

EMERGING BUSINESS MODELS *for Mobile Brokerage Services*

BUSINESS MODELS DESIGNED SPECIFICALLY FOR THE MOBILE ARENA ARE RESHAPING THE INDUSTRY. BUT EACH MODEL HAS UNIQUE ADVANTAGES AND DISADVANTAGES — POTENTIAL ADOPTERS SHOULD TAKE CARE IN CHOOSING AMONG THEM.

WEB-BASED E-COMMERCE has transformed the manner in which business can be conducted with customers, business partners, and suppliers. The competitive landscape across various industries has undergone significant changes as companies adapt their ways of doing business to leverage these emerging technologies [1, 8]. Paralleling this revolution, our society has become increasingly mobile [6, 11]. The ability to communicate from virtually anywhere at any time offers unprecedented levels of flexibility and convenience. Through a convergence of Web and wireless technologies, mobile e-commerce (MEC) promises to propel business in the new millennium by enabling the electronic exchange of capital, goods, and commercial information via untethered computing devices [12].

Given the suitability of the wired Web to conduct financial transactions efficiently

and economically, brokerage firms have devised novel, profitable, and proven methods for supporting business activities [8]. Extending conventional Web-based services with MEC promises to spawn a new wave of innovation. Brokerage firms are utilizing MEC to differentiate themselves in terms of customer attraction and retention. As companies adapt to the mobile environment, new business models are surfacing to meet the imperative. What are these new business models? What are the strengths, weaknesses, challenges, and future prospects for each of them?

This article attempts to address these questions. We discuss how MEC differs from the traditional wired approach, and offer an in-depth analysis of the various business models that have emerged in the MEC environment. We also present a classification scheme, examine the relative strengths and weaknesses of the models, and

discusses developing trends and their implications for MEC in the brokerage industry.

The emergence of MEC promises to supercharge and extend the capabilities of mobile brokerage service (MBS), acting as the catalyst for further innovation. Strictly speaking, MBS is not a recent development. With the aide of a mobile phone, investors can call their broker's touchtone trading system to retrieve stock quotes, place trades, and check portfolio balances. Internet-based MBS involves leveraging existing wired technologies and adapting them to the mobile environment. The wired Web has enabled companies to disseminate information globally, interact more closely with customers, provide customized information, streamline transactions, integrate disparate computing systems, and enable efficient collaboration. Firms have successfully exploited these capabilities to broaden their reach, range, and relationships with customers [1, 3, 8].

Wireless technology presents an attractive medium for conducting e-commerce for two reasons: ubiquity and localization. Ubiquity refers to the ability to access information from any location at any time. Investors are no longer constrained by wires. Users can complete their investment activities while out of the office or away from home. Ubiquity can be beneficial in cases where timely information is important, such as tracking and trading volatile stocks. MEC is especially suited to active traders who need the capability of executing trades wherever they are. This flexibility through mobility far outdistances traditional wired approaches in terms of convenience and responsiveness to changing market conditions.

Localization provides customized information based on physical location. Mobile device micro-processors allow service providers to identify location, enabling the assessment of roaming charges and provision of emergency services. Since location can be isolated, it can be exploited as a means to commercial ends. Information can be delivered that is tailored to specific locales. For instance, brokerage firms can leverage localization to provide directions to the nearest branch office and customize directions from the user's current location. Another method of utilizing localization involves the tracking of fleets and employees, such as pinpointing the whereabouts of

stockbrokers, analysts, and other key personnel when situations arise that require their immediate attention.

