White Paper

Mobility in Retail

A Global Opportunity Emerges

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Mobility in Retail: A Global Opportunity Emerges

For retailers, the massive adoption of mobile devices[1] by consumers presents a tantalizing opportunity. Worldwide, there are more than 4.1 billion mobile subscribers, which represents a penetration rate of 61 percent.[2] In the United States and Europe, more consumers are connecting to high-speed networks with faster, more intuitive mobile devices. In emerging countries, where Internet penetration rates are far lower than in the developed world,[3] even basic mobile devices have become vital communication and productivity tools for consumers.

Yet, while a few leading retailers are taking advantage of this trend by introducing compelling mobile services, many remain on the sidelines. In the United States, for example, only 12 percent of retailers report having mobile commerce capabilities.[4] And while many large retailers have rolled out mobile websites,[5] most provide only basic information and offer limited search capabilities that are not optimized for mobile devices, making them difficult to navigate. Such half-hearted attempts amount to checking off an item on a to-do list rather than delivering mobile applications that will help consumers shop smarter and faster.

The Cisco Internet Business Solutions Group (IBSG) believes retailers that take mobility seriously will gain a first-mover advantage. Furthermore, retailers that become the trusted and preferred online merchants in their segments, just as Amazon was able to do more than a decade ago, will increase productivity, attract more shoppers, and grow revenues. Retailers that wait any longer to develop a comprehensive mobile retailing strategy increase the likelihood of being left behind.

Early Challenges Slow Adoption

Retailers' reluctance to move quickly on mobility is understandable given the failed promise of the recent past, in which inadequate networks, poor device usability, and perceived consumer apathy stalled the development and adoption of mobile retailing.

High-speed, third-generation (3G) networks promised to revolutionize the mobile experience by dramatically increasing the speed at which data could be transferred to and from mobile devices. The slow pace of network rollouts, competing standards, and patchy coverage, however, delayed widespread 3G adoption.

Even as faster data services eventually became available, mobile devices were still difficult to use because of small screens, slow processors, and cramped keyboards. Awkward wireless access protocol (WAP) browser technology also added to the problem by making the mobile web hard to navigate.

Given slow networks and limited device capabilities, consumers were content to use their mobile phones for calls and text messages. There was little demand for advanced mobile services. For example, early mobile offerings from retailers and other companies such as banks often met with indifference from customers.[6]

Finally, many retailers had a myopic view of mobility and simply replicated their corporate sites for the mobile web without taking into account the constraints and context of mobile networks and devices.

Given these impediments, it is not surprising that mobile retailing did not catch on. These challenges also explain why many retailers are apprehensive about investing in mobility now—especially given today's challenging economy, where cost cutting and capital preservation have become top priorities.

A Global Opportunity Emerges

Over the past two years, the missing pieces—faster networks, better devices, and consumer demand—have fallen into place to make mobility in retail a worldwide reality.

Faster Networks

At the end of 2008, 3G penetration in Western Europe and North America reached 31 percent and 29 percent, respectively.[7] By 2010, penetration will reach 57 percent in Western Europe and 47 percent in North America. Globally, 22 percent of mobile subscribers will enjoy 3G connectivity by 2010.[8] The deployment of wireless (Wi-Fi) hotspots based on the 802.11 standard[9] has given consumers with "dual-mode" devices[10] even faster mobile web access than 3G. And a new Wi-Fi specification, 802.11n, has greatly improved both the range and data-download speed of wireless networks, and should soon be accessible through mobile devices.[11]

Better Devices

Mobile devices have become much more powerful, versatile, and user friendly. Given these developments, consumers are responding by using their devices for mobile browsing,[12] social networking,[13] and location-based services.[14]

In particular, the Apple iPhone, with its application support, multi-touch screen, and intuitive user interface, has set the standard for the mobile device industry and expanded the possibilities of mobility for retailers. Combined with the iPhone App Store, which recently hit a billion downloads,[15] Apple has transformed the mobile device into a multimedia platform, and made it easy for third parties—including retailers—to distribute their applications.

