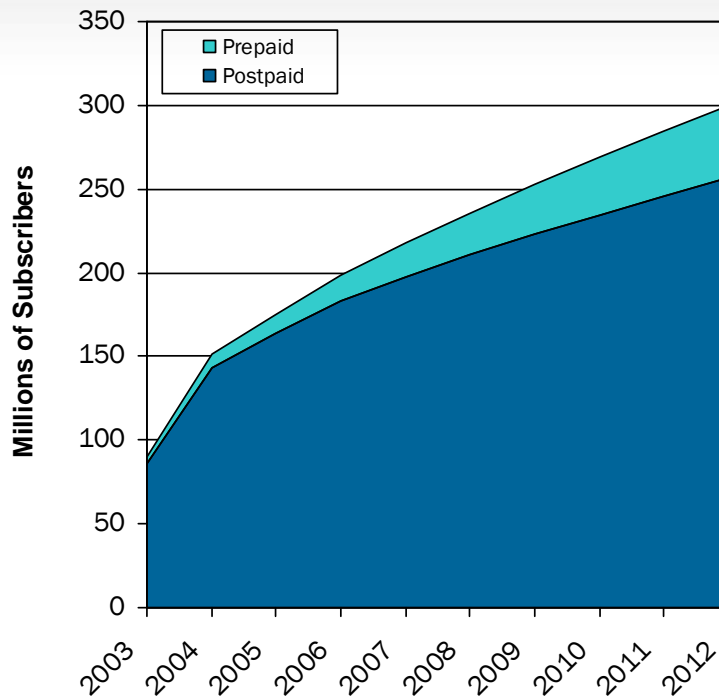
	2003	2004	2005	2006
Cost per Gross Add	\$388	\$419	\$383	\$378
Average Revenue per Unit (monthly)	\$51.78	\$52.82	\$51.57	\$50.40
Cash Cost Per Unit (monthly)	\$39.45	\$36.85	\$36.38	\$34.81
Profit per Unit (monthly)	\$12.34	\$15.98	\$15.20	\$15.59
Breakeven (months)	31.4	26.2	25.2	24.3
Breakeven (years)	2.6	2.2	2.1	2.0

Note: Based on top four U.S. wireless service providers.
Source: Company earnings reports and filings: In-Stat Analysis, 7/07

In addition, In-Stat believes that total customer acquisition costs over time (as based on average Cost per Gross Add (CPGA) will decline over time due to the increasing percentage of prepaid subscribers entering the market. In 2006, approximately 7.5% of US wireless subscribers were prepaid. By 2012, In-Stat projects that prepaid subscribers will make up approximately 14.1% of the market. Furthermore, In-Stat research shows that CPGA has been declining over the last three years. In-Stat believes the combination of an increase in prepaid subscribers and a drop in CPGA will result in the overall reduction of Customer Acquisition Costs for each carrier over the study period.

In short, two of the main service provider expenses, churn and customer acquisition costs, will have less of an impact on profitability as the market matures.

Figure 2. US Wireless Industry: Prepaid vs. Postpaid Subscriber Forecast, 2003–2012



Millions of Subscribers	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total	91	151	175	198	218	236	253	269	285	299
Prepaid	5	8	12	15	20	25	30	35	39	42
Prepaid/ Total	5.0%	5.5%	6.6%	7.5%	9.2%	10.7%	12.0%	12.9%	13.6%	14.1%

Source: Company earnings reports and filings; CTIA Semi-Annual Wireless Industry Survey; In-Stat Analysis, 7/07

Key Findings from Network Operating Data Analysis

From a network data perspective, the two most important variables that influence service provider revenue potential and profitability are total number of cell sites and 3G data network coverage. (For purposes of this report, 3G data network technologies refer to CDMA EV-DO and WCDMA/HSDPA only. GPRS and EDGE are not considered 3G data network technologies.) For the period from 2007–2012, we expect the top 4 service providers to add more than 16,300 cell sites a year in aggregate (i.e., 4,075 cell site builds each per year) to their networks to expand network coverage and capacity. A key indicator of this build out is the ratio of nationwide subscribers to nationwide cell sites.

The concept of network build out and expansion is further emphasized by the average roaming revenue per cell site. Between 1990 and 2004, there was only one year where roaming revenues per cell site declined—2000. Starting in 2005, roaming revenues started declining by an average of 15% per year.

As service providers have expanded their networks and capacity, the need for their subscribers to roam onto competing networks has declined, as reflected by the decrease in roaming revenues per cell site.

Considering that the US market is at the tail end of a high growth phase, it has been very difficult for service providers to build out their networks at the rate comparable with subscriber growth. As a result, the ratio of subscribers to cell sites steadily increased until it peaked in 2006 at 1,257.4. In the Third Wave, subscriber growth will slow, so service providers will catch up with their network build outs—we expect the ratio of subscribers to cell sites to be 1,171.5 in 2012, which represents a 7.0% decline in the ratio from 1,257.4 in 2006. This indicates that there will be more network capacity per subscriber, and that subscribers will experience fewer network busy signals, dropped calls and crosstalk due to network overcapacity.

Furthermore, information from the top 4 service providers indicates that the 3G data network upgrades are well on their way. Verizon Wireless and Sprint Nextel claim that they will have CDMA EV-DO Rev. A coverage built out to 100% of their networks by year-end 2007, representing 48.1% of US subscribers in 2006. Although AT&T/Cingular had only built out WCDMA/HSDPA coverage to approximately 6.0% of their network at year-end 2006, and T-Mobile USA had only rolled out EDGE coverage with no formal plans to build out WCDMA/HSDPA, we expect both service providers to complete build out of their 3G data technologies within the next 4 years. 3G data network build out will dramatically increase the amount of network capacity available to each subscriber.

Table 5. US Wireless Industry Network Data, 2003–2006

Top 4 Service Providers

	2003	2004	2005	2006	CAGR	NOTES
Subscribers (millions)	90.6	151.1	174.8	198.1	29.8%	
Cell Sites (thousands)	86.3	107.0	140.7	157.6	22.2%	Based on total cell sites
Average Subs per Cell Site	1.05	1.41	1.24	1.26		Based on total cell sites and subscribers
Percent 3G Data Coverage	2.4%	17.5%	33.9%	46.5%		3G Data Coverage means CDMA EV-DO and 3G HSDPA build out
3G Data-Enabled Cell Sites (millions)	2.1	18.7	47.7	73.3	226.7%	

CTIA Semi-Annual Wireless Industry Survey

	2003	2004	2005	2006	CAGR	NOTES
Total Cell Sites (thousands)	163.0	175.7	183.7	195.6	6.3%	
Top 4/Total Cell Sites	53.0%	60.9%	76.6%	80.6%	NA	Evidence of industry consolidation

Source: Company earnings reports and filings; CTIA Semi-Annual Wireless Industry Survey; In-Stat Analysis, 7/07

Further Assumptions about the Maturing US Wireless Market

Based on current market conditions and trends, In-Stat made a number of assumptions about how the US wireless market will progress from 2007 to 2014.

In the maturing US wireless market, the business case for auctioning more spectrum and implementing new network technologies is unknown:

- The industry is already in the process of expanding coverage and capacity
- Despite the introduction of new technologies, there seems to be sufficient bandwidth and capacity available to meet consumer needs

In conjunction with Media & Entertainment (M&E) companies and Consumer Electronics (CE) vendors, wireless service providers will seek to add significant quantities of content onto their networks over the period from 2007 through 2012.

