Rational Exuberance: The Wireless Industry's Killer "B"

No industry suffered as much from the hope and hype of the 1990s boom as telecommunications. The dream of convergence — of video and voice and broadband Internet — led companies around the world to imagine vast new traffic and wealth emerging from Internet-enabled business-to-consumer (B2C) and business-to-business (B2B) commerce. This e-business mania led telecom companies to overbuild in the local exchange market and the long-haul fiber-optic transport market. When wireless became the "next big thing," the private sector piled in, with European telecommunications companies alone dropping $105 billion on sought-after third-generation (3G) wireless Internet licenses.

The result has been disastrous. The telecommunications industry worldwide is mired in overcapacity, deep debt, razor-thin margins, and bankruptcies.

Was all for naught, especially in the highly touted wireless marketplace? The answer, for the moment, is no. Although it is true that mobile commerce has been slow to develop, particularly in B2C applications, our research is showing that many companies have been quick to capitalize on wireless connectivity in a market surprisingly close to home: their own work forces. More than two-thirds of the 473 firms in our recent study of companies' wireless strategies, investments, and experiences are using the wireless Internet primarily for business-to-employee (B2E) applications to improve productivity and operational efficiency. (See "About the Research," at the end of this article.) The surveyed sectors included banking, insurance, manufacturing, telecommunications, transportation, media, utilities, retail, health care, and government.

Many observers and analysts have anticipated continued growth in the wireless market, the industry's recent travails notwithstanding. The Telecommunications Industry Group's 2003 *Telecommunications Market Review and Forecast* predicts that wireless spending will increase from $123.4 billion in 2003 to $164.5 billion in 2006, a 10 percent compound annual growth rate. Long-term growth in mobile business may come through partnerships across industries aimed at building loyal customer relationships in B2C and B2B contexts. The budding B2E segment, however, underscores an important — but oft-forgotten — fact about business development in industries that are based on rapidly evolving technologies: Markets frequently develop naturally in unexpected places.

In this article, we explain the early "m-business" hype and the reasons for widespread disappointment with the telecommunication industry's progress. We also describe how mobile technology is being successfully leveraged by some organizations to enhance

their competitive advantage. In addition, we evaluate the propensity for industries to adopt wireless technology, identify potential opportunities, and raise guiding questions for firms considering m-business solutions. Through various examples, we provide senior executives with a sense of how to approach investments in new technologies in general and m-business in particular.

The Hype Cycle

We define *m-business* as the use of wireless handheld devices connected to public and private electronic networks to communicate, inform, transact, or entertain, using text, voice, and data. Following the characterization used by Ravi Kalakota and Marcia Robinson in their book *M-Business: The Race to Mobility*, we use the term *mobile* to mean fully portable, real-time access to the same information, resources, and tools that, until recently, were available only from the desktop.

All new technologies go through a hype cycle, and m-business is no different. Estimates of the growth of m-business have swung wildly during the past several years, with growth projections in a sample of 10 studies published from 1999 through 2002 having a variance as high as 100 percent. This hype was driven largely by three factors: excitement about the technology and its capability; the continuing growth of wireline e-business; and the rapid adoption of wireless devices around the world.

The combination of these three factors could have yielded a legitimate "white space" opportunity — an unmet consumer need that previously could not have been filled. M-business's white space was assumed to be consumers' need to access information, connect with others, and complete transactions anywhere, anytime while on the move.

M-business has fallen well shy of most expectations, however, prompting some to view m-business as simply an untethered extension of traditional telephony. This sluggish growth and disillusionment can be attributed to seven causes:

Lack of Network Capacity. In its current form, the second-generation (2G) wireless Internet cannot deliver the speed and ease of use required for most revenue-generating m-business applications. For example, our study indicates that on average, a two-megabyte file takes more than three hours to download to a mobile phone on current technology, more than 200 times as long as it takes to download to a desktop PC with broadband wireline technology.

