

Consumer Direct

NEXT-GENERATION CONSUMER DIRECT: THE EVOLUTION OF MOBILE COMMERCE



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NEXT-GENERATION CONSUMER DIRECT: THE EVOLUTION OF MOBILE COMMERCE

Institute for the Future/Peppers and Rogers Group

Consumer Direct

May 2001

SR-729

ACKNOWLEDGMENTS

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Table of Contents

List of Figures and Tables	v
Preface	vii
CHAPTER 1	
The Roots of M-Commerce: Mobile Phone Users	1
CHAPTER 2	
Mobile Technologies: Fragmented Solutions, Localized Responses	15
CHAPTER 3	
Engaging Skeptical Consumers	25
CHAPTER 4	
Opportunities in M-Commerce	37
CHAPTER 5	
The Emerging M-Commerce Industry	53

List of Figures and Tables

Figure	1-1	Base of Mobile Phone Users Has Grown	2
Figure	1-2	Monthly Bills Becoming Less Expensive	3
Figure	1-3	Slowing Growth, But Steady in Late 1990s	4
Figure	1-4	Call Length Has Risen Steadily Since 1996	5
Table	1-1	Mobile Shopper Profile	6
Figure	1-5	The Rise in Sophisticated Consumers Is Shaping the Marketplace	7
Table	1-2	Sophisticated Consumer Households Are More Likely to Own Mobile Devices	7
Table	1-3	Sophisticated CD Shoppers Rely on Mobile Communication	8
Figure	1-6	Mobile Phone Penetration in the United States and Europe	8
Table	1-4	Population Densities Lower in United States than in Europe	9
Figure	1-7	U.S. Mobile Phone Subscribers 2000–2010	10
Table	1-5	Younger Households Are Eager to Own Mobile Devices	11
Table	1-6	Consumers' Reasons for Using a Mobile Device	11
Figure	2-1	Internet Adoption	15
Figure	2-2	Wireless Technologies in the United States	17
Figure	2-3	M-Commerce Consumers	19
Table	2-1	Automatic Location Identification Coming Soon	20
Table	2-2	Mobile Devices Emerging as a Viable Alternative to the PC for Internet Access	22
Figure	2-4	Sophisticated Consumers Prefer Mobile Devices to Access the Internet	22
Table	3-1	Improvements in Cost, Security, and Speed Would Drive Mobile Purchasing	26
Figure	3-1	The Marriage of Mobile Phone and PDA Technology: The Kyocera Smartphone	27
Figure	3-2	Rapid Adoption of i-mode	32
Figure	4-1	The Purchasing Process	38
Figure	4-2	PlanetHopper Offers Location-Based Deals	44
Figure	4-3	StreetBeam Weaves Together the Shopping Experience	45
Figure	4-4	Stay Involved While Away from the PC with eBay Anywhere	47
Table	4-1	Applications That Make Use of the Unique Features of M-Commerce	51
Table	5-1	How Much Will Consumers Be Willing to Pay?	54

PREFACE

Mobile commerce, or m-commerce, has generated some of the biggest investments in business history—on top of the billions of dollars spent acquiring spectrum licenses at government auctions, many business experts estimate that investments to roll out the infrastructure to support mobile Internet networks could exceed \$300 billion worldwide. M-commerce may have generated some of the biggest hype as well. Although m-commerce is unlikely to live up to the hype any time soon and may take a decade to justify the investments, it will still have an important impact on how consumers shop in the near term, and thus on the continuing evolution of the consumer direct (CD) channel.

In this report, we define m-commerce as the consumer use of mobile devices—such as mobile phones, personal digital assistants (PDAs), pagers, and so on—to inform purchasing decisions and to conduct transactions with businesses. Much of the potential for m-commerce in the United States rests with the 115 million mobile phone users who are currently employing these devices in innovative ways and who, in the process, are incorporating them more and more into their daily lives. As various new technologies make these devices more sophisticated both in themselves and in what they connect to, they will become key components of the interaction between consumers and businesses.

The person-to-person capabilities of mobile devices create a new avenue for providing value to individual customers. In this way, these devices are becoming effective tools for building and deepening the one-to-one relationships that are the goal of CD channels. The most successful m-commerce applications will take advantage of the unique capabilities of Internet-enabled mobile devices. Effective applications will also address consumers' current skepticism about the value proposition of m-commerce.

M-commerce will not replace existing methods of shopping, either on- or offline; rather, it will have its greatest impact as an enabler of other channels—one of the important threads that tie together the many

channels of an increasingly complex retail environment. Companies utilizing mobile devices to create a more seamless experience for consumers will enhance the in-store shopping experience, add flexibility to traditional and newer forms of CD shopping, and provide a critical link between bricks-and-mortar stores and CD channels. In this way, m-commerce will facilitate consumers' channel-bundling strategies and will create the opportunity for companies to better integrate the myriad shopping channels to serve customers effectively at any time, in any place.

We begin this report, *Next-Generation Consumer Direct: The Evolution of Mobile*

Commerce, with a discussion in Chapter 1 about the biggest driver of the m-commerce market—mobile phone users. In Chapter 2, we survey the emerging technologies that will enable mobile devices to access data in new and different ways. Then, in Chapter 3, drawing on the results of our 2001 survey and focus groups, we discuss consumers' attitudes toward m-commerce and the changes that will be required to encourage its adoption. In Chapter 4, we discuss the applications of m-commerce most likely to succeed. We conclude with Chapter 5, a look at the emerging m-commerce industry and the revenue models likely to prevail.

THE ROOTS OF M-COMMERCE: MOBILE PHONE USERS

Assessing the potential for m-commerce requires an understanding of how consumers are adopting and incorporating mobile devices into their daily activities. Indeed, the rapid creation of a worldwide base of more than 400 million users of one such device—the mobile phone—has driven telecommunications carriers to make gigantic investments in next-generation m-commerce technologies such as mobile Internet networks that enable always-on wireless connections. Around the globe, there are more mobile phone owners than PC owners, and this base of users will continue to grow in the future, although at a considerably slower rate.

Despite this slower growth, new opportunities will emerge to take advantage of consumers' evolving patterns of mobile phone use. The same factors driving the rapid growth of this enormous user base will also influence how people integrate mobile phone technology into their daily activities. A few years ago, the adoption of mobile phones in the United States, which continues to lag behind that of Europe and Japan, reached a key threshold, creating a large enough network of users that people could use their phones more intensively to communicate with other users in the network. As a result, the devices have become more integrated into daily activities, and at the same time are morphing into personal rather than household devices. Individuals are using their mobile phones for an expanded array of purposes—to act more spontaneously while

on the go, to maintain an open communications link with other household members, and so on—all of which are driving the growing importance of mobile communication to consumers.

MOBILE PHONE ADOPTION

Consumers' eager embrace of mobile technology in the past two decades is perhaps the most compelling evidence of m-commerce's potential. In the United States, as in other regions of the world, consumers have made a critical shift from thinking of mobile phones as luxury, high-tech gadgets to regarding them as essential tools of daily living. As mobile technology penetrates further into the mass market, expect the growth of mobile phone use to continue in the future, albeit at a slower pace.

A Healthy Base Poised for Continued Growth

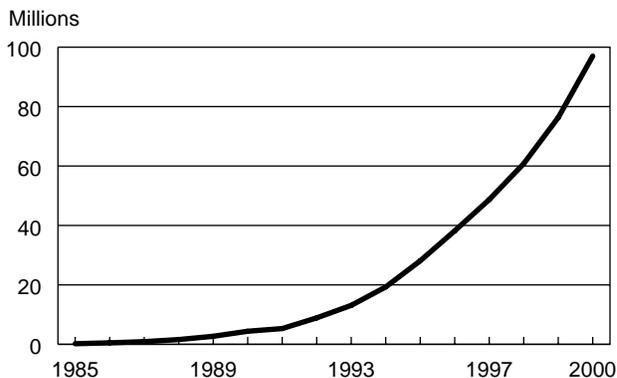
Although U.S. consumers have led the adoption of technologies such as household PCs and the Internet around the world, the U.S. rate of adoption of mobile phones has lagged behind that of other countries, such as Finland, Japan, and Sweden. The adoption of mobile phones in the United States has grown steadily since the mid-1980s, however (see Figure 1–1). In March 2001, there were approximately 115 million individual mobile phone users in the United States, or 41% of the population. A recent survey of U.S. households conducted by the Institute for the Future (ITF) and the Peppers and Rogers Group (PRG) indicates that the United States is catching up to Europe and Japan. The survey found that almost as many U.S. households have a mobile phone (61%) as have a personal computer (63%). It is important to note that the 20% gap between the

share of individual users (41%) and household ownership (61%) seems to suggest that many of the 105 million American households own more than one mobile phone. The fact that there is more than one mobile phone in many households suggests that communication by mobile device is being conducted not so much at the household level as at the individual level. This means that businesses can have more direct access to individuals.

Past Drivers of Adoption: Improved Technology Reduces Costs

In the past, decreases in price and improvements in the user interface of mobile phone technology encouraged adoption. Indeed, improved mobile phone technology was the main driver of consumer adoption throughout the 1980s and 1990s, as mobile phones became smaller, more convenient to use, and less expensive. Moreover, technology advances drove

*Figure 1–1
Base of Mobile Phone Users Has Grown
(U.S. mobile phone subscribers at midyear, in millions)*



Source: Cellular Telecommunications & Internet Association

the price of both phones and service down by more than 50% from the late 1980s to the late 1990s (see Figure 1–2). In the United States, the cost of purchasing devices is usually amortized over the life of the service commitment so that declines in the average cost of monthly service bills reflect not only decreases in service costs, but in device costs as well. As prices went down, mobile telephony became more attractive to more people.

**The New Force Driving Adoption:
Network Effects**

The late 1990s witnessed a transition in the major forces driving adoption of mobile phones. Adoption gains through improvements in device size and declining prices had mostly run their course. The size of a device containing a keypad, for example, that could reach both the user’s ear and mouth, hit a practical limit. Similarly, the steady decreases in service costs, which had driven nearly two decades of growth, ended in late 1998. Since reaching their low point in December 1998, monthly bills have risen by 15%. (However, changing usage patterns—people tend to use mobile phones more often nowadays—rather than increasing prices on service plans, seem to account for this increase.)

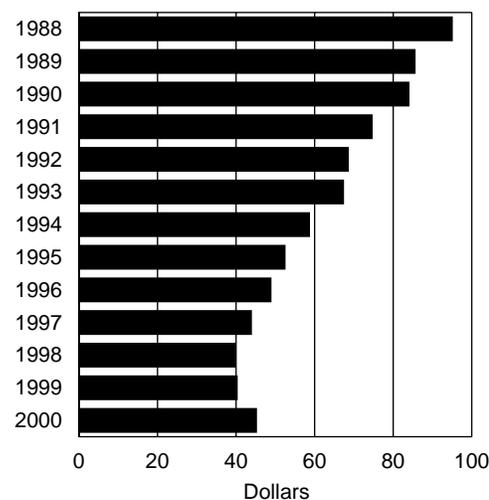
Today, “network effects” drive the growth of mobile phone adoption. Formally known as Metcalfe’s Law (named for Robert Metcalfe, credited with inventing Ethernet, the world’s dominant local area network, and best known as the founder of 3Com Corporation), network effects suggest that the value of a network increases exponentially for every additional user. As the value of the network increases, so does the growth. This law has been used to explain the proliferation of many new tech-

nologies that depend on a community of users; for example, radio, television, VCRs, e-mail, and the World Wide Web.

The Impact of Network Effects

As the base of subscribers has grown, and mobile phone adoption has moved down market to reach beyond leading-edge technology adopters, network effects have kicked in and are now playing a large role in driving both the adoption and use of mobile phones. In the late 1990s, as consumers found that more members of their social networks—family, friends, coworkers, and so forth—had mobile phones, the devices were perceived as more valuable, if not essential, to daily life, and many more consumers bought one for their own use.

*Figure 1–2
Monthly Bills Becoming Less Expensive
(Average local monthly U.S. mobile phone bill, in dollars)*



Source: Cellular Telecommunications & Internet Association

The numbers bear this out. As is typical of the adoption curve of any new technology, the rate of growth in the number of mobile phone subscribers has been slowing since the mid-1980s (see Figure 1–3). However, since 1998 the annual growth in subscribers has remained steady at around 25%, suggesting that a new force, namely the network effect, is sustaining continued adoption in this later period.

Growing Intensity of Use

The emergence of network effects and the increased value of using a mobile device has not only encouraged consumers who do not own mobile phones to become new subscribers, it has also affected how existing subscribers use their phones.

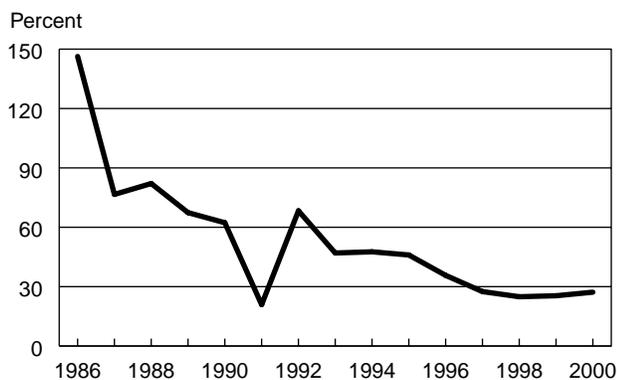
In the early stages of adoption, mobile phones were used mainly for unusual circumstances—for business people to stay in touch

while traveling, or for general consumers to use in case of emergencies. The sharp drop in mobile phone growth during the recession of 1991 indicated that these devices were considered luxuries for the most part, and were thus highly sensitive to the economic cycle. As the network of users steadily grows, however, these devices are increasingly used for routine, nonemergency situations, and are becoming increasingly integrated into daily activities. In focus groups conducted with mobile device owners, one consumer commented:

I've had a cell phone as long as they have been around. The original reason was basically one of security—just to have something in case your car broke down, or in case there was an emergency. But really, it's gone way past that now—it's totally used for communication. You know, I talk to my clients, talk to people, talk to my wife, talk to the kids. You feel lost without it after a while.

—Advanced CD shopper, married male, early 50s

Figure 1–3
Slowing Growth, But Steady in Late 1990s
(Annual percent growth in mobile phone subscribers in the United States)



Source: Cellular Telecommunications & Internet Association

Moreover, the average length of a mobile phone call, which in the past exhibited no clear trend, began steadily increasing in 1998, around the same time that network effects seem to have kicked in (see Figure 1–4). Although, the increases are in seconds, that these figures apply to a hundred million users, each making hundreds of calls per year, makes the 10% increase since 1996 significant.

In fact, new patterns of social interaction among these networks are beginning to emerge—patterns that rely strictly on mobile

communication. In focus groups IFTF and PRG conducted with mobile device users, respondents described people who have gone “completely wireless,” disconnecting their landline phones and relying solely on mobile connections:

She has her mobile phone with her all the time. She doesn't have a phone plugged into the wall in her house. So you can get her anywhere, any time. And that's a great thing—you just have to transition over to that.

—Novice CD shopper, married female, late 20s

Other people who don't completely disconnect use mobile communication to provide flexibility. One working mother relies on her mobile phone for a range of activities, from getting directions to staying in touch with friends she doesn't have time to call when she is at home with her kids:

I use my cell phone all the time for directions when I'm getting lost.... It's a great way to communicate and get in touch with everybody because you can't do it at home with a kid!