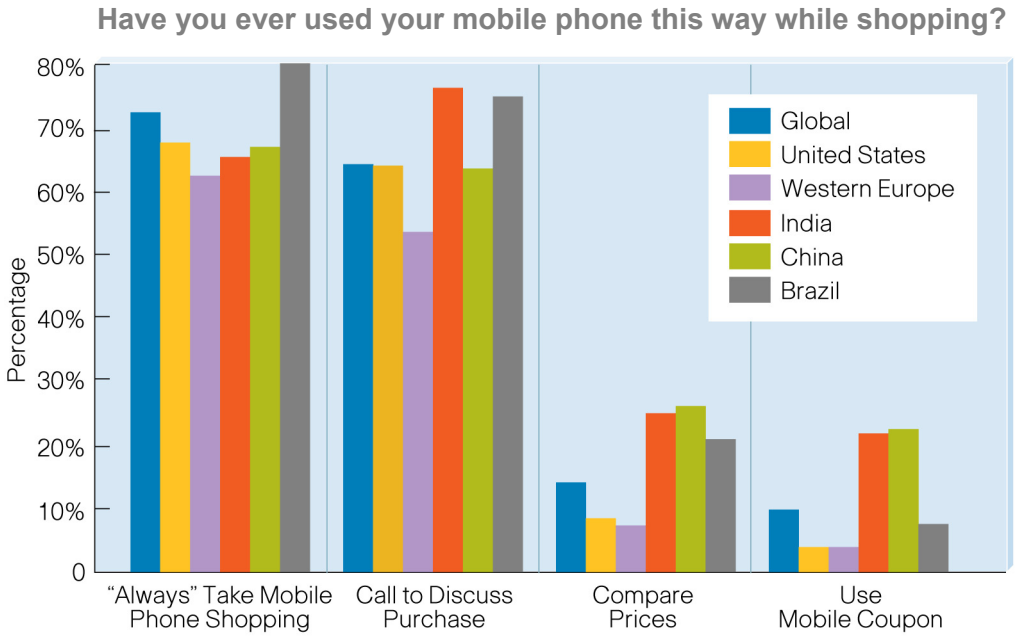
Most important, the success of the iPhone has shown that consumers are willing to use their mobile devices for advanced services. In a recent survey, 80 percent of iPhone users in the United Kingdom said they had browsed the mobile web, versus 48 percent of other smartphone users.[16] In response, competitors have launched a host of iPhone-like devices. Research in Motion (RIM) also recently launched its own application store for the popular BlackBerry device.

As the rest of the industry works hard to catch up to Apple, and as consumers replace their existing phones with smartphones, advanced mobile usage will become more widespread. In fact, 387 million smartphones will be sold globally in 2013, up from 185 million in 2009.[17]

Consumer Readiness

Consumers around the world are ready to use mobile devices to shop, compare, and transact both on the web and in stores. According to a Cisco IBSG Connected Life Market Watch survey[18] (see Figure 1), nearly 70 percent of consumers across various countries "always" have their mobile devices with them while shopping in a store. And when in the store, 64 percent of consumers globally contact family and friends about purchases.[19] This gives retailers an unprecedented opportunity to market and sell to consumers at the so-called "point of decision."

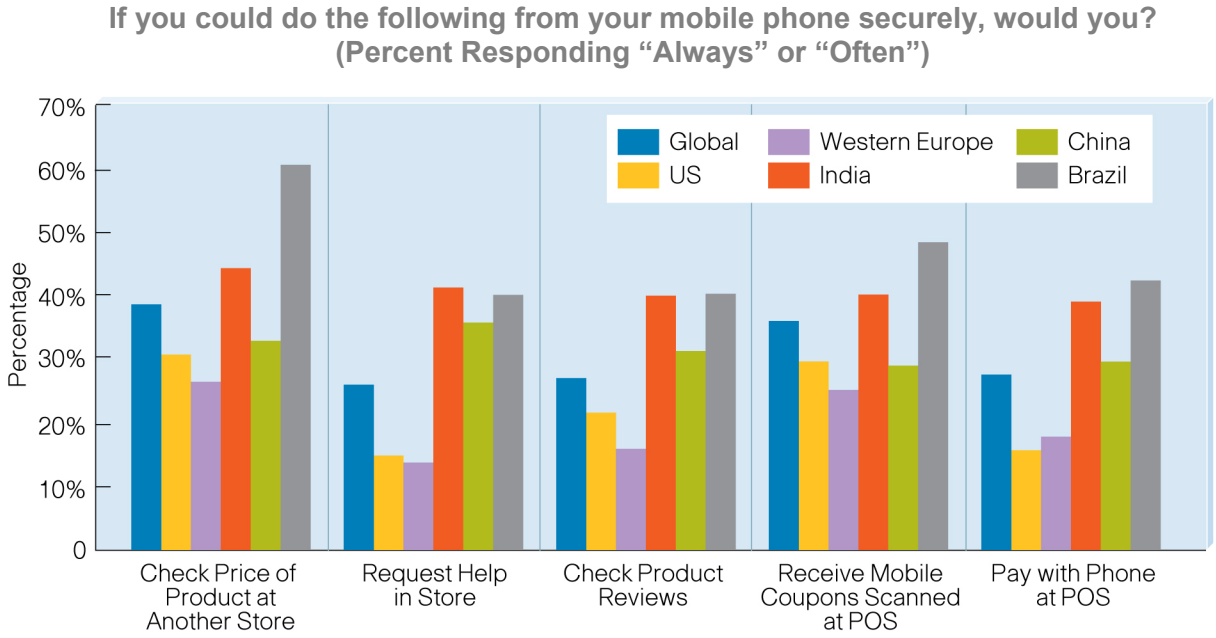
Figure 1. Consumers Worldwide Are Bringing Their Mobile Devices into Stores