- Because a strong part of the M&E and CE value proposition is based on the ability of the wireless network to deliver a favorable user experience, M&E and CE companies are going to continue to use as much bandwidth as possible to improve their own offerings
- In addition, M&E and CE companies may also seek strategies to bundle high bandwidth service quality with their content, services and applications to strengthen their own value propositions

In the period following the post-Internet-Bubble telecom recession, carriers have become much more aggressive about cutting costs, and cautious about how they build their business and make strategic decisions.

- Therefore, we expect service providers to put much more emphasis on their Return on Network Assets and ROI, rather than growth and margins

The Impact of Market Competitiveness—The Herfindahl-Hirschman Index

In order to develop a relative understanding of the competitiveness of the US wireless industry, In-Stat used the Herfindahl-Hirschman Index (HHI). HHI is a measure of the size of firms in relationship to the industry and an indicator of the amount of competition among them. It is defined as the sum of the squares of the market shares of each individual firm. As such, it can range from 0 to 1 moving from a very large amount of very small firms to a single monopolistic producer. Decreases in the HHI generally indicate a loss of pricing power and an increase in competition, whereas increases imply the opposite.

The Herfindahl-Hirschman Index for the US wireless industry suggests the market is very competitive, and that service providers have decreasing pricing power. Therefore, despite the fact that service providers would like to earn higher ARPU over the 2007–2012 timeframe, they may not have the pricing power to do so without incurring more costs.

Table 6. Market Share by Subscribers and HHI Score, 2003–2006

	2003	2004	2005	2006
AT&T/Cingular	15.1%	27.0%	26.0%	26.2%
Sprint Nextel	10.0%	22.4%	22.9%	22.8%
T-Mobile	8.3%	9.5%	10.4%	10.7%
Verizon Wireless	23.6%	24.1%	24.7%	25.3%
Other	42.9%	17.0%	15.9%	15.0%
HHI Score	0.280	0.219	0.218	0.218

Source: Company earnings reports and filings; In-Stat Analysis, 8/07

The Wireless Dilemma: The Pressure of Competing in a Mature Market

In-Stat analysis has established several key points about the maturing wireless market:

- The revenue growth prospects are uncertain
- The cost of acquiring customers will have less of an impact on profitability
- Service providers will continue to build out cell sites and upgrade their networks to next generation network technologies
- M&E and CE companies will continue to leverage the network for new and innovative services
- The wireless market will remain competitive

Throughout the history of the wireless market, service providers have continued on an inexorable march to generate enough cash flow to continually invest in their network assets. However, based on some of the emerging market conditions, it will be more difficult to execute this business strategy.

Many industries and companies want to leverage the capabilities of the wireless network, but no one wants to invest the capital. This puts a tremendous strain on service providers to shoulder the investment burden. In addition, the more companies and subscribers that use the network, the more complex the network gets. The main drivers of network investment are to expand coverage, build capacity, and improve throughput. Much of this is achieved through multiple new technologies and media format standards. The result is that the network becomes more complex and expensive to run and to maintain.

Therefore, as the market matures, service providers will be put under increasing pressure to manage the cost and complexity of the network, while improving their return on network assets.

The Impact of Poor Cell Phone Experiences on Customers

What Survey Data Exists that Support our Claims about Market Maturity?

In-Stat's June 2007 survey of 1,004 wireless users addressed the drivers and incidences of customer dissatisfaction and churn. By combining this data with actual operating data from the top four service providers, In-Stat was able to determine a number of factors that support claims about how the market is maturing.

Table 7. Summary of Operating Data, Network Data, and Survey Data Findings

Carriers	Operating Data			Network Data		Survey Data	
	Market Share (YE 2006 Est.)	ARPU (YE 2006)	Monthly Churn Rate (2006)	Subscriber per Cell Site (YE 2006)	3G Data Network Build Out (YE 2006)	Length of time with current carrier: More than 2 years (n=683)	What will do at end of contract: Stay with current carrier (n=491)
Verizon Wireless	25.3%	\$49.80	1.17%	2,220	78.1%	32.4%	35.4%
AT&T/Cingular	26.2%	\$46.11	1.8%	NA	6.0%	26.4%	23.4%
Sprint Nextel	22.8%	\$58.55	2.64%	870	75.8%	16.3%	14.7%
T-Mobile	10.7%	\$55.00	2.9%	694	0.0%	10.2%	10.2%

Source: Company earnings reports and filings; In-Stat Primary Research, 6/07; In-Stat Analysis 7/07

First, the survey data demonstrates the strong correlation between customer satisfaction and churn. Service providers that have the lowest churn have the most subscribers that have stayed with their service providers for more than two years, and have the largest number of subscribers that intend to stay with their current service provider at the end of their current contracts. They also have the highest market share. Taken together, this implies that carriers with the highest level of customer satisfaction have the lowest churn rates.

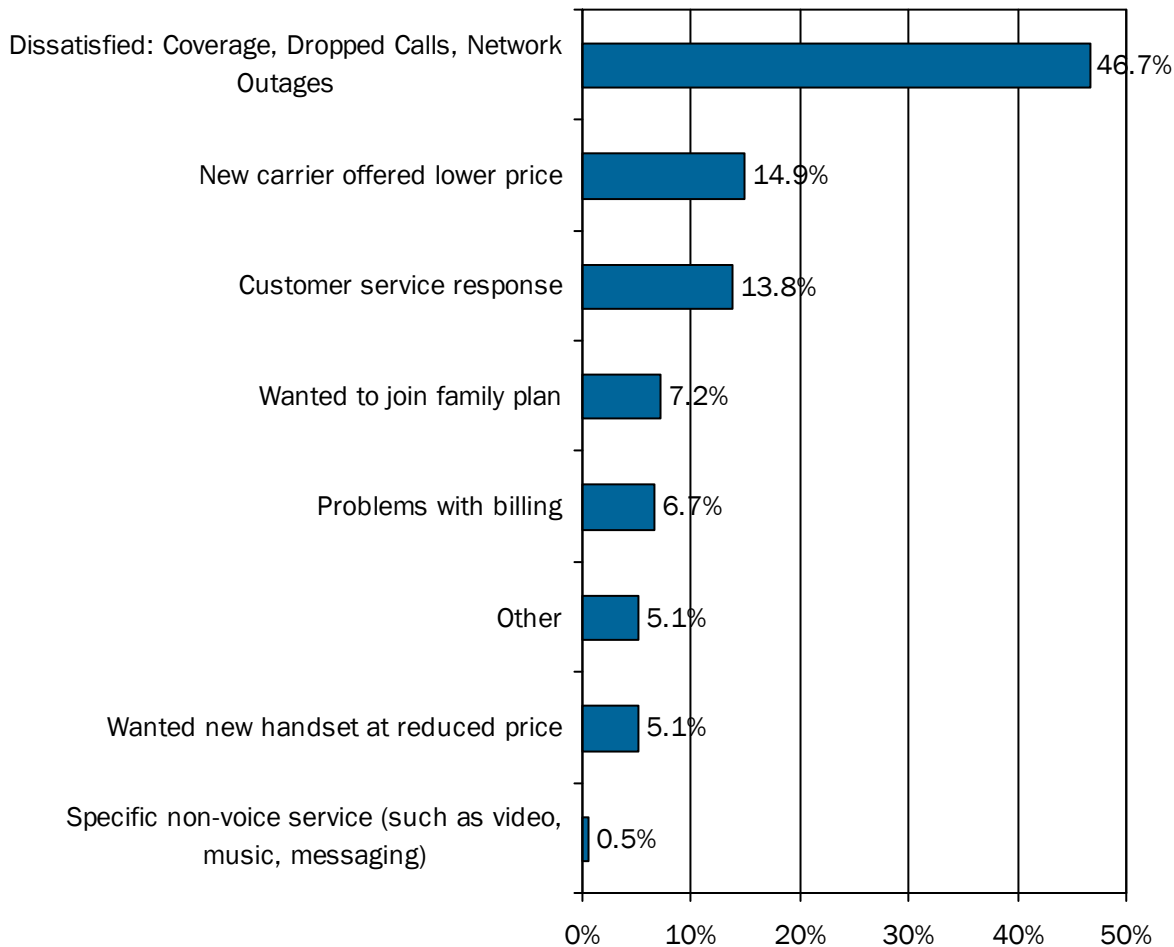
Second, there is no evidence supporting that a better subscriber/cell site ratio or a higher percentage build out of 3G data network capability results in higher market share, ARPU, customer satisfaction or increased years with current provider. This may be the case now, but it will probably not be the case in the future. Considering that data revenues accounted for 12.7% of ARPU in 2006 and is on the rise, subscribers per cell site and 3G data network build out may be a key competitive differentiator over the next few years.