—Novice CD shopper, female with young child, mid-20s

Still others are learning to utilize their mobile phones for much more than communication, relying on them to consolidate a range of other activities:

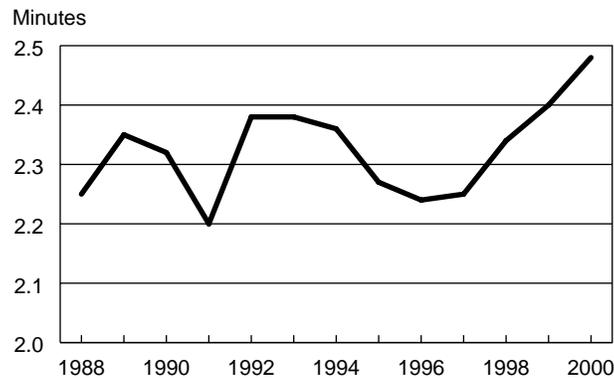
I use my little device to consolidate a lot of other pieces of equipment that I use—like an alarm clock, personal file folders—I use my phone for everything.

—Advanced CD shopper, single male, mid-20s

Sophisticated Consumers Lead the Way

Over the years, IFTF has tracked the emergence of an influential group of sophisticated consumers with a strong influence on the marketplace. These more sophisticated consumers are identified by the following characteristics: high education, discretionary income, and PC ownership. In the last decade, the share of consumers possessing these characteristics has grown rapidly as a share of the total population. Whereas the total number of adults is

Figure 1-4
Call Length Has Risen Steadily Since 1996
(Average call length, in minutes)



Source: Cellular Telecommunications & Internet Association

Profiling Mobile Shoppers

About 4% of U.S. consumers are mobile shoppers—people who have purchased a product or service using an Internet-enabled mobile device. This small but growing group represents the leading-edge adopters of this newest channel in the shopping mix. Mobile shoppers tend

to be younger (64% are between the ages of 18 and 44), more educated, and have moderate incomes. Not surprisingly, early experimenters with m-commerce have also shopped through other CD channels. Indeed, 94% of mobile shoppers also make purchases through other alternative sales channels.

*Table 1–1
Mobile Shopper Profile
(Percent of mobile shoppers by sex, age, education, income, and shopper group)*

Sex		Education	
Male	52	Less than high school	11
Female	48	High school grad	34
		Some college or more	53
Age		Income	
18–24	14	<\$25,000	12
25–34	21	\$25,000–\$49,999	34
35–44	29	\$50,000–\$75,000	32
45–54	20	\$75,000+	22
55–64	15		
65+	2		
		CD Shopper Group	
		CD shopper	94
		Non-CD shopper	6

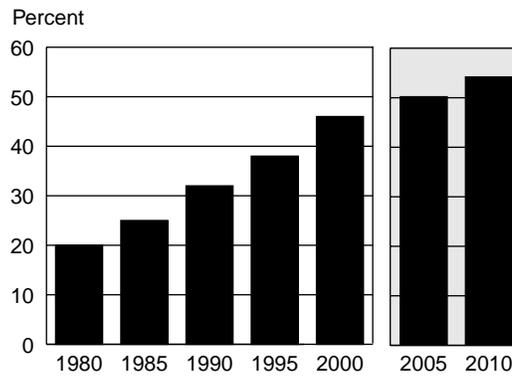
Source: Institute for the Future/Peppers and Rogers Group, *Next-Generation Consumer Direct: The Evolution of Mobile Commerce*, U.S. Household Survey, 2001.

growing at about 1.2% per year, this group of sophisticated consumers has been growing on the order of 5.5%. Currently, in North America they make up close to half of all adults and are growing five times faster than the adult population as a whole (see Figure 1–5).

This group of sophisticated consumers is an influential force shaping new opportunities in the marketplace, especially in the New Economy. Indeed, as the leading adopters of mobile technologies, including mobile phones and newer devices like PDAs, they are laying the groundwork for the emerging m-commerce market (see Table 1–1 in the sidebar, “Profiling Mobile Shoppers”). Using education as a proxy, our survey shows that the most sophisticated consumers are nearly twice as likely to own mobile devices (see Table 1–2).

As sophisticated consumers incorporate new technologies and services into their daily activities, they are looking for ways to gain more control over their schedules, and for access to more options for added convenience and value. This includes their shopping activities. In the past three years, IFTF and PRG have explored the adoption of alternative forms of shopping, namely shopping through CD channels, both traditional forms, such as catalogs, televisions, and direct mail, as well as newer forms, such as online shopping and home-delivery grocery services (see sidebar, “Exclusive Categories of Consumer Direct Shoppers” on page 9). It is no surprise that CD shoppers are much more likely to own mobile devices than non-CD shoppers. Moreover, more than 70% of the most sophisticated shoppers, Online+ and Grocery+ shoppers, report

*Figure 1–5
The Rise in Sophisticated Consumers Is Shaping the Marketplace
(Percent of total adult population)*



Source: Institute for the Future/Peppers and Rogers Group, *Next-Generation Consumer Direct: The Evolution of Mobile Commerce*, International Household Survey, 2000.

*Table 1–2
Sophisticated Consumer Households Are More Likely to Own
Mobile Devices
(Percent of households that own a ..., by education)*

	Mobile Phone	PDA
Total	61	14
Less than high school	43	10
High school	57	10
Some college	67	15
College	72	24
Postgraduate	78	22

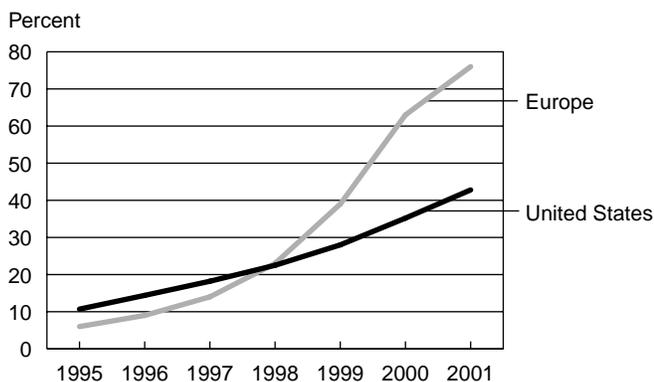
Source: Institute for the Future/Peppers and Rogers Group, *Next-Generation Consumer Direct: The Evolution of Mobile Commerce*, U.S. Household Survey, 2001.

Table 1-3
Sophisticated CD Shoppers Rely on Mobile Communication
(Percent of households, by CD shopper group, that have a mobile phone)

	Mobile Phone	PDA
Total CD	67	16
Non-CD	44	8
Catalog/Mail	58	11
Online+	77	21
Grocery+	71	30

Source: Institute for the Future/Peppers and Rogers Group, *Next-Generation Consumer Direct: The Evolution of Mobile Commerce*, U.S. Household Survey, 2001.

Figure 1-6
Mobile Phone Penetration in the United States and Europe
(Mobile phone subscribers at midyear, as a percent of total population)



Note: Europe includes Austria, Belgium, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Latvia, Lithuania, Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom.

Source: Cellular Telecommunications & Internet Association; Durlacher Research Ltd.; Eqvitec Partners Oy.

owning mobile phones, and are three times more likely than non-CD shoppers to own PDAs (see Table 1-3).

FUTURE ADOPTION FORECAST

The influence of network effects that reached critical mass in the late 1990s will continue to grow, affecting the size of the subscriber base of mobile phone users, their demographic profile, and the way mobile devices are integrated into daily life. However, the most important impetus for m-commerce will be the way devices are used, rather than the size of the subscriber base.

An Increasingly Mobile Mass Market

The base of mobile phone consumers in the United States will continue to grow, albeit at a slower rate than the 25% annual growth of the past three years. Europe's past numbers give us some indication of how far U.S. mobile phone adoption is likely to go from today's 41% of the total population (see Figure 1-6). Europe has adopted mobile phones much more quickly than the United States has, having achieved a penetration rate of 63% in 2000. An average of European analysts' forecasts suggests that the rate will climb to the low 70s by the end of 2001. Growth after 2001 is likely to slow to the single digits as the market approaches saturation—about 75 to 80% of the population.

The U.S. base is growing more slowly than Europe's for three reasons:

- First, the lack of a single agreed-upon network standard in the United States has lowered the availability and quality of reception, especially while traveling. Whereas Europeans can use their phones just about anywhere in the

world, U.S.-based service typically cannot be accessed internationally.

- Second, the fact that U.S. subscribers pay for incoming as well as outgoing calls has influenced some users to turn off their phones to save money, dampening—relative to Europe—some of the network effects that have driven growth.
- Third, lower population densities in the United States mean that many potential subscribers are in areas with limited coverage or poor reception (see Table 1–4).

*Table 1–4
Population Densities Lower in United States than in Europe
(People per square kilometer)*

United States	29
Canada	3
United Kingdom	244
Germany	235
France	107
Netherlands	63
Sweden	22

Source: World Bank, *World Development Report*.

Exclusive Categories of Consumer Direct Shoppers

- *Non-CD shoppers.* Households with members who have not made a remote purchase in any CD channel in the past 12 months.
- *Traditional Catalog/Mail shoppers.* Households with members who have shopped from catalogs, direct mail ads, newspaper/magazine ads, television, radio, or the yellow pages in the past 12 months. Excluded are those who have also engaged in the more sophisticated channels of online or grocery delivery shopping.
- *Online+ shoppers.* Households whose members have shopped online in the past 12 months, excluding those households that use a grocery delivery service. Most of these households also use the traditional CD channels.
- *Grocery+ shoppers.* Households whose members have used some form of remote-order home-delivery grocery service in the past 12 months. These households also use other CD channels.

Teens and young adults age 10 to 24 account for 11 million subscribers today. These young consumer groups are eager adopters of new technology, and they are more likely to adapt their behaviors to the technologies.

Early sales figures for 2001 indicate that the growth of mobile telephones in the United States is likely to be in the 14 to 16% range rather than the 24 to 28% range of the past three years. Meanwhile, as a result of differences in mobile technology infrastructures and geographic characteristics, the saturation rate in the United States is likely to be significantly lower than that of Europe, perhaps around 65%, versus 75 to 80% in Europe (see Figure 1–7).

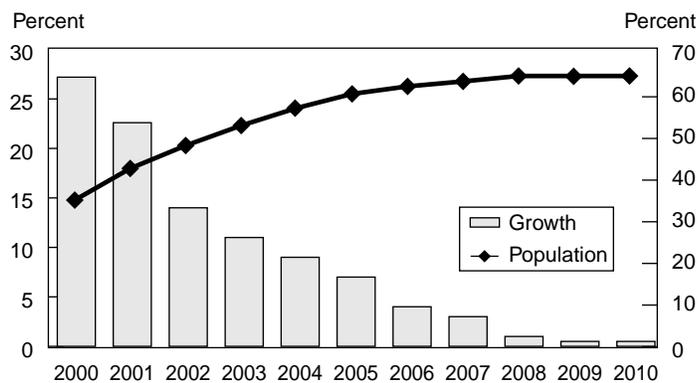
It is also worth noting that while mobile phone adoption was very sensitive to the business cycle during the 1991 recession, when annual percentage growth in the number of subscribers dropped from 62% to 21% in one year, lower prices and the continued integration of mobile phones into daily life will make their usage less likely to be affected by a recession in the future.

Changing Profile of Mobility: Younger, Female, and Less Sophisticated

Future adopters of mobile phones in the United States will differ demographically from current users. The anticipated 60 million new users over the next five years are less likely to fit the profile of sophisticated leading-edge adopters. A recent study released by a leading trade journal, *The Standard*, in collaboration with Forrester Research found that future subscribers are likely to be younger, female, and with significantly lower income and education than existing users—indicating the movement of mobile phone adoption into the mass market.

Moreover, the emergence of the youth segment over the next few years could be influential. Teens and young adults age 10 to 24 account for 11 million subscribers today. These young consumer groups are eager adopters of new technology, and they are more likely to

Figure 1–7
U.S. Mobile Phone Subscribers 2000–2010
(Annual percent growth and subscribers as a percent of total U.S. population)



Source: Institute for the Future

adapt their behaviors to the technologies. They can deal with limitations such as small screens and keypads better than older adults, for example. As young adults move into the workforce, many can afford and are acquiring their own phones (see Table 1–5). Even if they can’t, they can borrow their parents’ mobile phones. In this way, they get used to using a mobile phone and are more likely to buy their own when they get a chance.

Evolving Usage Patterns: Integrating Mobile Communication into Daily Life

The biggest opportunity associated with mobile phones may not come from the growing subscriber base but rather from the changing patterns of existing users. As mobile phone users come to employ their phones for more than just unusual circumstances like emergencies, new usage patterns are emerging. Among the most popular uses today is mobile work communication, which includes conducting meetings and conference calls while driving or traveling, a practice that indicates the value of mobile devices in integrating activities and functions throughout the day.

In focus groups of mobile device users, participants revealed a wide range of uses for their mobile devices (see Table 1–6). Some of these reflect the traditional patterns of “occasional” uses, such as for emergencies and travel-related communication; however, many people point to much more intensive use of these devices as a key link to others in their social networks, including family, friends, and work contacts. These uses reflect a much more integrated connection between the mobile phone and the individual’s daily life.

*Table 1–5
Younger Households Are Eager to Own Mobile Devices
(Percent of households in each age category that own a mobile phone or expect to purchase one in the next 12 months)*

	<i>Currently Own</i>	<i>Plan to Own</i>
Total	61	22
18–24	73	40
25–34	68	21
35–44	62	21
45–54	62	25
55–64	62	14
65+	41	16

Source: Institute for the Future/Peppers and Rogers Group, *Next-Generation Consumer Direct: The Evolution of Mobile Commerce*, U.S. Household Survey, 2001.

*Table 1–6
Consumers’ Reasons for Using a Mobile Device*

Traditional Uses

- Emergency/safety
- Peace of mind
- Personal travel into unfamiliar areas
- Business travel
- International travel for extended periods

Emerging Uses

- Access to other mobile users in the household
- Constant contact with work
- Just to “keep in touch”
- Asking directions
- Consulting with family members while shopping
- Phone as a reminder and organizer

Source: Institute for the Future/Peppers and Rogers Group, *Next-Generation Consumer Direct: The Evolution of Mobile Commerce*, Focus Groups with CD Shoppers, January 2001.

Whereas telephone numbers for landlines give access to a household, mobile phone numbers give access to an individual. This shift ... presents a significant opportunity for companies to develop applications that target and serve individual needs.

As more functions, such as online capabilities, are built into mobile devices, and consumers gain more experience using the technology, usage patterns will continue to evolve.

Enabling Spontaneity

When people use mobile communication to stay in touch with members of their social and work networks, they are using the technology to act more spontaneously. Perhaps as a result, social visits and meetings with friends are being planned more often at the last minute. Changes in plans can be made up to the time of the meeting rather than up to the point of leaving the home or office. This ability to be spontaneous is affecting consumer behavior as well. Supermarkets and department stores are filled with mobile users consulting their spouses or partners about what's on sale. One consumer commented:

Cell phones are a great way for me also to communicate with my husband. If he's asked me to pick up something at the store I can give him a call and say, 'Hey, I'm in front of XYZ. Tell me, do you want this brand or that one or that one?' That way it resolves conflict later on and I don't have to worry about 'Oh no, you got me the wrong thing.'

—*Novice CD shopper, married female, late 40s*

The ability to communicate on the go like this is making consumers' shopping lists and stores' direct mailings less important and in-store merchandising more important. This kind of spontaneity will play a key role in

determining the types of m-commerce applications that will be most useful to consumers in the next decade.