Base: broadband and mobile subscribers
Western Europe includes Great Britain, France, Germany, Italy, and Spain
Source: Cisco IBSG Connected Life Market Watch, 2009

The Connected Life Market Watch survey also asked what consumers would do with their phones if secure services were available (see Figure 2). Results showed respondents worldwide are ready to try new in-store services that would make the shopping experience faster and more convenient.

Figure 2. Consumers Worldwide Are Ready To Try New In-Store Services



Base: broadband and mobile subscribers
Western Europe includes Great Britain, France, Germany, Italy, and Spain
Source: Cisco IBSG Connected Life Market Watch, 2009

Nearly 40 percent of consumers globally are interested in using mobile devices to check the price of an item at another store, with 61 percent saying they would do so "always" or "often." Globally, 27 percent of consumers would check product reviews with their mobile devices and 36 percent would sign up to receive coupons they could redeem at a store's point of sale (POS).

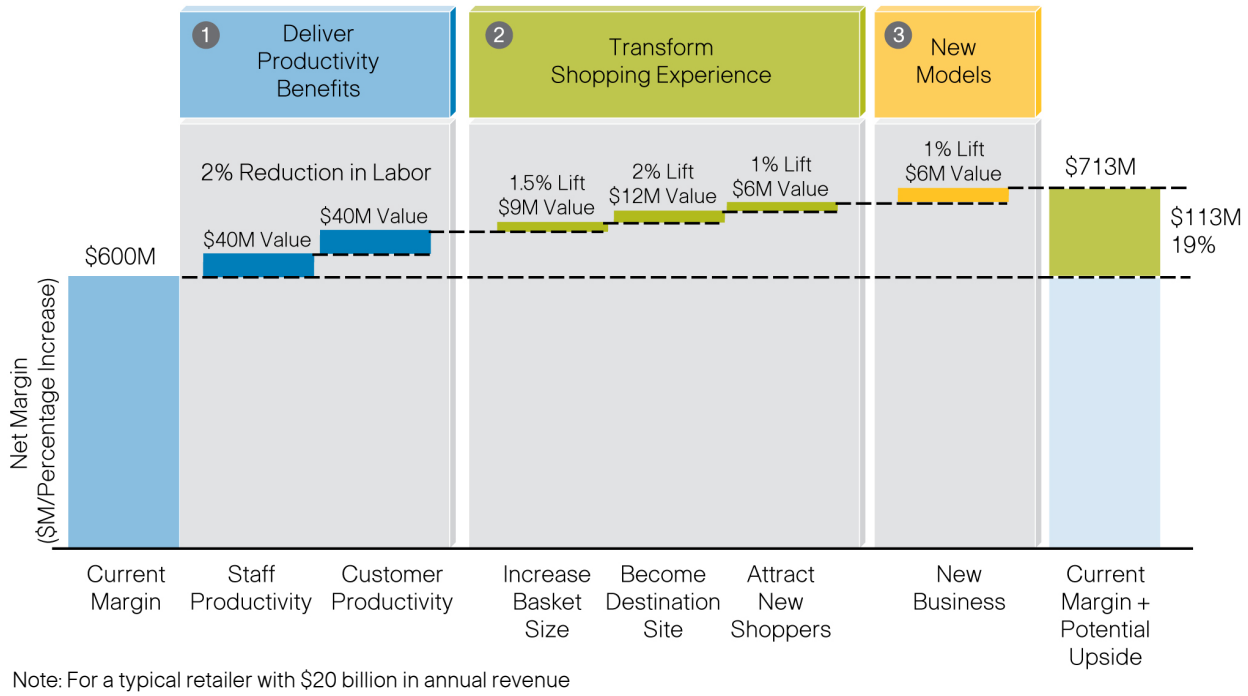
Retailers Must Act Now

It is clear that consumers are ready to adopt a mobile shopping experience. Retailers must act quickly to take advantage of this opportunity or risk becoming less relevant to an influential and growing group of consumers.