Although MEC proves advantageous in terms of ubiquity and localization, the wireless architecture

Device Type	Examples	Strengths	Limitations
Web-enabled mobile phones	1. Sony Ericsson T226 2. Motorola T730 3. Nokia 6610	1. Easy to obtain and set up. 2. Most new mobile phones are Internet-enabled and most carriers provide data and voice service packages. 3. Easy to switch between voice and text. Can call your financial advisor easily.	1. Most phones have small screens. 2. Alphanumeric keys more challenging to use to enter information. 3. Based on pull technology.
Personal Digital Assistants (PDAs)	1. Palm Pilot 2. Compaq IPAQ 3. Microsoft PocketPC	1. Larger screens make information easy to read and allows for better charting. 2. Designed for easier navigation and entering of text. 3. Can use stylus rather than keypad.	1. No voice capabilities. 2. Certain PDAs require separate modem. 3. May need to charge modem separately from PDA. 4. Based on pull technology.
Two-way pagers	1. RIM Blackberry	1. QWERTY keyboards allow for easy data entry. 2. Based on push technology.	1. No voice capabilities. 2. Most models limited to textual information only. 3. Smaller models require scrolling to read large amounts of data.

Sources: E*Trade (www.etrade.com), Fidelity Investments (www.fidelity.com).

Table 1. Mobile device comparison.

presents a number of unique challenges. In the conventional wired Web environment, devices, applications, and networks are well developed and standardized [12]. The wired Web architecture is comprised of four main components: Web servers, network transport, applications, and devices. Web servers facilitate requests for documents, which are transmitted using the network transport. Networks supply the capacity to mobilize data and connectivity between Web servers and applications. This is achieved through standard Internet transmission protocols TCP/IP and Hypertext Transfer Protocol (HTTP). Applications utilize or modify the content dispersed via the network to fulfill a user request. Using languages such as Hypertext Markup Language (HTML), applications manipulate and render data on devices.

Existing Internet-based technologies have been designed specifically for fixed, wired platforms. The wireless Web requires additional components: a mobile gateway, wireless network transport, wireless-specific applications, and mobile devices. A mobile gateway must be installed to translate data from the wired Web for transportation over the wireless medium. Unlike wired transport mechanisms that rely on common standards, four competing protocols exist in the U.S. market for wireless network transport: Cellular Digital Packet Data (CDPD), Mobitex, Global System for Mobile Communications (GSM), and Code Division Multiple Access (CDMA).

Application standards are equally fractured. Many methods of manipulating content are being utilized including Short Message Service (SMS), Wireless Markup Language (WML), and Handheld Device Markup Language (HDML) [12]. Mobile devices come in disparate forms, exacerbating heterogeneity. The three major types are Web-enabled mobile phones, personal digital assistants (PDAs), and two-way pagers. As shown in Table 1, each type has inherent strengths and liabilities in performing MEC transactions, restricting the specific features and functions they can support.

Evolving network, application, and device standards in the MEC environment make the transition from conventional Web-based e-commerce to MEC a challenging proposition. Success depends on a firm's ability to recognize, assimilate, and fully leverage technological opportunities [2].

MEC Business Models

To identify the various approaches that brokerage firms are adopting in the MEC arena, we obtained an initial list of candidate brokerage firms from a previous study [8], which examined 106 brokerage firms offering online brokerage services at the beginning of 2002. In light of the dot-com demise as well as recent merger and acquisition activity, the initial list was cross-referenced to Hoover's Online (www.hoovers.com) and Gomez Advisors (www.gomez.com) to identify changes in industry composition. The revised list contained 101 brokerage firms, 80 of which did not offer MBS, and were thus eliminated from the analysis.

Information related to the remaining 21 firms was collected based on Web site reviews and recent publications in the popular press. Based on the compiled information, firms were classified according to their underlying approaches to MBS. The investigation revealed a total of four business models, which can be broken down along two distinct dimensions to form a 2x2 matrix (see Figure 1). Firms were found to compete along the dimensions of price and platform.

Price encompasses the unique pricing strategies utilized to generate revenue and create value for investors. Two subtypes can be identified within the price dimension: standard and stratified. Not surprisingly, these pricing mechanisms mimic those associated with conventional wired Web offerings [8]. Yet supplying MBS amplifies costs, meaning that firms must devise compensatory methods of revenue gener-

ation. Some firms charge clients additional fees for MBS-based trades. This strategy is the industry norm and is thus referred to as standard pricing. The stratified pricing approach goes beyond standard pricing by exempting additional fees for lucrative clientele. The brokerage industry, and particularly online brokerage, is driven by commissions, which are generated through trade executions [8]. Profitability is a function of volume. The stratified approach enhances profitability by enticing active investors and wealthy clients to trade more often through zero cost, anywhere, anytime solutions.

