

Pays would not provide a level of privacy protection equivalent to non-publication of the subscriber's listing.

To publish such number or to make them available through directory assistance without the cellular subscriber's consent would, given previous practice, amount to the introduction of a service that would result in a reduction in the subscriber's privacy. The charging of a fee for Calling Party Pays, in conjunction with the introduction of the publication of listings without the subscriber's express consent, would be contrary to the principle that when new services are introduced, appropriate measures must be taken to maintain the customer's privacy at no extra cost unless there are compelling reasons for not doing so.⁷⁷

Section 4.05 Technical Issues

The issues dealing with implementation of CPP will be largely a function of the nature and definition of the service. For example, a CPP service that is restricted to a local service area faces different (and significantly fewer) implementation issues than would one that is provided nationally. A basic local service can easily be implemented today using proprietary approaches and a business arrangement with the local exchange carrier. On the other hand, a "leak proof" and fraud resistant national CPP service that allows roaming opens a myriad of routing, billing, and caller notification issues. If, in addition to a national roaming capability, this national CPP service includes the ability to provide the customer with the selective screening of incoming calls (*e.g.*, the customer pays for incoming calls from selected numbers) and allows for the possibility of number portability, then the implementation issues become even more complex.

The technical issues and key decisions which must be addressed in the development of a CPP service description include the following:

- Location of CPP interception in the path of call setup.
- Notification to the caller of CPP charges.
- Minimization and handling of leakage.
- Flexibility in per-minute rates, and the ability to reverse charges.
- Local and toll CPP calls.
- Allocating roaming charges.
- Billing the caller.
- How billed revenue is shared with the wireless carrier.
- Interactions with Number Portability and Local Exchange Competition.

A major technical issue for CPP is to define where, in the path of call setup, the network recognizes that CPP applies to a call. Possible choices are the originating

⁷⁷CRTC: Report to the Governor in Council on Directory Subscriber Listings and on Unlisted Number Service (part 3), *MS Presswire*, December 24, 1996.

switch, an intermediate switch or the terminating CMRS switch. The switch at the location that is chosen will be responsible for notifying and billing the caller and forwarding a portion of the billed revenue to the terminating carrier. Choosing the originating switch would, if a national service is desired, require upgrades to all LEC and wireless switches in the U.S. to support CPP (although the use of intelligent networks in the form of IN/AIN may somewhat reduce the number of nodes needing an upgrade). This choice would also require every wireless carrier that supports CPP to have a business agreement with all possible originating carriers, to ensure that billed CPP revenue is transferred from the originating carrier to the terminating carrier, and to ensure that the correct per-minute charges are applied. If an intermediate switch is chosen as the location for CPP recognition, billing problems are somewhat reduced, as this switch would likely be controlled by an inter-exchange carrier which can already collect for toll charges. This choice would require business agreements with all inter-exchange carriers to forward the CPP revenue to the terminating carrier and signaling or databases to define the correct per-minute charges that apply to the call. In addition this choice may force all CPP calls to be handled as 1+ toll calls. The third choice is to allow the call to reach the terminating carrier's Mobile Switching Center (MSC) before determining that CPP applies. While this simplifies call processing, and restricts upgrades to only the wireless carrier (and selected customers) that wish to provide CPP, it requires the wireless carrier to have the ability to bill calls originating from any phone in the U.S. Problems of leakage from pay phones and hotel phones may be impossible to solve. Even when it is theoretically possible to bill back (*e.g.*, from a residential line), the wireless carrier will be required to have business agreements with every carrier in the U.S. from which CPP calls can be made (*e.g.*, LECs and competing wireless carriers).

Callers to CPP mobiles must be notified that they will be billed additional charges. This notification can be implicit in the number dialed (*e.g.*, separate NPA or NXX blocks), a recorded message or an interactive dialog (allowing other choices such as diversion to voice mail). Implicit notification will almost certainly not be adequate for some state and local regulatory organizations. More sophisticated notification methods are unlikely to be applicable if the originating switch handles the call. Even if an intermediate switch handles the call, diversion to voice mail will require, at the least, modifications to ISUP (ISDN User Part) signaling protocols. If the notification is to be specific to the CPP subscriber's carrier (*i.e.*, with the name of the carrier in the recorded message), it forces the terminating MSC to perform interception.

Leakage should ideally be eliminated, but this may be difficult given today's network architecture. If it cannot be eliminated, it probably cannot be simply tolerated as people will soon learn which types of phones (*e.g.*, COCOT - Customer Owned Coin Operated Telephones - pay phones) always leak. The best approach may be to ensure that leakage is always detected, so that incoming calls can be denied, diverted to voice mail or routed to a credit card billing operator. It may also be possible, as another alternative, to present the terminating subscriber with an indication (such as distinctive ringing) that they will be charged for the incoming call when leakage is detected.

Carriers have many choices for CPP charges. The per-minute charges for CPP can be restricted to a standard rate per carrier, or allowed to vary by subscriber and by time of day. It may be desirable to allow a CPP override to apply to calls from recognized numbers or to callers who enter a special PIN code. Some carriers may also wish to charge a different rate for the first minute than for subsequent minutes. These requirements can only be met if the intercepting carrier is either the terminating carrier, has an online rating database or a signaling link to the terminating carrier to obtain rating information per-subscriber in realtime.

Calls to CPP mobiles may be local or long distance. Allowing local CPP calls to be dialed as 7 digit calls will make it extremely difficult to prevent leakage from pay phones and hotel phones. The choices are either to handle the leakage (e.g., by diversion to voice mail or by connection to a credit card operator) or to force all calls to CPP mobiles to be dialed as 1+ toll calls. This second choice may not be acceptable to all carriers or their regulatory agencies. It would be desirable to handle toll calls to CPP mobiles with integrated CPP/toll billing, both to simplify the notification to the caller and to prevent the caller from having to enter credit card information twice in one call. This can only be done if an inter-exchange switch intercepts CPP calls.