Three Mobility Opportunities for Retailers

Cisco IBSG believes mobility presents three significant opportunities for retailers: 1) enhance employee and shopper productivity, 2) transform the shopping experience, and 3) develop new business models. Together, these opportunities can increase net margins for a retailer with $20 billion in annual revenue by 19 percent over three years (see Figure 3).

Figure 3. Potential Net Margin Increase of Mobile Retail over Three Years



Note: For a typical retailer with $20 billion in annual revenue
Source: Cisco IBSG, 2009

While the task may seem daunting, launching mobile services does not have to be difficult or expensive. Initial steps, including text messaging, mobile websites, and use of in-store wireless networks, can be done quickly and inexpensively. In fact, some retailers are already succeeding by using mobility to deliver on the three opportunities identified by Cisco IBSG.

Opportunity 1: Enhance Employee and Shopper Productivity

Over the past decade, retailers made selective investments in mobile solutions aimed at employee productivity.[20] Unfortunately, these programs typically relied on expensive, single-function devices that ran on proprietary networks. Because of this approach, retailers often ended up with multiple devices from different vendors running on incompatible networks.

Today, mobile devices are so inexpensive and sophisticated that the delivery of in-store productivity applications is quickly shifting from proprietary handheld units to standard, off-the-shelf mobile devices. This trend is allowing retailers to cut communications costs and enable rich, productivity-enhancing applications for store workers. For example:

- Office supply giant Staples is using consumer mobile devices for stock management and mobile checkout.

- ProcessAway, an application developer based in the United States, offers a $19.95 program that transforms the Apple iPhone into a mobile POS device that accepts credit card payments.[21]

Shoppers are more productive when they control the shopping experience. As a result, America's largest grocery chain, Kroger, and outdoor equipment retailer, Moosejaw, both allow customers to bypass traditional POS transactions by using text messaging to pay for goods in the store. In addition, shoppers can now use their own mobile devices to purchase items, saving valuable time during the checkout process.

Several retailers are also experimenting with Near Field Communication (NFC) technologies. NFC-based payments promise significant labor savings for retailers because transactions take under five seconds—half the time of cash and faster than even debit or credit card payments.[22]

Dutch grocer Albert Heijn recently piloted NFC-based payments using commercially available consumer mobile devices from Nokia. Shoppers simply scanned shelf labels of products they wanted to purchase, downloaded the information at the POS, and paid for their items.

Opportunity 2: Transform the Shopping Experience

Consumers want a better shopping experience, not just a more efficient one. Leading retailers are using an ever-expanding range of mobile tools including proximity marketing, mobile loyalty programs, quick response (QR) codes,[23] and location-based services to deliver interactive, personalized experiences for consumers.

SMS Text Messages, QR Codes, and Proximity Marketing

Although an increasing number of consumers have phones with mobile browsers, many people still have basic cell phones with no Internet access capabilities. As a result, retailers must weigh deployment of the latest technologies against delivering basic services that reach the most customers.

Wal-Mart is one retailer that has struck the right balance. The company uses SMS text messages to deliver alerts to customers. These messages also contain embedded links to the company's mobile website. For consumers with basic phones, the SMS messages contain the needed information. Customers that have devices with web browsers can click on the links to learn more. In addition, a special version of Wal-Mart's mobile website is designed specifically for iPhone users. The site offers features such as the ability to create shopping lists and locate Wal-Mart stores nearby.

No matter which technologies are deployed, retailers can use mobile marketing techniques to transport consumers from the physical world to an interactive brand experience. Ralph Lauren, for example, uses QR codes on its magazine ads to drive traffic to the company's mobile website. After taking a picture of the QR code with their mobile phone, consumers can browse information about the product, see related videos, and purchase the advertised item.