From Household Device to Personal Device

Our focus groups also provide evidence that the mobile phone is shifting from being a device shared by members of a household to a device used separately by individual members of a household. When it was used for emergencies on long trips, for example, a single mobile phone could be shared among all family members. Or one member of the family might have used the mobile phone, but just for business trips. As mobile phones have become bound up in daily life, however, in some households each individual now keeps a phone all day long. In this way, the phone is more difficult, if not impossible, to share. In response, mobile service providers such as Cingular, Verizon, and Sprint are offering "family talk" plans that provide free calls between family members and discounted mobile phones for every member of the family.

Estimates based on our recent household survey suggest that there are about 1.6 mobile phones in each household that has at least one. This suggests that more than one member of a given household has his or her own mobile phone, which points to a shift in access. Whereas telephone numbers for landlines give access to a household, mobile phone numbers give access to an individual. This shift will have a large impact on how consumers use their devices, but it also presents a significant opportunity for companies to develop applications that target and serve individual needs. This opportunity will drive the growth of m-commerce.

**CONCLUSION:
MOBILE PHONES ARE BECOMING THE
THREAD OF THE SOCIAL FABRIC**

As mobile phones and other mobile devices move into the mass market, consumers are adapting the technology to integrate various activities and functions in their daily lives. Increasingly, the ability to communicate, to connect, and to conduct transactions while on the go will reshape when, where, and how shopping-related activities are conducted. The diffusion of mobile phone technology and patterns of consumer adoption provide several key insights into the future of m-commerce, including:

- *Consumers are using mobile phones to integrate activities.* As consumers adopt mobile phone technology, it is clear that the real value of the tool is in the ability to integrate multiple activities such as working on the road, getting a spouse's input while making a purchase in a store, or making a last-minute change in plans for a social or business meeting, and so forth. Ultimately, mobile tools such as phones and PDAs will enable consumers to weave together a seamless experience across myriad locations, contexts, and devices.
- *Network effects intensify usage of mobile phones.* More people are acquiring and using mobile connections well beyond the tradi-

tional justifications for the expense, namely safety and security. Indeed, more and more, people are using them as their main communication mode, enabling them to stay in constant touch with family, friends, and business contacts. Although most of the growth in users has already occurred, especially in Europe and Japan, the growing intensity of use provides the essential foundation on which the emerging m-commerce industry will grow.

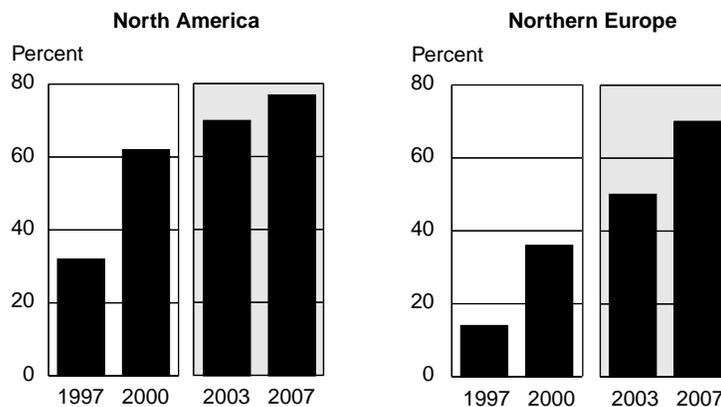
- *Younger consumers will lead future adoption.* Young consumers are the most eager adopters of this new technology and are the most likely to adapt to the limiting aspects of the technology, such as small screens and hard-to-use keypads. Since they adapt more easily to requirements for behavioral changes, younger consumers will be an important m-commerce market to tap.
- *Mobile devices provide unique access to individuals.* As businesses are pushed toward conducting more personal and targeted interactions with consumers to stay competitive, mobile phones and other mobile devices will become a critical point of contact with individual consumers. More than other retail channels, mobile devices provide unique and exclusive access to individuals, creating new opportunities to engage customers in one-to-one relationships.

Increasingly, the ability to communicate, to connect, and to conduct transactions while on the go will reshape when, where, and how shopping-related activities are conducted.

MOBILE TECHNOLOGIES: FRAGMENTED SOLUTIONS, LOCALIZED RESPONSES

The combination of the widespread consumer adoption of mobile phone technology and the surge in PC-based Internet use over the past six years (see Figure 2–1) has prompted large-scale investments in the development of new technologies that enable people to access the Internet through their mobile phones and other mobile devices, such as PDAs and pagers. Over the next ten years, the technological backbone supporting mobile connectivity will continue to be diverse and fragmented. In the absence of clear network standards, localized solutions will emerge to support a variety of activities. This environment will reinforce consumer uses of mobile devices that are spontaneous, location-specific, and individualized. In the long term, the integration of Internet access with mobile devices will encourage users to rely more heavily on such devices to access a greater range of value-added services, including m-commerce.

Figure 2–1
Internet Adoption



Source: Institute for the Future/Peppers and Rogers Group, *Next-Generation Consumer Direct: The Evolution of Mobile Commerce*, International Household Survey, 1997 and 2000.

3G ... is where the huge investments are being made right now in both the United States and Europe.

Developments in four key areas of mobile technologies will influence how consumers use m-commerce applications in the future: telecom carrier networks, positioning systems, wireless local area networks, and next-generation mobile devices. The intersection of these four technologies will differentiate m-commerce from other shopping channels, and will define m-commerce opportunities for the next decade and beyond.

MOBILE INTERNET NETWORKS: A FRAGMENTED LANDSCAPE

The development of standards that enable digital data to be received and transmitted over wireless networks will be an important driver of m-commerce. These standards are important because they determine how the radio signals containing voice and data are sent among the networks of users and service providers.

Two significant constraints within existing mobile networks are driving the investment in new network technologies and their rollout. First, the increase in voice traffic as the subscriber base increases, as well as the growth of network effects that encourage people to spend more time on mobile phones, will soon overwhelm existing networks. Second, effective m-commerce applications will demand high-speed, always-on data access. Just as we have seen in the rollout of PC broadband connections, the “theoretical” connection speeds of mobile devices telecoms set out in their marketing materials are significantly higher than the realistic speeds that consumers can expect for everyday use. Most advertised connection speeds are based on the maximum speed attainable with few simultaneous users and no network congestion—a very unusual circumstance.

Each of the data transmission standards in development fits into a well-defined category. The industry refers to these categories as “generations”; for example, “2G” stands for second generation.

- *2G*. In the United States, second-generation technologies such as TDMA (Time Delay Multiple Access) and CDMA (Code Division Multiple Access) can handle only a small number of concurrent users. As a result, these technologies offer very slow connection speeds when available. In the United States, about 2 million people currently use this technology, mostly to receive news headlines, stock prices, and weather reports.

- *2.5G EDGE* (Enhanced Dataset for GSM Evolution)—sometimes considered 2.75G. This set of standards represents a way to increase connection speeds with a small additional investment relative to the larger investments that are required for 3G. These systems offer speeds close to that of a home-based PC modem and cost about 20 to 25% as much as a 3G rollout is likely to cost. 2.5G systems are likely to become available in late 2001 or early 2002 in the United States. A similar technology called GPRS (General Packet Radio Service) is being rolled out in Europe now and shows promise as a less expensive, almost-as-good alternative to UMTS (Universal Mobile Telecommunication System), a 3G technology. The success of 2.5G technologies could delay the widespread rollout of 3G. Watch Europe for signs of this slowdown.

- *3G*. This is where the huge investments are being made right now in both the United States and Europe. UMTS is the umbrella term for the carrier technologies that will be used in each country. The 3G technology most preva-

lent in the United States is called CDMA2000. This technology will initially create effective connection speeds similar to those of home-PC modems, but the speeds could increase fivefold within a few years. More important, connections will be instantaneous, eliminating the time required for dial-up, which deters more consumers from using this technology. Initial rollouts, in dense urban areas, are likely to occur in 2003 in the United States.

- *4G*. Because 4G technologies will be launched near the end of the decade, their precise characteristics are difficult to define. However, they will have at least two important differentiators: (1) speeds that make it practical to deliver streaming video over mobile devices, and (2) seamless connectivity, so that a single device works in just about every country and every local network in the world. The Japanese company NTT DoCoMo is trying to establish a leadership position in this standard and has announced plans to roll out 4G in Japan between 2008 and 2010. If NTT DoCoMo can

deliver on its ambitious plan, 4G will represent a more significant jump in bandwidth from 3G than the jump from 2G to 3G today.

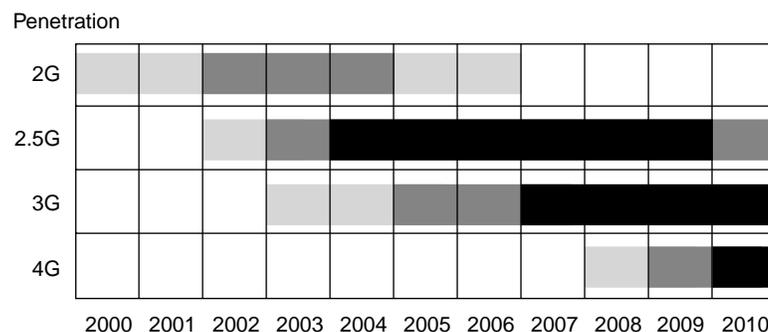
A key point to remember about these technologies is that they will overlap in time, which will create a very fragmented base of mobile users over the next ten years (see Figure 2–2). The successful deployment of new network technologies will ultimately rely on individual subscribers, all of whom will have to migrate to new devices and services to use these technologies.

OUTLOOK: NO CLEAR NETWORK STANDARD EMERGES

For wireless carriers, each of these technologies is extremely expensive to roll out, for three reasons:

- First, they require a government license to use a specified range of radio frequencies. European operators spent about \$120 billion for 3G licenses in 2000. The United States will hold similar auctions in 2002.

Figure 2–2
Wireless Technologies in the United States
(Darker shading indicates higher penetration)



Source: Institute for the Future

To pay for these huge investments, in the next ten years they will aggressively pass on these costs to other entities in the m-commerce value chain, including, ultimately, consumers.

- Second, they require an investment in network infrastructure, such as upgrades of routers and antennas. For example, building the 3G infrastructure will require installing six times as many antennas as exist today. Estimates for the 3G infrastructure upgrade in Europe are about \$150 billion.

- Third, mobile handsets have to be upgraded. The average cost of a handset is about \$170. Most carriers will have to subsidize the cost of upgrades to 3G-ready handsets quite heavily to encourage their widespread adoption.

It is important to note that, at least initially, telecommunications carriers will bear all of these costs. To pay for these huge investments, in the next ten years they will aggressively pass on these costs to other entities in the m-commerce value chain, including, ultimately, consumers. With costs between \$1,000 and \$1,500 per subscriber, how consumers end up paying for them—directly, embedded in services, or priced into products—will have a large effect on the success of m-commerce. The more these costs can be “hidden” or spread out over the years, the more likely consumers will be interested in trying out these technologies.

The timing of these rollouts could be slowed by market conditions, which have been discouraging large investments, and by some rethinking of how much carriers spent in 3G spectrum auctions in Europe. In March 2001, Japan Telecom warned that its 3G rollout will be delayed until mid-2002, and NTT DoCoMo warned that widespread adoption of 3G will take three to seven years. Furthermore, British Telecom has admitted that it overbid in European auctions last summer by about \$15 billion. With all these doubts in the air, a group of European telecoms recently submitted a peti-

tion demanding that governments return the auction proceeds to the bidders and hold new auctions based on the quality of each telecom’s proposed rollout rather than simply giving them to the highest bidder. It is unlikely that the governments will meet these demands.

Operators in the United States will be watching European companies to see how they deal with the tremendous debt they have incurred in bidding for licenses. As a result, on the one hand, U.S. auctions are likely to be less costly to carriers since they can learn from Europe’s mistakes. On the other hand, the lower population density of the United States is likely to make the infrastructure rollout more expensive. One emerging alternative is to improve 2.5G technologies until they can operate at close to the speed of early 3G. Recent improvements in data compression technologies make this option feasible and could extend the popularity of 2.5G and delay the widespread—and much more expensive—adoption of 3G. If 2.5G technologies progress far enough in the next 18 months, investing in 3G technologies could become much less attractive to U.S. operators and might lead them to skip a generation and invest more in speeding up the rollout of 4G technology.

Mobile Internet Forecast: Fragmentation Persists

Without a clear network standard for the deployment of mobile Internet services, the process of upgrading a large base of mobile users to technology capable of exploiting network advances is daunting, to say the least. The sheer number of mobile device users who choose to subscribe to mobile Internet services will be a key driver of the evolving m-commerce market; however, as fragmentation of

network standards persists, it will be difficult to develop and deploy effective, scalable m-commerce applications over the mobile Internet (see Figure 2–3).

POSITIONING TECHNOLOGY: NEW OPPORTUNITIES FOR LOCALIZATION AND PERSONALIZATION

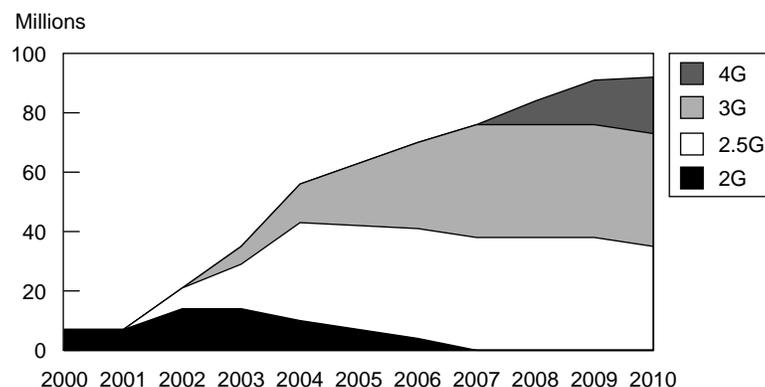
Technologies that can identify the precise geographical location of a mobile device will differentiate the m-commerce channel from other customer channels by enabling the communication of extremely targeted information based on the exact location of the customer—information that can be delivered at the moment the customer needs it or is most likely to act on it. Unlike 3G network technology, these technologies are coming to the United States soon—possibly within the next few months (see sidebar, “Federal Communications Commission Mandates Automatic Location Identification,” on page 20).

Positioning Systems: Network Versus Handset

Positioning technologies come in two types of systems: networked-based and handset-based. Network-based systems use the time and angle of incoming signals from mobile devices to base station antennas and can locate individuals within a mile of their current location. The location measurements can be made more precise by combining readings from two or more antennas. In cities and other areas with an installed base of network antennas, carriers can determine the location of individuals to about 50 yards.

The second type of positioning technology is handset-based, which uses a small global positioning system (GPS) receiver integrated into the mobile device. Whereas antenna location systems measure location relative to a cell antenna, a GPS receives and measures signals from satellites to determine positioning within an accuracy of ten meters (approximately 11

Figure 2–3
M-Commerce Consumers
(Subscribers with Internet-enabled mobile devices, in the United States)



Source: Institute for the Future

yards). The handset then sends the coordinates to the carrier to identify the user's location. These devices make the handset more expensive, however, and this expense will delay widespread adoption of GPS-based location finding for several years.

While positioning technologies will make 911 service more effective, their impact on

direct marketing could be even more significant. Indeed, they will enable a wide array of one-to-one personalization applications that can deliver information and services to consumers precisely when they need them. We discuss some of the potential applications of positioning technologies in more detail in Chapter 4.

Federal Communications Commission Mandates Automatic Location Identification

The key impetus behind the development of positioning technology was the passage of the Federal Communications Commission's Wireless Communications and Public Safety Act of 1999. This law mandates that by the end of 2001 25% of new wireless devices

must incorporate automatic location identification (ALI) technology. By the end of 2002, all new devices must have ALI (see Table 2-1). This will allow public safety operators to identify the precise origin of 911 emergency calls, known as E-911, as is done with landlines today.