Platform refers to the various devices, applications, and networks for which firms offer MBS. The plat-

form dimension can be subdivided into two categories, namely vertical and polymorphic. MBS solutions are deployed to accommodate the varying features and capabilities of mobile devices. Features commonplace on conventional wired Web sites are not as pervasive in MEC due to current device, applica-

tion, and network restrictions. When we compared each firm's conventional online venue to its MEC counterpart, we found roughly 25% of conventional wired features are currently being supported in MBS offerings. Feature availability was found to be further restricted for specific types of devices and carriers, as exemplified by Fidelity's MBS solution depicted in Table 2.

Many devices cannot support rich features such as charting and in-depth research. Furthermore, devices tend to support a limited set of application languages, which in turn must be able to communicate over the specific type of network to which the customer subscribes. In light of these challenges, some firms require customers to use specific types of devices and carriers while others allow customers to select configurations. The former is referred to as the vertical approach, which provides an integrated solution across specific devices, applications, and networks. The latter is labeled polymorphic due to the many forms and combinations of devices, applications, and networks supported.

Various business models have been devised to compete along the price and platform dimensions. By selecting a specific approach to price and platform, firms strategically position themselves in a particular quadrant of the price-platform matrix, as illustrated in

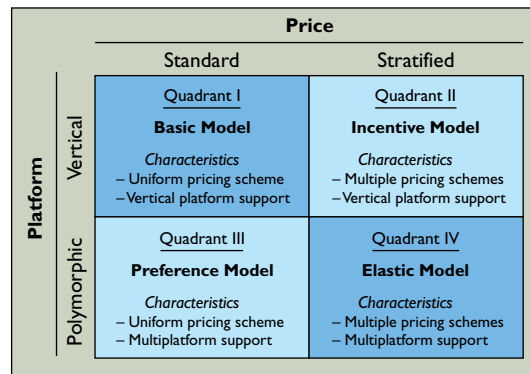


Figure 1. Price-platform matrix.

Figure 1. As a result, each quadrant represents a specific business model: basic, incentive, preference, or elastic. Table 3 illustrates how each model exhibits distinctive characteristics, promoting an array of strengths and limitations.

For each model, the unique interaction between price and platform is described as follows:

Quadrant I—The basic model. The simplest form of MBS combines limited platform support and a uniform pricing scheme. Companies require investors to select from a menu of platform alternatives and charge basic MBS fees. Monthly MBS service fees allow investors to access real-time quotes, trade stocks, receive alerts, and view portfolio balances. When a MBS trade is executed, investors are charged roughly twice as much as for traditional online trades.

The main advantage of the basic model lies in its simplicity (see Figure 2). Due to the limited set of configurations that must be supported, computing personnel need only be conversant in a few specific domains. Furthermore, uniform pricing does not require that systems support multiple pricing schemes. The marriage of vertical platform and standard pricing allows firms to bundle device, carrier, and MBS services to offer a comprehensive proposition. Bundling simplifies matters for consumers. Customers are guided to the appropriate technologies and receive consolidated bills. Simplicity can be especially important for investors new to MBS.

Simplicity can also be a limitation. Uniform pricing may alienate active and wealthy investors, as they are able to get better deals elsewhere. Restricting devices and carriers limits consumer choice. Furthermore, it is presently unclear which technologies will dominate. As the market settles and new technologies emerge, firms adopting the basic model may be at a competitive disadvantage if they

are unable support the dominant design [9].