During the 2008 Summer Olympics in China, Coca-Cola used proximity marketing to reach consumers throughout Beijing. The company deployed more than 1,500 hotspots at strategic locations throughout the city. As people with Bluetooth-enabled devices passed by

the locations, they were prompted with messages to download an Olympic-themed commercial. Consumers could download the content and then share it with friends using their mobile devices.[24]

Mobile Social Networking

More than two-thirds of mobile phone users carry their phones with them when they shop. Cisco IBSG believes the type of communication from these devices will evolve from simple phone calls and text messages to more interactive, location-based and presence-aware modes, including mobile social networking. For example, social networking site Twitter grew an astonishing 1,382 percent year over year, with more than 7 million unique visitors in February 2009.[25]

Retailers can take advantage of this trend to extend their brands by interacting with customers and "becoming part the conversation." Reebok, for instance, used a mobile social networking campaign to promote Freestyle Hi, the company's popular women's athletic shoe. Customers used their mobile devices to create their shoes and then shared the design with friends for feedback. The average shopper spent 3.5 minutes designing her shoes and showed the design to three or more people. More than 45 percent of participants saved the picture to their phones. This put Reebok front and center on consumers' mobile device screens.[26]

Combined with location-based services, mobile social networks also have the potential to drive traffic into stores. Offerings from Brightkite, Loopt, and Google show which friends and businesses are nearby. Some mobile social networks even suggest meeting places based on mobile search terms or members' interests.

Location-Based Services

Location-based shopping services are fast becoming a critical part of the mobile retail landscape. Slifter, for example, gets shoppers into stores by sending "Hot Deals" messages to subscribers that promote sales on products and services at nearby stores. The company also provides location-based product search. For example, when a customer searches for "skateboards," Slifter provides information about stores close by that carry the item, including locations, prices, and directions. The company's database contains 350 million products at more than 200,000 retail stores in the United States.[27]

Kraft is using a GPS-enabled application for the iPhone called the iFood Assistant. The service helps shoppers find and prepare recipes that feature Kraft products. The iFood Assistant directs customers to the nearest store where Kraft products are sold, breaks down the recipe into a convenient shopping list, and shows customers where the products are located by aisle.[28]

Mobile Loyalty Programs

In today's economic environment, consumers want to find the right products at the right price. This is one reason loyalty-based discounts and membership programs are so popular, even though they can be difficult to manage.[29]

Consumers are open to solutions that can help them manage their loyalty programs. For example, 46 percent of respondents in the Cisco IBSG Connected Payments Survey said they would be "very likely" or "likely" to use a service that consolidated all of their loyalty cards and membership programs into a single form of payment.[30]

When combined with mobile payment services, mobile devices are ideal for managing loyalty programs. This is because loyalty card information can be entered and automatically verified during the checkout process.

Ergo Sum, a consortium of some of the largest retailers and service providers in France, will begin piloting a new mobile loyalty program in December 2009. Customers of mobile operators Orange, SFR, and Bouygues will be able to use NFC-enabled phones to make payments, manage their loyalty programs, and use electronic coupons at participating retailers.[31]

Interestingly, the Cisco IBSG Connected Payments Survey suggests that bundling NFC-based payments with mobile loyalty programs could double or even triple consumer adoption of the new technology, increasing customer satisfaction and intimacy, while cutting operating costs for retailers.[32]

Opportunity 3: Develop New Business Models

For large, established retailers, competition from companies with disruptive business models based on mobility can seem like a minor threat. Mobility, however, can pose a significant challenge because it gives shoppers more power and price transparency than ever before.