Although this may be changing, traditionally roaming mobiles incur additional charges: possible toll charges from their home system to their current visited system, airtime charges that are likely at a higher rate than at home and possibly one-time daily access fees. It is unlikely that standard CPP rates will cover these charges that could amount to several dollars for the first minute in a day. Consequently, CPP rates to a roaming mobile may have to be considerably higher than to a mobile that is registered in its home system. In the absence of postalized rates, it will be very difficult for originating or intermediate switches to correctly calculate and apply these additional charges (that may vary from call to call). Also, because the caller has no knowledge of the whereabouts of the mobile they are calling, some regulatory agencies may refuse to allow these charges to be billed back to the caller. An alternative would be to charge the subscriber for all roaming charges incurred.

Billing the calling party is simple if the originating switch handles the call and the originating carrier handles the billing, although determining the amount to bill may be difficult. Inter-exchange carriers can also bill the calling party, with somewhat less difficulty in determining the amount. Terminating carriers will have no difficulty in determining the amount to bill, but great difficulty in placing the amount on the caller's bill, given that the originator could be calling from any local, long distance or wireless carrier in the U.S.

If the terminating carrier does not bill the call, revenue has to be forwarded from the carrier that intercepted the CPP call to the wireless carrier, with business agreements to cover the portion of the charges that are forwarded versus the charges that are retained. This will also require wireless carriers to have special software to segregate and audit the expected revenue on a per-originating carrier basis, to ensure that all CPP charges owed are actually forwarded.

Calling Party Pays will interact with other changes in the telecommunications environment, particularly local number portability and local exchange competition. Number portability probably rules out the ability to segregate CPP subscribers into separate NPA or NXX blocks, as this would not allow subscribers to add or delete the CPP service without changing their phone number. On the positive side, number portability also places a new type of Service Control Point (SCP) into the network that could be used to supply CPP information (such as rating and diversion information). Local exchange competition will simply increase the number of carriers, which will make negotiating nationwide business agreements with this industry sector even more complex.

The complex technical challenges facing a CPP implementation in the U.S. reflect the competitive and dynamic nature of the US telecommunications industry. In many countries that currently have CPP for mobile calls there are very few carriers, often only one carrier providing both local and long distance service, along with a handful of wireless carriers. Also, CPP is usually applied universally to all mobiles who are identified by a distinct area code. This vastly simpler environment dramatically reduces the technical challenges that are faced.

It is questionable whether *any* actions are required of federal regulators with respect to implementation. If any actions are required of the FCC, they are relatively limited. Indeed, as noted in section 4.0 above, the FCC may have already taken sufficient action in its prior orders to provide the impetus for a timely resolution of outstanding technical issues, and to foster the ubiquitous availability of CPP as a consumer option.⁷⁸

Section 4.051 Implementation Plan

This Service Report will provide the first step in a CPP implementation plan -- providing background and historical information, along with a list of the technical challenges that must be solved before CPP can be implemented.

The next step is for CTIA to facilitate a carrier effort to define the specific requirements for CPP that meet the needs of wireless carriers, and also fits the existing and future business and regulatory telecommunications environment. This will result in the development of a service description that will define the capabilities and limitations of a practical CPP service.

The service description will need to be validated by the development of information flows for both CPP call processing and billing. This will identify interfaces and network elements that likely require modification and will ensure that information required for CPP call processing is available when and where it is required during the call processing, billing and settlement phases.

⁷⁸See e.g., *First Report and Order, Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, 11 FCC Rcd 15499, at 15633, 15660-61, 15741-42, and 15763-64 (1996), *appeal pending sub nom. Iowa Utilities Board, et al., v. Federal Communications Commission*, No. 96-3321 (8th Cir.); see also *Second Report and Order, Policies and Rules Concerning Local Exchange Carrier Validation and Billing Information for Joint Use Calling Cards*, 8 FCC Rcd 4478, at 4481 (1993).

Once a service description has been validated against information flows that show that it will work, a Standards Requirement Document (SRD) can be prepared as input to standards organizations, including both the TIA TR-45 standards committee and ATIS T1. Depending on the decisions documented in the SRD, other standards organizations and industry bodies may also be affected. These organizations may not have a wireless focus and consequently may need to be educated on the need for wireless CPP and the benefits to their industry segment.

Finally, an implementation guide should be prepared to indicate how the various aspects of a CPP feature can be integrated into a cohesive whole using existing and newly defined standards.

THE EVOLVING WIRELESS MARKETPLACE

FEBRUARY 1998

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Peter D. Hart Research Associates,

METHODOLOGY

Between January 17 and 20, 1998, Peter D. Hart Research Associates conducted a nationwide telephone survey among a representative sample of 1,004 wireless users. The survey is both an update of trend questions covered in the 1996 and 1997 wireless surveys, and an exploration of new topics and subject areas. The margin of error for the survey is $\pm 3.2\%$.

HIGHLIGHTS AND KEY FINDINGS



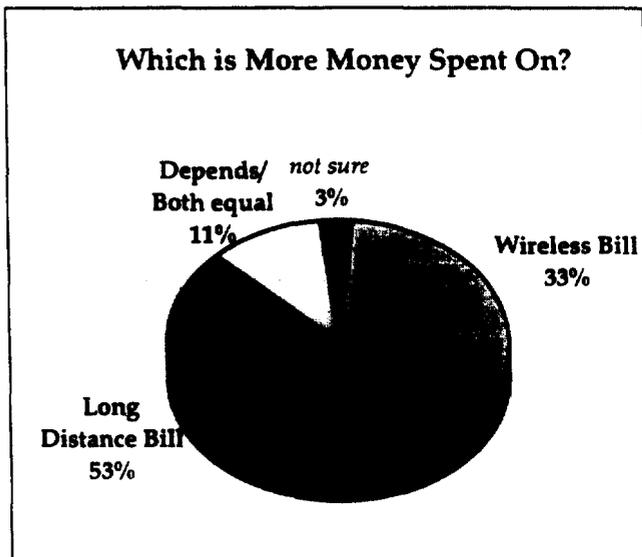
THE EXPANSION OF WIRELESS PHONE USE TO ALL SEGMENTS OF SOCIETY HAS CREATED A MARKET THAT DEMOGRAPHICALLY RESEMBLES THE AMERICAN POPULATION. Wireless phones are no longer a product available to and used by only an elite, wealthy, and highly educated segment of the population. Today, the wireless phone market looks very much like a cross section of America—men and women, young and old, professionals and blue collar workers, high school and college graduates, and members of both lower and upper income households. As was the case with all the preceding technologies (microwaves, VCRs, and computers) that have penetrated the American marketplace, the cost of owning a wireless phone has become affordable and matches up with people's desire to own.

