



The Wireless Future
A Look At Youth
Unplugged



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executive summary

Connection. The need to be connected to friends, family, and society at large is driving the adoption rate of wireless technologies among young people and, more broadly, consumers, around the world. The global connection revolution that began with the landline telephone and continued with the Internet is now being propelled by wireless technologies that allow us to take our connection addiction on the road. As the world gets smaller and people get even more mobile, technology will enable communication behaviors that will redefine the 21st century.

Being connected, whether to other humans or to specific content, is crucial to today's world.

Wireless manufacturers, service providers, and content developers are quickly providing products, devices and content to meet this demand.

The youth market (ages 13 to 24) is particularly adept at intuitively using these wireless devices and incorporating them into their lifestyles.

Wireless technologies have allowed the youth consumer to extend themselves beyond traditional forms of communication, time, and limited mobility issues. This group is technologically savvy. How is this wireless environment shaping young adults' attitudes and behaviors? Are they interacting differently today than in past years? As they age, will their communication styles change? What emerging applications best fit into young people's lives and meet their needs?

Cheskin has identified eight trends that will define current and future wireless innovation in the US.

The Wireless Future

A Look At Youth Unplugged

Cheskin chose to investigate these issues for two key reasons. First, new generations define new behaviors and can foreshadow wireless behavior and market acceptance for the consumer population at large. Secondly, understanding the nature and behavior of such a market segment will inform wireless carriers, device makers, and application developers what types of experiences and products consumers seek and need. This report

summarizes the insights that we have gleaned about trends of young people's communication behaviors, their adoption of a variety of wireless technologies,

and emerging applications that match the needs and desires of a connected youth market.

Through quantitative primary research with teens, age 13-18, and young adults, age 19-24, in addition to interviews with industry experts and secondary research, Cheskin has identified eight trends that will define current and future wireless innovation in the US.





1 Social connectivity and entertainment will be the primary defining characteristics of wireless devices in the youth market, and likely the consumer market at large.

Continual access to friends and colleagues as well as entertainment experiences that feature games, music, and images are the main activities on mobile devices cited consistently by young people in our sample. The larger consumer market will follow the adoption behaviors of the young adult market.

2 Young people will build relationships via wireless devices.

While adults use their digital and wireless communication devices to maintain relationships they've established elsewhere, teens are comfortably building virtual relationships that are not time or location dependent. Many of these digital communication behaviors naturally shift as people age. The more abundant leisure time and curiosity of teens results in communication as exploration. As they mature, communication becomes more practical. But emotional bonds established early via a communication device may become associated with the product itself - fostering loyalty to brands.

3 Multitasking capabilities will flourish within the youth market.

Teens today have more time pressures and much fuller schedules than did past generations of youth. They gravitate toward technologies that fit in with this new lifestyle. Whether their keen ability to multitask is facilitated by technology, or the technology encourages it, youth appreciate and enjoy the ability to do many things simultaneously. Wireless technologies that leverage this behavior will be very appealing to this market.

4 Personal security and convenience will continue to be motivating factors for first time mobile phone consumers.

Initially, many people acquired a mobile phone for emergency or safety reasons - young adults wanted to feel secure driving in remote locations and parents wanted to keep track of their kids. Teens on the other hand don't view their mobile phones in this way at all. But as E911

mandates take effect and location-based tracking is incorporated into mobile phones, the perception of safety will be reinforced as a part of the device.

5 Personalization of design, function, and interface will be a common expectation.

Beyond the ability to change mobile phone faceplates and ringtones, consumers will expect their wireless devices to be a personal accessory that reflects their tastes and identity.

6 Wireless entertainment and information applications will become favored "gap-fillers."

Short session gaming, quick loading applications, and other mobile entertainment and quick hit information sources will be our new electronic pacifiers. They will free people from gaps of boredom. Teens who have the innate need to be continually stimulated will be able to easily satisfy this desire via wireless mobile technology. This expectation will be maintained as consumers mature.

7 Strategic convergence will define the most successful wireless devices.

Applications that are related in a broader context and that compliment each other will result in more appealing devices. Rather than creating "uber-devices" that merge PDAs and mobile phones, successful devices will embody mutually enhancing functions, such as games which encourage communication in combination with mobile phone and text messaging capabilities, all of which have socially enhancing benefits. Another example will be mobile phones and PDAs with location sensing technologies for serving up location-specific content.

8 Entertainment will drive the development of wireless cross-platform content.

Wireless technology will drive the development of particular entertainment experiences that people can access throughout their entire day and from nearly any device - PC, mobile phones, fax machines, landlines, PDAs. Although true wireless cross-platform experiences have not yet been realized, entertainment content that takes advantage of limited attention spans and anytime, anywhere mobility will become increasingly popular.





introduction

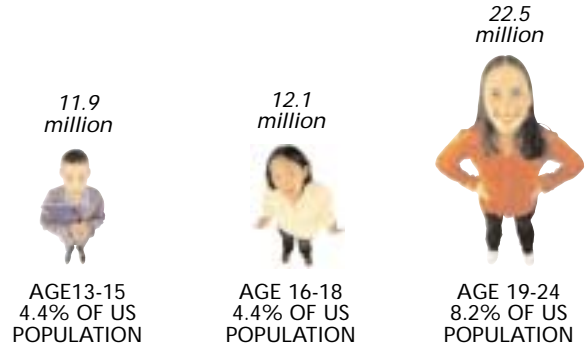
Which came first, the cargo pant or the mobile phone? Were the large pockets on this popular clothing designed to hold phones or did youthful wearers innovate? Regardless of whether by design or coincidence, young people and communication technology have evolved together. Wherever you look, young people are attached to their mobile devices. Mobile phones with fluorescent faceplates share backpack space with school books, Game Boys are common in the back seat of the family SUV. Youth, especially teens, carry their life and entertainment on their bodies, and their social interactions increasingly rely on digital devices, from pagers to mobile phones, to IM on the home PC. What is it about youth that explains their facile adoption of technology, and what can companies learn that will inspire

These new generations will define new behaviors and can foreshadow wireless behavior and market acceptance for the consumer population at large.

them to develop successful next generation wireless devices and applications, not just for youth, but for the mainstream market that traditionally follows their lead?

The current wireless market in the US is a volatile one, where products and applications are developed, discarded, and reinvented rapidly. Knowing which way the industry will evolve will depend not only on engineering innovation and the development of consistent standards and protocols, but more importantly on understanding what consumers are ready to embrace, what will resonate with their current lifestyles, and what will enhance their lives in the future. As a bellwether of lifestyle trends, the

youth: one of the largest, upcoming markets



Source: 2001 U.S. Census

teen spending represents a significant portion of all consumer spending

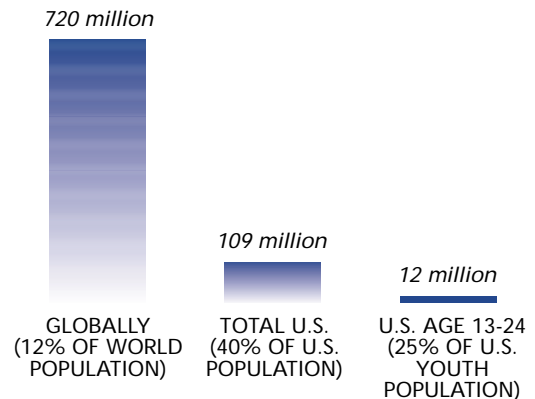


\$155 BILLION PER YEAR, GROWING AT 1.3% IN 2000

ABOUT \$84 PER WEEK

Source: Teen Research Unlimited, 2000

mobile phone subscribers in 2000



Source: International Telecommunications Union, 2001; eMarketer, 2001; CTIA, 2001; Cahners InStat, 2001





youth market provides some of the best insight into the future of technology. Equally as important is their economic influence, this market of 13-24 year-olds accounts for over 16% of the total US population¹, and the teen market alone in the US yields \$155 billion in spending power.²

Globally, the youth population is bigger than other segments and typically acts in concert. Whatever teens in the US and UK do quickly and convincingly travels around the world, jumping geopolitical boundaries with ease. Since wireless devices are generally much less costly than PCs and already have a stronghold in Asia and Europe, global adoption should be rapid and pervasive.

Cheskin chose to investigate these issues for two key reasons. First, these new generations (13 - 24 year olds) will define new behaviors and can foreshadow wireless behavior and market acceptance for the consumer population at large. Secondly, understanding the nature and behavior of such a market segment will inform wireless carriers, device makers, and application developers what types of experiences and products consumers seek and need. This report summarizes the insights that we have gleaned about trends of young people's communication behaviors, their adoption of a variety of wireless technologies, and emerging applications that match the needs and desires of a connected youth market.

¹ US Census 2000

² TRU press release, January 25th, 2001 - http://www.teenresearch.com/PRview.cfm?edit_id=75





BACKGROUND ON THE WIRELESS INDUSTRY

At Cheskin we seek to evaluate the results of research in the context of technology capabilities and business trends. Understanding the current adoption curve of wireless technologies along with the timeline for future network and technology innovations offers crucial perspective on the evolving behaviors and needs of the youth market and later developments in the mainstream.

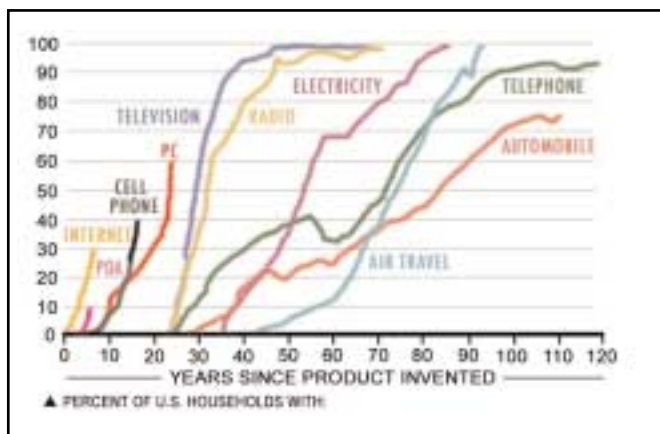
Along with the Internet, mobile phones have experienced one of the most dramatic adoption curves of any new technology in the past century. Considering the relatively young age of wireless technologies, research indicates that these network and wireless devices are mirroring or bettering adoption curves of past technologies that are now common, everyday household products.

Penetration rate of various devices

The current penetration of mobile phones in the US Youth market is 25%. We chose an online sample of respondents with higher than average mobile phone ownership to be able to better identify leading technology trends.

Our sample showed a high penetration rate of CD burners (36%) and cable modems (30%), and the relatively low penetration rate of pagers (16%). One theory on why pagers may be declining in popularity is that text messaging capabilities are becoming available in today's mobile phones. Understanding the nature of teens in the context to their device usages will be helpful in predicting emerging application that will become popular. See Appendix for a summary table showing device ownership.

Figure 1. Technology adoption history



Source: Mobile Insights, Inc. Copyright 2001.