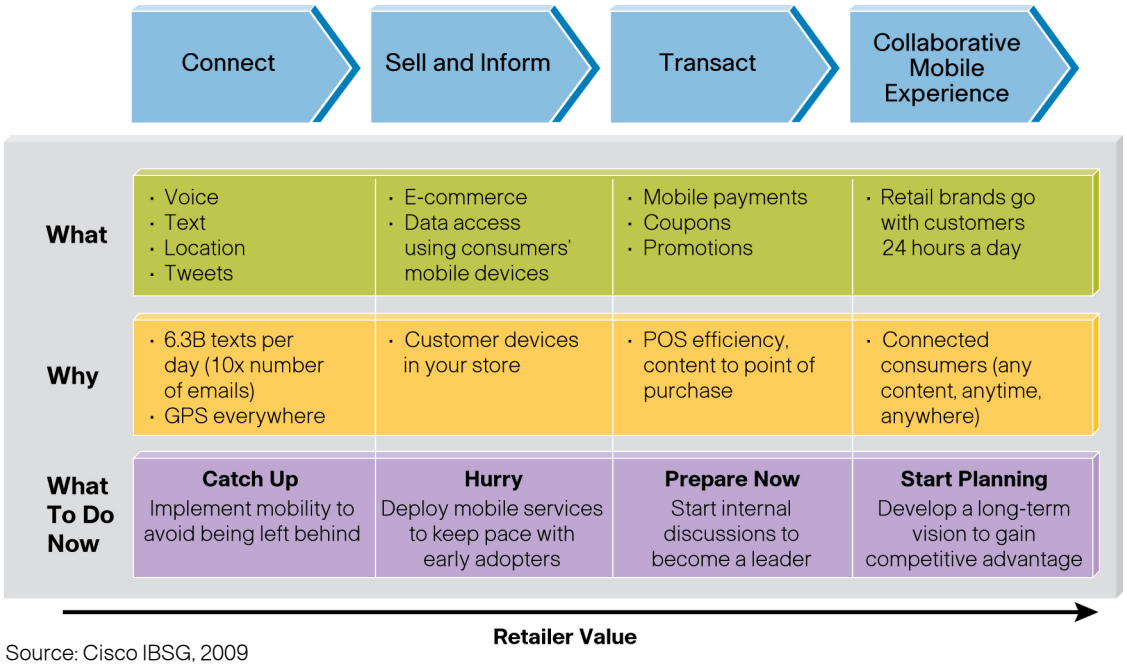
For example, Amazon Japan's Scan Search service enables shoppers to scan bar codes with their mobile phones. If Amazon sells the same product, it will appear on the phone's mobile browser along with recommendations and customer reviews. Shoppers can then buy the item directly from Amazon. For consumers in the United States and the United Kingdom, Amazon offers a similar SMS-based service.

These services allow Amazon to seize sales from traditional retailers, effectively turning their stores into Amazon showrooms. If retailers do not defend their turf by rolling out their own mobile offerings, Amazon and other nimble competitors will be able to "steal" sales from previously loyal customers.

The Way Forward

While mobility presents many opportunities, deciding how to move forward can be difficult. To make this process easier, Cisco IBSG has created a four-step framework that enables retailers to develop a phased approach to mobility (see Figure 4).

Figure 4. A Four-Step Framework To Achieve Mobility Leadership in Retail



Source: Cisco IBSG, 2009

Step 1: Connect

Mobile phones have become essential communications devices that consumers carry with them at almost all times. Savvy retailers will use these devices to connect with their customers. In the connect phase, technology is used for simple voice and text communications. This allows retailers to gain traction with mobile customers without a large up-front investment.

Step 2: Inform and Sell

Mobility gives retailers unprecedented opportunities to market and sell to customers whether they are in the store or on the go. This step can be accomplished by providing one-click access to experts, peer reviews, and social networks.

Step 3: Transact

Technologies that enable mobile transactions and deliver targeted mobile promotions are developing rapidly. This phase involves the use of these technologies to create an e-commerce platform that can enable both mobile transactions and real-time redemption and settlement of promotions.

Step 4: Collaborative Mobile Experience

In the final step, retailers gain the ability to be with their customers 24 hours a day, seven days a week. If done correctly, retailers will not only dominate their own product categories, but will become a conduit for a wide range of products and services available from other retailers.

Key Business and Technology Questions To Ask Now

As a prelude to these steps, retailers should ask themselves several business questions to tailor their mobile strategies to meet customer needs. Some of these questions include:

- Who is the target customer?
- How are customers using mobile devices now?
- How will customers use their devices in the future?
- How can mobility cut costs in stores?
- How can mobility provide meaningful differentiation?
- Who are the best partners to help develop and execute a mobile strategy?

Equally important are questions about technology readiness:

- Are store networks capable of delivering rich wireless content to customers?
- Will mobile commerce integrate with other channels to provide a consistent customer experience?
- What are the current and emerging standards?

By answering these questions, retailers can begin to benefit from the new opportunities presented by retail mobility.

Conclusion

Globally, more than 4.1 billion consumers have mobile devices, and they are ready to use them to interact with retailers to make their shopping experience better and faster. For retailers, the barriers to rolling out unique and effective mobile services have been overcome. Faster networks, innovative devices, and, most important, high consumer interest worldwide make now the time to invest in mobility.

As we have seen, leading retailers are already reaching consumers with mobile services that make them more productive in the store, and engage them in unique ways that transform the shopping experience. Mobility can also help retailers move into new and adjacent markets, and protect their market share from bold competitors who are using mobile devices to intercede between retailers and their customers.