The following table compares some basic demographic characteristics of the wireless market to those of all American adults found in our January 1998 NBC/*Wall Street Journal* survey. These two samples of the population are largely parallel in terms of age, education, and income. There is a more marked difference by occupation, however, as wireless users are less likely to be retired, and more likely to be professionals and managers, than are Americans overall.



	Wireless Users %	All Adults %
Sex		
Men	45	47
Women	55	53
Age		
18-34	31	29
35-44	27	23
45-59	26	25
60 and over	15	22
Income		
Under \$30K	16	25
\$30K-\$50K	27	25
\$50K-75K	19	18
Over \$75K	16	16
Occupation		
Professionals/managers	36	23
White collar/sales workers	20	20
Blue collar workers	22	19
Retirees	11	20
Education		
High school or less	33	37
Some college/vocational	33	28
College degree or more	33	34

An indication of the mass appeal and use of wireless phones is the fact that fully one-third of consumers report that they spend *more* money on their wireless phone service bill than



they do on their long distance telephone bill. Given Americans' reliance on long distance service, this is an impressive result for the relatively young wireless industry. Younger users are more likely to spend more on wireless service than are older users, but business users are the biggest spenders on wireless service. In fact, a larger proportion of business users pay more for their wireless service (46%) than they do for their long distance service (39%).



WIRELESS PHONES CONTINUE TO BE USED PRIMARILY FOR PERSONAL NEEDS, BUT CONSUMERS REPORT SPENDING LESS ON THEIR WIRELESS SERVICE THIS YEAR THAN THEY DID LAST YEAR. Today, 31% of wireless users say that they spend \$25 or less on their wireless phone service in an average month, and 27%

say they spend more than \$50 per month. This is a decrease in users' average monthly bill since last year, when 35% said they spent more than \$50 per month and 22% paid \$25 or less. In both years, about 35% spent between \$26 and \$50.

Today, three in five consumers use their wireless phone primarily for personal reasons, while only one in five use their phone mostly for business needs. A comparison of survey results from the past three years shows a gradual increase in the proportion of personal users, with a corresponding decrease in business users: in 1997 personal users outnumbered business users by 58% to 25%, whereas in 1996, 50% of users were personal users and 30% were business users.

Personal users are split evenly between those who say they use their phone mostly for personal safety (25%) and those who use it mostly for personal convenience

(24%), with some of them saying they use their phone for safety and convenience equally (11%). Personal users, especially personal *safety* users, are more likely than are business users to be women; and, personal *convenience* users tend to be younger than do both personal safety and business users. Business users are a more distinct group of consumers, who tend to be middle-aged, professionals and managers, college-educated, and longtime users (have had a wireless phone for three years or more). There is a significant difference in average monthly spending by type of use, with 49% of business users spending more than \$50 a month, but only 23% of personal convenience users and 9% of personal safety users paying this much.

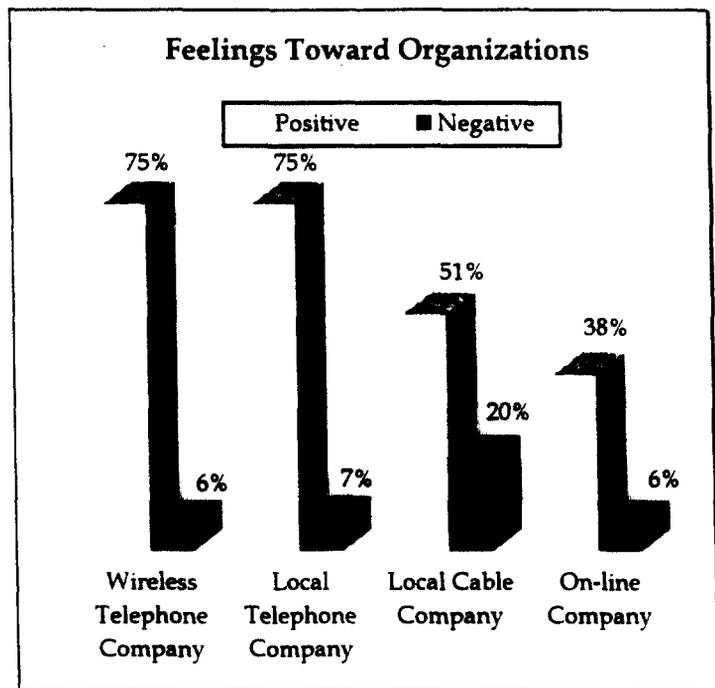
	<u>1998</u>	<u>1997</u>
	%	%
Type of Use		
Business	21	25
Personal	61	58
Local vs. Long Distance		
Local calls	68	70
Local/long distance	31	29
Make vs. Receive		
Make calls	61	56
Make/receive calls	38	44
Minutes Used Per Week		
15 minutes or less/week	37	NA
16-59 minutes/week	31	NA
1 hour or more/week	27	NA
Monthly Cost		
Spend \$25 or less/month	31	22
Spend \$26-\$50/month	35	36
Spend over \$50/month	27	35

More than one-third of consumers are light users who spend just 15 minutes or less talking on their wireless phone in an average week, 31% are medium users who spend 16 to 59 minutes a week, and 27% are heavy users who talk for an hour or more a week. Those who talk the most tend to be younger users, business users, and those who have had a wireless phone for three years or more.