The Wireless Marketplace

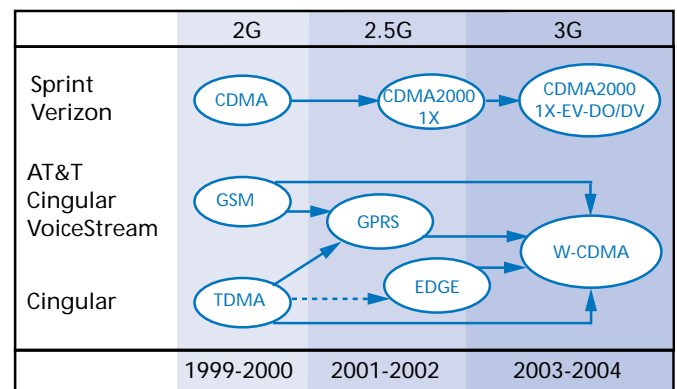
The local and long distance telephone business is very established, and these large carriers wield considerable power over the mobile phone and broader wireless businesses. Carriers, equipment providers, and device makers bear the heavy cost of rolling out new networks that deliver better quality voice communications and faster data speeds. It is important to understand the timeline for next generation network rollouts and their related data speeds before we can review applications that will be viable in a youth market.

Network Migration Paths

There is a global transition underway as carriers and device makers upgrade their infrastructure and hardware to handle greater capacity of voice and data traffic. The US is two to three years behind Asia and Europe in this transition. Two of the key factors that account for this include: the failure of US carriers to agree upon a standard protocol and the limited availability of spectrum for next generation networks.

2.5G (Generation) and 3G networks will bring about packet-switching technologies that will provide more bandwidth for voice and data transmission and the potential for an "always-on" connection to information servers. These networks will deliver richer content - audio, images, video- that we predict will be readily devoured, first by the youth market and then by mainstream markets.

Figure 2. Network migration paths in the US



Source: The Strategis Group, 2001





Network Providers and Data Speeds

Today's 2G networks were built for voice traffic, although 2.5G modifications are being made to transform them into data networks as well. The data speeds of these current networks are very slow compared to data speeds that Americans are accustomed to with PCs. Furthermore, the average data speed of the modestly loaded networks will be markedly less than the theoretical data speeds due to network hot spots, slowdown of data when moving with devices, among other things.

In the business community, the need to be connected to corporate intranets and to access email anytime is driving the adoption of mobile data networks. Conversely, in the consumer market, the need to be entertained during boring gaps throughout the day and the need to communicate in creative and personal ways will drive the adoption of mobile data networks. Entertainment and social connectivity will define wireless devices in the youth and larger consumer markets.

Figure 3. Network providers and data speeds

network	carriers	availability	average actual speed	theoretical network speed
CDMA	Sprint PCS Verizon	today	7-9 kbps	14.4 kbps
GSM	AT&T Cingular VoiceStream	today	7-9 kbps	14.4 kbps
iDEN	Nextel	today	4-8kbps	9.6 kbps
CDPD	AT&T	today	8-10kbps	19.2 kbps
GPRS	AT&T, Cingular VoiceStream	mid 2001 to end 2002	40-60kbps	85 kbps
EDGE	Cingular	2002	128 kbps	470 kbps
CDMA2000 1X	Sprint PCS Verizon	2002	50-100 kbps	153 kbps
CDMA2000 1X-EV	Sprint PCS Verizon	2003	600-900 kbps	2 Mbps
W-CDMA	AT&T Cingular VoiceStream	late 2003	384 kbps	2 Mbps

Source: *Adventis, The Strategis Group, Cheskin, 2001.*

The impact of Bluetooth and 802.11

Two emerging local networking technologies that will impact how the myriad wireless devices communicate with each other and the larger Internet are Bluetooth and 802.11b (e.g., Wi-Fi).

Bluetooth is a communications standard for a small, cheap radio chip to be plugged into computers, printers, mobile phones, etc. A Bluetooth chip is designed to replace cables by wirelessly transmitting information at a special frequency to another Bluetooth chip in a receiving device. It has a networking range of about 30 feet, and it transmits data at about 1 megabit per second.

802.11b is a wireless local area networking standard that uses the 2.4 gigahertz radio frequency band (as does Bluetooth) and which is relatively low cost to deploy. It is cheaper than laying cables, and several companies, hotels, and airports are beginning to provision it to bring high-speed internet access to their employees and customers. 802.11b has an average data transfer rate of 9 to 11 Mbps. Like Bluetooth, 802.11b works with phones, PDAs, computers, and other devices.

These two technologies are worth noting in the United States because they promise to easily link the variety of digital media and information devices in our lives.

The relatively local nature of young people's lives makes them excellent candidates for adopting these LAN technologies in their homes, schools, and public gathering places. However, most companies delivering products with these technologies are focused on enterprise customers. The trends that we have identified in the youth market like multitasking, cross-platform content, strategic convergence, and a preference for entertainment content can guide technology companies in designing and marketing consumer-oriented LAN products.





THE YOUTH CONSUMER AND THE FUTURE OF WIRELESS

The youth market today sometimes seems to differ dramatically from past generations. They have integrated technology so thoroughly into their lives that it's hard to imagine a non-tech teen or young adult. On the other hand, some youth behaviors are consistent from one generation to the next, varying little regardless of cultural or technological influences. They have always loved entertainment. Most are highly social and experimental. And, once they get a license, they are highly mobile.

Technology has become a great facilitator of teen and young adults' social needs, building on their peer fixation and enhancing their ability to communicate with one another. In addition, it supports and encourages their natural tendency to experiment, both with their identity and their behaviors. The ease and anonymity of email and instant messaging offers a powerful platform for their social exploration and interaction.

Since technology is ubiquitous and a natural part of teens' everyday lives, their expectations for it are high and they push its limits, particularly in the field of entertainment. It's common for young tech device users to discover unplanned functionalities or gaming tricks that were not intentionally designed into a game. In addition, youth are intolerant of poorly designed devices or interfaces. They want it to be "cool" and work well.

And as every parent knows, teens are mobile, especially when they turn 16 and begin driving, constantly in search of fun and friends. Wireless technologies now allow them even more freedom to connect and explore. Untethered from their location-dependent technology, they have a

new freedom that makes them an even more powerful disseminator of trends - word-of-mouth and demonstration by use are influential tools with this segment.

Because of their natural curiosity, their strong need to communicate, their craving for entertainment, and their strong sense of design and style, we turn to youth as a bellwether for predicting behavior and preferences of the larger consumer market.

Communication and Connectivity

As mentioned briefly before, teens and young people are very social by nature and wireless devices and other digital communication tools have enabled them to be connected

to their peers, family members, and those interested in like content. As we explore these behaviors, we also should keep in mind new behaviors that may be emerging as new communication devices are being created, such as multi-tasking and participation in simultaneous conversations.

Technology has become a great facilitator of teen and young adults' social needs, building on their peer fixation and enhancing their ability to communicate with one another.

Wireless Devices Enable Multi-Modal Behaviors

When it comes to communication, young people are the quintessential multitaskers. They thrive on conducting multiple simultaneous conversations across many mediums. Past observational studies conducted by Cheskin have shown that youth are quite likely to talk on landline phones while chatting on their PC while answering a page on their pager or phone.

Teens in this study, were more likely to carry on multiple conversations than young adults (57% vs. 49%).

Furthermore, teens expressed that they could have more simultaneous conversations and still feel connected to the conversation (~ 4.28 conversations) than young adults (~ 3.69 conversations).

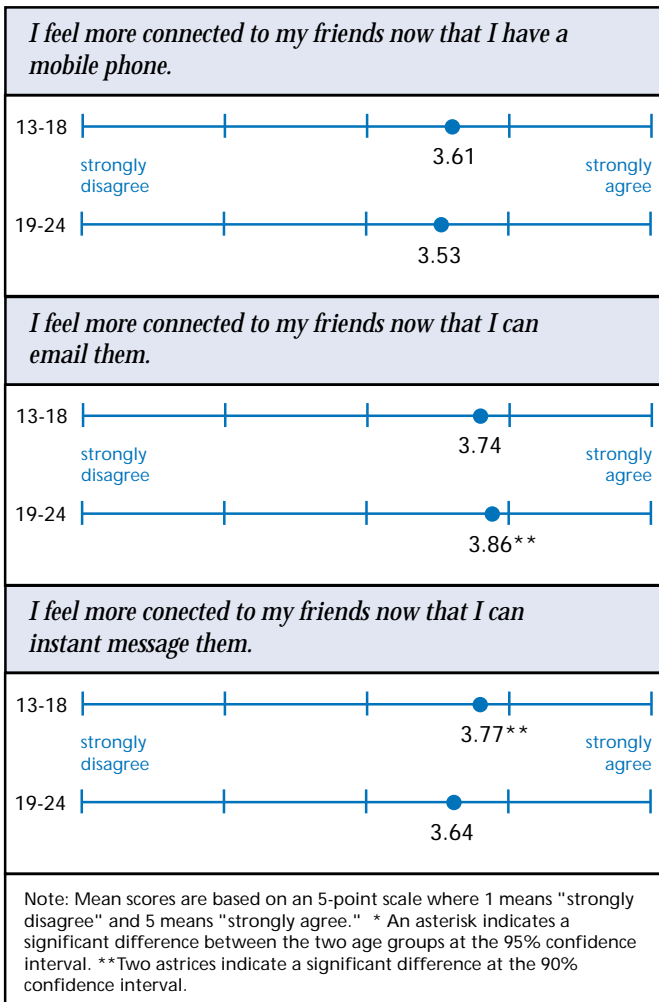




Mobile phones, email and instant messaging make us feel more connected to friends

New technologies are becoming more important as youth attempt to maintain their friendships in an ever more fast-paced and complicated world. Both teens and young adults feel more connected to their friends now that they can contact them on their mobile phone, email or through instant message (IM).

Figure 4. Wireless connectedness



Text rivals voice communications

Even with the pervasive availability of landline and wireless phones that enable instant, two-way voice communications, young people still frequently communicate with each other via text. What makes text messaging so compelling to young people? We think there are multiple reasons.

- First, with text messaging and buddy lists, they can immediately broadcast information to a large group of friends simultaneously. "The information gets disseminated immediately, as if there is a roomful of friends," explains Dan Williams, Director of Corporate Strategic Design at Motorola.
- Second, text messaging does not disrupt their current interactions the same way that pausing to make a phone call does. Whether it's in the middle of a math lecture or during a movie it is easier to multi-task and silently receive the message than it is to

"The information gets disseminated immediately, as if there is a roomful of friends." Dan Williams, Motorola.

noticeably draw attention to a ringing mobile phone. This falls easily into the common behavior of secretly passing notes. Teens are protective of their privacy and may enjoy the low-key, stealth nature of text based communications.

- Third, text messaging allows for anonymity and convenience of message delivery. These two elements provide a great deal of control over the interaction, which may appeal to youth especially when involved in a number of other, concurrent tasks.
- Lastly, as we discussed earlier, text allows individuals to assume multiple personalities with different groups of friends.

Breakthroughs in interface design in mobile phones that allow consumers to more easily compose text messages along with rich audio and visual content will help facilitate these communication behaviors and will be widely adopted by the youth market.





We're learning to use multiple communication devices interchangeably

The regular telephone is still one of teen's top devices for talking with others, but its popularity is closely matched by mobile phones and pagers. On average, teens speak to about six people per day via regular phone and four via mobile phone and pager. Young adults also use all three technologies to contact friends and relatives, but use their devices more frequently for work, business, and information seeking than teens. When asked about the use of IM for business communications, 8% of teens compared to 20% of young adults admitted to this use of the technology. (See full table of frequencies at end of report.)