Lack of Consumer Demand for the Technological Capabilities. Third-generation technology is substantially faster than 2G; a two-megabyte file will download in about five seconds on a full-fledged 3G network. But customer demand is influenced by today's

reality rather than tomorrow's promise, and has remained low.

Mobile Device Limitations. The real estate on a phone screen is a fraction of a laptop computer's. "Browse and Buy," an activity ubiquitous enough in wireline e-business to turn eBay into a household name, cannot easily be transferred to mobile devices. Such constraints also all but eliminate another common form of revenue generation in e-business, online advertising. And newer mobile marketing communications activities, such as sales promotions, are falling prey to the "law of diminishing astonishment."

Consumer Unwillingness to Pay. Because revenue growth is so slow, consumers are being asked to bear the brunt of financing new m-business applications through pay-per-use or pay-per-download mechanisms. But consumers haven't yet shown their willingness to be both guinea pigs for new business models and financiers of new applications.

Lack of Worldwide Wireless Technology Standards. To overcome barriers to interoperability around the world and provide end users with seamless service, wireless providers are required to have tri-band phones and service. In the U.S. alone, multiple technologies result in dropped calls as customers move from digital to analog networks. Furthermore, device manufacturers face the significant challenge of developing a new breed of 3G handsets that can juggle music, video, e-mail, and voice over three different radio bands within the next 18 months, when European 3G networks are expected to be built-out and functional. These new-generation devices must combine the wealth of applications of a computer with the roving versatility of a mobile phone. Many industry observers are skeptical that telecom manufacturers will be able to rise rapidly to this challenge.

Ubiquity of PCs. The ubiquity of PCs in large markets such as the U.S. is also a big barrier to m-business adoption, suggesting that consumers who have mobile access to the Internet do not necessarily use their mobile devices to complete revenue-generating transactions. With larger display screens and faster transmission available in homes, offices, and schools, consumers' need for wireless use is diminished. The online tracking firm ComScore Networks reports that U.S. consumer e-business from PCs reached $17.9 billion during the third quarter of 2002, a 35 percent increase over the previous year — a statistic that highlights the continuing use of PCs for Internet transactions.

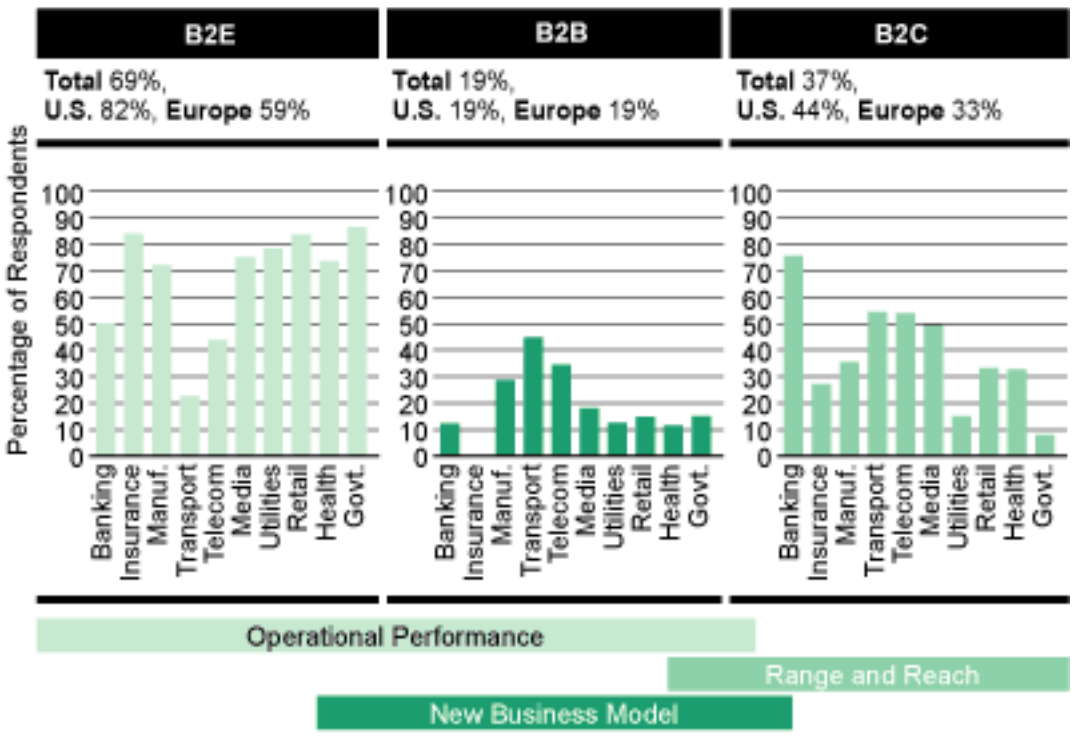
Failure of Firms to Understand Customer Value Creation. Finally, and most importantly, firms that really want to derive value from m-business will have to reexamine customer value creation. Service providers must recognize that m-business probably won't thrive