THE WIRELESS INDUSTRY HAS ESTABLISHED ITSELF IMPRESSIVELY IN THE MARKETPLACE, WITH WIRELESS COMPANIES NOW VIEWED IN THE SAME POSITIVE LIGHT AS ARE LOCAL TELEPHONE COMPANIES. Today, three in four users express positive feelings toward their wireless telephone service company, 17% have neutral feelings, and only 6% have negative feelings. These high ratings are

particularly impressive because the relatively young wireless service companies receive ratings equal to those given to the long-established local telephone companies (75% positive, 17% neutral, 7% negative) that are well-rooted in local communities. In fact, these findings reveal a slight improvement in the wireless industry's standing since last year when wireless service companies (71% positive) scored slightly



below local phone companies (74% positive). In addition, the wireless industry receives marks superior to those given to both the local cable company in users' area (51% positive) and users' on-line computer service company (38% positive).

Furthermore, consumers continue to believe by a substantial margin that wireless service is improving, with more than seven in ten (72%) wireless users thinking that service has gotten better over the past few years, rather than stayed the same (21%) or gotten worse (3%).

These findings are parallel to last year's ratings, when 72% thought that service had improved, 19% believed that it was the same, and 5% said service had gotten worse.



THE WIRELESS MARKETPLACE: LOW-TECH CONSUMERS IN A HIGH-TECH WORLD.

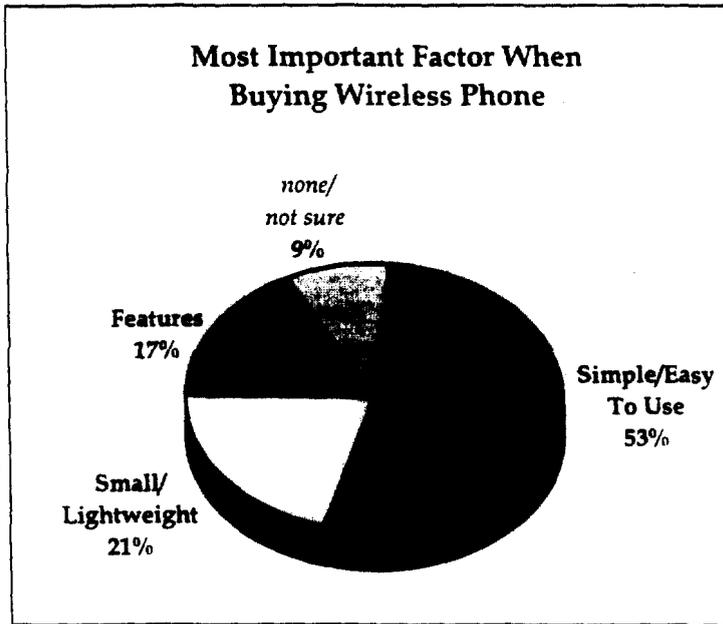
With more than half of users not particularly confident or knowledgeable wireless phone shoppers, the wireless market is composed of neither highly sophisticated nor technologically savvy consumers. While 45% of users consider themselves to be very or fairly confident and knowledgeable when it comes to shopping for a wireless phone, fully 52% do not feel that confident. The following table illustrates the major distinctions between high-tech and low-tech users both in terms of demographics and usage patterns.

<u>High-tech Users</u>	<u>Low-tech Users</u>
Men	Women
Under age 35	Age 45 and over
College educated	High school or less
Longtime users	New users
Business users	Personal safety users
Heavy users	Light users
High-end spenders	Low-end spenders
Higher level of satisfaction	Lower level of satisfaction

One element that might contribute to users' lack of confidence as shoppers may be their confusion about the difference between digital and analog phones. As digital networks have expanded over the past year, so has familiarity with the term, but most wireless users are still confused about what type of technology their phone uses. Today, 40% of users think that their phone is a digital phone, and only one in four believe they use an analog phone, while one-third don't know what type of phone they have. Clearly, many cellular users are mistaken about what type of technology they use, as PCS has been in the marketplace for only about two years and thus accounts for just a small proportion of sales at this time. These findings are more of an indication of digital networks' success in raising awareness of their new technology, rather than a real increase in knowledge about the technology among consumers.

It is significant that when it came to buying a wireless phone, the key for the majority of consumers was to find a phone that was simple and easy to use. Leaving aside the element of price, consumers were asked which factor weighed most heavily in their wireless phone purchasing decision. While some consumers (21%) wanted a phone that was small and lightweight, and some (17%) were looking for a telephone with many features, including voice

mail, call forwarding, and paging, more than half (53%) of users just wanted a phone that was simple and easy to use.



Those who were most concerned with the ease of use tend to be light users who spend less money on their wireless service, including older users, those who use their phone mostly for personal safety, users in lower-income households, less-educated users, and new users. There is little that

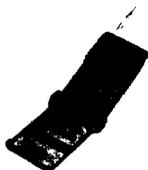
distinguishes consumers who care most about the size and weight of the phone, except that they are slightly more likely to be under age 35, college graduates, and members of upper-income households.