*Table 2-1
Automatic Location Identification Coming Soon
(Mandatory deadlines for mobile phone manufacturers to incorporate ALI)*

October 1, 2001	Begin selling ALI phones
December 31, 2001	25% of all new phones have ALI
June 30, 2002	50% of all new phones have ALI
December 31, 2002	100% of all new phones have ALI
December 31, 2005	95% of all users have ALI phones

Source: Federal Communications Commission

WIRELESS LOCAL NETWORKS: A LOW-COST ALTERNATIVE

Local wireless networks will also be a key enabling technology for m-commerce applications. With these technologies companies can create interactive networks within relatively small areas, networks that could be used to send data to a mobile device specific to a particular location, such as a household, store, or mall. Because they are less expensive than the massive, worldwide networks, they are more likely to affect mobile communications in the short term.

Bluetooth

Named for a Viking king, Bluetooth has become widely accepted as a standard for small wireless networks. These small, chipset devices are inexpensive—prices could drop to about \$5 within two years—and enable devices such as mobile phones and cash registers to communicate within a short range, about ten meters. This makes Bluetooth suitable for conducting transactions such as authorizing payments to vending machines or cash registers, or for tracking items within the network. Danish airports are currently using the technology to track baggage. Improvements could make Bluetooth effective up to 100 meters (approximately 109 yards), making it viable for m-commerce applications such as delivering advertisements and promotions as a customer browses through a store or mall.

The low cost of Bluetooth will also support the growth of wireless home networks, which will enable home appliances such as refrigerators and garage door openers to be linked to a home-based network. Wireless home networks create the potential for many new streams of information to be exchanged between busi-

nesses and consumers, such as data tracking food supplies in the refrigerator or maintenance and repair needs of household appliances.

Wireless Local Area Networks

Wireless local area networks (WLANs) offer an even more robust way to provide data access in public spaces. These types of networks tend to have longer range and offer higher bandwidth connections than technologies like Bluetooth, and as such may offer an effective way to deliver messages to customers in stores, hotels, and airports. By inserting a relatively low-cost 802.11 card into their PCs, current laptop users can get access to such a local wireless network.

Recent studies released by Intel Corporation and the University of California at Berkeley point out weaknesses in the security of data transmitted over these networks, a problem that must be resolved to ensure wide adoption. But there is great potential for these networks to become widely popular, since they do not depend on the national mobile Internet networks that telecom carriers are setting up. They do require an investment on the part of retailers or developers, but retaining control of the network and its content may make this investment worthwhile.

NEW DEVICES: CONVERGENCE OF MOBILE FUNCTIONALITY

The emergence of new types of mobile devices with new features promises a more user-friendly interface for m-commerce applications, and sets the direction for the evolution of devices in the future. The introduction of PDAs, such as the Palm Pilot and Handspring Visor, for example, has been extremely successful. Our survey found that 14%

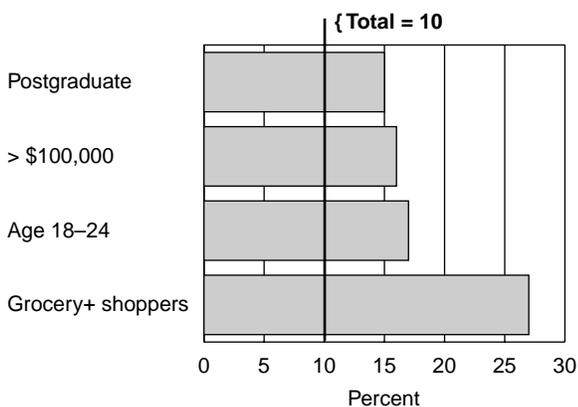
Wireless home networks create the potential for many new streams of information to be exchanged between businesses and consumers.

Table 2–2
Mobile Devices Emerging as a Viable Alternative to the PC for Internet Access
(Percent of U.S. households that own ...; percent of owners whose device is Internet-enabled)

	Own a is Internet-enabled
Computer	63	89
Mobile phone	61	20
Pager or beeper	30	16
PDA	14	35
Web via TV	9	100

Source: Institute for the Future/Peppers and Rogers Group, *Next-Generation Consumer Direct: The Evolution of Mobile Commerce*, U.S. Household Survey, 2001.

Figure 2–4
Sophisticated Consumers Prefer Mobile Devices to Access the Internet
(Percent of adults who preferred to purchase a mobile device, such as a pager, PDA, or mobile phone, rather than a PC, to access the Internet)



Source: Institute for the Future/Peppers and Rogers Group, *Next-Generation Consumer Direct: The Evolution of Mobile Commerce*, U.S. Household Survey, 2001.

of households had at least one of these devices; of those, one-third were capable of accessing the Internet (see Table 2–2).

The popularity of Internet-enabled PDA devices has led many industry watchers to suggest that they are more suitable for m-commerce than mobile phones. Indeed, they have larger screens and tend to have more refined and intuitive user interfaces. Most do not enable voice communication, however, which is a key component of m-commerce, as we will discuss in the next chapter. Indeed, our focus groups and interviews revealed that many of today’s travelers carry all three appliances (PDA, cell phone, and laptop) to make up for the perceived limitations of each.

I’ve got all the toys—cell phone, PDA, pager, PC, GPS—I work all over the country ... it’s mainly to keep in contact with the customers [and my wife and kids]... I would not know what to do without mobile communication. I don’t know how we did business ten years ago.

—Advanced CD shopper, married male, early 50s

Although the numbers are still small, lead adopters—younger, more educated, higher-income consumers—indicate a stronger preference for accessing the Internet through mobile devices. In our survey, we asked consumers which device they would purchase in order to access the Internet—a mobile device or a PC. These sophisticated consumers were more likely to say they would purchase a mobile device rather than a computer to access the Internet (see Figure 2–4). Among CD shoppers who utilize alternative retail channels for

more flexibility and control over their shopping, mobile connectivity was also an attractive option. In fact, Grocery+ shoppers, the most sophisticated of the CD shopper groups, were nearly three times more likely to demonstrate a preference for mobile connectivity. This trend underscores the potential of the mobile Internet as a viable addition to the CD channel mix.

Most of the industry executives we interviewed agreed that the ideal m-commerce device does not yet exist. Devices are likely to evolve significantly over the next two to three years, however. And each network upgrade—for example, from 2.5G to 3G—requires a new device. So far, consumers have shown a strong willingness to upgrade, although the carriers often subsidize the upgrades. Nokia, the world leader in mobile phones, says that of the 405 million handsets produced worldwide in 2000, an estimated 40% were replacements. Nokia expects this number to climb to 50% in 2001.

Mobile phones and PDAs are likely to converge into a device that has a larger screen, a simple user interface, and voice communication capability. Some of our interviewees suggested that the device will be closer to an enhanced mobile phone rather than a PDA with voice capability. That the mobile phone carriers will be in the best position to market these devices—by bundling the devices with service and spreading out their cost over the length of the service contract—also suggests that a phone-centric device is more likely.

Although the phone and PDA will likely converge, the resulting devices are just as likely to become distinct and varied to reflect the individual patterns of the users. Some users will view their device as a phone with the capability to conduct limited m-commerce transactions.

These devices will look similar to today's phones, but with larger screens. Others, keen to take advantage of the multimedia promise of m-commerce, will want devices with a much bigger screen and will be willing to sacrifice compactness for usability. Watch for a convergence between the best features of mobile phones and PDAs into a single device, and a divergence in the ways these new devices are used by individual consumers.

CONCLUSION: WHAT DO THE EMERGING TECHNOLOGIES MEAN FOR M-COMMERCE?

These four groups of technologies will provide the backbone of m-commerce applications. Evolving network standards promise to make mobile Internet access fast, reliable, and instantaneous. Positioning technology will identify the exact location of consumers, thereby enabling the delivery of location-specific and time-sensitive information. Bluetooth and WLANs will emerge as low-cost networking alternatives, enabling the interactive exchange of information and the transmission of targeted messages to consumers in local networks. And new devices featuring the union of the best features of today's mobile phones and PDAs will provide consumers with a more intuitive and navigable interface.

To take advantage of the intersection of these technologies, companies should keep the following key insights in mind:

- *Develop common-denominator solutions for a fragmented market.* In developing mobile Internet applications, companies must plan to serve a highly fragmented consumer base. As network technologies evolve, companies will

Although the numbers are still small, lead adopters—**younger, more educated, higher-income consumers—**indicate a stronger preference for accessing the Internet through mobile devices.

need to develop niche strategies for exploiting network advancements and encouraging consumers to upgrade their service, while maintaining base-level services deployable across different network standards in order to reach the widest base of consumers.

- *Invest in low-cost local network alternatives.* Part of the value of m-commerce applications will be in the delivery of location- and time-specific information to consumers. Retail and service companies should make early investments in low-cost network alternatives for communication and service delivery, such

as WLANs, and take advantage of new capabilities created by the integration of positioning systems into mobile devices.

- *Design services to take advantage of unique infrastructure characteristics.* Over the next ten years, the infrastructure supporting m-commerce will be varied, requiring companies to develop applications that utilize the unique characteristics of the mobile infrastructure—local, limited, and focused interactions, delivery of individualized content and messages, and anytime-anyplace accessibility.

ENGAGING SKEPTICAL CONSUMERS

Technology will make it possible to bring m-commerce to consumers, but providers face a significant challenge in demonstrating the value of these services and encouraging consumers to adopt them. In our research, we have encountered a cohort of eager early adopters we call “travelers and techies.” The general population of consumers in the United States, however, is skeptical about the benefits of m-commerce. Our focus groups and surveys reveal that m-commerce providers need to address key obstacles to make these applications popular on a wide scale. Innovations that address consumers’ particular concerns are likely to catch on first.

In this chapter, we look at some of the barriers currently restricting m-commerce adoption in the United States. As a test case, we examine factors shaping adoption in Japan, one of the leading markets for m-commerce today. To provide further clues about which applications will break through these barriers, we explore the unique features of emerging mobile devices, and how they are likely to be used in the next decade.

CONSUMER SKEPTICISM: MAJOR BARRIER IN THE UNITED STATES

Potential m-commerce users in the United States have four categories of concern about m-commerce: usability, security, the m-commerce value proposition itself, and cost. We divided the survey respondents into three groups, representing both current and potential m-commerce users: those who have made a purchase

using their own Internet-enabled mobile devices, those who own a Internet-enabled mobile device but haven't made a purchase, and those who own a mobile device that is *not* Internet-enabled. Though these groups reflect a wide range of mobile device users, all respondents say that improvements in the same three areas—the cost of products and services, the ability to make secure transactions, and the connection speed—would spur them to make more mobile purchases (see Table 3–1).

In addition, our focus groups uncovered a broader range of concerns with the user interface. Overall, participants were very skeptical about the proposed added value provided by m-commerce services.

User Interface Issues Inhibit Adoption

Poor usability presents one of the most significant barriers to widespread adoption of m-commerce. In particular, consumers find that

the screens are too small, the keypads are difficult to use, and the connection speeds are slow. These drawbacks have two significant implications. First, early adopters have a high dropout rate. A Boston Consulting Group study in Europe found that one-third of early m-commerce users dropped out after a few tries. Second, the applications that have proliferated so far have been limited to short text messages, such as stock quotes and weather. Browsing on these devices is not practical. Our household survey of m-commerce shoppers found that 56% of mobile shoppers would use m-commerce more frequently if it were easier to use.

Screen Size

A mobile phone screen can rarely display more than five lines of text. But recent efforts to create a mobile device with a screen large enough to display a meaningful amount of data yet small enough to carry around conveniently

*Table 3–1
Improvements in Cost, Security, and Speed Would Drive Mobile Purchasing
(Percent of each group that listed ... as important in getting them to shop more frequently or to begin to shop online through a mobile device)*

	<i>Mobile Purchasers</i>	<i>Internet-Enabled Nonpurchasers</i>	<i>Non-Internet-Enabled</i>
Products and services less expensive*	74	71	55
Send orders securely over mobile connection	72	68	49
Connection speeds were faster	71	70	48
Easier to navigate using a mobile device	66	66	47
More product or service offerings	54	51	41

*Refers to products and services purchased through a mobile device.

Source: Institute for the Future/Peppers and Rogers Group, *Next-Generation Consumer Direct: The Evolution of Mobile Commerce*, U.S. Household Survey, 2001.

have so far resulted in an unsatisfactory compromise for most users.

The popularity of the PDA gives a good indication of how this problem will be resolved. PDAs have much larger screens than mobile phones and also have very purpose-built user interfaces. They are simple and designed for specific tasks, such as managing an address book and a daily schedule. The incorporation of a PDA-like screen and user interface into mobile phones will address some of the difficulties that have led to dropouts among early adopters of the mobile Internet.

This solution introduces a new compromise, however. With mobile phones averaging about \$170 and PDAs averaging about \$400, combining these two into a device that is affordable on a large scale will be a new challenge. The Kyocera Smartphone (see Figure 3-1) and the Ericsson R380 World Smartphone represent early efforts to combine the two, and they are currently priced at about \$500 and \$700 respectively. Most consumers will find these too expensive. Watch for innovations in sub-\$250 mobile devices with large screens and intelligent user interfaces. These devices will be a key driver of m-commerce, and the widespread marketing of them will indicate that m-commerce adoption may accelerate soon after.

Keypads

The typical 12-button keypad on a telephone makes an awkward interface for typing text, another reason for the high rates of abandonment among early m-commerce users. PDAs, however, use a plastic stylus, which allows users to enter data with a modified form of script. Other devices, such as the Blackberry, used primarily for e-mail, have a very small

Figure 3-1
The Marriage of Mobile Phone and PDA Technology:
The Kyocera Smartphone



Source: www.kyocera-wireless.com

The spontaneous, ad hoc patterns of behavior consumers demonstrate in bricks-and-mortar stores will only begin to be replicated on mobile devices once connections are instantaneous.

keyboard. As these devices converge with mobile phones, data entry will become easier.

Even these techniques make it difficult for many users, however. Such keyboards may discourage older users who may be less adept at using small buttons and an electronic interface. One promising technology for data entry on mobile devices is speech recognition. Companies are developing applications for enabling Internet navigation by voice commands. For example, Nuance Communications is pioneering a technology it calls the Voice Web, for which the interface is entirely voice-based. Users navigate Voice Web-enabled Web sites by speaking simple commands. Currently, available applications enable users to receive restaurant reviews, driving directions, and news.

Speed

To date, connection speeds for the mobile Internet, in both Europe and the United States, are painfully slow, making most m-commerce applications impractically tedious for all but a small group of the “travelers and techies” willing to make the effort. In our survey, 71% of consumers who had made a purchase on a mobile device said that faster connection speeds would encourage them to use m-commerce more often. The new transmission standards discussed in Chapter 2 should address some of these concerns. The industry, however, has generated extremely high expectations for how fast data will flow once 2.5G and 3G standards are in place. The actual speeds of day-to-day use will be about 15 to 30% of advertised “theoretical” speeds. This will limit most applications to text and small pictures for a significant time. Streaming video and animation on a widespread scale will most likely

have to wait for improvements in 3G standards and the rollout of 4G, which won’t occur until the end of the decade or later.

Another problem concerns dial-up speed—the time it takes to access the Internet. Currently, users literally have to dial up an access number to their Internet service provider as if it were a phone call. This isn’t a problem if the users have to do it only once or twice a day. But if they do it a dozen times a day, which is more like the pattern we’ve discovered in our research, such delays can be a nuisance.