by re-creating Web experiences on the phone. Rather, m-business will succeed by providing customers with information and applications they can use to solve problems more economically than they can with alternative means. The bandwidth requirements to fulfill these needs are at least four years away; until then, m-business providers will have to build their customer bases through services and applications that are simple, timely, location sensitive, and more cost-effective than current alternatives.

Looking Inside

Although these barriers have hindered B2C and B2B adoption, they do not appear to be impeding B2E implementation. Our study, which included companies in the U.S. and Europe, revealed that a significant majority (69 percent) of firms are focusing their m-business interests on B2E applications. (See Exhibit 1.) A smaller proportion of firms (37 percent) have invested in B2C applications. An even smaller proportion of firms (19 percent) are using mobile solutions in their B2B interactions. The B2E applications receiving the most emphasis include mobile office (communications and access to corporate information), customer care (contract and transaction management), and operational productivity (asset/fleet management and inventory management). Some companies are also focusing on mobilizing supply chains across organizations.

Exhibit 1: **Wireless Initiatives by Industry**



Source: Durlacher, IBM Global Services data

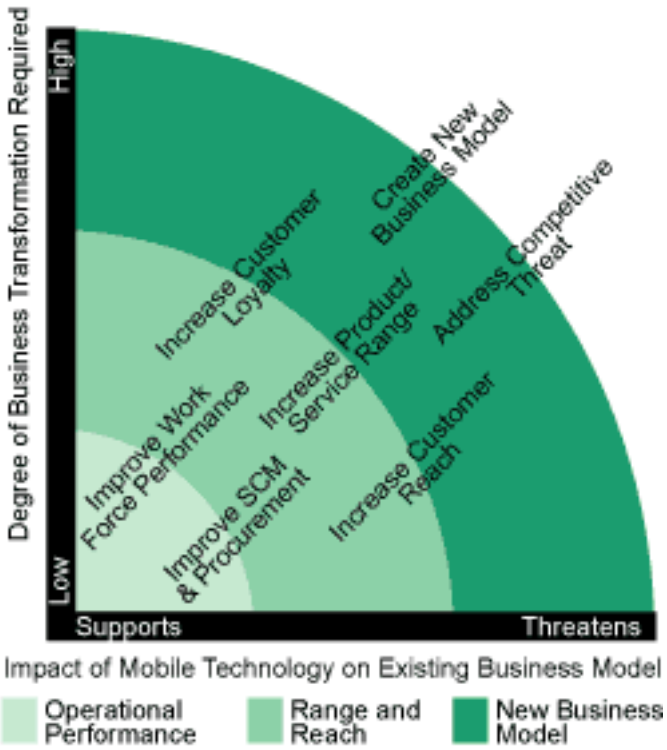
The different emphases reflect variations in strategic intent. B2E m-business investments suggest an interest in improving operational performance. B2C m-business investments are aligned with improving the firm's range and its customer reach. B2B applications are used partly to effect business model changes and partly to boost operational performance. Thus, it appears that firms' main near-term interest is to use m-business to improve performance, not draw revenue, and that they believe performance

improvements will be achieved by focusing first on employees. This is a natural development in a difficult economic environment. Performance enhancement often translates into cost savings, which can be quick, observable, and measurable. Revenue growth frequently takes time and requires customer education and behavioral change.