Quadrant II—The incentive model. Like the basic model, the incentive model adopts a vertical platform strategy, and thus inherits the strengths and limitations that arise from this approach. Firms adopting this model differ on the price dimension. By offering prerequisites to investors who trade frequently, firms can maximize trading volume and profitability. This stratified pricing approach originated in the conventional online brokerage arena, where firms offered reduced commission rates to active traders [8]. Translating stratification to MBS, add-on commissions are eliminated for active traders or waived for investors maintaining minimum account balances. Although firms may sacrifice commissions in the short-term, increased trading volumes will likely compensate for

Feature	Device		
	RIM Pager	Web-enabled Phone	Palm PDA
Trading	✓	✓	✓
Real-time quotes	✓	✓	✓
Market indices	✓	✓	✓
Most actives	✓	✓	✓
Portfolio Balances	✓	✓	✓
Order Status	✓	✓	✓
Watch Lists		✓	✓
Symbol Lookup		✓	✓
Account Positions		✓	✓
News Updates			✓
Charts			✓
Stock Screening			✓

Source: Fidelity Investments (www.fidelity.com).

Table 2. Feature-device comparison.

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Model Type	Distinguishing Characteristics	Example	Strengths and Limitations
Basic	<ul style="list-style-type: none"> Uniform pricing Vertical platform support 	SiebertNet	<p>Strengths</p> <ul style="list-style-type: none"> System simplicity Ability to bundle offerings Integration ensures technologies will work together efficiently <p>Limitations</p> <ul style="list-style-type: none"> May alienate lucrative investors Limited device and carrier options May be unable to adapt to emerging dominant designs
Incentive	<ul style="list-style-type: none"> Incentive pricing Vertical platform support 	Fidelity	<p>Strengths</p> <ul style="list-style-type: none"> Attracts lucrative investors Ability to bundle offerings Integration ensures technologies will work together efficiently <p>Limitations</p> <ul style="list-style-type: none"> Bundling and systems more complex than basic model Limited device and carrier options May be unable to adapt to emerging dominant designs
Preference	<ul style="list-style-type: none"> Uniform pricing Multiplatform support 	Ameritrade	<p>Strengths</p> <ul style="list-style-type: none"> Wide selection of devices and carriers Readily adaptable to emerging dominant designs <p>Limitations</p> <ul style="list-style-type: none"> May alienate lucrative investors Challenging to bundle offerings Systems more complex compared to basic model
Elastic	<ul style="list-style-type: none"> Incentive pricing Multiplatform support 	Charles Schwab E*Trade	<p>Strengths</p> <ul style="list-style-type: none"> Flexibility and configurability Attracts lucrative investors Wide selection of devices and carriers Readily adaptable to emerging dominant designs <p>Limitations</p> <ul style="list-style-type: none"> High system complexity Challenging to bundle offerings

Table 3. MBS business models.

lost revenue. In addition, enhanced levels of customer satisfaction and brand loyalty can only help firms retain their most profitable customers, improving long-term profitability.

The challenge for firms adopting the incentive model lies in the complexity of supporting multiple

pricing schemes. To support stratification, applications such as billing and trading systems must identify the stratum to which an investor belongs and calculate charges accordingly. Furthermore, stratified pricing impacts product bundling. Rather than promoting a single bundled proposition, firms must support different bundling options based on strata.

Quadrant III—The preference model. By paralleling the basic model in its reliance on standard pricing, the preference model mirrors its strengths and limitations along the price dimension. The difference between these models lies in platform, which shifts from vertical to polymorphic. A major drawback to vertical platforms involves flexibility and consumer choice. Since investors are limited to specific configurations, they are not free to choose the devices and carriers that best suit their needs. The preference model maximizes customer choice. One of the most appealing aspects of this approach involves device and network independence. Devices from most leading device manufacturers and network providers are supported. By offering a variety of devices and carriers, firms can be assured to stay on top of prevailing market trends. As dominant designs emerge, firms opting for this approach will be prepared.

However, supporting a multiplatform architecture can prove challenging in many respects. Building applications to support a myriad of devices and carriers is more complex compared to vertical approaches. Moreover, it is not a core competency that many brokerage firms wish to develop. Many firms outsource some or all of their MBS initiatives to third-party specialists, who provide turnkey MBS solutions [11]. The main drawback of outsourcing relates to differentiation. When firms deploy the same solution, services become commoditized and investors cannot distinguish between offerings. Polymorphism also makes bundling problematic due to the wide array of devices and carriers supported.