As a result, an instantaneous, always-on connection is essential for many of the applications we discuss in the next chapter. This is a key value of 3G technologies and will dramatically affect how phones are used. The spontaneous, ad hoc patterns of behavior consumers demonstrate in bricks-and-mortar stores will only begin to be replicated on mobile devices once connections are instantaneous. This always-on connection may be the most important innovation that 3G will provide. Instead of logging on and waiting 30 to 90 seconds to obtain a connection, users will be automatically connected to the mobile Internet when they turn on their phones. Indeed, if 2.5G technologies can be upgraded to provide an always-on connection, investments in the expensive 3G infrastructure may be delayed. Watch for the rollout of always-on connections as a key enabler of m-commerce, especially as a complement to in-store environments, and as another indicator that m-commerce is about to take off.

Trust and Security

The widespread use of m-commerce will depend highly on providers’ creating secure methods for sending data, and then convincing

skeptical consumers that their financial and personal data are safe. Though these concerns are an extension of the ones consumers have about e-commerce in general, m-commerce introduces new areas of worry—specifically, how safe can data be that travels through the air? Seventy percent of current m-commerce users in our survey said that they would use m-commerce more frequently if they believed transactions were secure. Our focus groups corroborated these findings and revealed three broad categories of concern: transmission security, identity theft, and location identification.

Transmission Security

Consumers are reluctant to use m-commerce because they fear that the transaction itself is not secure. Seventy percent of m-commerce users in our survey said that they would make purchases using mobile devices more often if security were better. Our focus groups revealed that consumers suspect that credit card or other billing data could be intercepted by a third party. It is interesting to note that consumers new to e-commerce share similar concerns but are making the transition to using the services nonetheless. Though there remains a segment of the population that is uncomfortable sending credit card information over the Web, the fears of these consumers have mostly been assuaged by improved encryption for transactions and by growing awareness that credit card companies limit consumer liability to \$50 or less. Similar solutions are likely to come to m-commerce in the next two years.

Our focus groups indicate additional concerns about data being sent through the air rather than over wires. Respondents thought this transmission method raises the possibility for theft, a

fear that may delay adoption of m-commerce somewhat. One consumer commented:

In my opinion, it's okay to [transmit information] on a network or if you do it on a cable modem or something. That's very secure—extremely secure. But on a wireless device at this point in time? It's a little too easy to grab stuff out of the air.

—Advanced CD Shopper, married male, early 50s

Identity Theft

Identity theft is another real concern. When we discussed the idea of the mobile phone as an electronic wallet from which one could authorize payments to, say, vending machines or cash registers, many consumers were concerned that the device could be too easily stolen and used for unauthorized payments. Two consumers in our focus groups made the point well:

Male: I think I would be concerned that I would have too much personal account information stored on an electronic device that would be too easy to lose.

Female: Yeah. Have you ever left your phone somewhere, and then somebody calls you and says, 'I have your phone'? It's bad enough having all my phone numbers on my phone that somebody can look up.

—Novice CD shoppers, married male, mid-40s, and married female, late 30s

Seventy percent of current m-commerce users in our survey said that they would use m-commerce more frequently if they believed transactions were secure.

Although consumers liked the idea of E-911 service, which would help emergency crews locate them automatically, consumers were uncomfortable about a company or government agency being able to track their location at all times—in real time.

Requiring a personal identification number, or PIN, to authorize payment assuaged some but not all concerns. Biometrics—technologies that authenticate the user’s identity by matching physiological traits specific to the individual (e.g., fingerprints or voice)—hold some promise in reducing the possibility of theft and unauthorized use. The cheapest biometric devices are now about \$50, but they will have to come down another 80% to be incorporated into mobile phones on a wide scale. Inexpensive biometric devices incorporated into mobile phones may represent another key enabler of m-commerce.

Location Identification

A third concern is linked with the positioning data and ALI technologies coming down the road. Although consumers liked the idea of E-911 service, which would help emergency crews locate them automatically, consumers were uncomfortable about a company or government agency being able to track their location at all times—in real time. We heard some specific comments in our focus groups about police using positioning technologies to identify speeders by tracking the time it takes for a vehicle to a cross a bridge, for example (though this application isn’t coming any time soon); yet the concerns seemed to go beyond specific examples. Participants frequently mentioned their concern about “Big Brother” (the all-seeing eye of the state in George Orwell’s *1984*), by which they meant the federal government and large corporations. These respondents were concerned about who would have access to knowing where they are and where they have been.

As a result, some consumers felt quite strongly that they would never use such a

technology. The most common sentiment was that consumers wanted control over when they transmitted their location data. Most do not want to transmit their locations continuously, but only in an emergency or while traveling in an area where location-specific services are available. Several focus group participants engaged in the following exchange illustrating this concern:

Female: So then you have this thing where something would be tracking where you are all the time It’s like a Big Brother thing ... I don’t want somebody to know where I am at all times. So if that’s the situation where it’s tracking you

Male: It would depend on if [the location tracking] was active all the time or if it was active only when you needed to find something close by.

Female: I think I’d think twice about it.

Female: I would think twice about it, too. I would like it if I happen to feel vulnerable, but I wouldn’t want to be broadcasting where I am to who knows who.

—*Novice CD shoppers*

It is unclear whether the ALI-capable mobile devices will allow users to deactivate positioning or whether it will be on all the time. These devices are coming soon—as early as fall 2001—so resolving this issue clearly and quickly will be critical for m-commerce pro-

viders. An always-on location standard will likely discourage a significant proportion of users from upgrading to new phones and may also reduce the appeal of the new phones in general. Still, such a standard would enable robust location-specific services. The value consumers place on these services may ultimately determine the evolution of positioning technologies and applications.

The M-Commerce Value Proposition

Most of the consumers we spoke with do not see how m-commerce will benefit them. As a result, they are reluctant to adopt m-commerce because it requires them to change their behaviors significantly. We described three potential m-commerce services to focus group participants—a mobile banker, an in-store shopping assistant, and a location finder that identifies stores, restaurants, gas stations, and so forth within a given area.

The groups we talked to were generally reluctant to use any of the services. For the most part, participants perceived the services as interesting but only marginally valuable. In most cases, these services provide alternative methods for accomplishing tasks consumers already accomplish another way. For example, when we asked consumers about mobile financial services, most thought their current methods worked just fine and did not see the value of such services:

I don't see any need to use [mobile services] for banking. It's convenient enough to go to the branch or online or all the other different ways to access your money.

—Novice CD shopper, married female, late 20s

Regardless of sophistication, most participants wanted to wait for the glitches to be worked out and for the value to be clearly demonstrated before adopting these technologies. Does this mean there's no hope for the adoption of these technologies? Not necessarily. These attitudes echo similar concerns expressed about the introduction of other earlier technologies: ATM machines and online brokerages. In both of those cases, consumers put aside their initial skepticism and embraced these new ways of doing business once they were more familiar with them and experienced their immediate benefits.

Cost

The anticipated costs of m-commerce provide an additional reason for not adopting m-commerce. Indeed, most consumers thought that mobile services like these should be free; they were willing to pay for services only for unusual circumstances. For example, some said they would be willing to pay 50 cents to a dollar to find out where the nearest gas station is while traveling in an unfamiliar city. There was also some support for subscription-based services. However, most respondents were reluctant to adopt the subscription-based model for a service until they were sure the service was valuable and they would use it frequently enough to justify signing up. Transaction-based fees were more popular because they pose a lower risk for these skeptical consumers.

The most common sentiment was that these services should be included in the monthly mobile phone bill as an added value. Some consumers were already getting services like this—for example, news headlines—and as a result had a perception that such services should be free. This attitude underscores the fact that

The anticipated costs of m-commerce provide an additional reason for not adopting m-commerce. Indeed, most consumers thought that mobile services like these should be free; they were willing to pay for services only for unusual circumstances.

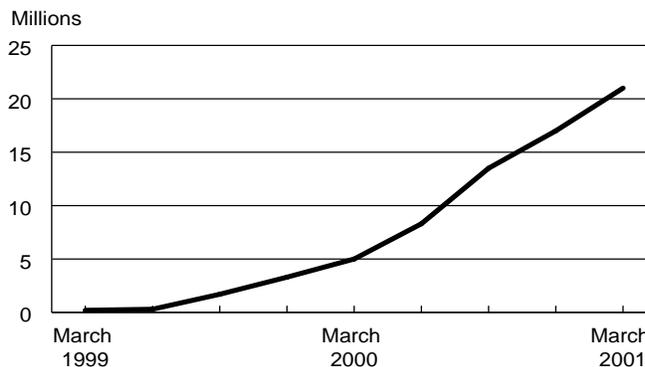
fee-based m-commerce services will require direct and immediate demonstration of value to the consumer.

LEARNING FROM JAPAN: THE YOUTH MARKET AND SHORT, FREQUENT USES

The consumers we spoke with were quite skeptical of m-commerce and seemed hard-pressed to identify its value to them. That these services are still mostly hypothetical and lack clear and present applications may account for some of this lack of interest, causing consumers to overstate their skepticism. Looking at m-commerce in Japan, where Internet-enabled mobile devices are already quite common, may give us a better idea of how consumers actually use these devices, and may shed some light on what to expect in the United States when the devices penetrate the marketplace.

Japan's NTT DoCoMo launched its low-bandwidth Internet phone service in February 1999. The system, an advanced 2G system called "i-mode," has so far attracted 21 million subscribers (see Figure 3-2). The i-mode has addressed some of the adoption barriers by making the interface simple and easy to use, and by eliminating the need for dial-up—it is always on. In addition to being able to make voice calls, i-mode users are able to send short text messages, access e-mail, and conduct simple Internet-enabled tasks; for example, checking stock quotes and accessing phone directories. The most popular application so far has been e-mail—about 80% of usage involves sending and receiving e-mails. This pattern may be a result of the way these devices were introduced and marketed. NTT DoCoMo never mentions the word "Internet"

Figure 3-2
Rapid Adoption of i-mode
(Total subscribers, in millions)



Source: NTT DoCoMo

in its advertisements. Rather, the company has marketed these devices as a tool for social communication and has suggested they can be used to enhance social activities. For example, one ad tells customers to “send a message to a buddy,” “find a restaurant,” or “go to a movie.” The second most popular applications have been for entertainment—users downloading and playing games and purchasing ring tones for their phones.

Youths

These usage patterns may reflect the demographics of i-mode users, most of whom are youths. Some 80% of Japanese youth own an i-mode device, accounting for 50% of the i-mode subscriber base. Finland, another leading-edge mobile phone market, has seen a similar explosion in adoption by youths. Youths are typically early adopters and as such may be more willing than others to learn how the mobile device works and to adapt to their challenging user interfaces. But beyond that, the ability to engage in two-way communication makes them an inherently social device, an application especially appealing to youths. The social factor may also be a key driver for the extent to which they incorporate these devices into the patterns of daily life.

Short, Frequent Use

Perhaps the biggest lesson from Japan is to pay attention to the way that users have incorporated these devices into their daily lives. A recent IFTF study in Japan found that i-mode users access their devices for short periods of time many times throughout the day rather than for longer periods of time once or twice throughout the day. People took advantage of small niches of time to use these devices—while

riding the subway, for example, walking to the office, shopping, and even watching TV. They use their devices for making calls, sending e-mail, playing games, and checking news. The key element of these usage patterns is that they use their devices for very short periods of time.

This pattern stands in stark contrast to the PC-based pattern of staying online for a longer period of time, the pattern on which most e-commerce is based. Another Boston Consulting Group study found that, whereas the average PC user in Japan goes online for 30 minutes, a typical i-mode session lasts less than three. As a result, it seems users are unlikely to migrate a complex ten- to 15-minute e-commerce order from the PC to the phone. The opportunity for m-commerce providers is likely to be in optimizing these niche-time encounters and finding ways to leverage the spontaneity that comes with them.

It is important to note that there are limitations to using Japan as a model for what will happen in the United States. The differences between Japan and the United States in culture and infrastructure are significant and will cause m-commerce to evolve differently in the United States. For example, whereas public transportation is the dominant form of commuting in Japan, car transportation dominates in the United States, creating different niches of available time throughout the day. As a result, we do not expect the applications that are most prevalent in Japan—games and the ability to download various mobile phone ring tones—to be the “killer apps” of m-commerce in the United States. However, the youthful demographics and patterns of short, frequent use are important attributes of m-commerce use in Japan that seem likely to establish themselves in the United States as well.

The differences between Japan and the United States in culture and infrastructure are significant and will cause m-commerce to evolve differently in the United States.

Internet-equipped mobile devices are distinct both from landline telephones and home PCs in that they provide a direct channel to the individual.

OPTIMIZE THE UNIQUE ATTRIBUTES OF MOBILE DEVICES

The inherent attributes of Internet-enabled mobile devices themselves may also provide clues to how m-commerce applications may evolve successfully.

Access to the Individual

Internet-equipped mobile devices are distinct both from landline telephones and home PCs in that they provide a direct channel to the individual. Home landline telephones provide access to individuals, but only through the filter of the household. Landline telephone numbers generally represent groups of individuals—there are, on average, 2.6 individuals per household in the United States. Mobile phone numbers provide direct access to an individual.

Mobile phones are more individualized than home PCs as well. Like landline telephones, home PCs are usually shared devices that serve a whole household. Each member of the household may have his or her own user name and password, but the machine is shared, and, in many cases, communications via PC treat the user as a household rather than an individual. For example, the cookies associated with a user's Web browsing, which Web sites use to personalize their offerings, represent the browsing patterns of all users of that computer. Users must go through a process of setting up individual identities for each user in the household in order to create individually distinct browsing histories. This has significant implications for what types of messages can be sent through mobile phones—in general, they can be more personalized and focused, and given good customer management applications on the part of the business, the

messages can be designed to meet the exclusive needs of that particular user.

There is another implication of this type of direct access, however, one not so positive for m-commerce providers. Users of mobile devices may be much more sensitive to unwelcome intrusions. Currently, mobile phone numbers are not generally published in directories, and as a result people are used to having much more control over access to these numbers, since they often have to pay for incoming calls. Therefore, they may be even less receptive to unwelcome intrusions on their mobile devices than they are on their home phones or PCs.

Integration into Daily Life

Not only do mobile phones offer a direct tie to individual consumers, but that tie is virtually constant throughout the day, since these mobile device users tend to integrate them more thoroughly into the activities of their daily lives. The intensity of use described in Chapter 1 and the usage patterns of i-mode users in Japan indicate how much these devices are being integrated into daily life. Unlike a PC or landline phone, mobile devices are within reach almost constantly throughout the day. They can be used at work, at home, or, most significantly, any time in between. The shift in usage patterns to short but frequent sessions makes these devices quite different from the PC or landline phones, which require consumers to make themselves available to the devices rather than the other way around.

Knowing Where the Consumer Is

The rollout of ALI in mobile phones over the next two years could allow marketers and retailers to know where consumers are at any given moment in time. Good for the business,

perhaps, but not always good for the consumer. Important privacy issues need to be resolved to take advantage of these technologies (for more information on strategies for dealing with privacy concerns, see the Consumer Direct report *Personalization: Managing Opportunity and Risk in the Consumer Direct Channel*, April 2001). Opt-in permission marketing models will help resolve these issues, allowing marketers to send communications that are relevant not only to that person but also to that person at that particular place and time. For example, AMC movie theaters could send information for films that are appropriate for children 12 and younger to a mother who has expressed an interest in receiving such information. The woman could specify ahead of time what types of information she wants to receive and when she wants to receive the information. For instance, she may only want information regarding activities for children to be sent on Friday afternoons, when she is typically picking them up from music practice.