This short-term interest does not necessarily reflect how companies will implement m-business applications over time. When considering a new technology, a company faces two central decisions: how much to invest in the technology, and how to align the investments with the firm's strategic intent. By analyzing m-business investments by the firms in our database, we have developed a framework that can guide other managers as they confront these decisions.

Exhibit 2 shows that framework. The x-axis depicts the degree to which a new technology supports or threatens the firm's existing business model, and the y-axis shows the degree of internal business transformation anticipated as a result of the new technology. Some firms view a new technology as an incremental innovation, and their adoption of it is guided by potential changes to their revenues and profits and by how it can enhance the organization's structure. Others consider a new technology a disruptive innovation that could radically alter their business model and sometimes the entire organization's culture and structure.

Exhibit 2: **A Framework for Understanding M-Business Strategies**



Source: Authors' analysis and IBM e-Business Strategy and Change Consulting

This framework shows that internal performance improvement is the "low-hanging fruit" most readily available to a company contemplating a technology investment, which explains the early interest in m-business's B2E applications. About 42 percent of the businesses we studied have equipped their work forces with wireless voice or Internet systems, and another 28 percent are considering rolling out such systems. In these cases, the new technology is seen as supporting the firm's existing business model and not requiring significant internal business transformation. B2B applications can also improve employee, customer, and business partner processes, although the lower degree of implementation found in our survey suggests that executives see these applications as requiring a greater degree of business transformation and having more effect on the business model.

Companies pursuing B2C mobile applications appear to believe that the new technology

requires both moderate change in the existing business model and a moderate amount of organizational transformation to adopt. Many firms in banking, insurance, manufacturing, transportation, telecommunications, media, utilities, health care, and government, for example, have begun customer-facing m-business activities to increase customer reach, increase product/service range, or improve customer loyalty. All of these activities — including customer self-service (mobile customer contact, query, and order), mobile applications development and deployment (personalized and location sensitive), and m-business (mobile billing, payment, and transaction) — require some behavioral change on the part of both customers and employees.

Finally, if the innovation threatens to disrupt the company's business model and also radically transform the organization, then the company will have to modify its existing business model or create a new one to address significant competitive threats. Because most companies are unwilling to take such actions, as Clayton M. Christensen showed in *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail* (Harvard Business School Press, 1997), transformative m-business technologies, such as those that span B2E, B2B, and B2C applications, will take more time to be adopted.

M-business interests differ by industry, and within the solution sets, industries also differ in their specific areas of interest. (See Exhibit 3.) B2E solutions, for example, fall into three categories: mobile office (e.g., messaging, remote office), customer care (e.g., sales force automation, contact management), and operational productivity (e.g., fleet management, authorization). The primary solution set in B2B applications is supply chain management (e.g., order tracking, asset tracking, just-in-time delivery, procurement). The two most commonly used B2C applications are customer service (e.g., call center, order processing, billing, payment) and information and commerce (e.g., location services, personalization, and notification).

Exhibit 3: **Importance of Mobile Internet Solution Sets by Industry**

Low ○ ◔ ◑ ◕ ● High	B2E			B2B	B2C	
	Mobile Office	Customer Care	Operational Productivity	Supply Chain Management	Customer Service	Information & Commerce
Banking	◕	○	○	○	●	●
Education/Govt.	◑	◑	◕	◑	◑	◑
Health Care	◑	●	◔	◕	◔	◕
Insurance	◕	●	○	○	●	◕
Manufacturing	◑	◕	◑	◕	○	◔
Media/Entertainment	◕	◔	○	○	◔	●
Retail	◑	◑	◕	◕	◔	◕
Technology	◑	◕	●	◕	●	◕
Telecommunications	◑	◔	●	◕	●	◑
Utilities	◑	◑	●	◕	●	◑

Source: IBM Global Services data

Industry Differences

When synthesized, the differences among industries become even more apparent, revealing distinctions in the needs they perceive and their strategic priorities. For instance, such sectors as insurance, manufacturing, utilities, retail, health care, services, technology, and government are focusing on performance improvement applications in the B2E arena. Exploring more deeply, though, we can see additional correlations among industries. Banking and insurance traditionally emphasize customer service. But both industries are also placing emphasis on wireless B2E mobile office technology, reflecting the higher degree of mobility of the sectors' work forces.