Last, survey data also shows that price is not as significant a factor as dissatisfaction in convincing subscribers to churn to different service providers. 27.2% of respondents claimed to leave their previous service providers for a lower price, a family plan, or a deal including a new handset. In comparison, 46.7% of subscribers claimed to churn due to dissatisfaction with coverage, dropped calls or network outages.

All together, In-Stat interprets this data to mean that if service providers address the main issues that cause customers to be dissatisfied (which are problems with network coverage, dropped calls, and network outages), they can lower their incidence of churn, which has a number of trickle-down effects. It can result in longer-term subscribers that will potentially increase overall service provider profitability.

Figure 3. Primary Reason for Subscribers to Churn

What is the primary reason you chose to leave your previous wireless carrier?
 N=195



Source: In-Stat Primary Research, 6/07

Wireless Service Provider Strategies in the Maturing Market

Through an analysis of market data, service provider data and survey data, In-Stat has been able to establish several key characteristics about the future US wireless market:

- Investment in network technologies will continue at a torrid pace
- Competition among the top service providers will remain fierce
- Network-related problems are at the root of most customer dissatisfaction

All of these factors refocus attention on churn, not so much as a lever of cost, but more as a lever of profit in the emerging market.

In addition, increased demand for wireless data services places a new imperative on wireless service providers to ensure and enhance network quality. Modern digital wireline systems today provide “five-nine” reliability, which means the network is available for use 99.999% of the time for a given year. (This means a person trying to make a call on a digital wireline network would have no dial-tone for roughly 5.26 minutes for the entire year.) However, many wireless service provider networks do not operate at this type of availability, and are therefore considered not as reliable. In fact, they operate at reliability levels that are much less. In wireline voice telephony, communications links that do not provide at least “four-nine” availability, or are available 99.99% of the time, are considered faulty because they interfere with the ability of subscribers to hold a conversation. In data communications, the need for network availability is even greater—most data communications require even higher levels of reliability.

In the absence of this type of network availability, communications protocols are designed to detect, correct, and retransmit data packets over these networks until the data transmission is complete. Improvement in network reliability and availability should improve data usage, increase overall customer satisfaction with data services, and create more bandwidth for service providers to sell to other customers. All of these results would support the main service provider initiative to maximize profits from their network assets.

These emerging market issues dictate a fundamental shift in service provider strategy. In the recent past, with the market in a high-growth phase, service provider strategy was focused on growth, margins, and debt reduction. The primary gauge for service provider success was subscriber growth and ARPU. Revenue growth was partially offset by customer acquisitions costs and churn, which was an indicator of true growth (gross additions) rather than net growth (net additions). Any improvement in net income generated by revenue growth and a reduction in costs had a positive impact on cash flow that could be reinvested in the network and used to pay down debt.

Table 8. Impact of Maturing Market Issues on Service Provider Financial Performance

Established Claim	Potential Impact on Earnings
Limited Subscriber Growth	<ul style="list-style-type: none"> Limited revenue growth potential
Limited Service Revenue Growth	
Limited Pricing Power	
Churn Reduction	<ul style="list-style-type: none"> Decrease in total Customer Acquisition Costs
Increase in Prepaid Subscribers	
Increase in Cell Sites	<ul style="list-style-type: none"> Continued investment in network build out and upgrades
Build Out of 3G Data Networks	

Source: In-Stat Analysis, 8/07

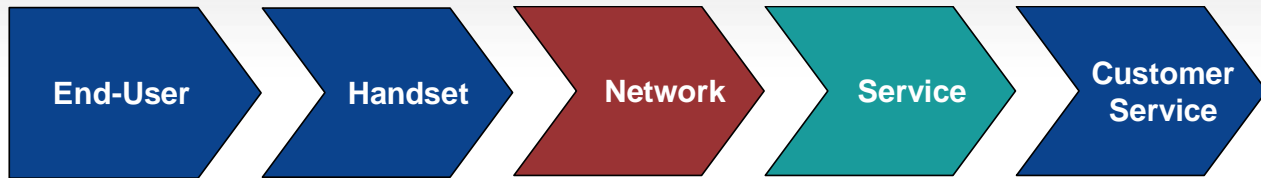
In a maturing wireless market, the focus shifts from the “value of the subscriber base” to the “value of the network.” The first reason why this is true is because network availability and quality are the primary drivers of churn. Second, next generation capabilities of the network are what drive the ability to generate revenue. Since there is a limit to subscriber growth, the only way to improve margins and cash flow is to sell more bandwidth and reduce operating expenses. Much of a service provider’s ability to do so is embedded in its network management and maintenance costs.

As the focus shifts from subscribers to the network, the importance of building out the network, upgrading the network, and keeping the network up and running become increasingly critical. Service providers already invest a significant amount of money in network build outs and upgrades, but they have yet to systematically invest in solutions that address network management and maintenance. If service providers want to improve their financial performance and maximize their return on network assets, they need to start considering solutions that address network costs, availability, and quality.

Historic Strategies for Addressing Quality and Cost

In the wireless industry, the customer perception of quality is based on a wide range of factors. In-Stat believes this perception quality is based on three specific management areas within the service provider: (1) Customer Management, (2) Network Management, and (3) Service Management. For the customer, quality provided by each of these areas of the service provider is irrelevant—they only care about total quality, which includes the efficient and effective operation of these three management areas all together. A failure of any one management area to provide quality service reflects on the service provider as a whole. In other words, customer perception of quality is only as good as the weakest or faultiest point of service in the value chain for each of these management areas.

Figure 4. End-User Value Chain and Service Provider Management Areas



Customer Management

- Marketing
- Sales
- Customer Service/Web Self Service
- Billing

Network Management

- Provisioning and Development
- Inventory Management
- Maintenance and Repair
- Performance Management
- Network Rating and Usage

Service Management

- Provisioning and Development
- Service Inventory
- Problem Management
- Performance Management
- Service Rating and Usage

Source: In-Stat Analysis, 9/07

Over the past decade, service providers have invested primarily in Customer Management and Service Management. For example, since 2002 each of the major US wireless operators have undertaken major customer care initiatives:

- Nextel invested heavily in customer care technologies and solutions in as early as 2002.
- In 2003, Sprint entered into a strategic alliance with IBM to transform the service capability and cost structure of its customer service organization—since then, many of its initiatives have been focused on streamlining a number of business organizations and support systems, and consolidating vendors and agents.
- After a period of cost cutting in 2002 and 2003, Verizon Wireless' recent focus has been on improving network reliability and quality combined with increasing innovation, resulting in higher revenues and margins and low churn (an indicator of customer loyalty).