Enabling Spontaneity

Mobile phones are unique in the short, frequent sessions that typify their use. The way they are used in the United States for voice communications and ad hoc, last-minute, just-in-time changing of plans matches the patterns of behavior many individuals display in their in-store shopping. The way i-mode users operate in Japan also suggests that spontaneity will become a defining feature of m-commerce. The ad hoc way that mobile phones are used may make them particularly suited to a characteristic of retail that the promise of e-commerce has not been able to deliver—spontaneity and impulse shopping.

CONCLUSION: USE THE TECHNOLOGY APPROPRIATELY TO OVERCOME SKEPTICISM

Ultimately, the success of m-commerce will depend on the ability of companies to use the technologies appropriately to provide real added value to consumers' shopping activities. The ability to use the technology to perform myriad activities does not simply translate into value for the consumer. Rather, opportunities lie in matching the unique attributes and functions of the technology with services that fit well with the way consumers use these devices in their daily lives. To take advantage of these opportunities, companies should keep the following lessons in mind:

- *Skeptical consumers can be convinced.* Consumers today are skeptical about how m-commerce will benefit them. However, this skepticism should not be interpreted as a negative indicator of the potential for m-commerce in general—we are still too early in the adoption cycle to tell. Rather, these insights provide useful feedback on how m-commerce may have to evolve in order to increase the likelihood that it will become widely adopted.
- *Improvements in user interface will be crucial.* Widespread adoption of m-commerce will depend on improvements in usability, security, and cost. As consumers adapt to the technology, and improvements make access easier and faster, the value and convenience of the services will be easier to demonstrate.
- *Unique attributes of mobile channels must be leveraged.* Successful applications will be those that take advantage of the unique attributes of m-commerce channels: access to the individual, integration into daily life, knowledge of where

The ad hoc way that mobile phones are used may make them particularly suited to a characteristic of retail that the promise of e-commerce has not been able to deliver—spontaneity and impulse shopping.

the consumer is, and spontaneity. Japan, although different from the United States in important ways, provides some useful lessons for anticipating emerging patterns of use. Successful applications of m-commerce will be closer to the i-mode experience in Japan than to the e-commerce model in the United States, in that applications will be focused and will take advantage of the unique attributes of mobile

devices. They will not be replacements for PCs but, rather, complements. The success of i-mode in Japan suggests that key components of a successful m-commerce model will include targeting services to young consumer groups and developing applications amenable to usage patterns characterized by frequent short spurts rather than longer, daily sessions.

OPPORTUNITIES IN M-COMMERCE

M-commerce applications will be most successful where they supplement existing channels by taking advantage of the unique attributes of Internet-enabled mobile devices. In this way, mobile devices will play a key role in making the shopping process an increasingly multichannel experience.

In the first two years of the Consumer Direct program, we identified consumers' complex and sophisticated shopping strategies. We learned how they bundle channels—that is, how they rely on multiple channels for different functions across a variety of products and services. For example, consumers may see a product they're thinking of buying in a catalog, then search the Web for more detailed and unbiased information. Armed with that information, they go into a store so they can see how the item looks in person, try it out if possible, and ask the service representative further questions. If satisfied, they might finally make the purchase at another store that is farther away but that they know has the product at a lower price, or they may use the information they have gathered to negotiate a better price on the spot.

Given the complexity of this type of shopping behavior, especially for big-ticket items, it is important for companies to understand just how consumers bundle channels like this. To support these new shopping

patterns, companies must be able to create a seamless experience across a variety of points of interaction. (For more information on channel bundling, see the Consumer Direct reports *The Future of Consumer Direct: Shopping Behavior in the Age of Interactivity* [1999] and *Forecasting the Consumer Direct Channel: Business Models for Success* [2000].)

In this chapter, we explore the ways m-commerce can be used to weave together the customer experience in a series of interactions across multiple channels, thereby allowing companies to collect and respond to information about the customer in increasingly more targeted and personalized ways. By leveraging mobile technologies, companies can enhance the shopping experience in bricks-and-mortar stores and create crucial links for integrating CD channels. Promising market niches are already opening up, and if successful, they are likely to become the first effective, widespread applications of m-commerce.

ENHANCING THE IN-STORE EXPERIENCE

M-commerce will have its biggest impact facilitating the channel-bundling strategies consumers rely on to make more informed purchasing decisions. Much like e-commerce, m-commerce will make more of a mark not as a stand-alone channel but as a complement to other channels and a link between CD and in-store experiences. The unique attributes of mobile Internet devices will affect the shopping experience at key stages of the shopping cycle (see Figure 4–1), especially the first two, browsing and option evaluation. M-commerce will play its most significant role in driving sales in bricks-and-mortar stores in new and compelling ways.

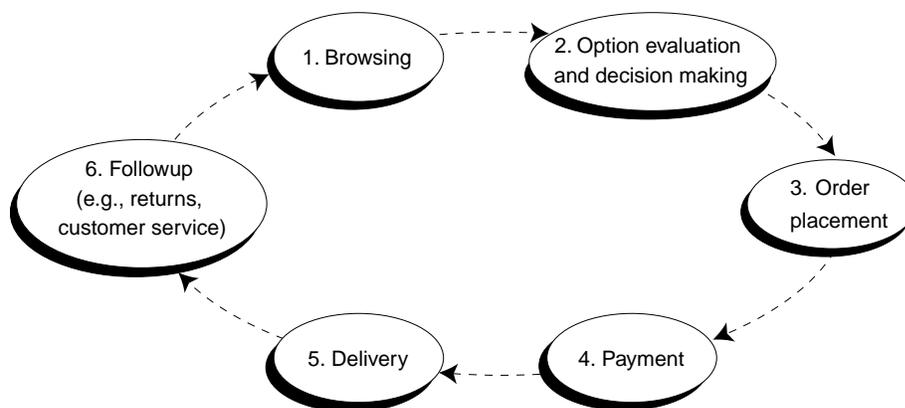
In-Store Shopping Assistant

One of the ways Internet-enabled mobile devices will reinforce channel-bundling strategies is as a source of information to help

consumers make decisions while in the store—essentially acting as an in-store shopping assistant. In ongoing research, we have documented consumers' dissatisfaction with the purchasing process and their desire for improvements at various stages. Furthermore, we have seen indicators of a shift in consumers' attitudes from *wanting* the process to improve to *expecting* the process to improve. Indeed, the demands of sophisticated consumers are driving businesses to rethink the ways they utilize different channels to create a more seamless shopping experience.

Our focus groups have shown that, in many cases, consumers have taken it upon themselves to utilize the tools available to improve the shopping experience. They have embraced the Internet as a do-it-yourself tool empowering them to make more informed decisions all along the purchasing cycle. For example, many consumers are using the Internet to find out about product features and pricing, then they

Figure 4–1
The Purchasing Process



Source: Institute for the Future and Peppers and Rogers Group

go into a retail store to negotiate with a salesperson. Services offered through mobile devices can take this strategy one step further—to enhance the shopping experience while the consumers are actually in the store, especially at the browsing, option-evaluation, and decision-making stages.

Browsing

The proliferation of very large retail stores, such as Wal-Mart, Target, and large supermarkets, makes finding products a real challenge for many consumers in many stores. Shoppers could use mobile devices to navigate a store more easily. Participants in our focus groups saw a mobile device as a useful way to help them locate items in a store quickly, without having to track down a map or a store clerk. One consumer described such a service:

I think it would be great if they could give you the location of the item [on a mobile device]. Many times I go into a store ... and I ask a salesclerk where something is. And I need three or four items and they say, 'Well, I think it's in aisle 17, or maybe in aisle 46?' and it just takes forever to find it. If I could just dial up and find out what aisles—aisle 17, section A—I can go right to it, make my purchases, and get out and be gone—rather than spend a half-hour walking around 40 aisles of being lost.

—*Novice CD shopper, single male, mid-50s*

Shoppers want to know which aisle an item is located in and where in that aisle they can find it. The simplest scenario is something like

this: The shopper inputs the name of the item in her mobile device and sees a description of the location of that item. More advanced interfaces would allow the user to pick from a menu of items and then display the location on a simple store map. These devices will provide a way to improve the shopping experience of cost-effective but not necessarily user-friendly store formats. This may influence consumers to visit these large stores more often and to reduce the number of abandoned searches for difficult-to-find products.

Such uses benefit the stores as well as the shoppers. Not only do such applications help stores sell more items and earn the loyalty of their customers, they also enable retailers to communicate with consumers at a crucial point in the purchasing process. When users indicate on their mobile device what product they are looking for, the retailer has an immediate opportunity to influence that purchasing decision. The retailer might display a coupon to encourage the purchase, or introduce a coupon for a competing product to encourage them to switch brands. If done effectively, these promotions could create a potentially lucrative new revenue stream for retailers and an efficient form of promotion for product manufacturers. Furthermore, the application might then suggest a complementary product. For example, a consumer in a supermarket looking for pasta sauce might receive a promotion for red wine or garlic bread.

These promotions make full use of the mobile devices' unique capabilities—their one-to-one communications and spontaneity. They also provide a way for retailers to send relevant messages to consumers at the time a decision is being made. It is a soft form of push advertising. The consumer has not asked for this

When users indicate on their mobile device what product they are looking for, the retailer has an immediate opportunity to influence that purchasing decision.

In-store price comparisons by a mobile device enable sophisticated consumers to make more informed decisions about spontaneous or impulse purchases.

information directly, but it is relevant, helpful, and, thus, even welcome. (We discuss the potential of other types of push advertising later in this chapter.)

Option Evaluation and Decision Making

One of the most popular applications of mobile devices to emerge from our focus groups is receiving information about products at just that point when a purchasing decision is being made. For example, some people thought it would be useful to get more detailed nutritional information about grocery products while in the store. People with specific nutritional needs wanted the ability to find out more detailed data on food ingredients. Another consumer might want to know how a particular product can help manage cholesterol. Other respondents wanted to be able to check the detailed specifications for consumer electronic devices. One person thought that the typical product specifications shown in a store are not enough and wanted access to more detailed product reviews:

The other thing is detailed product information ... that gives reviews or consumer report information. When you go up to a counter and there's ten different electric razors—my husband wants one—how do you choose? The same with DVD players [and other products.]

—*Novice CD shopper, married female, late 30s*

As consumers become more sophisticated, they will demand even more detailed product information. In this way, mobile devices might extend some of the information capabilities

that, so far, only the Internet has been able to deliver. These applications will bring much of the decision-making process back into the retail store.

Price comparisons will be another valuable offering. Focus group participants were very enthusiastic about a service that would allow them to compare prices of specific products. Such a service would allow them to input a product and then receive ranked listings of branded products by price, and even generic or private-label alternatives. Some participants also were enthusiastic about a service that would allow them to compare prices of the same branded item in *other* stores. Indeed, price comparison has proven to be an extremely popular and valuable activity for consumers online. Our focus groups were full of examples of consumers scouring the Web or using agents to find the best price before making a purchasing decision. The ease of navigation will make the PC the more popular device for price comparisons—at least when it comes to planned purchases. However, in-store price comparisons by a mobile device enable sophisticated consumers to make more informed decisions about spontaneous or impulse purchases.

Intel has developed and patented a technology that uses a barcode scanner built into a mobile device that enables consumers to track their purchases or to conduct price comparisons while shopping. For example, a woman shopping for lipstick might pull up a list of past purchases she scanned into her PDA to find the color of the lipstick she bought a few months back and liked so much. Likewise, a couple shopping for a DVD player could scan the UPC symbol on the display model. A software agent could then scour the Internet looking for

reviews and price information for that product. The couple could use the information to finalize their decision at the store or to receive a list of prices and identify an online retailer with a better deal. If they wanted, they could even purchase the DVD player from the online retailer right then and there, and have it delivered directly to their home. This type of technology will further blur the line between online and offline shopping and encourage the integration of channels.

These in-store information-gathering activities are highly dependent on the data source. When we described a device that could perform these functions to our focus group participants, they immediately leaped on the issue of who would provide the information. They were extremely skeptical about a service run by a particular retailer or brand manufacturer. When we suggested a service in which a retailer provided an in-store device for price comparisons, there was widespread skepticism. One participant summed it up well:

I think if Best Buy provided the device then it would be obviously to Best Buy's advantage to pump Best Buy's products. I would rather have something that's more unbiased, so if Best Buy sells three brands of DVD players—I'd rather know what five brands I'm not seeing [Best Buy] is not going to send you to Circuit City when you're standing in Best Buy, and [they're] pay[ing] for that technology, you know!

—*Novice CD shopper, married male, early 40s*

Consumers are enthusiastic about receiving and using this type of information, but they are very wary of biased information provided by companies trying to influence their purchasing decision. Retailers and brand manufacturers will need to think through these issues carefully when choosing how to provide product information and price comparisons that consumers trust to be fair.

These applications are technologically attractive as well because they do not necessarily depend on expensive new standards like 3G. Local wireless networks would be sufficient for most in-store applications and would resolve the common problem of poor reception in large retail outlets. These large buildings can partially block mobile transmissions from antennas outside. Wireless networks, however, place their antennas within the building itself. This speeds up the time horizon for m-commerce applications and makes their implementation practical within a couple of years.

M-commerce will become an important part of the multichannel shopping process as consumers look to supplement their current shopping behaviors with relevant, timely, and trusted information. But rather than compete with the in-store experience as some e-commerce models do, m-commerce will *enhance* store shopping. Trusted information from independent external sources will augment the information consumers get from the store personnel. In-store merchandising will increase in importance as shoppers become better equipped to make impulsive and spontaneous purchases—the types of purchases e-commerce is least able to provide (see sidebar, “An In-Store Experience,” on page 42).

M-commerce will become an important part of the multichannel shopping process as consumers look to supplement their current shopping behaviors with relevant, timely, and trusted information.

An In-Store Experience

Already, mobile phones are changing in-store browsing and shopping in another, more subtle way. Consumers are using the simple voice capabilities of mobile phones to consult with family members while making purchasing decisions. They walk into a store, look at the shelves, and consult on the phone with a household member or friend about what to buy. The shoppers describe what is on sale, which produce items look fresh, and what new products are available. This changes how people shop, and how stores market their products.

For example, instead of Judy creating a shopping list and sending it with her husband, Arthur, to the store, Arthur stops by the store on his way home from work,

calls Judy on his mobile phone, and walks through the store, putting items in his cart as he consults Judy on what they need and what looks good. Or maybe Judy made the list in the last half hour and is reading it to Arthur as he pushes the cart around. There is very little planning involved; the shopping is done spontaneously. As a result, the Wednesday grocery mailer sent out by stores declines in significance and the in-store experience increases. Shelf space and product placement become more important than ever as the mobile device-equipped shopper consulting a spouse is able to shop spontaneously and impulsively. Paradoxically, mobile communication helps bring the shopper back into the store.

Customer Service

Internet-enabled mobile devices also provide a way for employees to give better customer service to shoppers in stores. Best Buy, a consumer electronics retailer, is experimenting with providing its employees with mobile devices that allow them to help customers locate products. Employees using these devices can also access inventory to see whether an item is in stock and to identify other Best Buy stores where products are available.

This model may provide an effective way to migrate skeptical consumers over to using these devices on their own. Consumers who ask an employee for information and then see that employee access the information on a mobile device encounter the benefits of these types of applications directly. These customers are likely to be willing to try a mobile shopping assistant on their own. The employee could show the customers how the device works and perhaps point them to the store's Web site to download the personal shopping assistant application.