Quadrant IV—The elastic model. By combining stratified pricing and platform polymorphism, the elastic model provides maximum flexibility and is readily adaptable to changing market conditions and emerging dominant designs. Adaptability makes this model the most configurable along each dimension. Yet, the power of elasticity also makes it the most complex model. Like the preference model, bundling

can prove challenging. Furthermore, support for multiple pricing mechanisms and disparate technologies must be designed into MBS applications. To confront the intricacies of this approach, one firm adopting this model, Charles Schwab, devotes 75 full-time technicians to its MBS initiative and will ultimately expand its computing staff by 1,000 (nearly 25%) to support Web-based development in general [11].

Implications and Future Trends

Which, if any, of these models will ultimately prove successful? How will competitive pressures influence these models? These are open empirical questions. However, it is important to look to the future and investigate the forces—both technological and sociological—that will impact MBS.

Overall, only a small percentage of online trades are transacted over MBS venues [4]. Why are firms encountering such remarkably low market penetration for what the popular press has touted as

the next killer application? The lackluster acceptance of MBS can be attributed to many factors. Customers who are familiar with conventional Web applications expect high-quality, fast, and reliable services tailored to their unique needs [8]. The wireless Web is currently an inefficient means for conducting complex transaction processing. Data transfer rates are relatively slow, making the transmission of rich information impractical. In order for MBS to gain a foothold, wireless infrastructures must be upgraded and standardized. According to ZDNet (www.zdnet.com), Cingular Wireless, the nation's second largest wireless carrier, has committed to building a high-speed mobile network across the U.S. based on the GSM standard. GSM systems can deliver data faster than other protocols such as CDMA and CDPD, supercharging throughput to levels approaching wired DSL connections. At these data transfer rates, multimedia transmission can become a reality.

In addition to broadband, a recent spate of mergers and acquisitions has fueled the expansion of coverage areas. Most major U.S. population centers are currently covered by one or more mobile voice carriers. However, large carriers have shied away from sparsely populated areas mainly due to economic factors, leaving the vast majority of the U.S. landscape disconnected. Furthermore, areas servicing mobile data are more confined, even in metropolitan areas

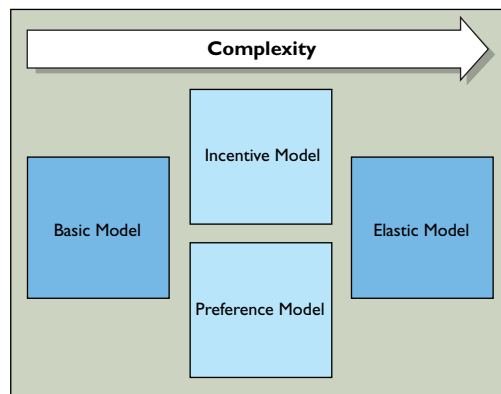


Figure 2. System complexity.

where mobile voice capability is pervasive. As carriers build out their infrastructure, services will likely become more ubiquitous.

On the application front, dominant designs will be those that can leverage the most popular configurations. Similar to mobile networks, application architectures are being shaped by the forces of standardization. At present, applications support specific platforms, rendering them useless in the context of the broader market. Best-of-breed solutions will allow various devices to communicate in both voice and data modes over disparate networks. Standardized markup languages such as Synchronization Markup Language (SyncML) and Extensible Telephony Markup Language (XTML) are emerging to meet this need. These languages are XML-based technologies designed to provide a comprehensive, flexible approach for delivering next-generation mobile services. SyncML and XTML offer the ability to create applications that seamlessly connect diverse devices and networks. Not only can these languages support a full range of current configurations, but they can also be scaled to enable new technologies as they emerge.