Service Providers also have invested heavily in the Network Management and Service Management portions of their business. Investment in network build-out and upgrades is evidenced by the increase in total cell sites and the transition from 2G to 3G digital technologies. The growth of data revenues as a percent of service revenues is a clear indicator that service providers have also invested heavily in Service Management.

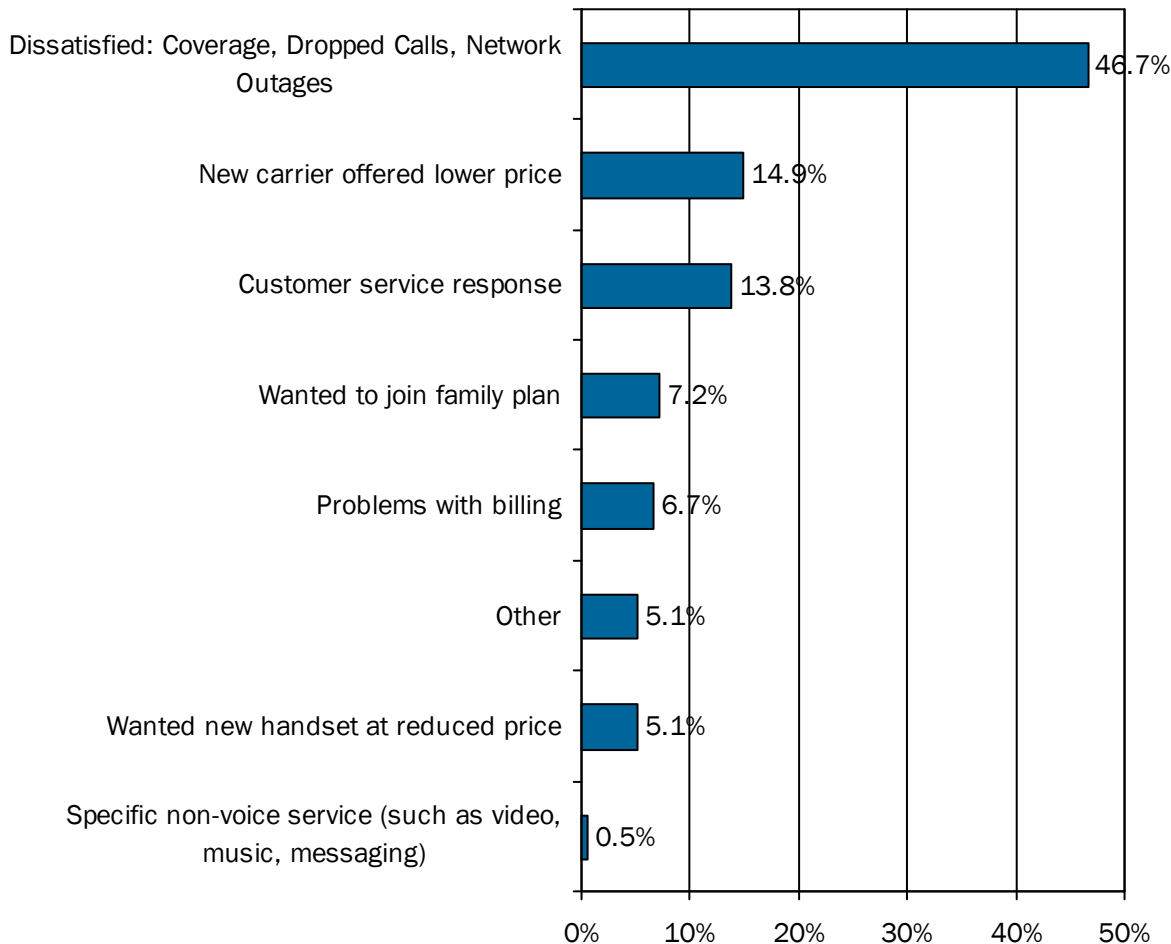
Table 9. Base Station Equipment and Upgrade Forecast, 2006–2011

	2006	2007	2008	2009	2010	2011	NOTES
Total Base Stations (thousands)	261.7	299.8	315.6	326.1	333.6	353.3	Based on 2006-2011 forecast
Total New Base Stations	31.8	49.9	26.6	20.4	20.7	30.6	Based on 2006-2011 forecast
New Base Stations/ Total Base Stations	12.2%	16.7%	8.4%	6.2%	6.2%	8.7%	Based on 2006-2011 forecast
Total Base Station Equipment (BSE) Revenue (millions)	\$2,420	\$3,661	\$2,274	\$1,827	\$1,721	\$2,807	Based on 2006-2011 forecast
Average Cost to Deploy New Base Station	\$75,998	\$73,340	\$85,354	\$89,660	\$82,988	\$91,747	Based on 2006-2011 forecast; assumes new base stations do not require upgrades
Total BSE Upgrade Revenues	\$604	\$2,122	\$943	\$679	\$845	\$1,960	Based on 2005-2011 forecast
Average Cost to Upgrade Base Station	\$2,629	\$8,493	\$3,264	\$2,221	\$2,699	\$6,073	Based on 2005-2011 forecast; assumes all non-new base stations require annual upgrades
BSE Revenue + BSE Upgrade Revenue (millions)	\$3,024	\$5,783	\$3,217	\$2,506	\$2,566	\$4,767	

Source: In-Depth Analysis: Base Station Five Year Forecast 2005-2011, September 2006, Allen Noguee; Five-Year Worldwide Cellular Base Station Report, 2006 – 2011, June 2007, Allen Noguee

However, according to In-Stat survey data, service provider investments in quality control and cost reductions over the last few years have only partially addressed the primary reasons why subscribers churn from service providers in the first place.

Figure 5. Primary Reasons Why Customers Churn
What is the primary reason you chose to leave your previous wireless carrier?
 N=195



Source: In-Stat Primary Research, 6/07

In In-Stat’s survey, the primary reasons reported for customer dissatisfaction resulting in churn were Poor Coverage, Dropped Calls, and Network Outages, which, despite significant investments, reflects heavily on the quality of service in the Network Management area. In comparison, only 27.2% of customers left their previous wireless carrier for a better deal (i.e., new carrier offered lower price (14.9%) , wanted to join a family plan (7.2%) or wanted new handset at reduced price (5.1%)), which reflects on the Service Management area. And only 20.5% of customers left their previous wireless carrier due to poor customer service (i.e., customer service response (13.8%) or problems with billing (6.7%)), which reflects on the Customer Management area.

Taking a closer look at Network Management, it is clear that there are three basic functions which affect service quality. First, investment in network build out and upgrades takes care of the provisioning aspects of Network Management. This addresses customer concerns about poor coverage and partially addresses issues relating to dropped calls. Second, investment in network management

technologies that provide inventory management, performance management, and network rating and usage are all functions that occur in the Network Operations Center. While these solutions help identify if there is a problem, they may not have any ability to affect change in the network that results in an increase in customer satisfaction.

The only functional area that is left within Network Management is maintenance and repair. Only recently have any major US wireless service providers made announcements about how to address these operating expenses through network-related maintenance and upgrade costs.