Location-Based Communications

Location-based services take advantage of knowing a consumer's exact location. The ALI systems that, by law, will become widespread over the next two years will enable these services. Local area networks also provide a way to pinpoint the location of a mobile device user.

The key to these services is that the providers will know, within several meters, the exact location of an individual consumer. Once they know this, the systems can send communications to consumers to inform them of relevant information to influence a purchasing deci-

sion. A key distinction from the applications discussed above is that location-based communications tend to be "push" rather than "pull" communications. The consumer does not actively seek out the information at that moment. Rather, a provider sends information to the consumer based on where the consumer is and other factors.

As an example, a company named GeePS, a wireless applications service provider (WASP), has begun providing location-based services to malls and bricks-and-mortar retailers. The company is installing the first system in the Palisades Center, a 220-store mall in the New York metropolitan area that attracts over 20 million visitors a year. The system will provide personalized messages and promotions on the shopper's mobile device as she walks around the mall. A key element of this system is that it uses the opt-in model; that is, it requires customers to sign up for the service, thus messages are not unsolicited.

The user registers for the service on the Palisades Center's Web site, or through a dedicated kiosk in the mall. The user indicates what types of messages she would like to receive, from which stores, and for which categories of products. She also selects whether she would like to receive the messages by voice, short-message service (SMS), or e-mail. As the shopper walks through the mall, she receives promotions and advertisements that correspond to her choices based on where she is in the mall. Simple demographic data collected at the time of registration allow these services to be customized to the user. GeePS is selling these systems to malls and retailers as a way to increase purchases per visitor.

Location-based communications tend to be "push" rather than "pull" communications. The consumer does not actively seek out the information at that moment. Rather, a provider sends information to the consumer based on where the consumer is and other factors.

These types of technologies give companies an outlet to provide extremely targeted information to consumers at the time the information could be most useful.

PlanetHopper, of New York City, has developed another type of location-based service, but this one extends over large parts of dense urban areas. PlanetHopper's applications focus on the entertainment industry, including movie theaters, restaurants, and cafés. Similar to GeePS, customers preregister for PlanetHopper's service on a Web site, indicating what types of entertainment options they are interested in. They also indicate how many messages they would like to receive—an important factor, since many mobile device subscribers pay a fee for each incoming message. Users walking around a city may get a message that the café up the street is offering a two-for-one special. Or they may be informed that the movie theater around the block is offering \$5 off the next

show, which starts in 15 minutes. The user then shows the electronic coupon at the cinema to receive the discount (see Figure 4–2).

PlanetHopper markets this system to entertainment providers as a “capacity management system.” Similar to the way the Internet enables airlines to sell discounted seats on the last day to fill airplanes, PlanetHopper allows entertainment providers to fill excess capacity at the last minute; for example, movie seats in a theater. This “last-minute” component could not be accomplished on the Internet, since it relies on consumers being mobile and close by.

These types of technologies give companies an outlet to provide extremely targeted information to consumers at the time the information could be most useful. As these location-tracking systems become more sophisticated, consumers might use their devices to manage their lives more effectively. For instance, a mother who has just picked up her kids from day care late on a Friday afternoon might want to find out how long the wait is at her kids' favorite restaurant. As she sits in traffic, her kids might pull up information on movie times at the Cineplex off the next exit.

Consumer Control

GeePS and PlanetHopper both have acknowledged consumers' insistence on control and their reluctance to receive unsolicited messages. They both empower users to choose the services they would like. And in doing so, they collect valuable information about demographics and preferences that allow messages to be customized and thus more effective. That consumers often have to pay for incoming messages make unsolicited messages—“wireless spam”—even more invasive than e-mail spam. That these devices tend to be personal and their

*Figure 4–2
PlanetHopper Offers Location-Based Deals*



Source: www.planethopper.com

phone numbers less available than those of landline phones make unsolicited messages even more obtrusive. As one of the executives we spoke with put it:

Consumers should be able to decide in advance how their information should be used ... and providers will have the responsibility of using this information properly and guarding it from unauthorized usage.

—Executive from an m-commerce security firm

Another example of consumer-controlled marketing comes from TDI, a marketing firm, which rolled out a related service called StreetBeam during the 2000 holiday season. The campaign involved 100 ads on Manhattan phone booths and bus stops in high-traffic areas. The ads contained embedded wireless devices that let pedestrians download information to their own mobile devices about Banana Republic's store locations, promotions, gift ideas, e-coupons, and other offerings. Pedestrians passing a Banana Republic ad saw a blinking red light on its margin, with a diagram of two mobile devices beaming at each other. The consumer then pointed her device at the sign and within a few seconds she saw a file that she was able to choose to accept or not (see Figure 4–3).

Future Location-Based Applications

The penetration of Internet-enabled mobile devices as well as the rollout of ALI will allow much more widespread and sophisticated use of location-based applications. The combination of the in-store shopping assistant mentioned earlier with location identification could

Figure 4–3
StreetBeam Weaves Together the Shopping Experience



Source: www.streetbeam.com

Consumer direct shoppers using mobile devices will be able to extend the functionality of the PC so that transactions can be altered or modified while the consumer is away from the computer desk.

enable messages and promotions to be delivered to consumers while they're still in the store. For example, a promotion for cereal might appear on a shopper's device as he passes by the cereal aisle. As these applications proliferate, however, enabling consumers to control and filter these messages will become even more important.

THE ROLE OF M-COMMERCE IN CONSUMER DIRECT CHANNELS

Like its role in bricks-and-mortar shopping, the role of m-commerce in CD shopping will be to supplement the existing channel. CD shoppers using mobile devices will be able to extend the functionality of the PC so that transactions can be altered or modified while the consumer is away from the computer desk. In this way, m-commerce will play a bigger role as a supplement to the PC than as a replacement. The limitations the PC puts on shopping—not being able to touch and feel the items, not being able to see the colors exactly—are exacerbated on a mobile device with a small screen. The low bandwidth of mobile devices, even those with more advanced network technologies, makes navigation and browsing very slow and difficult. M-commerce will succeed when it is positioned as a way to enhance PC-based CD shopping. As such, effective applications in the future are likely to include using m-commerce to provide consumers more control over automatic replenishment services, for example, and the option to purchase items found in a store and have them shipped directly home.

Early Attempts by Online Retailers

The major online retailers have rolled out efforts to take advantage of m-commerce.

Unfortunately, their reluctance to announce how successful these efforts have been indicate that this channel is still very experimental and has not yet been widely adopted. These applications are likely to be most successful where m-commerce is used as an extension of the PC-based online experience.

Amazon was the first major online retailer to launch a service for mobile shopping. Although the service has had limited success—reports indicate that of Amazon's \$2.8 billion in sales last year, only \$1 million came from wireless efforts—Amazon Anywhere is an interesting application which provides a hybrid between online shopping and m-commerce. Customers establish an account on the Amazon.com Web site and enter credit card and address information there so that they avoid having to enter that information every time they use the mobile device. Searching on a mobile device is similar to searching the Web, except that three to five results are returned instead of hundreds. The user has the option of choosing “more info” or “buy now.” The interface is quite simple, provided the connection speed is fast enough. The one drawback is that Amazon Anywhere relies on the user knowing a lot about the product prior to the purchase. This indicates that the impulse and spontaneity that mobile devices provide don't work as well in the CD world as they do in the bricks-and-mortar world.

Similarly, eBay, the online auction site, has launched a service called eBay Anywhere. Registered eBay members can browse, search, and bid on items, as well as check their account status, using their Internet-enabled mobile phone or PDA. When they are involved in an active auction, bidders can also receive alerts and messages that tell them they have been

outbid, or that the auction has ended (see Figure 4-4).

Alerts can also be sent to e-mail-enabled pagers. Since auctions can end at any time of the day, these mobile devices give eBay members an effective way to stay involved when they are away from their PCs. However, the interface of a mobile phone is not well suited to browsing through the hundreds of thousands of items available. The most likely solution here is a multichannel solution. Potential buyers use a PC to browse and bid on an item. They then use their mobile device to monitor the bidding throughout the day.

Future of M-Commerce Direct

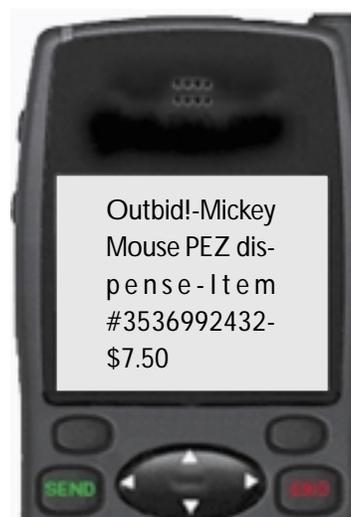
Evolving network technologies, new mobile devices, and better user interfaces will improve the browsing experience of mobile devices. Due to screen size, however, it will never approach that of the PC. Furthermore, as broadband access for PCs becomes more widespread, the performance gap will expand. Over the next decade, mobile applications will largely be based on purchases that require text-based data or very simple graphics. Finding product specifications or comparing prices works well when you are in a store and can see the product under consideration. Purchases of items the user is familiar with will work as well. But the most promising potential seems to be in a hybrid approach, using the PC for tasks that require browsing and extensive data entry and then using the mobile device for updates or other simple tasks. Mobile devices designed to integrate or “sync” with a PC, such as a PDA, will enable this hybrid approach quite effectively.

M-Commerce for Automatic Replenishment

One application of this hybrid solution might be with automatic replenishment services. A user who sets up an account with a grocery delivery service might pick the initial list of items using a broadband connection via PC. She might indicate that she wants a delivery of diapers, laundry detergent, and paper towels once every third Tuesday. A couple of days before the scheduled delivery, the grocery delivery company could send a message to her mobile device reminding her of the standing order and asking for confirmation. This gives the customer more control. The reminder message could also inspire the customer to add more items to the order—adding convenience for the customer and increased sales and delivery efficiencies for the grocery delivery company.

But the most promising potential seems to be in a hybrid approach, using the PC for tasks that require browsing and extensive data entry and then using the mobile device for updates or other simple tasks.

Figure 4-4
Stay Involved While Away from the PC with eBay Anywhere



Source: Institute for the Future and www.ebay.com

Products and services sold through mobile devices will not make up a large percentage of sales in the consumer direct channel.

The ability to confirm automatic replenishment orders is important to consumers. Several of our focus group members liked the idea of automatic replenishment of groceries but were deterred by what they felt would be a loss of control. For example, they might not want a delivery one week if they had been traveling and still had plenty of supplies. Or they might not be home for the usual Tuesday evening delivery because their daughter was in the school play. Mobile devices give the consumer an additional means of contact with the grocery delivery company, that is, not just through their PC at home or at work. This gives them more control over their purchases and thus their lives. Mobile devices will play a key role in resolving the loss-of-control issue, thereby making automatic replenishment of groceries and similar services more attractive for many consumers.

In-Store Direct

Another potential application of m-commerce is the combination of in-store and CD shopping. For example, a shopper could browse through a bricks-and-mortar store, view the promotions, touch, feel, and inspect the items, and then use a mobile device to order a product and have it delivered to the home. This combines the sensory experience of bricks-and-mortar shopping with the convenience of home delivery. Shoppers avoid having to wait in line and carry the items home. Of course, they also don't get the item right away, and this is why this type of service will likely be a niche service, since, in most cases, it would not take much effort to bring the item home.

This strategy could serve consumers very well at certain times for certain products, however. For example, it might work well for large

items that are difficult to carry or fit in a car, such as televisions and kitchen appliances, or for other items from a household supply store such as Home Depot or Lowe's. Such a service might also work well for very intense mall shoppers who want to be able to shop without carrying bags from store to store. It could also be useful for shoppers who use public transportation, where carrying heavy items is more difficult than for car drivers, or for those making purchases while traveling.

Products and services sold through mobile devices will not make up a large percentage of sales in the CD channel. But in certain niches, mobile shopping will be useful. Here, as in other cases, m-commerce will achieve its highest value when used as a complement to other channels, such as bricks-and-mortar stores or online shopping.

PROMISING NICHES FOR M-COMMERCE

In addition to bricks-and-mortar stores and CD channels, look for m-commerce to become an important channel in niches that are well suited to taking advantage of mobile capabilities: finance, travel, and youths.

Finance

Using mobile devices for finance-related services, such as electronic wallets and money management, is a promising niche for m-commerce.

Electronic Wallets

Although the consumers we spoke with are reluctant at present, using a mobile device as an electronic wallet to authorize small transactions seems to have potential. These applications are already widespread in Finland, where consumers can point their device at a vending

machine to pay for an item. The charge for the product then appears on their phone bill. Because this is a new service for telecom carriers, however, transaction costs are high. A user today receives a \$1 service fee along with the charge of 75 cents for a Coke, for example. With scale and billing improvements, these transaction costs will decrease to that of a credit card, 1 to 3%. This will enable widespread use of mobile devices for other small transactions, such as fees collected by toll-booths and parking lots.

NTT DoCoMo will provide an important test case of these types of applications in Japan. NTT DoCoMo and Coca-Cola Japan will launch a joint effort this summer to enable i-mode users to purchase drinks from vending machines. Monitoring whether the 21 million i-mode users actually begin using their devices as electronic wallets, and how many do so, will provide an indication of how promising these applications may become in the United States in the next two years.

Mobile devices may also become useful at the point of sale. For example, a Bluetooth-enabled cash register will let a customer pay for a purchase by punching in a PIN on her mobile device to authorize payment. For some people, this type of payment will be more convenient than waiting for a credit card payment to authorize and signing the receipt.

Banking

Banking and money management also seem well suited to mobile devices, because they do not depend on complicated graphics or pictures. Again, the use of m-commerce for banking involves a hybrid solution. Most banking and investing activities can already be done quite conveniently via the Internet, phone, or ATM.

The mobile device allows the opportunity to conduct some of these transactions at particular times when it isn't convenient to access these other resources—authorizing payment of a monthly credit card or utility bill while you're on the road, for example, or away from a PC. Consumers we spoke with were not very interested in these applications, however, so there is a significant amount of behavioral change required to make them broadly accepted.

The business leaders we interviewed acknowledged that consumers will be sensitive to security issues involving the transmission of personal financial data. They expressed some concern that efforts to enhance security tend to diminish the usability of the device or service. One executive commented:

I do not believe that there will be high-security applications on the devices because it makes them too complicated to use ... the burden of protecting your assets will be on the providers, just like credit cards.

—Executive from wireless technology developer

However, some felt that new technologies, such as biometrics, could resolve this dilemma. Others mentioned smart card identity module (SCIM), digital signatures, and other applications focused on authentication as possible technical solutions to protecting consumer privacy. The bottom line is, though, that until consumers find a compelling reason to bank by mobile device, they won't do it.

Travel

The nature of a mobile device lends itself to use by travelers. Our focus groups revealed that consumers would be somewhat receptive

Others mentioned smart card identity module (SCIM), digital signatures, and other applications focused on authentication as possible technical solutions to protecting consumer privacy.

The most successful applications of m-commerce will be those that take advantage of the unique attributes of mobile devices.

to applications that notify them of the locations of services such as their bank's ATMs, a preferred restaurant chain, or gas stations while they are on the road. The participants made it clear that these uses would be limited to the times they were traveling in unfamiliar areas. Few thought these types of service locators would be useful in their own cities.

Applications such as changing travel itineraries seem to hold some promise as well. Most of the browsing and data entry would be done on the phone or online, as is currently the case. The mobile device would then be used to confirm, update, or change the reservation. British Airways recently launched a service that allows preferred travelers to check in, check seat availability, and check for gates and times via their mobile device.