Figure 5. Who are they calling

People reached in an average weekday		
	13 -18	19 -24
Regular phone	Close personal (89%*) friends Parents (63%) Casual friends (59%*) Siblings (32%) work colleagues (11%) businesses (7%) information (5%)	Close personal (76%) friends Parents (75%*) Siblings (50%*) Casual friends (42%) work colleagues (38%*) businesses (36%*) information (12%*)
Mobile phone	Parents (72%) Close personal (60%) friends Siblings (32%) Casual friends (27%) Other relatives (18%) work colleagues (10%) businesses (5%) information (3%)	Parents (67%) Close personal (66%) friends Siblings (37%) Casual friends (33%) work colleagues (28%*) Other relatives (26%*) businesses (18%*) information (9%*)
Pager/Beeper	Close personal (70%*) friends Parents (65%*) Casual friends (55%*) Siblings (27%) work colleagues (23%)	Close personal (49%) friends Parents (39%) Siblings (30%) work colleagues (27%) Casual friends (26%)
Note: * An asterisk indicates a significant difference between the two age groups at the 95% confidence interval.		

Figure 6. How many people are they calling

Number of people reached in an average weekday		
	13 -18	19 -24
Regular phone	5.98	6.67
Mobile phone	4.24	4.55
Pager/Beeper	4.27* sent 6.48 received	2.41 sent 4.87 received
Note: * An asterisk indicates a significant difference between the two age groups at the 95% confidence interval.		

Instant Messaging extends friendship networks

Young people who use instant messaging tend to have a large circle of friends on their "buddy lists." Teens in our study had a wider circle of buddies (37 on average), than young adults did (average 27 buddies), but this could be due to the newness of this medium. Interestingly, the number of buddies drops off markedly in the 22 - 24 age segment. Again, this could be because IM is still novel and not widely used beyond the teen market.

When it comes to communication, young people are the quintessential multitaskers.

Carriers and device makers have an opportunity to customize products and marketing programs specifically for the homogeneous usage patterns of teens. The popularity of local family calling plans is a good example of a marketing program well-suited for this type of communication behavior.





Text messaging eases communication with "faceless friends"

Young people readily communicate with people they have never met in person when using email and instant messaging. The anonymous nature of the online medium allows them to develop an intimacy with people they've never met that is unlike any other communication medium.

Both teens and young adults are more likely to communicate with people they've never met via instant messaging than email; furthermore, 13 - 18 year olds are more likely to communicate with those they've never met using either email or IM than 19 -24 year olds are.

Figure 7. Number of "faceless friends" met in email and IM

	13 -18	19 -24
IM	11.0*	7.2
email	5.7**	4.4

Note: * An asterisk indicates a significant difference between the two age groups at the 95% confidence interval. ** Two astrices indicates a significant difference at the 90% confidence interval.

Although numerous organizations have rightly raised concerns about young people's personal security online, it's important to note that there are positive aspects to this somewhat anonymous mode of communication. Being able to communicate with peers across borders and continents can only expand young people's understanding of culture and global differences and similarities. In addition, many companies are trying to provide interaction environments that are relatively safe. For example, UPOC has created chatrooms for kids that allow them to get together to talk about their favorite bands or star on a fan site. Other companies like JAMDAT Mobile, Inc. are offering role-playing games. These types of interactions are perfect for the "social" seeking agenda of young people and facilitate the "connectivity" desired by these youthful audiences.

"Many teens have found that the easiest way to manage different buddy lists is to have a separate identity for each circle of friends that they have." Pierre de Vries, Microsoft

Anonymous communication allows for greater personal exploration

"Finding one's self" is a normal aspect of being a teen. Teens and young adults try on new personalities all the time - looking for the right fit. With the advent of email came the exploration of asynchronous communications that allowed for individuals to mask who they were with pseudonyms and non-linear modes. Soon followed the Internet, which allowed this behavior to develop more extensively and provided the opportunity to study people's interaction in chatrooms, gaming environments, bulletin boards, etc. One common finding of these studies was that individuals could explore their identities while online. A number of experts we interviewed confirmed that this type of exploration is currently being done through wireless devices as well, especially by teens.

The sense of anonymity with text messaging allows young people to try out different personalities with people they don't interact with face to face. Dave Robak, Vice President of Business Development for Cybiko, describes this anonymous quality, "They can change how they portray themselves day by day or hour by hour. First they're chatting with the chess club then they're chatting about the hottest bands. They can't do this as easily with their everyday friends."

Pierre de Vries, Director of Advanced Product Development at Microsoft, considers another aspect of using different identities. He suggests, "Many teens have found that the easiest way to manage different buddy lists is to have a separate identity for each circle of friends that they have. This could be called persona management, where they have a sports persona, gossip persona, etc. Different people in their lives seem to have access to different parts of their personality - but it may just be a

workaround for current problems with buddy list management."

Ironically, a related but contrary trend emerging is the notion of "persistence of identity." Here, device manufacturers and content providers are trying to allow teens and young adults a way to keep their identities across interactions, games, or devices. Julien Ulrich, Vice President of Business Development at UPOC states, "Rather than chat-





rooms where they come and go, the rooms are persistent and they can chat with friends when they want to and have the same identities."

Regardless if identity exploration is multi-faceted or singly-focused, wireless device and content developers will need to remember the importance of identity formation in their young audiences and provide them with outlets to explore this aspect of their development.

Technology helps build relationships

The age range between 13 to 24 may not seem that significant in number of years, but in terms of psychological and sociological development, there are profound differences between the younger ages and older ages. In many cases, however, it's dangerous to assume that maturity level accounts for behavioral differences in technology use. We should consider that a trend that is popular with teens hasn't yet fully caught on with young adults. In the case of IM, it's possible that young adults don't have as much time to socialize and don't work in an environment that uses IM yet.

The key trends found in this study were:

- All ages send similar amounts of email, however older youth received significantly more. Many factors could contribute to this including the increasing distribution of a person's email address to spam lists the longer they have been online.

- Younger ages were more likely to IM and had more buddies on their buddy lists than older ages.
- Younger ages were more likely to communicate, either by email or IM, with those they've never met than older respondents.

Figure 9. Instant message behaviors

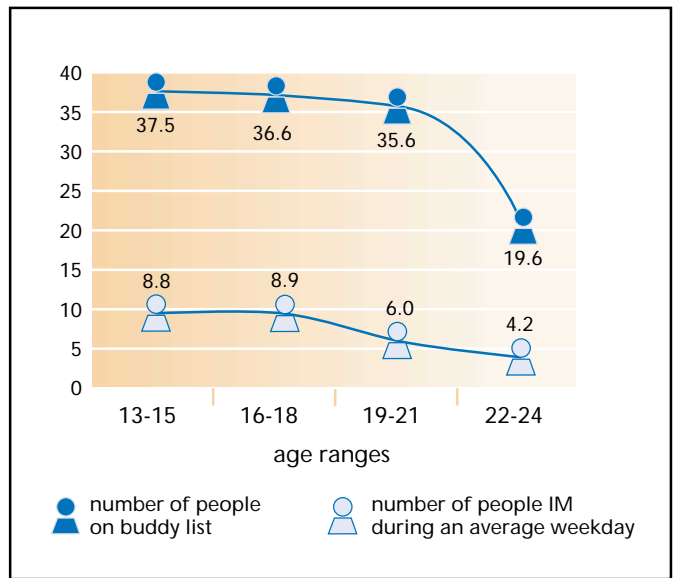


Figure 8. Email behaviors

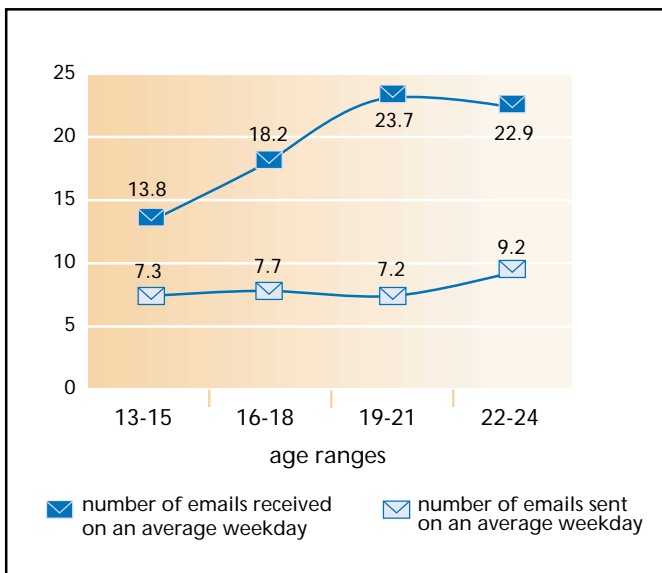
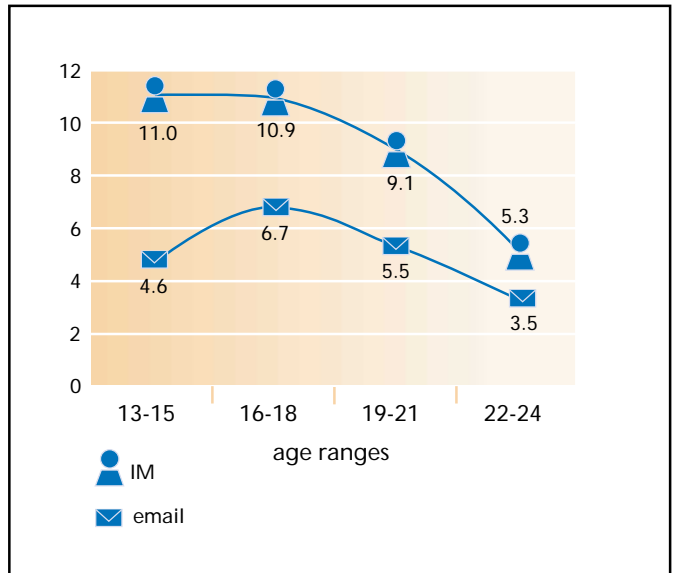


Figure 10. Communicating with "faceless friends"





As we age our lifestyles shift and the following trends start to emerge.

- We become more organized because we have more responsibilities (e.g. work, college, finding a place to live) and we have greater control of how we spend our time (e.g. less under parental influence). This trend was evident in the types of portable devices older groups preferred as their favorite versus the younger audience. Older respondents indicated a higher preference for mobile phones, laptop computers and PDAs, whereas younger segments indicated a higher preference for Discman/Walkmans, mobile phones, and Game Boys.
- We typically become less focused on expanding and exploring new social networks and focus more on close friendship circles. As older segments have less time to spend in purely social interactions, they're circle of casual friends most likely decreases. This may be one explanation for why teens have much larger circles of buddies and actually communicate more with "friends they've never met." This phenomenon will need to be watched to determine if these younger cohorts actually maintain this behavior or if they shift away from this as they mature.
- We become more attached to technologies we feel comfortable with and may not continue to adopt new technologies. This might explain the discrepancy of the eldest group using more email, a technology young adults have grown up with versus younger groups favoring IM. However, this may change if business and work environments begin to utilize IM more for internal communications than the current standard of email. Thus far, 20% of 19 - 24 year olds indicated using IM for business communications or work discussions. We expect that IM use will increase, especially for those under 30.

In a nutshell, device manufacturers and carriers need to pay attention to how their audience is maturing and shift their focus accordingly, such as offering new services to meet new social structures and psychological frameworks.

As older segments have less time to spend in purely social interactions, they're circle of casual friends most likely decreases. This is one explanation for why teens have much larger circles of buddies and actually communicate more with "friends they've never met."





Physical Transcendence - Immediacy and Mobility

Wireless sets us free and enables mobility. Individuals can now communicate and access content while they are on-the-move in nearly any situation. Not only do these technologies transcend physical location, but also time. Instead of having to wait to find information or contact someone, an individual can do so immediately. While a significant percentage of adults have adopted mobile phones, many have done so simply for emergency situations. Teens and young adults, on the other hand, saw their potential for much broader usage.