Few companies are investing in B2B efficiency improvements. Some, though, are experiencing striking gains. Ethicon Inc., a Johnson & Johnson company that is the world's leading supplier of sutures and other surgical supplies, is representative of firms seeking operational efficiency improvements through m-business. (See "Ethicon's B2E Efficiency Effort," below.)

Focus: Ethicon's B2E Efficiency Effort

Ethicon Inc., a Johnson & Johnson company, is a leading supplier of sutures and other surgical supplies, providing more than 3,500 products to some of the largest hospitals all over the world. Daily restocking of surgical supplies in emergency and operating rooms is critical to these institutions and to the lives of their patients. In the past, hospitals relied on time-consuming manual methods of checking inventory, registering supply needs, and placing orders.

Ethicon estimated that nearly half of all health-care facilities still placed orders via a fax machine or pager, and another 40 percent placed orders by telephone. These labor-intensive processes were both time consuming and error prone.

Compounding these problems was the fact that many hospitals lacked the information technology

infrastructure to automate their supply reorders, and the cost of building such an infrastructure was prohibitive.

Given these constraints and the compelling need for hospitals to maintain their inventories, Ethicon determined that providing an affordable, simple wireless order-entry system for its products would clearly differentiate the firm from its competitors. It took less than six weeks for Ethicon, working with IBM, to develop a handheld mobile solution called E-sy Scan that allowed users to scan the bar codes on items in the surgical supply closet, enter the quantity of items needed into the device, confirm the order, and wirelessly transmit it to Ethicon. This "mobilized" process allows supply managers to relay orders to Ethicon instantly, saving customers significant time while reducing the possibility of errors in the manual maintenance of inventory. Ethicon first tested this wireless service in November 1999 at the Manchester Royal Infirmary in the U.K. Following its success, Ethicon installed this system in 14 other hospitals over the next 16 weeks.

Ethicon's mobile system demonstrates how value can be created for both the customer and the provider by the application of wireless technology. Ethicon customers using the system report an 80 percent reduction in the time it takes to place orders, a 10 percent reduction in the time supply managers spend ordering inventory each day, access to bulk purchase savings, and a streamlined supply chain management process.

— V.S., T.O'D., and D.R.

Other organizations from our study that are attempting to use m-business to improve operational efficiency and performance include:

• The McKesson Corporation, which armed 1,300 warehouse workers with strap-on computers and rigged 31 distribution centers with wireless local area networks. This has resulted in an 8 percent increase in productivity, an 80 percent drop in incorrect items shipped, and a 50 percent drop in product shortages over two years.

• Ohio's Hamilton County police department, which has launched project COP-SMART, a program that enables officers to generate and transmit electronic reports, as well as access federal, state, and local databases for vehicle records, wanted persons lists, and criminal history information. The efficiencies of this system equate to the addition of 500 patrol officers.

• Trinity Development and Construction Services, based in Columbus, Ohio, which is generating a cash-flow windfall by leveraging wireless technology. For example, when $300,000 of materials arrive on the site of a state highway project, a worker transmits the receipt to headquarters, which in turn generates a bill to the Ohio Department of Transportation. Speeding this part of the procurement process has helped generate savings equaling 3 percent of revenue. Trinity believes that the system paid for itself in about nine months.

Industries that are emphasizing improvement of their range of and reach to customers include banking, transportation, telecommunications, and entertainment and media.

Companies in these sectors are implementing mobile payment systems and trying to generate revenues by providing more content-based services to subscribers.