	<u>Confident Shoppers</u>	<u>Non-confident Shoppers</u>
	%	%
Simple/easy to use	42	63
Small and lightweight	28	16
Features	20	14

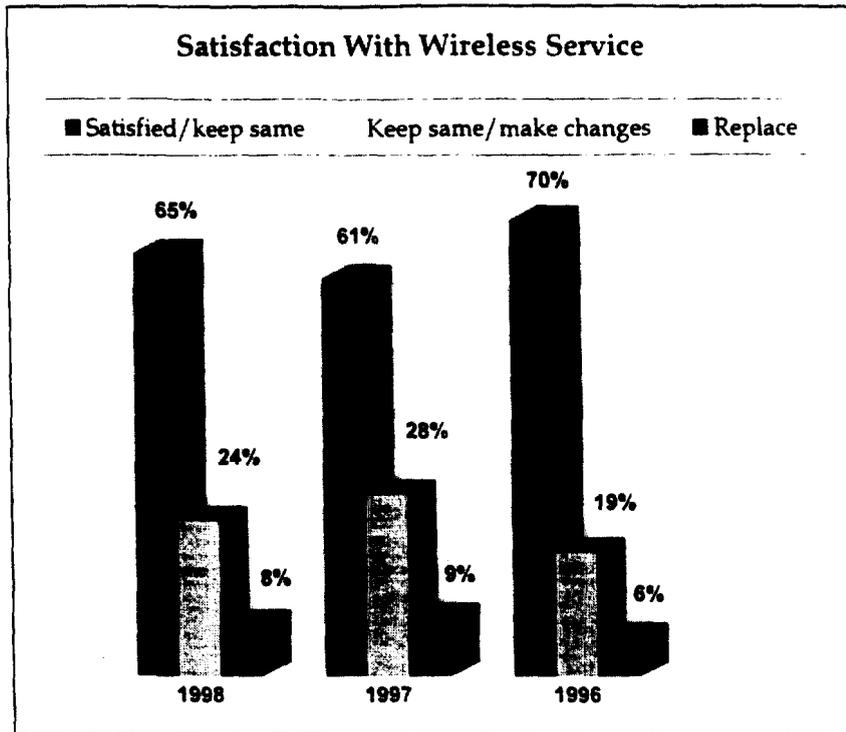
One reason that features may take a back seat to ease of use and size of the phone as the deciding factor in the phone purchasing decision is because many consumers don't use these features. In fact, less than one in three (29%) users say that they regularly use features such as voice mail, call forwarding, and memory dialing on their wireless phone. Nonetheless, these feature-users comprise an important segment of the market, as they tend to be heavy users, especially business users and those who use their phone to receive as well as make calls. Young users age 18 to 34 are also much more likely than are older users to depend on these features.

When it came to deciding which wireless service company to choose, consumers relied on people they know, rather than turning to representatives of the wireless industry. In fact, four in ten users say they got the most helpful information that assisted them in making their selection from a family member, friend, or colleague, while less than one in five found a sales representative in a wireless phone store or an advertisement to be helpful. They did not find any other sources of information to be of great assistance.

41% Family/friend/colleague
 19% Sales rep/wireless phone store
 18% Advertisement
 9% Sales rep/retail store
 6% Customer service line
 4% Other magazine/newspaper
 2% Internet
 2% Wireless catalogue/magazine



CONSUMER SATISFACTION WITH WIRELESS TECHNOLOGY REMAINS HIGH OVERALL, BUT THE INDUSTRY FACES SOME CHALLENGES IN KEY AREAS. Today, 65% of users say that they are satisfied with their service company and would like to keep it, while only about one-third either would like to keep the same company but have it make some changes (24%) or replace their current company (8%). Satisfaction is up slightly from last year – when 61% of users wanted to stay with their company – but it remains slightly below the 70% satisfaction level found in 1996. While general satisfaction is high, it is notable that it is lowest among those who tend to use their wireless phone more often – professionals and managers (59%), business users (60%), and those spending more than \$50 a month on their wireless service (59%). This is a key measurement for any business and the current numbers are on par, but the challenge for the companies in the wireless industry is to retain the loyalty of the more sophisticated and higher-spending public.



When it comes to customer satisfaction in specific categories, the wireless industry fares best on quality of the product (71% very/fairly satisfied) and providing reliable and dependable service (71%). Encouraging results also are revealed in terms of the resolving customers problems, and this is the area in which there has been the most notable improvement over the past year (up from 61% to 70% extremely/very satisfied). Wireless also garners decent marks for providing clear and reliable transmission of calls, as 63% are very or fairly satisfied with this aspect.

The wireless industry does have some problem areas, as ratings are less impressive when it comes to maintaining the privacy of calls (59% very/fairly satisfied), as well as providing new and innovative services (58%). Concern about the privacy of calls spans all categories

	Extremely/Very Satisfied
	%
Overall Satisfaction	65
Quality of its product	71
Reliable/dependable service	71
Resolving customers' problems	70
Clear/reliable calls transmission	63
Privacy of calls	59
New/innovative services	58
Competitive prices	55

and types of users, although medium users are more likely to be satisfied. Groups who are least satisfied with the wireless industry's innovation are well-educated users, light users, those who do not usually leave their phone turned on, and those with high monthly service bills.

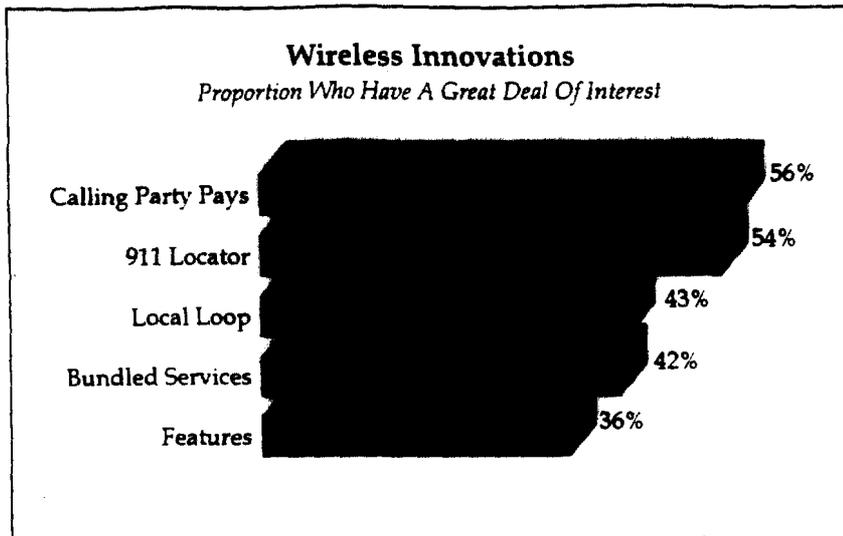
Clearly, price remains a sensitive point for the wireless industry, as consumers continue to give it the lowest marks for having competitive prices (55%). Price is an important issue among users across the board, yet low-end spenders are among the most satisfied with wireless prices, while high-end users are among the least satisfied.