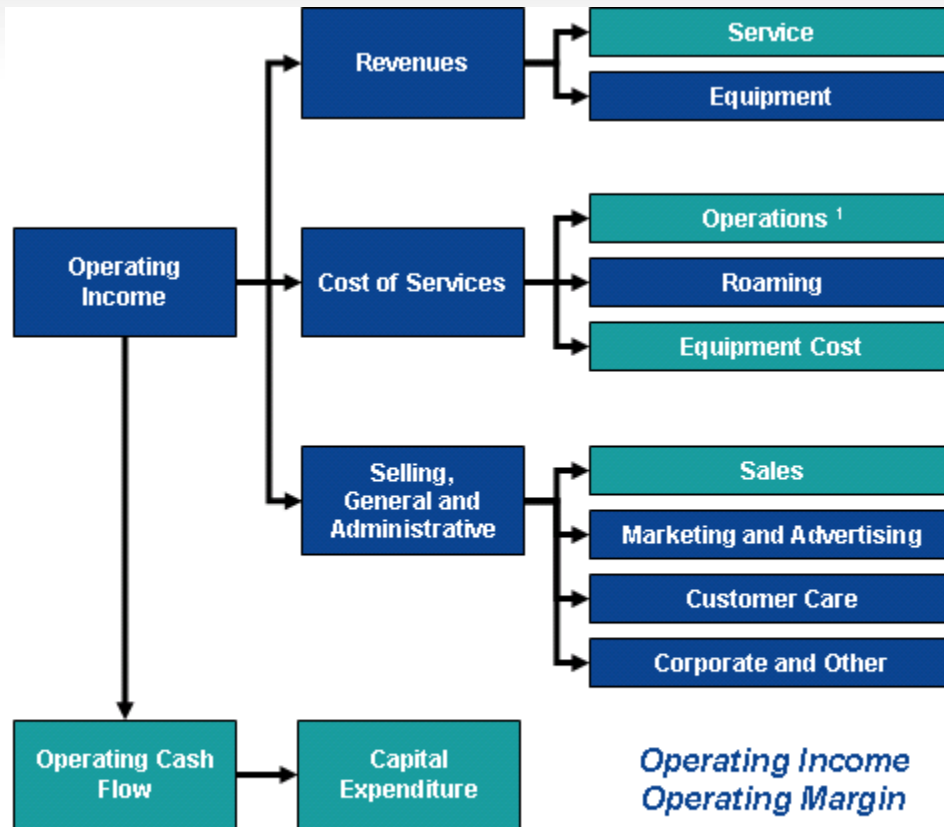
- In June 2007, Sprint Nextel announced an initiative with Service Experts to provide an automated field service solution for network and site technicians that will eliminate the need to manually complete service work orders
- In March 2007, Verizon Wireless announced an initiative with Comarco to provide ongoing nationwide network quality testing

Assuming maintenance and repair is partially responsible for incidences of dropped calls and network outages, it behooves carriers to invest in solutions that minimize these causes for customer dissatisfaction. In fact, if past service provider strategies that yielded improvements in Operating Income Before Depreciation and Amortization (OIBDA) are an indicator, then strategies that address the root causes of customer dissatisfaction should also have a noticeable impact on OIBDA.

The US Wireless Service Provider Cost Structure

In order to develop a better understanding of how service provider strategies affect financial performance, In-Stat has created a cost structure framework to rationalize the different ways US service providers report their operational and financial data.

Figure 6. Service Provider Cost Structure Framework



Note: (1) Operations Expense includes Customer Operations, Network Operations and Network Maintenance
 Source: In-Stat Analysis, 7/07

How Service Provider Strategies Affect Financial Performance

The largest and fastest growing expense areas for wireless service providers are Operations Expenses, Sales Expenses, and Customer Service Expenses. This is the main reason why most service provider investments in the business have been directed at these cost centers.

Over the last four years, there has been a steady improvement in OIBDA, partially due to a recovery of the telecom market from 2002 and 2003, and partially due to a number of cost containment initiatives that were implemented during the market downturn. Moving forward, it seems that service providers do not have many further options to keep control of their costs related to customer acquisition, customer Service or Network Investment. Therefore, they are going to have to look into other areas to improve quality and cut costs—and operations expense is the largest cost center to address.

Table 10. Aggregate Financial Data for Top 4 US Wireless Service Providers, 2003–2006

In billions	2003	2004	2005	2006	4-Yr CAGR	NOTES
Revenue						
Service Revenue	52.7	76.6	100.9	112.8	28.8%	
Equipment Revenue	5.9	9.8	11.5	14.2	34.2%	
Total Revenue	58.6	86.4	112.4	126.9	29.4%	
Cost of Service						
Operations Expenses	12.2	15.3	23.5	27.4	31.0%	Includes customer operations, network operations and network maintenance
Roaming Expense	3.8	4.2	3.7	3.6	-1.2%	
Cost of Equipment	3.9	3.6	6.5	7.1	21.9%	Component of CPGA
Selling, General and Administrative						
Sales Expense	10.0	14.2	18.0	18.6	22.8%	Component of CPGA
Marketing and Advertising Expense	2.2	4.1	4.5	5.3	34.6%	
Customer Care	6.1	9.1	11.2	11.9	25.1%	
Corporate and Administrative	2.0	3.0	3.7	4.0	25.1%	
Total Operating Expenses	40.2	53.4	71.1	77.9	24.7%	
OIBDA	18.4	33.0	41.2	49.1	38.6%	
OIBDA Margin	31.4%	38.2%	36.7%	38.6%		
Est. Operating Cash Flow	14.6	19.9	41.7	NA		Based on Sprint, T-Mobile and Verizon
Est. Capital Expenditure	11.4	15.1	20.6	22.6		Based on Sprint, T-Mobile and Verizon

Source: Company earnings reports and filings; In-Stat Analysis 7/07

The cost structure of top tier service providers is highly variable, which means for each additional dollar of revenue they generate, there is a high related cost to support the earning of that dollar. Therefore, strategies that address the main levers of variable cost should have a significant impact on overall financial performance.

In the Third Wave of market maturity, Cash Cost per Unit (CCPU) becomes an increasingly important metric to determine profit potential. As already mentioned, service providers are going to have to continue to improve margins to generate the cash flow to invest in the network. Since Operations Expenses make up a significant portion of CCPU, it becomes a prime target for cost reduction.

Our analysis suggests that innovation in this part of the business could have significant impact on overall service provider performance. Operations Expenses include network management and maintenance and a significant portion of the labor assets of all service providers. Therefore, any effort by service providers to use solutions to make this part of the business more efficient, while improving overall network quality, should have a significant impact on overall service provider financial performance.

Addressing the Third Wave

In the third wave, service provider value is based on the quality of the network, and profitability is based on keeping the network up and running. In-Stat has already established that (1) service provider value is shifting from its subscriber base to its network assets, (2) financial strategy should now be focused on improving return on network assets, and (3) the best way to improve returns (through Net Income) is to address Operations Expenses.

Despite the importance of Operations Expense in overall profitability, there have been very few field force based initiatives in this cost center that apply technology or solutions to reduce costs and improve efficiency. Field force technicians make up the largest percent of service provider employees and the largest percent of costs (primarily labor expense) related to Operations Expense. In-Stat analysis shows that field service technicians have made up an average of 31.6% of service provider employees since 2003.