Mobile services can be implemented effectively in gradual steps or as a comprehensive enterprise-wide effort. For either approach, Cisco IBSG's four-step framework allows retailers to collect "easy wins" on the way to becoming mobile leaders. Developing services aimed at what customers want right now can help retailers stay relevant, while planning to deliver the next generation of services that customers will want in the future.

Endnotes

1. Mobile devices include “basic” cell phones, smartphones, and other networked devices with communications capabilities.

2. Source: International Telecommunications Union, 2008.

3. In 2008, only 12.8 percent of people in developing countries were Internet subscribers while the penetration rate of mobile subscribers in the same countries was 39.2 percent. Source: International Telecommunications Union, 2009.

   The Cisco IBSG Connected Life Market Watch survey, completed in January 2009, asked broadband and mobile subscribers from 13 countries a range of questions about their current and future mobile usage. Countries included in the survey were Brazil, China, France, Germany, India, Italy, Mexico, Saudi Arabia, South Africa, South Korea, Spain, the United Kingdom, and the United States. For purposes of this paper, the term “global” represents combined results from all 13 countries.

   Note: All respondents in the survey were both broadband and mobile subscribers. In the United States and Western Europe, where broadband access is common, respondents were closer to the general population in terms of income and technology adoption. Broadband users in Brazil, China, and India, however, are much more likely to be early adopters of technology because of their affluence and likelihood of living in urban areas as compared to the general population. Thus, the level of current adoption and future interest in mobile retail services should not be extrapolated to include all consumers. The demographic reached by the mobility survey, however, is precisely the market most global enterprises target in these countries.

   Mobile and broadband penetration rates calculated by percent of total population are provided below for Brazil, China, and India. Unless otherwise noted, the data source is International Telecommunications Union, 2009.

   Brazil: Broadband penetration is 4 percent, or 10 percent of households. Mobile penetration is 63 percent. Source: IET, 2008.

   China: Broadband penetration is 6 percent (source: Ministry of Industry and Information Technology, 2008), or 15 percent of households (source: Frost & Sullivan, 2008). Despite relatively small penetration by population, China accounts for 24 percent of DSL connections globally. Mobile penetration is 41 percent. Source: Point-Topic, 2009.

   India: Broadband penetration is 0.27 percent of the population, or less than 2 percent of households. Source: iTU, 2009, Mobile penetration is 20 percent. Source: LECG, 2009.

4. Source: RIS News, 2008.

5. In the 2008 Cisco E-Commerce Study, 42 percent of the 45 largest U.S. and European retailers had mobile sites that allowed consumers to view product information on a mobile device. Only 15 percent, however, had transactional capabilities, and only 6 percent had a site designed specifically for mobile devices. Source: Cisco IBSG, June 2008.

6. Sources: Brandchannel, 2004; Forrester Research, October 2007.
7. Source: Morgan Stanley, April 2009.
8. Ibid.
9. There were more than 250,000 Wi-Fi hotspots globally in 2008. This number is forecast to double by 2012. In addition, many large retailers have incorporated wireless networks, giving them an ideal way to reach consumers when they are in the store.
10. "Dual-mode" mobile devices can use either cellular networks like 3G or Wi-Fi networks for mobile browsing. These devices are becoming increasingly common. Global shipments of dual-mode devices are forecast to increase from 75 million in 2008 to nearly 303 million in 2012. Source: In-Stat, December 2008.
11. The Institute of Electrical and Electronics Engineers (IEEE) is officially scheduled to approve 802.11n as a standard in January 2010, but technology companies are already selling 802.11n products. Source: Wi-Fi Planet, February 2009. It is speculated that Apple will soon release an 802.11n-compatible version of the iPhone and iPod touch. Source: *PC World*, April 2009. Additional improvements that make it easier to connect mobile devices to Wi-Fi networks are already in the works with the proposed 802.11u standard, which is scheduled to be published March 2010. Source: IEEE, 2009.
12. In 2008, 15.6 percent of mobile subscribers in the United States (more than 40 million people) actively used the mobile Internet. Among these subscribers, 35- to 54-year-olds, a prime consumer segment, were the single largest demographic group, with 37 percent using the mobile Internet. Source: Nielsen Mobile, July 2008. Of mobile subscribers in Europe, 19 percent in the United Kingdom, 14 percent in France, and 10 percent in Spain and Italy accessed information and news using a mobile web browser. Source: comScore, January 2009. And as smartphone penetration increases, mobile web access will spike dramatically. Nearly 85 percent of iPhone users in the United States and 58 percent of smartphone users worldwide have browsed the mobile web. Source: M:Metrics, January 2008.
13. Europeans, especially in the United Kingdom, are quickly adopting mobile social networking. More than 9 percent of mobile subscribers use their devices to access social networks, a year-over-year increase of 167 percent. In France, Italy, and Spain, nearly 5 percent of subscribers use their mobile devices to access social networks. Source: comScore, January 2009. In the United States, 27 percent of 18- to 24-year-olds use their mobile devices for social networking, while 7.3 percent of all mobile subscribers do so. By 2012, nearly 62 percent of 18- to 24-year-old mobile subscribers will use mobile social networks, and almost 16 percent of total subscribers will do so. Source: In-Stat, 2008.