CONSUMERS REGISTER SIGNIFICANT INTEREST IN WIRELESS INNOVATIONS THAT ARE ON THE HORIZON. The survey reveals areas in which the wireless industry has an opportunity to improve its lackluster ratings for providing new and innovative services to date. Consumers' interest in wireless innovations extends beyond existing features, such as paging and voice mail, to more innovative services that can revolutionize the way wireless phones are used. Particularly encouraging for the wireless industry is the vast appeal of innovative services such as a 911 wireless locator and the wireless local loop.

More than half (54%) of users have a great deal of interest in the service that enables a lost person to be located using 911 and their wireless phone. Interest in this innovative safety service is consistent across the board, regardless of whether consumers use their phone mostly for business, mostly for personal convenience, or mostly for personal safety.

A solid 43% of users register a great deal of interest in the wireless local loop—a single phone line that can be connected to either a regular phone or a wireless phone. The wireless local loop appeals to a more upscale audience that is more prone to heavier wireless phone use: business users, professionals, and those with monthly bills of \$50 or more. In addition, 44% of wireless users who have more than one phone line in their home say that switching their second phone line to a wireless phone line that can be used as both a regular and a wireless phone appeals to them a great deal.



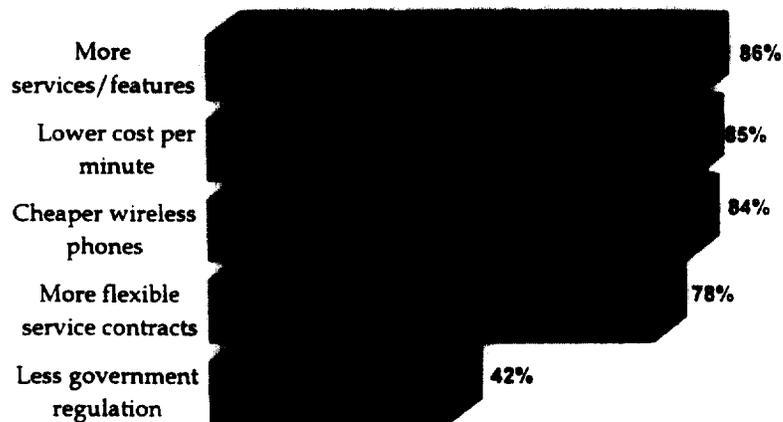
With price being such an important factor in the wireless market, it is not surprising that users have the most interest in a service that would lower the cost of using their wireless phone. More than half of users (56%) have a great deal of interest in a calling-party-pays service, and this innovation appeals to all

types of consumers. On another price-related issue, consumer interest in bundling has increased over the past year, as the proportion of users who have a great deal of interest in receiving one combined bill for several communication services (including wireless service, local phone service, long distance service, paging, and Internet access) has increased from 30% to 42%. The appeal of bundling has risen most among users age 18 to 34, professionals, and business users.



THE MAJOR EXPANSION OF THE WIRELESS MARKETPLACE OVER THE PAST YEAR HAS NOT GONE UNRECOGNIZED BY CONSUMERS, AS MANY USERS REPORT EXPERIENCING COMPETITION IN THE SERVICE ARENA FIRST-HAND. Consumers are taking note of the mounting competition in many wireless markets, as more than seven in ten (71%) wireless users think that there is more competition among wireless companies today compared to one year ago. Just 4% of users believe that there is less competition, and 21% feel that the level of competition has remained the same. This impression of an increasingly competitive marketplace is constant across the different segments of the market—including both young and old, business and personal users, and both heavy and light users.

Benefits of Increased Competition
% who say it is a result of increased competition



Users credit increased competition in the industry with providing several benefits to consumers. In fact, nearly seven in eight users think that competition has resulted in more new wireless services and features (86%), a lower cost-per-minute rate (85%), and cheaper wireless phones (84%), with slightly fewer believing that it has brought about more flexible service contracts (78%). Only about half as many users (42%) feel that this increase in competition has reduced government regulation of wireless service.

Nearly six in ten users (58%) personally have experienced this competition among wireless service companies. One-third of users say they considered two wireless service companies before selecting their current service company, and 25% considered three or more companies before making a choice. Longtime users, heavy users, and high-end spenders are all more likely to have considered multiple service companies. Consumers' attitudes toward competition vary little, regardless of how many service companies they considered, although those who considered multiple companies are slightly more likely to credit increased competition with all of the benefits listed above, with the exception of less government regulation.

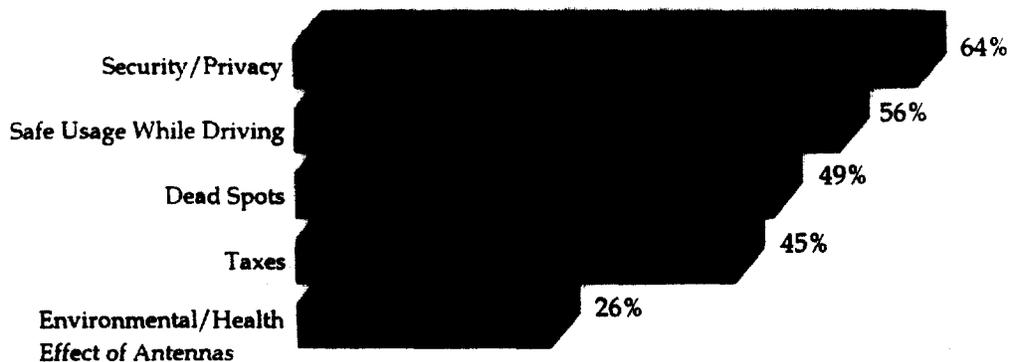


AS THE WIRELESS MARKET CONTINUES TO DEVELOP AND EXPAND, IT WILL BE IMPORTANT TO ADDRESS CONSUMERS' CONCERNS ABOUT SEVERAL ISSUES. The main issues facing the wireless industry today vary in importance to consumers.