Wireless means mobility

Teens are a highly mobile segment of the population. Turning 16 is a magical event in a young person's life, marking freedom from home and social independence. Not surprisingly, and to the chagrin of some parents, teens use their phones extensively while driving and riding as passengers. The most frequently cited locations for using mobile phones by our respondents include outdoor public areas and in the car.

Figure 11. Top 3 places where young people use mobile phones

	13 -18	19 -24
Outdoor public areas	63%	69%
While someone else is driving	58%	63%
While I'm driving	30%	66%*

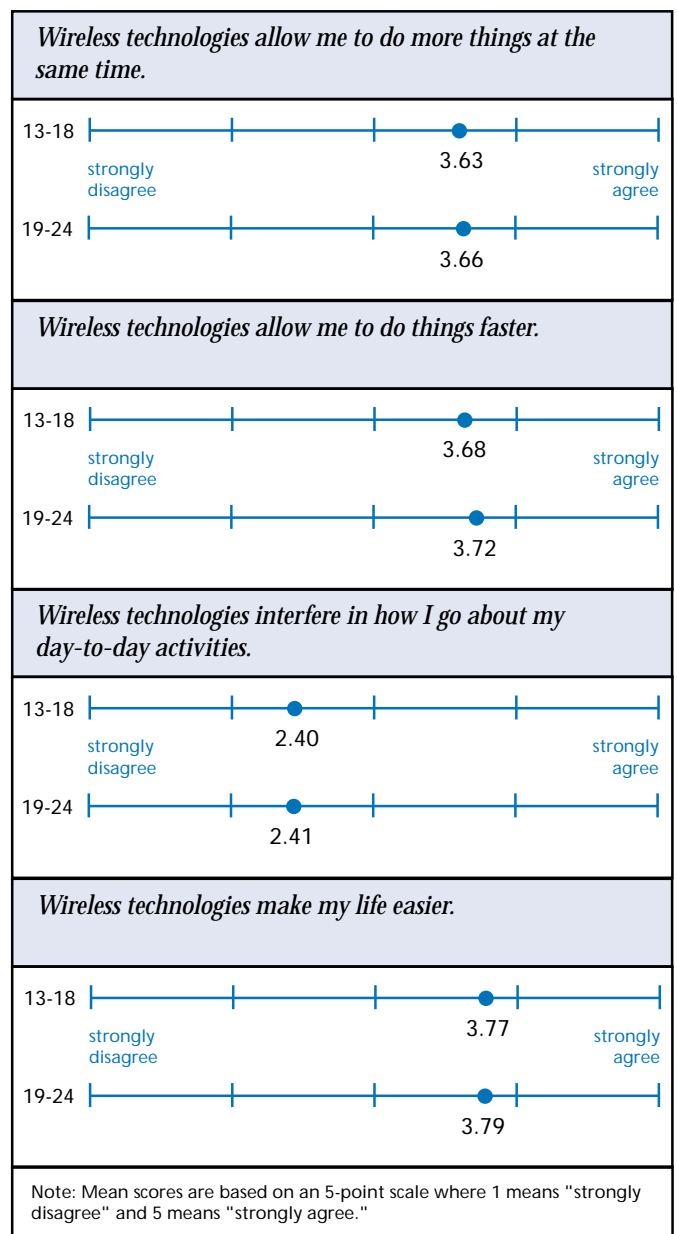
Note: * An asterisk indicates a significant difference between the two age groups at the 95% confidence interval.

Automobile manufacturers should take notice of this usage pattern and think about young people as viable customers of telematics (i.e., an industry term for mobile communication and data technology in automobiles). Affordable hands-free calling devices, navigation systems, and mobile Internet technologies would be well received by parents who want to assure their kids a safer driving experience.

Wireless means "easier"

Wireless technologies are speeding us up by allowing us to do more things quickly and concurrently. Our respondents also indicate that wireless technologies are making their lives easier. We expect that today's youth will continue embracing these technologies and this "multitasking, makes life easier" mentality until it is the norm. Wireless technologies will be an extension of the mind and body for these youth.

Figure 12. Integrating wireless technologies into everyday life



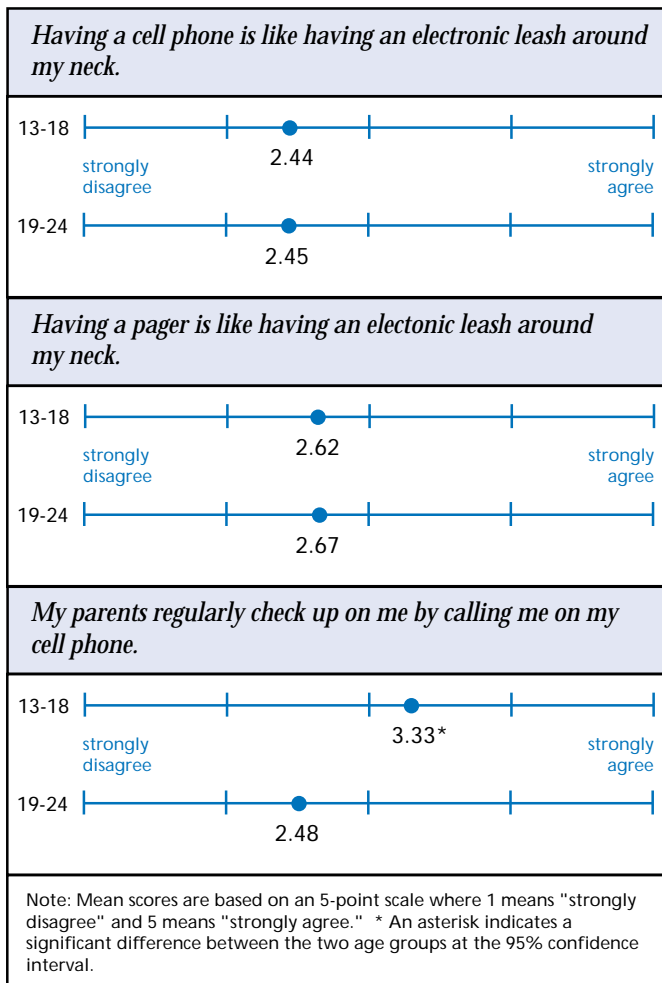


Wireless means freedom

Often we see the media or hear adult consumers talk about their love/hate relationship with their wireless device. Being connected anywhere/anytime isn't always an ideal situation and business people especially complain about being too available. Rather than being convenient, the ringing mobile phone can be an annoyance.

However, our study indicates that this perception may not be common among youth. It remains to be seen if the freedom that a mobile phone or pager offers to teens takes on a more burdensome aspect as they mature or whether this perception will fade with time.

Figure 13. The Wireless electronic leash?



Benefits - Emotional v. Functional

Motivation is key to understanding why teens and young adults use the wireless devices they do and the content they choose. Are the devices they use based on satisfying emotional reasons, practical reasons, or because they had no choice at all? Are there any difference between teens and young adults and their motivations? Understanding the nature of this segment's motivations will provide

Teens used portable devices more for entertainment and fun, while young adults were more inclined toward using such devices for functional purposes.

device manufacturers, carriers, and content providers with information about what products need to be developed to serve these consumer needs and wants.

As Jeff Giese, editor of Fierce Wireless, states, "Mobile phones are like cereal. Parents buy it for their kids for the vitamins, and kids eat because it tastes good. They buy phones for their kids to keep track of them and for emergencies, but kids use them mostly to talk to their friends." One trend that was robust across our data: Teens used portable devices more for entertainment and fun, while young adults were more inclined toward using such devices for functional purposes.

Favorite Portable Devices - Entertainment, Communication and Utility

The top five portable devices were: mobile phones, Discman/Walkman, Game Boys, laptop computers, and pager/beepers. Furthermore, there were preference differences between the two age groups. The younger group (13 - 18) was more likely to cite entertainment devices like Discmans and Game Boys as their favorite portable devices. Young adults (19 - 24), chose mobile phones first, then Discman/Walkmans, followed far behind by laptop computers and PDAs. The teens favored entertainment content (music and games) while the young adults favored communication, entertainment, then utility. The higher price of laptop computers and PDAs is most likely





a factor for their lack of preference in the younger age group. History has shown that most people cite utility and productivity as the reasons for buying higher priced computing hardware, and once they own them they end up using the hardware mostly for entertainment.

Figure 14. Favorite portable devices

	total	13 -18	19 -24
Mobile phones	33%	23%	43%*
Discman/Walkman	30	43*	18
Game Boy	7	12*	2
Laptop Computer	6	3	8*
Pager/Beeper	4	3	5
PDA	2	0	4*

Note: * An asterisk indicates a significant difference between the two age groups at the 95% confidence interval.

Key Reasons for Using Favorite Portable Devices - Emotional Benefits, Practicality, and Design Style

After respondents identified which portable device was their favorite, they subsequently answered what their top two reasons were for using that device. Three key areas emerged from respondents as to why a certain device was their favorite. The three categories consistently cited were:

- Emotional benefit (e.g. it's fun, to be connected, was bored, etc.)
- Functionality or practicality (e.g. offer a certain service or content, adds convenience to one's life, emergency reasons, etc.)
- Design/interface (e.g. compact, easy to carry, lightweight, versatile, etc.)

Mobile phones are practical tools for young adults

Mobile phones were the # 1 favorite device among young adults, with 43% listing this device as their favorite. Their main reasons for using mobile phones were practical: for emergencies, and for convenience. Interestingly, teens valued mobile phones more for the constant connection they provided. While this may be a manifestation of teens' tight friendships, it may also be a change in behavior they carry with them to adults. They prefer always feeling connected.

Figure 15. Mobile phone reasons for preference*

	total	13 -18	19 -24
Emergency/safety	29%	18%	35%*
Convenience/don't have to use pay phones	23	20	24
Be connected/never miss a call or appt.	21	29*	17
I'm accessible/people can reach me if needed	18	21	17
Mobile communication access	17	17	17
Small/compact/easy to carry	16	12	18**

Note: * An asterisk indicates a significant difference between the two age groups at the 95% confidence interval. ** Two astrices indicates a significant difference at the 90% confidence interval.

* among respondents who cited mobile phones as their favorite device

Mobile entertainment devices are high on teens' list

Teen's favorite device was the Discman or Walkman (30%) for the obvious reason of listening to music. Music lovers tended to cite a similar reason regardless of age. Additional reasons for their preference were the mobility afforded by its size and portability and the ability to take and use it anywhere. This desire for "always available" entertainment is worth studying. Its roots lie in television, stereo, and videogame systems; however, its evolution is tied to freedom and impulse. This growing appetite for persistent connectivity and activity provides an enormous opportunity for wireless application developers of games, music, news, and enhanced messaging services.





Figure 16. Discman/Walkman reasons for preference*

	total	13 -18	19 -24
Listen to/love music	71%	73%	67%
Can take it anywhere/ everywhere	22	23	23
Small/compact easy to carry	22	21	22
Only one I own on the list	13	10	18**
Keeps me busy/occupied when bored/pass time	9	9	9

Note: ** Two astrices indicates a significant difference at the 90% confidence interval.

* among respondents who cited mobile phones as their favorite device

In contrast with Young Adults practical emphasis, teens value technology for its "fun factor." They were more likely than 19-24 year olds to agree with the statement that, "Wireless technologies make my life more fun." Wireless technologies of any type can benefit from reinforcing this "fun" aspect in order to succeed with teens.