The challenge is balancing labor capacity (supply of labor) with the need for network maintenance and upgrades (demand for labor). Since this is an imperfect and inefficient process (labor efficiency), there is still a lot of opportunity to “trim the fat” from the Operations Expense budget. Assuming labor capacity and labor efficiency are the key drivers of cost within Operations Expense, service providers should seek strategies, technologies, and solutions that address two key operating metrics that are the main drivers of cost: Cost/Truck Roll and Cost/Trouble Ticket.

The most prevalent solutions that exist in the market that address these areas of cost and efficiency are Network Management Solutions (NMS).

Overview of Network Management Solutions

For purposes of this report, In-Stat defines network management as the process by which wireless service providers maintain, administer, control, and monitor the various functions of their wireless networks. Generally speaking, the wireless network consists of four main components: (1) the Radio Access Network, (2) the Cell Site, (3) the Wide Area Network, and (4) the Mobile Switching Center.

- Radio Access Network (RAN). The RAN includes all base station equipment including Base Station Transceivers and Base Station Controllers.
- Cell Site. The cell site is the facility owned or rented by the wireless service provider or a third party that houses the RAN equipment and interconnects with the WAN. It also includes a number of components that manage the environmental conditions in the Cell Site environment, including surveillance and security systems, power management systems (including electricity, power generation and battery back-up), HVAC (Heating, Ventilation, and Air Conditioning) Systems, and access and control systems.
- Wide Area Network (WAN). The WAN is the telecommunications network used to backhaul wireless call and data usage from the cell sites.

- **Mobile Switching Center (MSC).** The MSC is essentially one of many Network Operation Centers that exist in wireless networks. They provide circuit and packet switching, network gateways, network management and call processing functions.

Given the variety of cell sites and network technologies existing within wireless networks, it is not hard to believe that there are a number of operating functions and processes that can cause network outages and failures. The problem is that service providers have a limited number of technicians to deal with these network problems. Furthermore, technicians often have limited knowledge of what the network outage or failure is at the cell site, so they are often ill-prepared to resolve the problems on the first visit.

Network Management Solutions are a group of hardware and software technologies that are used to remotely collect and monitor operating data on the RAN, cell site, and WAN parts of the wireless service provider network. This information can then be remotely accessed by technicians to make better decisions about how to efficiently handle problems that occur in the network. These solutions can also be used to initiate diagnostics, management functions, or cell site control commands from a remote location. Network Management Solutions typically incorporate features that manage the operating conditions of the cell site, and the operations and performance of the RAN and WAN.

The Importance of Network Management Solutions

Despite the maturity of the wireless business, there is still a tremendous amount of uncertainty about what happens to RAN, cell site and WAN technologies on a day-to-day basis, and why and when these network components contribute to wireless network failures and outages. Much of this technology is installed at unmanned sites that are widely distributed by geography and location. The equipment that exists at each of these sites varies greatly depending on a number of location and build out variables. Furthermore, the cell site facilities themselves that house these technologies also present a number of factors that can affect the operation of the network.

Considering the limited technician resources that service providers have to manage the network, any technologies that provide some transparency into the day-to-day operations of the RAN, cell site and WAN would give service technicians a tremendous advantage in handling network outages. This becomes especially important as the complexity of operating and maintaining the wireless network has increased over time. The objective of Network Management Solutions is to provide network technicians with better control and knowledge of the functions and operating processes of various network components. This, in turn, helps the technicians to be more efficient and productive in dealing with network outages, thereby improving the service provider network availability and quality.

Table 11. Basic Network Management Solution Features and Benefits

Features	Benefits
<ul style="list-style-type: none"> Centralized access to network operating data Remote control of site and network equipment Rapid response to site and network failures through proactive fault detection and alarms Efficient organization and preparation for network failure dispatches Remote monitoring, management and control cell site operating functions, including power and HVAC Remote monitoring and management cell site surveillance and security 	<ul style="list-style-type: none"> Improved detection of network failures and speed of resolution More efficient and coordinated dispatch of network technicians More organized and prepared technicians to handle trouble tickets Fewer truck rolls Longer network up-time Maximized revenue potential from network Better customer satisfaction Reduced overall network management expenses

Source: In-Stat Analysis, 9/07

Table 12. Network Management Solution Competitors

	Safety & Security	Power	HVAC	WAN	Radio Network	Antenna	Remote Access	Remote Control
	Access Control, Security Cameras, Fire/Smoke Alarms, Gas Leak, Water Intrusion	AC power, DC power, Generator, Battery	Heating, Ventilation, Air Conditioning, Humidity, Air Filters, Inside/Outside Temperature	Diagnostics, Performance, Reporting	BTS, Microwave Radio, Repeaters	RET Controllers, TMA, Tower Lights		
Asentria/Omnitronix		X	X	X	X		X	X
DPS Telecom	X	X	X	X			X	X
Kentrox/Applied Innovation	X	X	X	X	X	X	X	X
Sierra Monitor	X	X	X				X	
Sycamore Networks	X	X	X	X			X	X

Source: In-Stat Analysis, 9/07

The Network Operating Expense Model

In order to obtain a better understanding of the costs associated with network maintenance, In-Stat created a network operating expense model. The goal of the model was to understand how labor capacity and labor efficiency affect the ability of service providers to improve network availability and quality.

It is assumed that the key driver of cost in network maintenance is the Cost per Truck Roll and the Cost per Trouble Ticket. Therefore, any service provider strategies to cost effectively reduce the number of truck rolls and trouble tickets, while maintaining or improving network availability and quality, can significantly reduce network maintenance expenses, and therefore overall Cost of Services, and improve overall customer satisfaction.

Since the primary driver of Cost per Truck Roll and Cost per Trouble Ticket is the hours of technician labor involved, this network operating expense model attempts to break down network operating expenses to the average network technician labor cost per hour for the US wireless industry.

Network Operating Expense Model Methodology

The following table provides a summary of the main assumptions used to arrive at the technician labor cost per hour, broken down into: (1) Network Maintenance Expense, (2) Network Technician Compensation and Labor Capacity, and (3) Cell Site Maintenance Requirements.

Table 13. Network Maintenance Expense

Cost of Services	
Variable Cost	89.5%
Fixed Cost	10.5%
Breakdown of Cost of Service Variable Cost	
Interconnection Fees	10%
Energy and Utilities	5%
Customer and Network Operations	40%
Network Maintenance	45%
Breakdown of Network Maintenance Cost	
Compensation	90%
Overhead	10%

Source: In-Stat Analysis, 9/07

Table 14. Network Technician Compensation and Labor Capacity

Avg. Technician Salary (2003)	\$60,000
YoY Growth Technician Salary	5%
Benefits/Technician Salary	30%
Overtime/Technician Salary	50%
Overtime Hourly Rate/Standard Hourly Rate	1.6
Work Hours/Day/Technician	8
Work Days/Year/Technician	200
Standard Work Hours/Year/Technician	1,600
Overtime Work Hours/Year/Technician	500
Total Work Hours/Year/Technician	2,100
Technician On Call Rate (assumes 3 x 8 hour shifts per day)	33.3%
Technician Utilization Rate (productive work hours after paid vacation, holidays, training, etc.)	65%
Avg. Specialized Technicians per Cell Site (assumes 3 general areas of expertise required at each cell site; not required simultaneously; not required for the same trouble ticket)	3