Youths

Young consumers represent a key segment for m-commerce applications, for several reasons. For no other cohort are the elements of mobility and spontaneity so important. Also, they are the most eager adopters of new technology, and they learn how to use and navigate these devices much more quickly than older users. Most important, they have shown a willingness to make these devices part of their lives.

Youth adoption of the i-mode in Japan is a good indicator of what is likely to happen in the United States in the next five years. Market researchers predict that half of U.S. teens will own mobile phones within three years and that another 25% will have access to a parent's device.

Like their Japanese counterparts, U.S. teens are likely to use these devices mainly for voice communication, e-mail, and text messaging. And while selling them games and ring tones

may not be interesting to most companies, youths' eager adoption of these technologies makes them highly potential customers for other types of services. Information about higher-margin entertainment such as movies and concerts will be important. Mobile service agreements that allow parents to prepay a fixed amount for their children to spend are likely to be popular for these consumers as well. Wage-earning teens will make up an important target group, too.

CONCLUSION: LEVERAGE THE UNIQUE FEATURES OF MOBILE CHANNELS

The most successful applications of m-commerce will be those that take advantage of the unique attributes of mobile devices. In the first three chapters, we looked at how mobile technologies are evolving and how consumers' adoption and use of these devices is changing. From this analysis, we have identified four key attributes of mobile devices that distinguish them from other channels, such as the Internet and the telephone:

- *Integration and relevance.* With their growing intensity of use, individuals are integrating mobile phones into their daily lives for more and more important activities.
- *User location.* New technologies will precisely identify the real-time location of consumers.
- *Spontaneity.* Usage patterns combined with always-on connections to the Internet will allow these devices to be used spontaneously.
- *One-to-one personalization.* These devices are becoming tied to the individual in particular rather than the household in general, and are thus becoming more personalized.

In Table 4–1, we rate the applications discussed in this chapter by the extent to which they exhibit each of these key features. We expect those applications with high ranks in

three or four categories to be the most successful. This framework also provides a quick way to evaluate the potential of new applications as they emerge.

Table 4–1
Applications That Make Use of the Unique Features of M-Commerce

	<i>Integration/Relevance to Daily Life</i>	<i>User Location</i>	<i>Spontaneity</i>	<i>One-to-One Personalization</i>
In-store Shopping Assistant				
Locate items	High	High	Medium	Low
Product suggestions	High	High	High	High
Price comparisons	High	High	High	Low
Location-Based Marketing				
GeePS	High	High	High	Medium
PlanetHopper	High	High	High	Medium
M-Commerce Direct				
Amazon	Medium	Low	Medium	Medium
eBay	Medium	Low	Medium	Low
Auto-replenishment	High	Low	High	High
In-store direct	High	High	High	Medium
Financial				
Small transactions	Medium	Medium	High	Medium
Banking	Medium	Low	Medium	High
Travel-Related				
Directions	Medium	Medium	Medium	Low
Airline reservations	Medium	Medium	Medium	Medium

Source: Institute for the Future and Peppers and Rogers Group

Key Learnings

As companies develop applications for mobile channels, several key insights should be kept in mind:

- *Create a seamless customer experience.* M-commerce will play its most important role in supporting other channels, by providing a key link in integrating on- and offline channels and facilitating consumers' channel bundling behaviors.
- *Enhance the in-store experience.* Consumers are most interested in applications that allow mobile devices to function as shopping

assistants that will enhance their in-store experience. These applications hold potential for cross- and up-selling opportunities as well.

- *Provide timely, location-specific information.* Location-based applications hold significant potential in allowing companies to provide information that is targeted to an individual customer, at the moment the information is needed most. Although getting the explicit permission of customers to interact in this way is essential, companies have the opportunity to partner with consumers as they develop strategies to manage their lives more effectively.

THE EMERGING M-COMMERCE INDUSTRY

M-commerce is different from PC-based e-commerce in that the infrastructure will be owned by the key players in the m-commerce industry—the telecommunications carriers. In fact, the telecoms have already begun making the huge investments it will take to build the infrastructure. Because it is still unclear how m-commerce will evolve, however, telecoms face critical challenges in trying to recoup these investments.

As a result, the telecoms themselves will play a large role encouraging adoption and perhaps even subsidizing applications to encourage the use of mobile devices and services. How telecoms price their m-commerce services will help determine which applications evolve, and how quickly. Meanwhile, though the telecoms will play a central role in defining the m-commerce industry, local wireless networks may provide a way for retailers to circumvent the telecoms' influence.

HOW WILL CONSUMERS PAY FOR M-COMMERCE?

One of the key challenges for the m-commerce industry is how to recoup the enormous costs of creating the m-commerce infrastructure. This applies to telecom carriers that have invested in spectrum licenses and network infrastructure as well as to other players, such as retailers, airports, and marketers, who will

invest in local wireless networks and applications designed to run on them.

Revenues from the business-to-business side of m-commerce, which is beyond the scope of this report, will cover some of these fixed costs. And businesses that use mobile technology to make their operations more efficient, such as equipping delivery drivers with mobile devices, will help pay for some of this large investment. However, these efficiencies will account for only a portion of the roughly \$100 billion it will cost to build new antennas, to upgrade routers, to purchase spectrum licenses, and to develop applications for m-commerce. As a result, m-commerce players are looking to the 115 million mobile device-owning consumers to pay for much of the m-commerce infrastructure.

These companies will have to tackle several important issues in developing successful revenue models: What will consumers be willing to pay to access the

technology that enables m-commerce? Will consumers be willing to pay for additional m-commerce services as well? If so, what will the fee structure be for those additional services? If the answers to these questions don't provide enough revenue, m-commerce companies will then have to consider other potential sources, such as advertising.

Monthly Fees for Access

Mobile commerce users will pay fees for voice and data service. Currently, the average bill for local mobile voice service is about \$45 a month, or \$540 per year. Providers of mobile Internet services in the United States charge about another \$20 per month. With increased bandwidth and intensity of use, mobile Internet bills in the United States are likely to rise to the \$25 to \$35 range. Will the voice bills decrease as a result? Not necessarily. In Japan, increased use of phones for data does not reduce the time spent on the phone for voice communications. In fact, the opposite is true. Increased per-minute voice charges are the big reason NTT DoCoMo's subsidies for i-mode

service have been so successful. We expect the cost of the voice component of mobile phone service to rise as well.

As a result, the base amount subscribers will pay to access m-commerce will approach \$1,000 per year—a huge jump from current levels (see Table 5–1). And this is just for *access* to m-commerce services. How much will consumers be willing to pay for services on top of that \$1,000? The answer to this question will be a critical driver of m-commerce adoption.

Not only will the amount consumers are willing to pay for services be important to the evolution of m-commerce, but so will *how* they are willing to pay for these services. Possibilities include subscriptions, transaction fees, advertising, and embedded fees, each of which has specific implications for the adoption of m-commerce.

Subscriptions

Telecoms prefer subscriptions for services such as road directions and price comparisons because subscriptions tend to encourage consumers to adopt other services as well. A user who pays \$1 a month for a service for unlimited access to price comparisons will want to use the service as much as possible to get the most for his dollar. This may lead him to use his mobile device more often, to spend more minutes using the phone for voice communication, and maybe in the process to discover new services for which he might also be willing to pay by subscription. I-mode has followed this model and found it very successful.

But remember, consumers want control and value. Our focus groups revealed that consumers hesitate to pay for monthly services until they see a clear and immediate

Table 5–1
How Much Will Consumers Be Willing to Pay?

	2000	2005
Voice	\$540	\$600
Mobile Internet access	<u>NA</u>	<u>\$360</u>
Base subscriber costs	\$540	\$960
<i>M-commerce services</i>	NA	???

Source: Institute for the Future and Peppers and Rogers Group; Cellular Telecommunications & Internet Association.

demonstration of their value. Because most potential m-commerce offerings are for new ways of shopping that often require changes in behavior, subscriptions are unlikely to work as an entry strategy. Consumers need time to try out these services—either on a free-trial basis or by paying transaction fees per use. In the longer term, as these services demonstrate their value, consumers are more likely to embrace the subscription model in m-commerce as they have done on the Internet.

Transaction-Based Fees

Transaction fees are popular for mobile services in Europe, where consumers tend to be reluctant to embrace services on a subscription basis. This may have something to do with Europeans having more skeptical attitudes toward technology in general and an aversion to becoming “locked in” to subscription contracts. In the United States, transaction-based services will provide a way for skeptical consumers to try new services. Our focus groups showed that consumers are more likely to try new and unfamiliar services on a one-time basis. A likely scenario is that transaction fees will be useful in the beginning of an application rollout but will give way to subscription-based services as the consumers’ intensity of use increases.

INDIRECT REVENUE STREAMS

Revenue models that do not affect consumers’ wallets directly may provide a more palatable way to get them to use m-commerce services.

Advertising

Selling advertising that appears on the screens of mobile devices can generate revenue. The

exciting opportunity presented here is personalized advertising. The combination of a connection to an individual user with location-identification technology makes mobile phones a perfect candidate for personalized advertising. However, the severe constraints of small screen size and limited bandwidth are huge drawbacks. Using banner ads that share the screen with content, for example, as is the case when the Internet is accessed through a PC, is not practical on the small screen of a mobile device. New methods will need to be developed.

Marketers must move with caution when pushing mobile advertising. As mentioned previously, the very personal nature of mobile devices makes users averse to receiving unsolicited messages on them. Consumers consistently say that they prefer permission-based, opt-in models that require their explicit permission to send advertising. Businesses that want access to a consumer’s mobile device will have to ask permission to send communications. They also will have to work hard to understand the consumer’s preferences for content, format, and timing in order to provide relevant information at the time it is most useful. Although this style of communicating with consumers makes sense across the board, it is perhaps most crucial in m-commerce, simply by virtue of the very intimate nature of the channel.

PlanetHopper, as discussed in Chapter 4, is a good example of an m-commerce company operating an opt-in model. In its local network, consumers using PlanetHopper sign up with their favorite retailers and therefore don’t have to receive communications from stores that don’t interest them.

Although the move to 3G technologies that offer an always-on connection will enable even more personalized advertising, this type of general advertising through the m-commerce channel may not be the largest source of ad revenue. A more promising advertising model may be one based on in-store promotional advertising. For example, an in-store, wireless shopping assistant that influences consumers at the time a purchasing decision is being made might be an effective marketing tool for brand manufacturers, since it allows them to measure the effectiveness of their campaigns by sales. If these promotions drive sales significantly, shelf space or product placements within the shopping assistant service itself could become a much more valuable part of their advertising mix.

Embedded Fees

Another source of revenue could come from fees incorporated in product prices, in the same way that credit card transaction fees are embedded into the price of products already. The convenience of a credit card to the consumer is such that retailers are able to include these 1 to 3% fees in the prices of products. As consumers embrace the convenience of m-commerce and begin paying for items using their mobile devices as e-wallets, the transaction fees (like the \$1 fee for a 75 cent can of Coke) will decrease until they become invisible and simply part of the cost of the product; for example, a consumer will pay 80 cents for a can of Coke whether using the device or cash. The operators of the transaction infrastructure, the telecoms, will be in the best position to collect these transaction fees from retailers who will transfer some or all of the fee to consumers.

TELECOMS WILL PLAY A CENTRAL ROLE IN M-COMMERCE

In contrast to the Internet infrastructure, which is fragmented and distributed among many diverse players, a few commercial enterprises, namely the big telecom companies, will own the infrastructure for m-commerce. In particular, telecom carriers will own the spectrum licenses, the antennas, and the back-end routers and equipment. As a result, telecoms will remain at the center of almost every m-commerce transaction. They will act as gatekeepers and are likely to exert some degree of control over the other m-commerce players. This is not to say that they will provide all services. The industry is still very young and disorganized, and there is plenty of opportunity for new entrants to introduce new offerings and to carve out niches of their own.

But because they own the rights to the range of radio frequencies over which m-commerce takes place, wireless telecommunications carriers sit at the center of the industry. They bill customers for usage, and maintain the infrastructure and networks that enable mobile communication. As one executive we interviewed mentioned:

Wireless carriers, such as Verizon, Sprint, etc., will dominate the m-commerce landscape because they are the gatekeepers to the m-commerce marketplace.

—Executive at a wireless security firm

Telecoms are betting on an explosion of usage and are likely to make money by monthly service fees, per-minute voice fees, and per-kilobyte data fees. To maximize these fees,

they may support or even subsidize application providers to create the content and services that increase the use of phones. Indeed, the creation of a variety of value-added services may be the key to driving m-commerce. It is also the element most lacking today, which suggests why the consumers we spoke with are generally skeptical about the proposed benefits of m-commerce.

LOCAL WIRELESS NETWORKS: CIRCUMVENTING THE TELECOMS

Local area networks, such as a network within a supermarket with a range of 50 to 100 meters, may become a significant platform for a different type of m-commerce. Though these WLANs will take some investment to create, the key is that they can work independently of the telecoms—and at a much lower cost. Builders of local wireless networks do not need to buy spectrum licenses, since the network exists only within a store. The network consists of a base station that communicates with customers' devices. This base station is connected to the Internet via a DSL or cable line so that retailers can create and modify messages and applications such as promotions and product information. These networks represent a relatively inexpensive way for retailers to circumvent the power of the telecom carriers and the licensing fees they will charge. As such, these networks may become the preferred way for retailers and brand manufacturers to enter the m-commerce channel. Such networks may be especially effective in the next three to four years, as evolving network technologies struggle with competing standards and an enormous infrastructure challenge.

CONCLUSION: COMPANIES NEED CREATIVE MODELS FOR RECOUPING INVESTMENTS

In order for m-commerce to become a truly viable customer channel, the infrastructure to support instantaneous interactions and the delivery of real-time, personalized information must be put in place. Collecting feedback from early experimenters will also be critical in defining the value proposition of m-commerce offerings to consumers in the future. In the meantime, companies should focus narrowly on taking advantage of the unique strengths of the channel, and meeting clearly defined needs for targeted, time-sensitive, and location-specific information. As companies take position in the emerging m-commerce industry, key insights to keep in mind include:

- *Create opportunities for experimentation.* As companies provide more mobile services, creating opportunities for consumers to experiment will be a key component in driving adoption of m-commerce applications in the future. In this way, transaction-based fees versus other pricing models, or equipping in-store employees with mobile devices, provide consumers more flexibility to try new and unfamiliar services. Moreover, companies have a prime opportunity to collect and analyze consumer feedback that can be used to refine the services and ultimately increase the value to consumers.
- *Compete on value, not price.* Consumer spending on basic access to m-commerce will increase significantly in the next few years. This spending will crowd the revenue opportunities for additional m-commerce value-

added services, making competition fierce. To avoid the margin-destroying competition that this crowding will cause, retailers will do better by adopting indirect revenue models based on personalized advertising and fees embedded in product prices.

- *Rely on opt-in models to build consumer trust.* On the one hand, personalized advertising that is highly customized provides the best opportunity for retailers to take advantage of the m-commerce channel to build and reinforce one-to-one relationships. However, truly one-to-one communication through mobile devices will also raise the bar on the ongoing discussion about consumers' privacy. As companies move

into this new territory, getting explicit permission to engage customers through mobile communications will be essential to establishing m-commerce as a trusted channel.

- *Plan for a variety of infrastructure possibilities.* Over the next few years, it is unlikely that one dominant infrastructure standard will emerge to support m-commerce. Indeed, there will be many options from which consumers and companies can choose. Although telecoms will undoubtedly play a central role in the emerging m-commerce industry, other players will find alternative delivery mechanisms like local wireless networks to bring the value of m-commerce to their customers.