Device Interface and Personalization

Teens and young adults are savvy design customers. They want their devices small, compact, and easy to carry. And they want them customizable. For teens in particular, their mobile devices are a part of their daily lives and an extension of their personal identity. More often than not, they are as much a fashion statement as a useful and fun piece of technology, and can define a teen's social status. The ability to personalize one's phone can be as important as the ability to choose the proper outfit.

Mobile phone manufacturers are already addressing this with changeable faceplates, ringtones, light-up and laser antennas, and screen savers to name a few. The trade off with some of these options is a drain on battery life - something the youth customer will not tolerate. Nokia has been key in leading the revolution that changed phones from a geeky technology to a fashion statement. The key thing to remember is that teens will not purchase or use devices that are perceived to be uncool, no matter how well they work.

A false sense of security?

Carrying a mobile phone typically gives parents and children a greater sense of security, but anyone that has tried to use their phone when driving through rural or very hilly, wooded areas knows that coverage gaps can render them useless.

A solution mandated by the FCC is Enhanced 911 (E911). The E911 solution seeks to improve the reliability of wireless 911 services and to provide emergency services personnel with location information that will enable them to quickly and accurately locate a caller in distress as they can with a 911 call from a landline phone. However, this requires the upgrade of all new mobile phone equipment to allow for location detection of a caller within 50 -100 feet of accuracy through cellular tower triangulation or a global positioning satellite (GPS) chip. The FCC has mandated that all new mobile phones come equipped with this functionality and that call dispatch centers be prepared to respond to emergency calls starting October, 2001. However, there have been manufacturing and network delays, and the current opinion is that E911 functionality will not become readily available until the Spring of 2002.

Cheskin feels that E911 may inspire a wave of new mobile phone purchases and upgrades as more people seek this sense of security, even if their primary usage of the phone will be for casual communication. We should note that a number of privacy concerns have been raised about E911 and the power that carriers will have in being able to identify the location of their customers.





EMERGING APPLICATIONS THAT MIGHT APPEAL TO YOUNG PEOPLE

When you study early adopter markets like teens and young adults, new product applications become obvious. Our research findings and the information gathered from experts and secondary research have helped us pinpoint a variety of wireless applications and services that could appeal initially to the youth market and later to a broader mass market. This is not meant to be an exhaustive list of wireless products but a sampling of ones that represent specific trends. These applications seem to match the behavior and tastes of a young audience, and they reflect advances in technology that could be turned into successful products today and in the near future.

Six key emerging mobile applications include:

Enhanced Text messaging

Mobile gaming

MP3 players in mobile phones and enhanced ringtones

Sending pictures

Converging devices

Cross-platform content

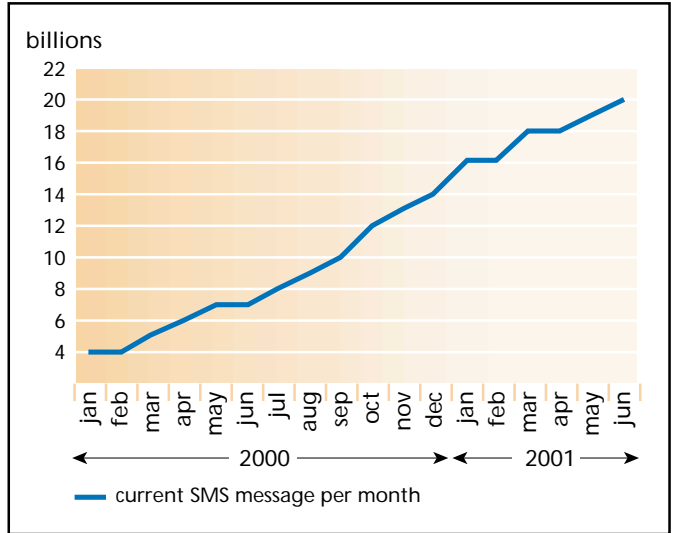
"There is a language evolving out of IM. It's like a secret handshake."

Dan Williams, Motorola

Text messaging is the Killer App

Given the high need to communicate with friends and even strangers, young people would value mobile phones that also have robust text messaging capabilities. An average of 19 billion text messages are sent each month globally.

Figure 17. SMS Growth & Forecast to June 2001



Source: GSM Association, 2001.

The most successful text-messaging device today in the youth market is the Motorola Talkabout two-way pager. The hip-hop community has embraced this device with vigor. The company has sold over one million units in six months (Motorola company information). But phones that combine voice communications and text messaging really satisfy a behavioral need of the youth market. Most of the major device makers and carriers have started to offer text-messaging capabilities with mobile phones service.

Short messaging systems (SMS) are widely used outside of the US by young people in Europe and Asia. Although young people in Asia have readily adapted to the limited phone keypad for composing text messages by "triple-tapping" to spell code words, some technologies that would make text messaging easier on a mobile phone include predictive text and new keypad interfaces. Predictive text is a technology embedded in the mobile phone that uses a built-in dictionary to predict the word that you are trying to spell as you are typing it. You can write by pressing one





key per letter, instead of two or three as with an ordinary phone keypad. This technology is carrier and device dependent and works with SMS. Nokia and Cingular offer this feature.

The Fastap™ is a new patented keypad interface that combines a traditional phone keypad with a full alpha keyboard. David Levy, CEO and Founder of Digit Wireless, saw the need for a new improved text interface as communication devices grew smaller and the input devices became more constrained. "Imagine using a PC keyboard that has only 12 keys - that's ridiculous! But that's what people are being asked to do." The Fastap keypad assigns each letter its own button and arranges them around the numbers on the phone keypad, plus a few additional buttons for punctuation. When the company conducted

"Imagine using a PC keyboard that has only 12 keys - that's ridiculous! But that's what people are being asked to do."

David Levy, Digit Wireless

focus tests with the new keypads, they witnessed first hand the innate ability of teens to embrace a new technology faster than adults. Levy explains, "Kids picked it up faster than adults. We didn't have to explain it to them. They just figured it out on their own." The Fastap keypad renders text messaging faster, reduces errors, and is ideal for communicating in code combinations of letters and numbers as the youth market is known to do.

The youth market has embraced this code language whole-heartedly, devising a whole lexicon of code, for example, "Great" spelled "Gr8." Dan Williams of Motorola, who has observed this behavior in his own 13 year old, describes its popularity. "It's cool to be able to write in IM and be up on the latest IM vernacular. The parents don't know what it is. There is a language evolving out of IM. It's like a secret handshake."

Any features or applications that enhances text communication in mobile devices like the accoutrement in IM - smiley face icons, cartoon images, sound effects, etc. - will greatly appeal to the youth market. This behavior translates well from the PC and Internet to mobile phones, even with the constrained input interface.

New text-messaging devices and applications

- AOL Instant Messaging phones - www.aol.com/aim/mobile/index.htm - offered on Sprint PCS with Motorola, NeoPoint, Nokia, Qualcomm, Samsung and Sanyo phones.
- Motorola Talkabout T900 2 way pager -
- Nokia 3210, 3300, and 7110 featuring predictive text
- Ericsson's Chatboard - QWERTY keyboard accessory that plugs into the base of a mobile phone
- Digit Wireless' Fastap keyboard - www.digitwireless.net . First availability in phones in the US within a year.
- Services that link multiple IM programs and buddy lists:
 - Trillium - www.ceruleanstudios.com
 - Imici - www.imici.com

Fastap™





Mobile gaming takes your addiction on the road

Young people have grown up playing videogames. Just as most people buy PDAs or computers for productivity and then end up using them for entertainment, we think that games will become a regular activity for mobile phones users, especially among young people. Datamonitor projects revenue from wireless games to reach \$6 billion by 2005 globally. In this section we will describe some of the types of wireless games that we think will become popular with young people, and we will talk about how some of the device makers are fitting games into their strategies.

Types of wireless games

Some of the newer games that are available through wireless phone carriers today take games like Snake to a whole new level. The top gaming styles that companies are currently creating in order from simple to more complex:

- Parlor games - cards, dice
- Puzzles
- Trivia
- Action
- Sports
- Role-playing adventure
- Persistent worlds
- Multimodal games

Since teens and young adults are used to a high level of stimulus, this "gap-filling" quality of wireless games takes advantage of a timeless behavioral pattern of young people.

One of the leading handset makers that has pioneered simple, single-player games like Snake and Memory in mobile phones is Nokia. Their Club Nokia is a Web portal that offers simple online games, a place to create and store graphics and ringtones, and a competition space where players can send in scores from built-in games to compete against other players. Nokia packages games and other content developed by third-party developers and offers it to mobile phone subscribers through partnerships with the mobile phone carriers. Many of the carriers, device makers, and Internet service providers are organizing portals like this and will eventually use them to conduct mobile commerce.

An example of a popular multiplayer trading game that appeals to a wide audience is Word Trader by a wireless

game developer in New York City named Unplugged Games. In it players trade words with each other until they get all of the words in a category (for instance, finding all the vehicles or insects). The player with the most complete categories wins the play session. Demographically, over 50% of the audience is female. Wireless games have the potential to appeal to every type of mobile phone user.

Most wireless games are designed for short play sessions of, for instance, three to five minutes. As Mitch Lasky, CEO of JAMDAT, another wireless gaming company puts it, "They fill in the crevices of time that people have in their days, as an antidote to boredom." Since teens and young adults are used to a high level of stimulus, this "gap-filling" quality of wireless games takes advantage of a timeless behavioral pattern of young people. One popular multiplayer action game offered by JAMDAT is called Gladiator (no relation to the Oscar-winning movie). In Gladiator users can create a character, choose a weapon, choose battle moves, then duels other gladiators in an

arena. Over one million people have played Gladiator with users logging over 14 million minutes of play (JAMDAT company information). Because games are played in short increments, it is important for players to have a persistent identity within the game. "The servers are

smart enough to know who you are. So you can play all the time from anywhere. Persistence is the key," explains JAMDAT's Lasky. "With persistence, you can return to the game in the place you left off -- for example, the server can remember where your golf ball is on the fairway, so you can select your club, duck into a meeting, then come out an hour later and hit the shot."

A popular type of wireless game that has evolved from the online gaming world that typically appeals to more of a "hard-core gamer" is persistent worlds. Key features of a persistence world are that in addition to a player's identity persisting between play sessions, the game environment maintains an evolving state over time, has an economy, and a community role-playing component.





An example of a popular persistent world game is Void Raider by Unplugged Games. In it, players command a space ship with a crew and the job is to raid and capture enemy ships for their cargo and their weapons. Players must manage their crew or they will deteriorate into "disgruntled, drunken layabouts." Eric Goldberg, CEO of Unplugged Games, is overwhelmed by the response from their audience to Void Raider. "In terms of sheer minutes, Void Raider blows all of our other games away. People play for hours. In the first month there were over one million minutes of play." The way that users play with the different genre of wireless games is very similar to the their behavior with online computer games.

Leveraging online gaming content in the wireless world as well as in the mediums of fax and regular landlines represents an exciting new category of games called multimodal games. Recently launched Majestic by Electronic Arts, falls into this category. A player registers on the Majestic website and plays the games in episodes that are unleashed monthly and that take the player through a storyline about conspiracy and espionage. Through the combination of Web sites, streaming video and audio, email, IM, mobile and landline phones, and fax a player is immersed in a compelling and sometimes creepy real-time experience.

The game uses AOL's instant messaging service and players are encouraged to work with other players to solve clues. The immediate response time of IM makes the unfolding game plot very dramatic. Majestic appeals very directly to the innate technology driven communication patterns of teens and young adults. This type of continuous entertainment experience that "follows" a player wherever they go truly leverages the mobility of wireless devices and has the potential to seamlessly link the variety of computing devices in our lives.