Users are most worried about the privacy of calls and the safety of using wireless phones while driving, and they have moderate concern about dead spots within wireless service areas and taxes charged on wireless phone calls. The good news for the industry is that there is very little concern among consumers about wireless antenna towers.

Privacy tops the list of issues that wireless users are worried about, with 64% saying it concerns them a great deal and another 19% saying it concerns them quite a bit. Concern about this issue spans all segments of the market. The issue of the safety of users who talk on their wireless phones while driving ranks second on consumers' agenda: 56% of users say it concerns them a great deal and 23% say it concerns them quite a bit. Older users are the most worried about this safety issue, but concern about talking while driving ranks high across the board.

Issues Facing Wireless Industry
Proportion Who Say Concerns A Great Deal

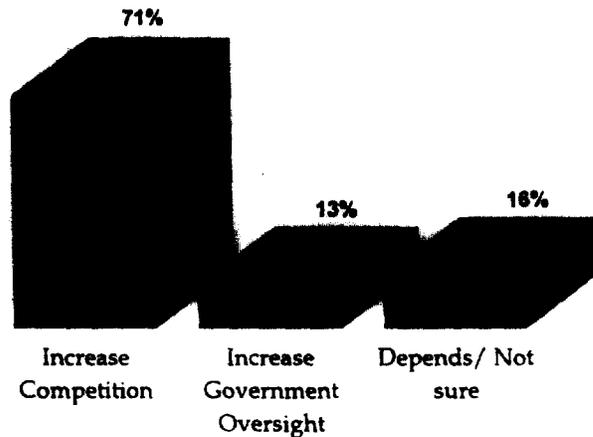


The one issue that currently is not of great concern to consumers is the effect of wireless antenna towers on health and the environment, as less than half of users say this concerns them a great deal (26%) or quite a bit (19%). Moreover, by a margin of almost three to one, consumers believe that the installation of additional wireless antenna towers would do more good than harm because it would allow more comprehensive coverage of service areas (65%), rather than cause more harm than good due to obtrusion and possible environmental risk (23%).



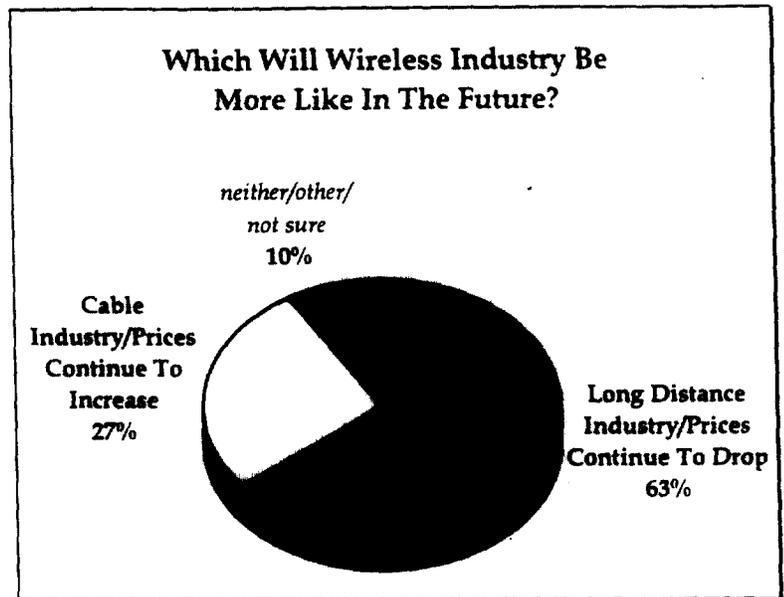
CONSUMERS' STRONGLY BELIEVE THAT MORE COMPETITION--NOT MORE GOVERNMENT REGULATION--IS WHAT MOST EFFECTIVELY WILL ENSURE THAT THE PUBLIC IS WELL-SERVED BY THE WIRELESS INDUSTRY. By a significant 71%-to-13% margin, wireless users favor doing things that would increase competition among wireless companies, rather than doing things that would increase government oversight, in order to best serve the public. Upscale users and men age 18 to 44 are the strongest proponents of increasing competition, but support for using market factors instead of government involvement is high across the all segments of the market.

Which Will Best Ensure That Public Is Well-Served By Wireless Industry?



WHILE WIRELESS TELEPHONE SERVICE IS SEEN AS A GOOD VALUE BY MOST CONSUMERS, THERE ALSO IS A REAL EXPECTATION THAT THE COST OF SERVICE WILL CONTINUE TO DECREASE IN THE FUTURE. An impressive 58% of users think that their wireless service is a good or above average buy, while almost two in five are less convinced that it is a good value for the money (31% think that their service is an average buy and 8% deem it a below average or bad buy). The most marked difference in opinion is by the amount spent on wireless service each month. Users who spend the least amount of money on their wireless service each month think that their service is a better value (63% good/above average buy), while high-end spenders are less convinced (53%).