Many businesses, such as British Airways PLC, also see a significant opportunity to leverage mobile technology as a means of differentiation. In 2001, British Airways began to offer a variety of mobile Internet services to travelers. The airline views the wireless channel as one of the most useful service-centric components of its coordinated customer relationship management (CRM) strategy.

The wireless system at British Airways goes beyond simple access to real-time flight arrival and departure information (probably buoyed somewhat by the ubiquity of the wireless standard GSM, Global System for Mobile Communication, in Europe). The British Airways system was the first in the world to give passengers the ability to check seat availability, check in, and select a seat via a graphical seat map on their wireless application protocol (WAP)–enabled device. Time-constrained travelers can check in using the pictorial seat selection tool on the phone, arrive at the airport, collect their boarding pass from a self-service kiosk in a matter of seconds, leave their baggage at the "Fast Bag Drop," and go straight to the boarding gate, saving minutes or even hours. Despite the low-key marketing of its WAP services, British Airways has experienced positive monthly growth in usage of the mobile channel.

In the B2B context, companies' major focus on supply chain tracking and procurement applications is in the transportation, telecommunications, and manufacturing industries. International Paper Company and Motorola Inc., for example, joined forces to create "smart packages" — shipping boxes with embedded radio frequency (RF) tags that emit signals that allow tracking. Smart packages take risk out of shipping valuables. The same RF tags can be used to notify suppliers when retailer inventories are low and to alert distributors if boxes are tampered with. Wal-Mart Stores Inc. has piloted an asset-tracking wireless application using RF tags. The company says it has been encouraged by the results of the pilot study and expects wireless to improve supply chain efficiency in four areas: global supply chain visibility, on-shelf product availability, theft detection, and self-checkout at retail stores. Wal-Mart must still work on implementation hurdles, such as transmission problems with the tag, the cost of the tag, and the quality of the readers, before it can roll the system out.

Analyzing Investments

Strategy involves choices — the choice of what to do, and the choice of what not to do. The Internet increased both the opportunity and the complexity in strategic decision making; mobility promises — and threatens — to intensify both, particularly as industry

and application boundaries become more permeable. Companies can use the analytical framework outlined above to develop a strategically coherent rationale for investment in mobile solutions.

Although the emphasis by companies today is on mobile B2E applications designed to boost productivity, our study indicates that B2C and B2B applications, aimed at changing customer relationships and transforming the way companies do business, will not lag for long, particularly as 802.11 wireless technology — the so-called Wi-Fi standard — continues to emerge as a major force in the acceleration of wireless Internet adoption. Indeed, Wi-Fi hot spots in restaurants, retail outlets, malls, and other public places could become the single greatest catalyst for widespread mobile Internet use from all devices in the future.

Our suggested strategic approach — and the examples of firms currently using m-business — can provide executives an understanding of how this and other mobile technologies might affect their own company's business and organization models. An understanding of where m-business investments are being made in an industry — and in complementary and competitive industries — will also prove valuable, since mobile technology's "anything, anywhere, anytime" value proposition is eroding barriers separating many industry segments. Future opportunities probably lie in a cross-industry context rather than within a single industry. The capability to recognize and act upon cross-industry value networks aimed at constantly enhancing customer value may be the hallmark of successful firms in the wireless world.

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About the Research

The sample was drawn primarily from the IBM Global Services client database in the U.S. and Europe. Other studies analyzed include:

- *The Dawn of Mobile e-Commerce*, Forrester, Oct. 1999
- *Europe's UMTS Meltdown*, Forrester, Dec. 2000
- *Global Next-Generation Mobile Communications*, Frost & Sullivan, April 2002
- *Mobile Commerce Report*, Durlacher, Nov. 1999
- *Mobile Communications Market Opportunity*, Strategy Analytics, Dec. 1999
- *Mobile e-Commerce: Time for a Reality Check*, Forrester, April 2000
- *Mobile Internet Realities*, Forrester, May 2000
- *Mobile's High-Speed Hurdles*, Forrester, March 2000
- *Moving in Mobile Media*, Lehman Brothers, Dec. 1999

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