"Game Boys are perceived more as toys, and 14 year olds have grown out of them. Older teens have a passion for gaming, but they don't want to be seen with a Game Boy."

Mitch Laskey, Jamdat Mobile, Inc.

Gaming devices and accessories

Cybiko

Cybiko is a communications/entertainment/productivity device for younger teens, and its games fall into three categories: action games, role playing games, and time wasters. Cybiko's Cylandia game, which is a tamagatchi style role playing game where you create and nurture creatures that can be shared with other players, has had over 100,000 downloads (Cybiko company information). Cybiko is a great example of a convergent device. See *Spotlight on Cybiko* in the convergent device section of this report.

Game Boy

One of the things that sets the Game Boy apart from other hand held gaming platforms is the fantastic variety and quality of games that run exclusively on the Game Boy. Another is the interface, which is precisely designed for

fast action games. Like Cybiko, the Game Boy appeals to a younger audience - most of the research participants in our study that owned and favored their Game Boy were in the younger teen group. This leaves an opportunity in the wireless gaming market for a device that appeals to older teens and young adults. Mitch Lasky

believes that "Game Boys are perceived more as toys, and 14 year olds have grown out of them. Older teens have a passion for gaming, but they don't want to be seen with a Game Boy." That space can be filled by mobile phones and PDAs.

Palm

In our survey we found that mostly 19 to 24 year olds owned PDA's (10% of 19-24 year olds; 6% of the total sample). Over the years Palm has enabled third party developers to create over 1000 games for Palm OS PDAs, and over 50% of Palm users have downloaded games for their device (Palm company information). Palm is targeting young adults with its new m100 series, which features interchangeable faceplates in a variety of colors and patterns and even blank faceplates that can be customized with personal artwork. "The primary focus for the m100 series is young people and college students," explains Morgan Slain, Director of Business Development at Palm.





Palm has their eye on gamers, and they are taking a number of steps to make the Palm a better device for gaming. First, they are introducing color screens to the Palms. Anyone who has ever seen a game running on a color Palm compared to a Game Boy will thank the company for not only making their gaming experience better but also for saving their eyesight. Of course, the trade-off is battery life as color screens consume more power than black and white screens. Next, Palm is encouraging even more game development for their devices. They have struck relationships with Sega and French game publisher, Infogrames, along with thousands of grassroots game developers who already publish games for Palms. Another new Palm development aimed at gamers is infrared communications capabilities using Bluetooth, a local wireless networking standard, so that players can compete against each other within in a 30 foot range.

Entertainment applications will drive the adoption of new wireless hardware and services in the youth market, and as the variety and quality of content improves, adult consumers will follow. Entertainment applications that can be enjoyed in short sessions, "gap-fillers," satisfy the need to stave off boredom for the younger user. Lastly, wireless devices will provide a new platform for multimodal games and cross-platform content that follow a user from one device to another making next generation digital content a continuous and truly addictive experience.

Jamdat



Game Boy Advance



Gaming Applications and Devices

- Club Nokia - www.nokia.com/games
- JAMDAT Mobile, Inc. - www.jamdat.com. Offered on AT&T Wireless, Qwest Wireless, Sprint PCS, and Telus Mobility.
- Unplugged games: - www.ungames.com. Deals with Sprint PCS, AT&T Wireless, Verizon Wireless, and Alltel.
- Majestic by Electronic Arts -www.ea.com. Costs \$9.99 per month, pilot episode is free.
- Cybiko - www.cybiko.com, \$99, all content is free for download from the website.
- Game Boy Advance - www.nintendo.com
- POX by Hasbro - www.hasbro.com
- Palm M100 device - \$130, interchangeable faceplates
- Gamepad for Palms by WorldWide Widget Works. Uses Serial port and extends down from bottom of device.
- Handspring has a snap-on joystick for their Prism model that sells for \$24.99
- Mobile phone joystick - Snakestick for Nokia phones. Designed for the game Snake.

Snakestick for Nokia phones



Hasbro POX





Music to your ears

Young people are avid consumers of music - it defines who they are and is an outward expression of their personal style. It was no surprise to us to learn how many young people owned portable music players. In this research, 61% of respondents owned Discman or Walkmans and 6% owned portable MP3 players. Young people of all ages are not only purchasing CD's but also avidly downloading MP3 files on their computers, composing custom music mixes, and ripping them onto portable MP3 players.

There are a number of handset manufacturers who are making phones that contain MP3 players. One early entrant in the US is Samsung with their Uproar phone. It's pricey at \$300, perhaps outside the price range of most young people, but it offers nicely designed functionality that appeals to a young audience. Kristina Spears, the Senior Manager of Strategic Marketing at Samsung who launched the Uproar phone explains, "Our primary market for the Uproar was 18 to 24 year olds. The secondary market for us was the under 30 year olds who like to have the latest technology. They could benefit from a convergent device, for instance, by listening to music on the subway while commuting." Samsung was the third most widely owned handset brand in our survey behind Nokia and Motorola.

Downloading music into phone handsets over the airwaves is not yet a viable activity right now because of the limited bandwidth of the current 2G wireless infrastructure. This will become a more viable feature in mobile phones with the 2.5G and 3G networks that will allow downloads at speeds comparable to a home dial-up Internet connection.

Another opportunity for music in mobile phones is ringtones. Many of our survey participants changed their ringtones (76%)³. Although downloading ringtones directly into phones is not as popular in the US as it is in

Asia and Europe, US carriers (including Cingular and Sprint PCS) have recently just started to offer that service where ringtones can be downloaded from websites and emailed into phones. We have listed a number of sites below that offer hundreds of choices of ringtones.

A new technology innovation that could have great appeal to a youth audience is progressive chord melody ringtones. These are basically more complex and better sounding melodies, many of them based upon Top 40 popular hits. Samsung, again, and Sanyo are leading the way with phones that offer this capability. Kristina Spears thinks that it will be very popular among young people, "Personalization of these melodies will be key. Not only do teens want to be able to change their ringer, they want to be able to create something that says 'this is me.'"

"Personalization of these melodies will be key. Not only do teens want to be able to change their ringer, they want to be able to create something that says 'this is me.'"
Kristina Spears, Samsung

As we have witnessed with the popularity of mixing music among amateur DJ's, personalizing music is very appealing to young people. Motorola has noticed this as well. They have created software application called the Ringer Tone Maker that allows users to customize a sample on the PC and then

transfer it to a mobile phone with SMS functionality. Yamaha is also developing a technology that will enable better quality ringtones. It's a wavetable chipset that will play polyphonic ringtones. Move over, Napster, this will give the music industry a whole new call to arms.

Another way to use music in mobile phones is to organize fan clubs around different artists. UPOC is a start-up company in New York City that offers a mobile marketing platform that combines communication and content. They strike deals with record labels and mobile carriers to bring users samples of new hit songs and voice messages directly from the musicians. They currently have over 100,000 young people using their service, and their audience is primarily teens and young adults (UPOC company information). Their teen segment is predominantly female. UPOC works because it supports two predominant teen needs - connectivity and social intimacy.

³ See summary Table 5 of other mobile phone activities found at the end of this report.





Julien Ulrich, Vice President of Business Development for UPOC describes one of their particularly popular fan clubs for Lil' Bow Wow, a teenage rapper, "He leaves a voicemail for the fans and they love it. It drives the fans nuts. They all get it at once and they immediately start chatting. They feel like they are more connected to the artist." One of the most heavily trafficked chatrooms is the Little Bow Wow Ghetto Girls chat room. "Some of the girls have asked us to give Little Bow Wow their phone numbers. They are in love with him."

UPOC has done extensive testing with teens throughout their product development process. They provide a good example of wireless entertainment content that is designed to appeal specifically to this market. Enhancing mobile phone communications with music and building music storage and playback capabilities into mobile phones leverages a time-tested behavior of young people.

Upoc



Nokia HDR-1



Incorporating music in wireless devices and services

- Samsung Uproar phone - www.samsung.com - holds up to 60 minute of CD-quality music. Download music from PC into phone via USB cable.
- Sanyo SPC 4500 - www.sanyo.com. Plays multi-tone ringtones.
- Nokia Music Player HDR-1 - digital music player + FM radio + hands-free headset for voice dialing a mobile phone - www.Nokia.com
- UPOC - www.upoc.com. Available on AT&T Wireless, Voicestream, Cingular, Sprint PCS, Verizon.
- Motorola Ringer Tone Maker - www.motorola.com - works with Motorola V.100, the V8088, and the P7689
- Ringtone download sites:
 - www.nextones.com
 - us.yourmobile.com
 - it.internations.net/freephone/ring-tones.htm
 - www.ringtone4u.co.uk

Samsung Uproar





Photos on the go

The next generation networks, 3G, will bring not only greater bandwidth for handling more voice and data traffic but also the capability to send images and audio between mobile phones. A number of device makers and infrastructure companies have joined together to define a new standard for enhancing the Short Message System to allow for the transmission of audio and images along with text. It's called Multimedia Message Service (MMS) or Enhanced Messaging Service (EMS).

InfoTrends Research expects at least two billion wireless photo messages to be sent annually by 2004 . We think that young people will be one of the first segments to fully embrace this capability. Twenty percent of our sample indicated that they "often or very often" exchange media files through email. Young people in Japan have been sending images to one another through their mobile phones for over a year now. They readily exchange animated pictures of their favorite cartoon personalities, with Pokemon being one of the most widely traded branded images in Japan.

An application developer that is not waiting for 3G to send animated messages is a company in Pleasanton, California, called Funmail. Currently running on iMode in Japan and on WAP phones in the US, Funmail interprets a text message and automatically creates an animation to accompany it. Users can also create their own animations. Funmail works on mobile phones, PCs, and PDAs. The company is targeting the youth market, moms and other people that are "emotional communicators," and young professionals who want to show off the latest technology on their gadgets.

The capability to capture pictures with mobile phones is an example of another convergent device trend that appeals to young people. Nine percent of our sample indicated that they wanted a digital camera with their mobile phone, with young adults (19 - 24) showing the greatest interest. Ericsson makes a camera accessory for mobile phones called the Communicam that takes a digital picture and sends it via the mobile data service to an email address. Ericsson is test marketing this product in limited cities. It is positioned precisely at young people.

Enhancing text and voice communication via wireless devices with images and photos will be very popular with teens and young adults. It will help them personalize their communications and will allow them to be more socially expressive. This behavior in young people is already very apparent in email and IM.

Images in mobile devices

- Multimedia Messaging - www.nokia.com or www.ericsson.com for white papers and news
- Funmail - www.funmail.com - works on WAP phones in the US
- Ericsson's Communicam - 24 bit color, 352x288 pixel resolution. Takes about 1 minute to send picture. Must have data transmission service with mobile phone carrier. Works on R320, R520, T39, T20e, T29 mobile phones.
- Lightsurf - www.lightsurf.com - a wireless platform for transmitting digital media between devices or PCs and PDAs. Founded by technology pioneer Philippe Kahn. It works with WAP, SMS, iMODE, MMS and other gateways and messaging services.

Ericsson Communicam



Funmail





Convergence - hype or hot?

There has been a lot of hype in the past few years about convergence - combining disparate features into a single mobile device, like a phone that is also a PDA (i.e. Kyocera PalmOS mobile phone). Cheskin believes the key opportunity in the consumer space will be devices that strategically combine entertainment features with mobile phones, (especially features that enhance communication activities), and less so information oriented features. In our study, we investigated what types of portable device or activity teens and young adults wanted to have combined with their mobile phone, if possible. The activities and portable devices most commonly combined with mobile phones were IM and email. Discman/ Walkman was the next most popular device to integrate with a mobile phone, followed by a digital camera.