14. Ten percent of mobile subscribers in the United States used mobile location-based services in the fourth quarter of 2008. Of this number, 22 percent were in the 25- to 34-year-old age group. iPhone users were three times more likely to use location-based services. Source: Limbo and GfK Group, February 2009.
15. Source: Apple, April 2009.
16. Source: comScore, March 2009.
17. Sales of smartphones such as the Apple iPhone and BlackBerry Storm—which include Wi-Fi capability to enable better mobile browsing and GPS to create a richer mobile experience—are increasing rapidly. Globally, nearly 185 million smartphones will be sold in 2009, with more than 34 million in North America, and more than 58 million in Europe, the Middle East, and Africa (EMEA). By 2013, the global total will reach 387 million—62.3 million in North America and 88 million in EMEA. Source: In-Stat, December 2008. By 2012, 47 percent of mobile devices sold in North America will be smartphones. Source: Nielsen Mobile, 2008. Global GPS-enabled phone sales will reach 240 million units in 2009 and increase at compound annual growth rate (CAGR) of 14 percent through 2014. Source: ABI Research, January 2009.
18. Source: Cisco IBSG Connected Life Market Watch, 2009. Note: see endnote 3 for additional information.
19. While most consumers are currently calling their friends and families, Cisco IBSG believes more advanced means of communication, such as mobile social networking, will increase the richness of interactions while consumers shop.
20. In a survey of the top 100 U.S. retailers, LakeWest Group found that 33 percent of retailers have rolled out mobile POS devices, and another 33 percent plan to use them by 2011. More than 80 percent currently use handheld scanners for inventory, which will be ubiquitous by 2011. Source: LakeWest Group, 2009.
21. ProcessAway taps into a payment processing platform from Authorize.Net. Source: Springwise, February 2009.
22. Source: MasterCard, 2006.
23. A quick response (QR) code is a two-dimensional bar code created by Japanese corporation Denso-Wave in 1994.
24. Source: *BtoB Magazine*, September 2008.
25. Source: Nielsen Online, March 2009.
26. Source: *Mobile Marketer*, December 2008.
27. Source: Retail TouchPoints, March 2009.
28. Source: *The New York Times*, January 2009.

29. The average household in the United States belongs to 12 loyalty rewards programs. Source: COLLOQUY, May 2007. Moreover, 42 percent of consumers use loyalty-based discounts and memberships "frequently" or "very frequently" when they make purchases. Source: Cisco IBSG Connected Payments Survey, IBSG Economics and Research, and Financial Services, August 2008. These programs can also be hard to manage, which may explain why the average household actively participates in only 4.7 loyalty programs. Source: COLLOQUY, May 2007.
30. Demographically, enthusiasm for a service that provides a single form of payment is widespread. The 18- to 24-year-old age group expressed the most interest, with 19 percent responding "likely" or "very likely" to use such a service. There is also broad interest among 25- to 29-, 30- to 34-, and 35- to 39-year-olds, with 12 to14 percent of respondents in these age groups either "interested" or "very interested." Source: Cisco IBSG Connected Payments Survey, IBSG Economics and Research, and Financial Services, August 2008.
31. Source: Orange, December 2008. The Ergo Sum initiative has strong potential to jump-start mobile payments and related services in France because the three main parties needed to forge agreements on standards, billing, and interoperability—retailers, financial services firms, and service providers—are all participating in the consortium.
32. Cisco IBSG Connected Payments Survey, IBSG Economics and Research, and Financial Services, August 2008.

More Information

The Cisco Internet Business Solutions Group (IBSG), the global strategic consulting arm of Cisco, helps CXOs and public sector leaders transform their organizations—first by designing innovative business processes, and then by integrating advanced technologies into visionary roadmaps that address key CXO concerns.

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