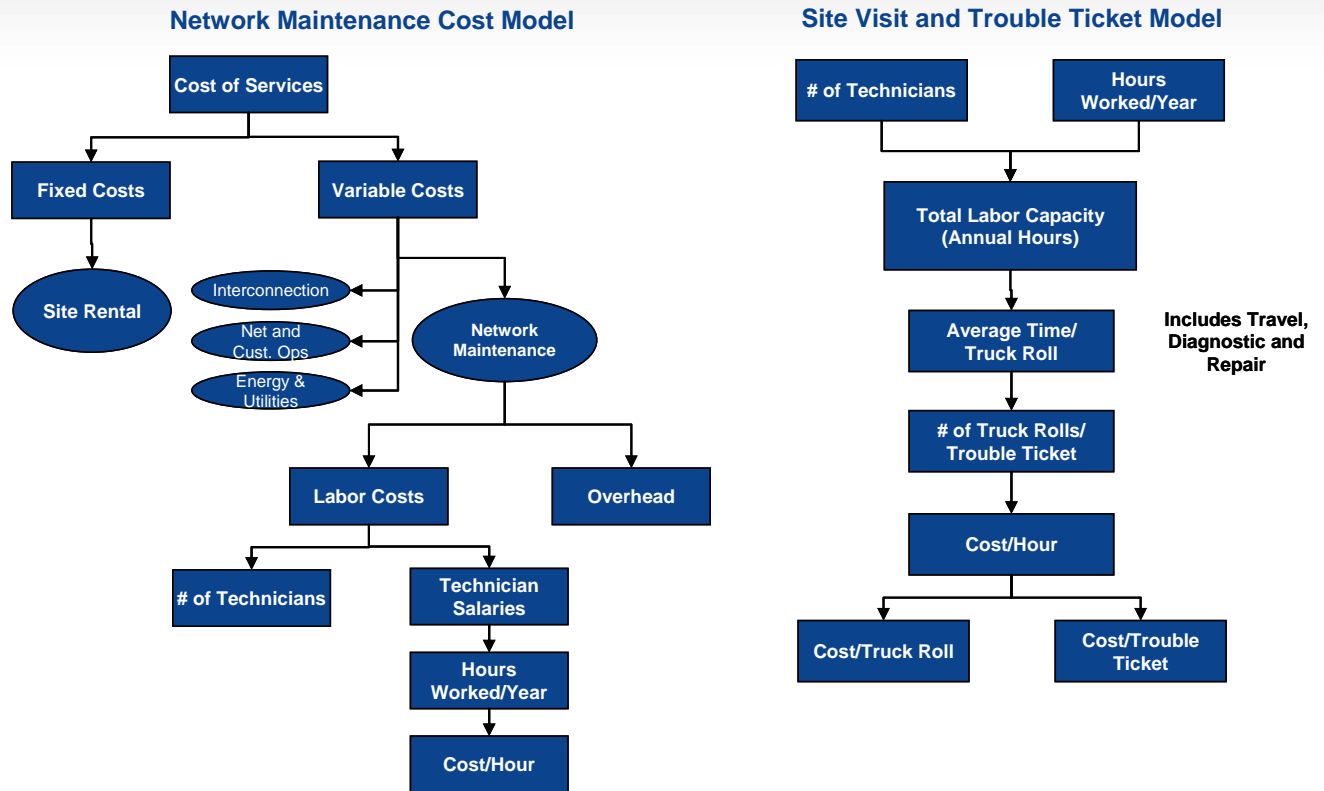
Source: In-Stat Analysis, 9/07

Table 15. Cell Site Maintenance Requirements

Avg. Travel Time/Trouble Ticket (Hours)	3.5
Avg. Diagnostic and Trouble Shoot Time/Trouble Ticket (Hours)	1
Worst Case: Avg. Truck Rolls/Trouble Ticket	2.5
Median Case: Avg. Truck Rolls/Trouble Ticket	2.0
Best Case: Avg. Truck Rolls/Trouble Ticket	1.5
Worst Case: Trouble Ticket Hours	11.25
Median Case: Trouble Ticket Hours	9.0
Best Case: Trouble Ticket Hours	6.75
Types of Trouble Tickets	
No Problem Found	20%
WAN Problem	50%
Energy & Utilities Problem	10%
HVAC Problem	10%
Radio Problem	5%
Safety and Security Problem	5%

Source: In-Stat Analysis, 9/07

Figure 7. Network Maintenance Cost Model, and Cell Site Visit and Trouble Ticket Model



Source: In-Stat Analysis, 7/07

Return on Investment Analysis for Network Management Solutions

After creating the network operating expense model methodology, In-Stat created a fictional “US Wireless” service provider to understand the impacts of improved network management on financial performance. US Wireless’ service revenues in 2003 were \$15 billion, and grew at the average revenue growth rate for the top four US service providers. In 2004, US Wireless acquired a smaller wireless service provider with approximately 6 million subscribers, including its network assets. US Wireless is assumed to maintain the industry average operating numbers for ARPU, Cell Sites/Subscriber, Churn Rate, Handset Cost per Gross Add, and Sales Expense per Gross Add. US Wireless follows all other characteristics of the top four service providers, including 3G data network technology roll-out.

Table 16. "US Wireless" Income Statement and Industry Average Operating Data

**US Wireless Income Statement
 2003-2006**

In billions	2003	2004	2005	2006
Revenues	\$16.6	\$24.5	\$31.8	\$35.9
Cost of Services	\$5.4	\$6.7	\$9.5	\$10.4
SG&A	\$5.6	\$10.5	\$11.6	\$11.3
OIBDA	\$5.6	\$7.2	\$10.7	\$14.3
OIBDA Margin	33.9%	29.5%	33.6%	39.7%

**Industry Average Operating Data
 2003-2006**

	2003	2004	2005	2006
ARPU	\$51.78	\$52.82	\$51.57	\$50.40
Subscribers (million)	24.1	34.9	46.5	53.7
Churn Rate	2.39%	2.36%	2.04%	1.98%
CPGA	\$369	\$405	\$364	\$357
Cell Sites (thousands)	23.0	24.7	37.4	42.7
Techs (thousands)	10.9	13.1	19.1	21.2

Source: In-Stat Analysis, 7/07

Based on this financial and operating data, In-Stat forecasted out US Wireless financial and operating performance through 2012, based on assumptions about how the US wireless market will develop.

Table 17. “US Wireless” Income Statement and Operating Data Projections, 2007–2012

	2007	2008	2009	2010	2011	2012
Income Statement (billions)						
Revenue	38.0	41.2	43.7	45.5	46.8	47.5
Cost of Service	11.1	12.2	13.3	14.5	15.7	16.9
Selling, General and Administrative	11.0	11.2	11.3	11.4	11.4	11.3
Total Operating Expenses	22.0	23.4	24.6	25.9	27.1	28.2
OIBDA	16.0	17.9	19.1	19.7	19.7	19.2
OIBDA Margin	42.1%	43.3%	43.7%	43.2%	42.1%	40.5%
Operating Data						
Subscribers (thousands)	59.0	64.0	68.6	73.0	77.2	81.2
ARPU	\$50.82	\$50.55	\$49.73	\$48.48	\$46.93	\$45.17
Churn Rate (monthly)	1.86%	1.74%	1.64%	1.54%	1.44%	1.35%
CPGA	\$350.75	\$342.78	\$335.05	\$327.55	\$320.27	\$313.21
Cell Sites (thousands)	47.2	51.6	56.0	60.5	64.9	69.3

Note: “US Wireless” is a fictitious company created by In-Stat for purposes of this analysis.
 Source: Company earnings reports and filings; In-Stat Analysis 8/07

Development of a Network Management Roll-Out Strategy

Having developed a base line income statement through 2012, In-Stat then tried to understand how the implementation of a Network Management Solution would impact the overall financial performance of US Wireless. The following assumptions were made about US Wireless’ Network Management Solution roll out strategy.