Figure 18. Preferred applications to combine with mobile phones

	13 -18	19 -24
Instant messaging	23%**	18%
Email	14	23*
Discman/Walkman	17	9
Digital camera	7%	11%

Note: * An asterisk indicates a significant difference between the two age groups at the 95% confidence interval. ** Two astrices indicates a significant difference at the 90% confidence interval.

Gerald Rocha, Senior Manager for Wireless Data for Cingular, points out that, "Convergence in the youth market will be between the phone and the desktop PC, not the phone and the PDA." This prediction is fueling the efforts of companies involved in building the mobile Internet. However, companies will need to be careful to recognize that few of the activities that work well on the Internet connected desktop PC will translate successfully to mobile phones and PDAs.

To date, WAP (Wireless Application Protocol) browsers that enable mobile phones to connect to the Internet have been slow and frustrating to use, especially with the

small screens of today's phones and the slow networks. Rocha believes that the phone is an under-utilized tool for interacting with the television. "The small form factor of the phone is like handling a remote control, and it is easier to use than a keyboard or PC while lounging in front of the television. It could interact with data elements in television programming like Enhanced TV."

An important consideration that may impact the uptake of convergent devices is battery life. Dan Williams of Motorola warns that, "Energy consumption is the number one Achilles heel for all of these devices. People don't want to carry around extra batteries, and teens are particularly intolerant of this." Today's mobile phones contain batteries that are optimized for voice communications enabling days of stand-by time and hours of talk time. Once a game or MP3 player starts to draw on that energy source, people may be disappointed that they run out of power just when they need to make or take an important phone call.

Mitch Lasky of Jamdat, offers an alternative point of view. He is skeptical of convergent devices. "The average consumer wants lots of single purpose cheap devices, not the Silicon Valley "Batman" device that does everything. Kids will carry around multiple devices in their cargo pants, as long as they are lightweight and small."

On the other hand, one company that has wholeheartedly embraced the value of convergence is Cybiko. Their Cybiko handheld computer for teens can be customized to operate primarily as a communications tool, a productivity tool, or an entertainment device, among other things. The user customizes their device when they first set it up. David Robak, Vice President of Business Development, for Cybiko explains, "It's practical. Users can add or delete functionality as needed." He explained the benefit of this to their young users, primarily teens ages 10 to 14. "Initially, boys played games and girls used the chat features. Then the boys figured out that the girls were all chatting, so they started to use the communication features, and they turned the girls onto gaming." This exemplifies the benefits of convergent devices: they appeal to audiences with varying needs and tastes, and the different functionality is cross-pollinated between the different user groups.





Spotlight on Cybiko

The Product - Cybiko is a wireless handheld computer for teens. It combines ten different products: wireless email between other Cybiko products, games, a scientific calculator, spell checker, Spanish-English Dictionary, multilingual phrasebook, organizer, address book, alarm clock, and an MP3 player. It comes with a stylus, a QWERTY keyboard, a 160x100 grayscale LCD display, 512K of RAM, a memory expansion slot, a PC connection port, and a radio frequency transceiver. It creates a local network by using the 902-928 mhz unlicensed spectrum band so that Cybiko devices can communicate with each other within 150 feet indoors and 300 feet outdoors. It sells for \$99. The next version, Cybiko Xtreme™, will be available this fall for \$149. All products and services are available for purchase at www.cybiko.com.

The Company - David Yang, Chairman, CEO, and Founder. Headquartered in Bloomingdale, IL. Development office in Moscow. 200 employees worldwide. Privately held. Raised a total of \$16 million to date.

The Audience - Teens ages 10- 14. Technically savvy gadget geeks, both male and female. Chose this audience because, as David Robak, VP of Business Development explains, "First, the social behavior of this group matched the technology; second, the segment was underserved; third, they were the best trained to use the technology; and fourth, they influence two generations up and one generation behind."

The Cheskin Analysis - We think that the Cybiko product provides a lot of value to a young teen, especially at the price of \$99. The most interesting feature is its local network which allows for tribal communication between teens who are in the same school, soccer team, neighborhood, etc. This age group has not yet started to drive so they have limited mobility and they tend to hang out in larger groups. It would be even cooler if the device could connect to the larger Internet so that teens could use the device to communicate with their expanded buddy lists.

Mobile phone makers are working on similar messaging and gaming functionality, but it will be hard to offer such a variety of features and flexibility as cost effectively as Cybiko.

Cybiko Xtreme



Cross-platform content that follows you wherever you go

Content that works across multiple platforms like the desktop PC, mobile phones, portable music players, digital cameras, and PDAs will make communication and entertainment experiences continuous, and even more valuable, initially for young people and eventually for all. An example is an online game feature that you can take with you, like a training activity for a character or a notification when another player has beaten your top score. Game features like these enable people to play games continuously, throughout the day, while they're in school, while they're doing their homework.

Another example is buddy list functionality that can be shared between the PC and the mobile phone and that is smart enough to follow a user from one device to another. This continuous mode of communication matches the behavior of young people today. In our study, 39% of respondents disagreed that it is rude to use wireless technologies in public, compared to 24% who agreed (36% were neutral). This attitude hints at the potential for US mobile phone users to potentially adopt the behavior of Europeans, where it is socially unacceptable to turn off the phone. Of course the fact that Americans pay for incoming calls, whereas Europeans do not, will have a significant effect on this behavior.





RECOMMENDATIONS

How to design for and market to young people

Young people can be the bellwether for the larger consumer market. They consume new technologies like early adopters, yet their pocket books are constrained like mass-market consumers. Nevertheless they still have formidable spending power and influence many family technology purchases. Wireless carriers, device makers, and content developers would be wise to pay more attention to young people as they roll out new products and services. They have the opportunity to attract loyal customers at an early age that will be worth more to them in the long run than middle-aged business people. By becoming experts at the youth market, wireless companies can speed the adoption of next generation equipment and services, reduce churn, and influence the mass market as a whole.

Rate plans

Family rate plans have spurred the adoption rate of mobile phones among young adults. These types of economical pricing plans introduced by the phone carriers in the last few years have been very successful in encouraging parents to add another phone to their service. Currently, it costs an average of \$10 per month to add an additional phone to a mobile phone service plan, and a number of per minute calling plans which range from \$24 to \$250 per month include a combination of in-family minutes and non-family minutes (company websites). Family plans, prepaid calling plans like Verizon's [FreeUp] prepaid plan, local calling plans with friends & family options, disposable phones, and buckets of data minutes are well-suited for young people with part-time jobs and a relatively local calling circle.

Branded content

Young people are fickle and are very influenced by trends. It is hard to pace the changing tastes of young people, but carriers and application developers that can secure content licensing deals with popular, evergreen youth brands like Pepsi, Nike, MTV, Sony, and the NBA, just to name a few, will see their own company's brand awareness rise in the minds of young people. It's important to consider how a technology or service aligns with these established

brands, however. Teens are also a marketing savvy group and will discard an inauthentic brand or overt marketing ploy without a second look. Latching onto the right brand with a compatible positioning is key.

Personalization of devices

We know from research and experience that color screens, longer life batteries, customizable physical details (faceplates, antennas, logos, carrying cases), better quality ringtones, and multimedia messaging capabilities are some of the features that appeal to young people. The youth market likes to personalize their devices to reflect a hot trend or a part of their personality. Putting design energy towards the invention of even more options for customizing a device will help to attract a younger audience.

Entertainment-oriented content and features

As we've seen, teens expect the digital devices to provide fun and entertainment. For this group, practicality and functionality aren't the driving benefits of portable and wireless devices. While many of these device associations and needs will evolve as teens mature, their long-term emotional attachments to products will still be deeply influenced by their initial relationship with them. Wireless manufacturers that take advantage of growing broadband capabilities by providing entertaining content that appeals to youth will build stronger product relationships. Using content to enhance the communication, less so the information, capabilities of the devices will appeal to a youth market and eventually the wider consumer market.

The "mobile Internet" is not the web in a smaller box

A whole segment of the wireless industry is striving to understand how to harness the power of the Internet in mobile devices and services. We caution against directly adopting the Internet paradigm to wireless. It is important to remember that behaviors and contexts are quite different when interacting with each of the medium – wireless device vs. the personal computer. Wireless devices are small with constrained input and display interfaces, have limited memory and battery time, and are used while on-the-go in short sessions. Personal computers have keyboards for easy typing and large color screens, more memory and usually unlimited electricity, and fos-





ter browsing behaviors that can last continuously for hours. Application and content providers should consider these issues when trying to leverage Internet content on portable/wireless device. The evolving business segment of location-based services will help to filter out the type of information that is relevant to users who are on the go.

Look to leading wireless communities

Due to a number of factors, including a limited landline infrastructure and unified equipment standards, a number of countries have superseded the US in their adoption and development of wireless technologies. Free market competition and the resulting lack of collaboration in the US show up most notably in the loss of economies of scale and poor interoperability between communication protocols. As Dan Williams from Motorola notes, "Competing spectrum standards between carriers in the US has slowed the delivery of some services to subscribers. In Europe and Asia fewer spectrum standards and similarities among wireless infrastructure has assisted rapid deployment of many new services."

Because consumers in these countries have already tested the wireless waters, they offer critical information about how technologies and devices fit into modern lifestyles. Although cultures vary greatly, Asians embrace styles and modes that Americans would not for instance, and the success or failure of trends cannot be easily predicted across cultures, nevertheless application developers can learn a lot by testing their content with a European or Asian carrier. Functionality and interface issues can definitely be assessed.

The DoCoMo business model offers one good testing opportunity - it is best for users and easiest for developers. Gerald Rocha of Cingular states, "The DoCoMo business model would work well in the US, giving developers a platform that they can write to and allow billing for the customer on their monthly bill. It's the Internet model in a microcosm. Everything has to interoperate."

In addition, developers in the US can look to other advanced wireless communities to understand which development platforms are taking hold most readily. These applications, such as Java, will most likely become the global standards of the future.

Spend time with young people to better understand their world

Young people's lives today are very different than those of adults. They are much more media savvy, they embrace technology with more enthusiasm, they have more options for entertainment, school is more competitive, and their lives are busier than the previous generations. An important part of understanding the youth market requires spending time with them. There are many ways to accomplish this if you do not have teenagers or college-age children of your own.

- Ethnography - hire some experts to hang out with your target population and document what they do with their time and how they communicate with their friends
- Youth panels - hire some young people to regularly advise you on new product development and marketing programs
- Dyads and One on One interviews - hire experts to collect in-depth information from your target audience and then analyze that information with a discerning mind towards spotting behavior and attitude trends

The clues to breakthrough innovation in any emerging market come from keen observation and a clear strategy that is based on company realities, varied customer types and differing needs. Knowing how youth has and is integrating digital technologies into their lives, and how their lives are changing, will provide the framework for developing future applications and devices that will be relevant and meaningful.





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Table 1. Sample Demographics

	Total Sample (N = 1011)	13 -18 (n = 498)	19 - 24 (n = 513)
Age Breaks		49%	51%
Female	56%	50%	61%*
Number in Household (mean)	3.66	4.25*	3.09
Ethnicity			
Caucasian	85%	88%*	82%
African American	5	4	6
Hispanic	4	4	4
Asian	3	2	4*
Other	6	6	7
Education			
11 th grade or lower	45%	88%*	4%
High school graduate	16	11	21*
Some college/technical school	29	1	56*
College graduate	10	0	20*
Have Job	56%	40%	72%*
Are Married	14%	1%	27%*
Have Children	14%	2%	26%*
Residence			
Urban	33%	27%	39%*
Suburban	43	40	45
Rural	24	33*	16
*An asterisk indicates a significant difference between the two age groups at the 95% confidence interval.			