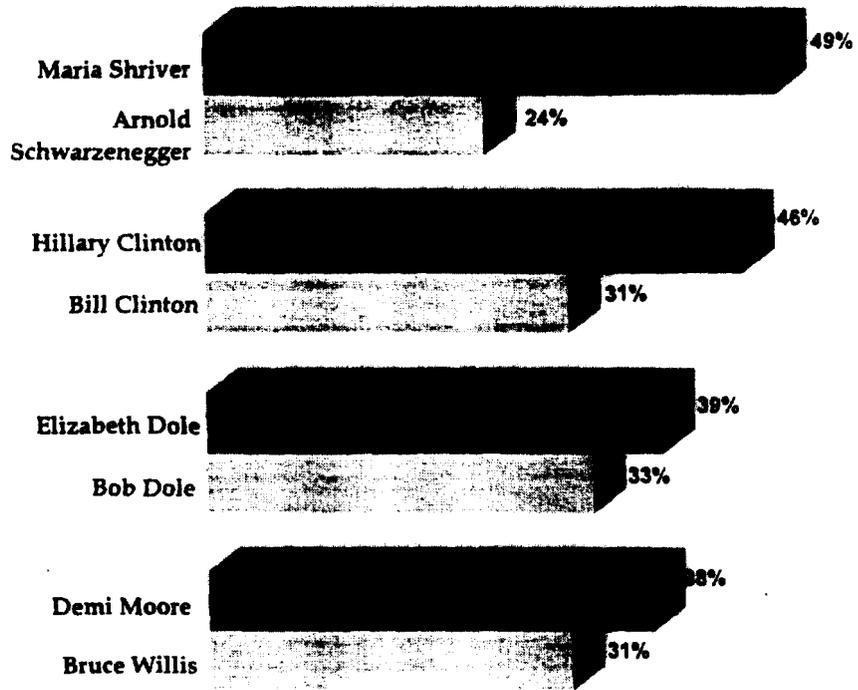
Yet, despite the impressive proportion of users who think that their wireless phone service is a good value today, consumers expect the wireless industry to continue to lower its service rates. As discussed earlier, consumers report spending less on their wireless service this year than they did last year, but as the following chart illustrates, they also expect wireless prices to continue to decrease over time. In fact, as the wireless telephone industry becomes a more mature industry in the marketplace, fully 63% of consumers believe that it will be more like the long distance telephone industry in which prices have continued to drop over time, while only 27% think that it will turn out to be more like the cable industry, with prices continuing to increase. The expectation for lower prices is high across all market segments, with men, users age 35 to 44, as well as older consumers, and members of upper-income households being the most demanding.



Looking ahead to next year, 24% of users expect the cost of their wireless service to decrease in the next year and 45% think that the cost will remain the same, whereas just one in four anticipate costs to go up.

	Most Likely Groups
81% pay own service bill	<i>older users, personal users, new users, lower-income households, blue collar workers</i>
77% only give phone number out to family/key people	<i>new users, personal safety users, lower-income households, women, age 18-34</i>
50% usually keep phone turned on so can receive calls	<i>white collar workers, business users, age 18-34</i>
27% purchased better, more advanced phone in past year	<i>upper-income households, business users, high-end spenders and users</i>
26% used phone to call 911	<i>longtime users, business users, high-income and white collar users</i>

Who Is More Dependent On Their Wireless Phone?



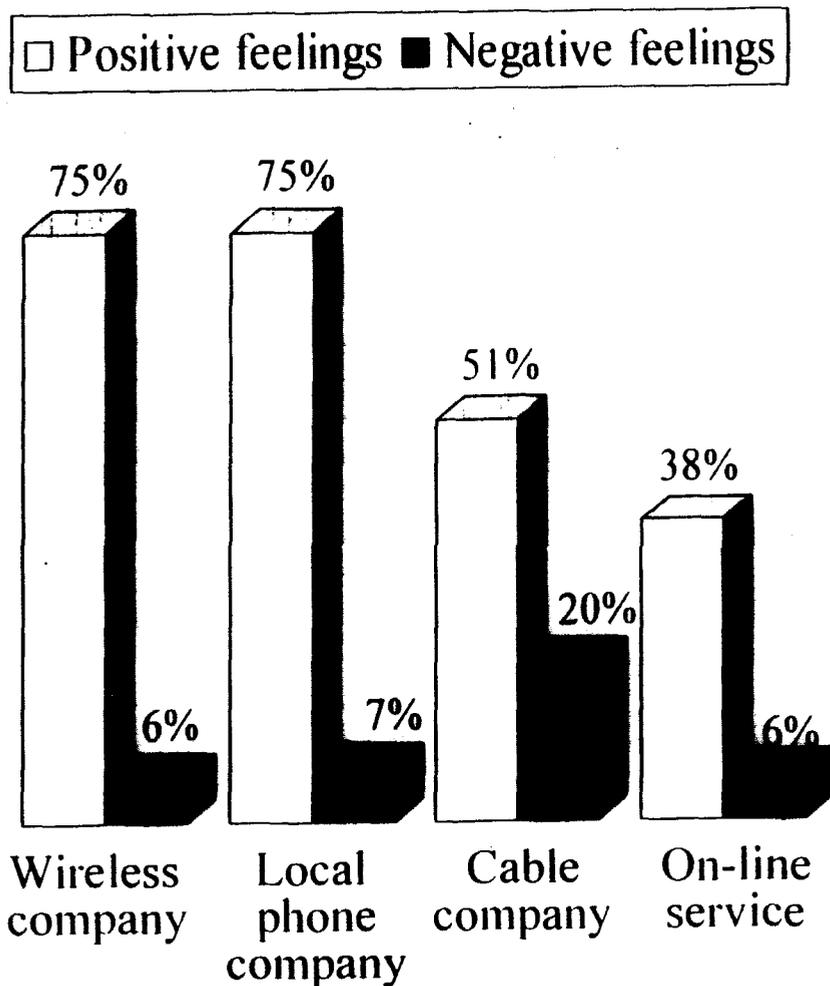
Peter D. Hart Research Associates

The Wireless Market 1998

1,004 wireless users

January 17-20, 1998

Wireless Tops The Charts



- ◆ 72% say their wireless service has gotten better over the past few years.
- ◆ 58% think their wireless service is a good/above average buy.

Competition Is Here

- ➔ **71% think there is more competition among wireless companies today than there was a year ago.**
- ➔ **58% considered more than one service company before selecting their current service.**
- ➔ **32% want their service company to make changes, or want to replace their service company.**
- ➔ **Customers recognize results of increased competition:**
 - **New services/features (86%)**
 - **Lower cost per minute (85%)**
 - **Cheaper phones (84%)**
 - **More flexible/varied contracts (78%)**
 - **Less government regulation (42%)**

Which Will The Wireless Industry Be More Like In The Future?