- US Wireless completely builds out its network management solution by year-end 2008, including training, and the system goes live on January 1, 2009
- The solution roll out is conducted in six of the most highly populated regions in the US: Chicago, Dallas/Fort Worth/Houston, New York, Baltimore/Washington D.C., Los Angeles/Long Beach, and San Jose/San Francisco/Oakland
- The number of US Wireless subscribers in each of these regional markets is determined by dividing the total population of all six regions by the total US population
- The assumed ratio of Subscribers to Cell Sites in those regions is 1,200
- The build out cost per cell site in those regions is \$5,250 per site
- Network technicians can roll out the network management solution at a rate of \$1,000 per month

The Potential Impact of Implementing a Network Management Solution

As mentioned earlier, the primary drivers of cost when dealing with network management and maintenance are the costs associated with trouble tickets and truck rolls. Therefore, the main impact that Network Management Solutions have on reducing costs are associated with reducing the total number of trouble tickets, and taking less time to handle trouble tickets. Network Management

Solutions do this by providing network technicians with better information about the cause of network outages so they are better prepared to resolve network problems on the first visit, or even fix problems with the network remotely. If even provides enough information to technicians to identify invalid trouble tickets.

Therefore, from one perspective, the key value that Network Management Solutions provides is the reduction of hours of labor that are required to correct outages in failures in the network. However, the hidden value in leveraging a Network Management Solutions is that it significantly increases the labor capacity a service provider has at its disposal because the workload is being handled more efficiently. This labor can then be reallocated toward solutions that drive better value for the carrier, like network optimization, proactive maintenance, and faster implementation of network upgrades and build out. In the end, this should improve network quality, increase customer satisfaction, and churn.

Table 18. “US Wireless” Savings from Implementing Network Management Solution

	2007	2008	2009	2010	2011	2012	NOTES
Cell Sites (thousands)	3.4	3.7	4.1	4.4	4.8	5.1	Based on 7.6% of total subscribers; 1,200 subs/cell site
Trouble Tickets/Cell Site/Year	23.6	23.2	22.7	22.2	21.7	21.3	Estimate based on US Wireless
Total Trouble Tickets (thousands)	80.4	86.6	92.5	98.0	103.2	108.1	
Avg. Technician Cost per Hour	\$84.95	\$89.20	\$93.66	\$98.34	\$103.26	\$108.42	
NO PROBLEMS FOUND (NPF)							
NPF Trouble Tickets (thousands)	16.1	17.3	18.5	19.6	20.6	21.6	Based on 20% of trouble tickets are NPF
US Wireless Cost/Trouble Ticket	\$764.57	\$802.80	\$842.93	\$885.08	\$929.34	\$975.80	
Savings from NPF (millions)			\$15.6	\$17.3	\$19.2	\$21.1	Solution is turned on January 1, 2009
LEGITIMATE TROUBLE TICKETS							
Legitimate Trouble Tickets (thousands)	64.3	69.3	74.0	78.4	82.6	86.5	Based on 80% of trouble tickets are legitimate
Median Case: Cost Savings (millions)			\$31.2	\$34.7	\$38.4	\$42.2	Based on Table 14. Assumptions for Cell Site Maintenance Requirements
Best Case: Cost Savings (millions)			\$46.8	\$52.0	\$57.6	\$63.3	Based on Table 14. Assumptions for Cell Site Maintenance Requirements
EST. SAVINGS RANGE (millions)			\$46.8 - \$62.4	\$52.0 - \$69.4	\$57.6 - \$76.7	\$63.3 - \$84.4	

Source: In-Stat Analysis, 9/07

In addition to the cost savings generated from using a Network Management Solution, In-Stat analysis also shows that leveraging a Network Management Solution can improve service provider labor capacity by up to 45.9% in the median case scenario and 91.9% in the best case scenario. This additional labor capacity can be reallocated toward other network based initiatives that contribute to the value of the network.

Conclusion: Role of Network Availability and Quality in the Third Wave

Over the next two or three years, the US wireless market will transition into its next phase of development, which In-Stat calls the Third Wave. The Third Wave is expected to be a period of market stabilization, characterized by high subscriber penetration, low churn, and an increase in prepaid subscribers. These factors will also have an impact on the financial performance of the top US wireless service providers, as ARPUs and customer acquisition costs decline.

The underlying theme of this market transition is that the value of a wireless service provider is transitioning from the strength of its subscriber base to the consistency and reliability of its network. In the past, wireless service provider value was predominantly determined by total subscribers, subscriber growth, churn, and ARPU. With a limited number of subscribers remaining to be acquired, subscriber growth can no longer be the key indicator of a service provider's financial potential. Now, the main mechanism for service providers to drive growth is through services. And the value of these services to subscribers is highly dependent on network throughput and capacity, as well as network availability and quality.

In-Stat primary research confirms that the main reason for customer dissatisfaction is network related problems, including coverage, dropped calls, and network outages. Whereas, service providers have invested heavily over the years in network build out and upgrades, they have yet to invest significantly in technologies and solutions that will improve their ability to manage network operations. Since previous investments in the network have led to noticeable improvements in Operating Income Before Depreciation and Amortization, further invests in network-based solutions like Network Management Solutions are expected to yield similarly favorable financial results.

Considering the current state of competitiveness in the US market, and the transition from Subscriber Value to Network Value-based strategies, In-Stat expects service providers to continue to pursue initiatives that improve margins and generate cash flow to invest in their networks. Any solutions that can improve network quality while reducing costs or increasing network labor capacity will serve the best interests of service providers. Network Management Solutions have presented themselves as a viable option for service providers to reduce costs, while improving network availability and quality.

The average US wireless service provider can implement a Network Management Solution over a very short time frame, and realize significant benefits from the implementation. Although it is a somewhat costly solution to implement, the return on investment occurs in a very short timeframe, and the value of the solution far exceeds the cost. This ROI is driven by savings in total labor costs for handling network trouble tickets. But the hidden benefit of the solutions is in an improvement in network uptime, which translates into more satisfied customers who churn less, and an increase in labor capacity that can be reallocated toward value generating initiatives for the service provider.

In the Third Wave, network availability and quality are going to be the key drivers for service provider success. Network Management Solutions may be the first and only way to help service providers to achieve this goal.

Methodology

The information in this report was obtained through primary and secondary sources. Primary sources included a survey conducted by In-Stat Primary Research of 1,004 respondents in June 2007 that addressed the drivers and incidences of customer dissatisfaction and churn. In addition to the survey, In-Stat conducted personal interviews with knowledgeable industry professionals within wireless service providers and tower management companies.

Secondary research encompassed publicly available information, reports, company earnings releases, SEC filings, and press releases from a number of different sources, including, but not limited to, wireless service providers, tower management companies, the US Census Bureau, the CTIA, FCC Wireless Bureau, and company web sites.

In-Stat developed market projections and a wireless service provider cost and revenue model to understand how different factors impact the profitability of wireless carriers. The wireless cost model is based on primary and secondary research. All other market forecasts, analysis frameworks, and financial analyses were developed by In-Stat for purposes of this study.

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Offices

North America

Arizona
+1.480.483.4440

California
+1.408.345.4495

Massachusetts
+1.781.734.8674

Asia/Pacific

Singapore
+65 6780 4321

China
+86 10 6642 1812

Europe/Middle East/Africa
1+480.483.4470

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