Table 2. Technology Ownership Penetration.

	Total Sample (N = 1011)	13 -18 (n = 498)	19 - 24 (n = 513)
Email Account	93%	88%	98%*
Video Games	72	78*	65
Instant Messaging	66	63	70*
Playstation/Nintendo	66	71*	61
Discman/Walkman	61	71*	51
Mobile phone	51	40	62*
DVD	38	30	46*
CD burner	36	33	40*
Game Boy	30	42*	19
Cable modem	30	35*	25
Digital Camera	24	20	29*
Laptop Computer	17	13	21*
Pager/Beeper	16	13	18*
DSL	11	7	14*
PDA/Pocket PC	6	2	10*
Portable MP3 Player	6	6	5
Wireless Modem	3	3	3
Web TV	2	2	2
TiVo/Replay	1	1	1
Smart Phone	1	1	1
SMS	1	0	1

*An asterisk indicates a significant difference between the two age groups at the 95% confidence interval.



Table 3. Internet Activities

	Total Sample (N = 1011)	13 -18 (n = 498)	19 - 24 (n = 513)
Email	94%	90%	99%*
Browsing or surfing	77	72	82*
Instant messaging	70	69	71
Research for homework or work	69	77*	61
Music (e.g., listening, downloading)	66	71*	62
Getting practical information	63	44	81*
Games (e.g., playing, downloading)	59	64*	54
Checking out product websites	57	43	71*
Checking out personal websites	49	43	55*
Purchasing products	47	24	68*
Chatrooms	38	48*	28
Video (e.g., watching downloading)	28	27	29
Bulletin boards	13	11	15
Newsgroups	11	6	16*
*An asterisk indicates a significant difference between the two age groups at the 95% confidence interval.			



Table 4. Frequency of Using Communication Devices on an Average Weekday

	Total Sample	13 -18	19 - 24
Regular Phone			
Calls Made	7.30	7.20	7.40
Calls Received	8.30	7.90	8.80
Mobile Phone			
Calls Made	4.70	4.23	4.99
Calls Received	5.03	4.54	5.33
Pagers			
Pages Sent	3.19	4.27*	2.41
Pages Received	5.54	6.48	4.87
Email			
Email Sent	7.9	7.5	8.3**
Email Received	19.9	16.0	23.3*
Internet			
Hours online, excluding email and IM	12.4	10.0	14.8*
Hours online, including email and IM	19.3	16.2	22.4*
The numbers above are reported means for an average weekday.			
*An asterisk indicates a significant difference between the two age groups at the 95% confidence interval. **Two asterisks indicate a significant difference between the two age groups at the 90% confidence interval.			



Table 5. Mobile Phone Behaviors: Have you done any of the following with your mobile phone?

	Total Sample (n = 513)	13 -18 (n = 197)	19 - 24 (n = 316)
Program phone numbers into memory	80%	67%	88%*
Change ring tones	76	68	81*
Collect voicemail	57	41	67*
Play games	42	36	46*
Change faceplates	27	26	27
Send pages/sort messages	24	18	28*
Download phone rings	7	7	8

*An asterisk indicates a significant difference between the two age groups at the 95% confidence interval.



Table 6. Mobile Phone Locations: Where do you frequently use your mobile phone?

	Total Sample (n = 513)	13 -18 (n = 197)	19 - 24 (n = 316)
Outdoor public areas	67%	63%	69%
While someone else is driving	61	59	63
While I'm driving	52	30	66*
Indoor public areas	52	50	53
Home	47	40	51*
Friend's or relative's home	46	44	47
Work/Office	33	23	38*
School	26	30**	23
*An asterisk indicates a significant difference between the two age groups at the 95% confidence interval. **Two asterisks indicate a significant difference between the two age groups at the 90% confidence interval.			



Table 7. PDA Activities: What do you use your PDA for?

	Total Sample (n = 63)	13 -18 (n = 12)	19 - 24 (n = 51)
Calendar	86%	75%	88%
Contacts	84	83	84
Games	78	83	76
Calculator	76	92	73
To do list	73	67	75
Email	21	25	20
Editing files	17	8	20
Reading articles or books	16	8	18
Listening to music	10	17	8



Table 8. Most Favorite Portable Device: Which of the following is your favorite portable device that you own or you use very frequently?

	Total Sample (N = 1011)	13 -18 (n = 498)	19 - 24 (n = 513)
Mobile phones	33%	23%	43%*
Discman/Walkman	30	43*	18
Game Boy	7	12*	2
Laptop Computer	6	3	8*
Pager/Beeper	4	3	5
PDA	2	0	4*
Portable MP3 player	1	2	1
Laptop computer with wireless modem	1	1	1
PDA with wireless modem	0	0	1*
Smart phone	0	0	0
None of these	15	13	18

*An asterisk indicates a significant difference between the two age groups at the 95% confidence interval.



Table 9. Which technology would you choose first to reach your close friend if you were trying to reach them, but couldn't see them face to face?

	Total Sample (N = 1011)	13 -18 (n = 498)	19 - 24 (n = 513)
First Choice			
Regular phone	73%	75%	71%
Mobile phone	15	13	17
Instant messaging	8	8	7
Email	4	3	4
Pager/beeper	1	1	1
First or Second Choice			
Regular phone	89%	91%**	87%
Mobile phone	63	59	68*
Instant messaging	21	23	19
Email	20	20	19
Pager/beeper	7	6	7
<p>This question was a ranking question. Respondent ranked their choices 1 (first choice) to 5 (last choice) in terms of how they would get a hold of their friend. *An asterisk indicates a significant difference between the two age groups at the 95% confidence interval. **Two asterisks indicate a significant difference between the two age groups at the 90% confidence interval.</p>			



Table 10. If you could combine your mobile phone with one other device, which ONE would you pick?

	Total Sample (N = 1011)	13 -18 (n = 498)	19 - 24 (n = 513)
Instant Messaging	21%	23%**	18%
Email	18	14%	23%*
Discman/Walkman	13	17%*	9%
Digital Camera	9	7%	11%*
MP3 Player	8	8	8
Pager/beeper	8	8	7
Gameboy	6	8*	4
PDA	5	2	9*
Video player	3	4	3
*An asterisk indicates a significant difference between the two age groups at the 95% confidence interval. **Two asterisks indicate a significant difference between the two age groups at the 90% confidence interval.			



Table 11. Attitudes toward Wireless Technologies

	Total Sample (N = 1011)	13 -18 (n = 498)	19 - 24 (n = 513)
I feel more connected to my friends now that I have a mobile phone.	3.56	3.61	3.53
I feel more connected to my friends now that I can email them.	3.80	3.74	3.86**
I feel more connected to my friends now that I can instant message them.	3.71	3.77**	3.64
Having a mobile phone is like having an electronic leash around my neck.	2.45	2.44	2.45
Having a pager is like having an electronic leash around my neck.	2.65	2.62	2.67
My parents regularly check up on me by calling me on my mobile phone.	2.85	3.33*	2.48
Wireless technologies allow me to do more things at the same time.	3.64	3.63	3.66
Wireless technologies allow me to do things faster.	3.70	3.68	3.72
Wireless technologies interfere in how I go about my day-to-day activities.	2.41	2.40	2.41
Wireless technologies make my life easier.	3.78	3.77	3.79
I use mobile phones/beepers mainly for emergency purposes.	3.01	3.12*	2.92
I save most of the emails that I receive.	2.63	2.59	2.67
I save most of the instant messages that I receive.	1.86	1.94*	1.78
It's not necessary to save hardcopies of info from a website if you've saved a favorite link to that website.	3.24	3.35	3.13
Wireless technologies make my life more fun.	3.69	3.80*	3.58
It's rude for people to use wireless technologies in public.	2.83	2.82	2.85
Wireless technologies have allowed me to be more organized.	3.27	3.20	3.34*
I worry about the security of using a wireless device.	2.79	2.74	2.83
Mean scores are based on a 5-point scale where 1 means "strongly disagree" and 5 means "strongly agree." *An asterisk indicates a significant difference between the two age groups at the 95% confidence interval. **Two asterisks indicate a significant difference between the two age groups at the 90% confidence interval.			



about the authors

Amy Francetic

Amy Francetic is a Senior Strategy Consultant leading the wireless practice for Cheskin. Francetic has over ten years of management and product development experience in the consumer technology segment. Prior to Cheskin, Francetic was CEO and Co-Founder of Zowie Intertainment, a high-tech toy company whose critically acclaimed products Newsweek heralded as "the IT toys of 1999." Francetic was recognized as one of the "Top 100 Young Innovators in Technology" by MIT's Technology Review in November, 1999, for her work in the fields of videogames and high-tech toys. Speaking engagements have included DEMOmobile 2001, Wireless Strategy 2001, Forum for Women Entrepreneurs, Stanford University, CNN-FN, KRON-TV, and she is a regular guest on ZD-TV's technology panel, Silicon Spin.

Lynn Rampoldi-Hnilo, Ph.D.

Lynn Rampoldi-Hnilo is a Research Manager at Cheskin who has focused her research on the impacts of traditional mass media with children, adolescents, and adults and recently on how individuals present themselves on-line via homepages and avatars. She provides research and consulting services specializing in innovative ways of understanding how people use, perceive, and interact with new technologies and media content. Lynn completed her Ph.D. in the Department of Telecommunications at Michigan State University and was a guest lecturer at Stanford University. She is a contributor and an editor of the book, "The Alphabet Soup of Television Program Ratings" (with B. Greenberg and D. Mastro), published in 2001.





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Julien Ulrich, Vice President Business Development, UPOC

Dan Williams, Director for Corporate Strategic Design, Motorola





Cheskin is a strategic research and consulting firm with an unparalleled history in marketing and design research. We recognize that innovation and success rests on an in-depth understanding of people. Our core belief is that authenticity, meaning, and relevance inspire trust resulting in lasting customer relationships. These philosophies have been the basis of work for much of the Fortune 500, from media and technology to packaged goods and professional services. Over the past 50 years, our contribution to major national accounts has enriched our expertise in brand strategy, positioning, product development, multicultural markets, and futures scenarios. With a diverse multilingual staff representing over 20 different countries and cultures, Cheskin is highly regarded for our ability to see patterns and deeper meanings, and to look forward and anticipate change.

Our wireless consulting and research practice

In order to provide a fuller solution to its clients, Cheskin offers strategic consulting services to compliment its research services. As with research, consulting focuses on emerging markets and technologies. We've been performing research and consulting for the wireless industry for the last five years, and have been tracking youth trends for the last 20 years. As these industries and markets rapidly evolve, it is critically important for businesses not to lose sight of the benefit that its technology provides to the consumer. Cheskin consulting helps businesses segment their market and develop strategies to better reach these segments.

During our long history, Cheskin has amassed a strong network of contacts at large consumer brands, technology, and service companies. We leverage these contacts to help large and small companies forge relationships with each other and develop new revenue models and strategic partnership plans that can help companies deliver on their growth goals. Some of our clients in the wireless space have included Motorola, Microsoft, Hewlett Packard, Compaq, Verizon, Samsung, and Metricom.

255 Shoreline Drive
Suite 100
Redwood Shores
California 94065
phone 650.802.2100
fax 650.593.1125
info@cheskin.com