Devices are also converging, as evidenced by the introduction of all-in-one mobile devices. These innovative technologies leverage the strengths of Web-enabled mobile phones, PDAs, and two-way pagers, packaging them into a comprehensive offering. These solutions provide maximum flexibility to mobile investors, as they can interact in a variety of communication modes using a single interface. For instance, when the price of a particular stock is falling, an alert can be pushed to the investor, who can download a real-time chart, place a trade via MBS, or call a financial professional all through the same device.

As technologies become increasingly powerful and standardized, firms can design and deploy MBS solutions more effectively since fewer platforms will need to be understood and supported. Thus, the business models supporting platform polymorphism will likely evolve out of existence due to technological pressures. In turn, models are likely to evolve along the price dimension. Firms will likely continue to differentiate themselves in terms of pricing, bringing commission rates in line with traditional Web-based fees. In support of this notion, some firms have suggested the elimination of MBS transaction fees altogether.

Beyond infrastructure issues, socioeconomic forces may preclude MBS diffusion. It may be unreasonable to expect high levels of adoption given the nascent nature of mobile technologies, especially in the midst of a sluggish stock market where online trading volumes have diminished [4]. Yet, a rebound in the stock

market does not eliminate the fact that MBS currently appeals to a narrow market segment. Active investors require uninterrupted MBS access to retrieve real-time information and execute trades from any locale. In contrast, mainstream investors, especially those with long-term goals, trade infrequently and thus do not need to be in continual contact with their investments. These investors will likely opt for conventional online or brick-and-mortar approaches to investing. Those who perceive MBS as a method for realizing their investment goals will likely be adopters [10].

In the context of MEC in general, valuable lessons can be learned from the MBS rollout. No one is immune to the challenges facing mobile wireless technologies. MEC forces firms to rethink the manner in which their products and services should be optimally priced, distributed, and supported to meet mobile customers' needs. For instance, firms must understand who these individuals are, what types of wireless devices they use, how much they are willing to pay, as well as how, when, and where customers will likely utilize mobile wireless technologies in their business activities. By selecting the most appropriate options and configurations, firms can maximize profitability and more successfully integrate MEC into their existing operations.

Conclusion

Since the Web's inception, dramatic changes have occurred in the brokerage industry. MEC has altered the competitive landscape even further. Business models designed specifically for the mobile arena have since emerged to reshape the industry. Each model has its unique advantages and disadvantages, meaning that potential adopters should carefully select the model that best fits the context at hand.

At present, MBS appears to be tailored to a relatively narrow market segment of active investors. Nearly 80% of all brokerage firms have chosen not to compete and only a small fraction of online trades originate from mobile devices. However, adoption rates will likely improve due to the technological advances. The current mobile environment presents striking similarities to the embryonic stages of the wired Web [12], where network, application, and device platforms were severely fragmented. As technologies become increasingly standardized, firms will be able to design and deploy MBS more efficiently and effectively.

As standards emerge and technologies converge, the platform dimension of MBS will likely disappear. Pricing strategies will need to be revised according to prevailing market conditions and competitive forces.

In order to effectively compete in the mobile brokerage industry, an appropriate mix of technical features, consumer value, and service levels must be implemented to satisfy market demands. Firms must develop the capabilities to recognize, assimilate, and fully leverage technological opportunities [2]. Firms that can cope with the rapidly evolving mobile environment will likely be more successful in the long run. **C**

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Due to fundamental differences in wireless infrastructures between domestic and international markets, the authors have limited the scope of this investigation to brokerage firms operating in the U.S. It is anticipated that an alternative set of business models will emerge internationally.

CLAYTON A. LOONEY (cal4n@virginia.edu) is an assistant professor of commerce at the McIntire School of Commerce at the University of Virginia, Charlottesville, Virginia.

LEONARD M. JESSUP (ljessup@wsu.edu) is the Dean of the College of Business & Economics and Philip L. Kays Distinguished Professor of Management Information Systems at Washington State University, Pullman, Washington.

JOSEPH S. VALACICH (jsv@wsu.edu) is the Marian E. Smith Presidential Endowed Chair and the George and Carolyn Hubman Distinguished Professor of Management Information Systems in the College of Business and Economics at Washington State University, Pullman, Washington.

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