

Assessing the Market Potential of Network-Enabled 3G M-Business Services

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October 2002

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Abstract

This chapter argues that the key differentiators of m-business are a set of the Experience/Function parameters that set m-offerings apart from e-business. “Network-enabling” of m-business by taking advantage of new network based services that can seamlessly handle many of the service features can add great value to m-business offerings. In network-enabled m-business, business adopters and their end users in the field are freed from the burden of constantly dealing with the challenges designing, redesigning, configuring, integrating, upgrading, troubleshooting, maintaining, and billing for m-service offerings. A constellation of m-business service offerings that could take advantage of new network based services are presented. Finally, an approach is suggested to add value and differentiate m-service offerings so that they continue to remain profitable.

Keywords: 3G, UMTS, GPRS, M-Commerce, M-Business, Network Services, B2B

Introduction

While the early introduction of 3G Wireless Networks saw some financial and technical hindrances to the launch of 3G/UMTS¹ networks and services, by 2010 m-business services are likely to be pervasive in the economically advanced countries of the world. An emergent class of new, network-enabled services will drive a substantial part of the growth in 3G/UMTS business applications. Even newer generations of 4G services may enter the scene by 2005. This chapter lays out an approach for distinguishing, conceptualizing, and evaluating the market potential of such network-enabled 3G services.

The chapter is divided into seven parts. The part following this introduction describes the multiple dimensions on which m-business applications, especially in the business-to-business (B2B) arena, offer advantages and enhancements over regular, computer-based e-commerce. Next, the concept of “network-enabled” m-business services is explained. This is followed by profiles of selected, proposed, new UMTS/3G m-business services in the B2B arena. Using an evaluative framework that we have developed, we offer a comparative assessment of the profiled m-business services. Finally, we offer general guidelines for assessing new m-business services, discuss some of the challenges in introducing them, and provide a summary and some key conclusions.

¹ In this chapter, we will use the acronyms 3G (Third Generation), UMTS (Universal Mobile Telecommunications System), and 3G/UMTS interchangeably. These denote the new class of third-generation mobile telecommunications and mobile commerce products, applications, and services that were launched in the early 2000s.

M-Business: Advantages and Enhancements over E-Business

E-business has conquered the world. Despite the bursting of the dotcom bubble, it is hard to believe today how one managed to transact any business in the early 1990s without the Internet. Whether employed for information, support or advertising, nearly every business in the world of any size has a website. E-commerce has revolutionized how many companies do business, allowing for new business models and spawning completely new types of businesses. So with e-business less than 10 years old, is the world ready for something new, something with a potential of revolutionizing business practices the way e-business did? The answer is “Yes.”

Like e-business that preceded it, m-business as a transformational force is here to stay. In the next few years, mobile business or m-business will emerge as a powerful new approach for conducting business. The initial years will be spent solving some of the challenges associated with the new m-business paradigm – usage and user patterns, creating optimal terminal types, and evolving sustainable business models. But after this is accomplished, m-business will become as pervasive as e-business has become today. While the transformation induced by m-business would be dramatic, it would not necessarily replace e-business. M-business would enhance existing e-business functions and applications and launch new ones, totally mobile instead of being tied to desktop terminals. In many ways, m-business would establish new patterns of doing electronic transactions, over and beyond what fixed-line e-business is capable of.

E-business happened because of the combined efforts of the personal computer,

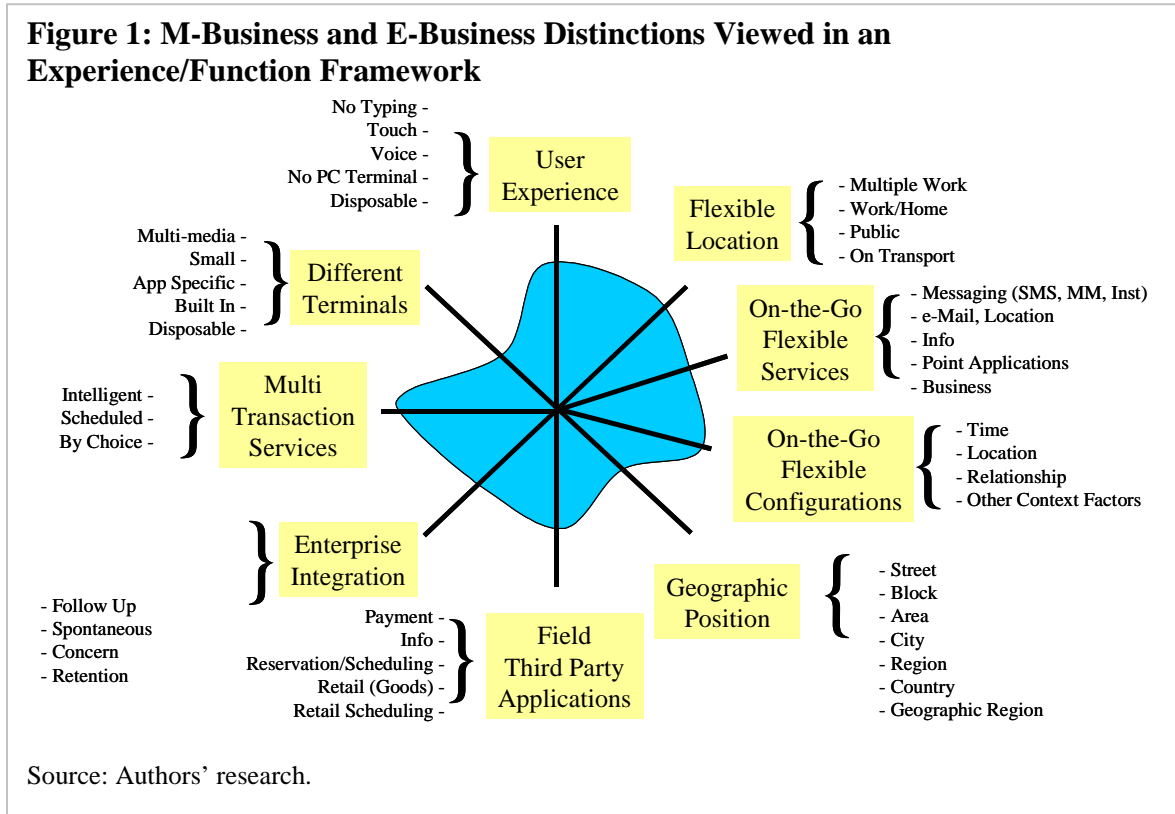
Table 1: Basic, but Inherently Limiting, Distinctions between E-Business/E-Commerce and M-Business/M-Commerce

| E-Commerce | M-Commerce |
|--|--|
| Web-based solutions for selling and interaction with customers | Mobile Phone/Handheld terminal-based solutions for selling and interaction with customers |
| | Services delivered to customers via Mobile Phones/Handheld terminals |
| E-Business | |
| E-Business | M-Business |
| Web-based extensions of the business enterprise | Mobile extensions of the business enterprise |
| Web and computer-based solutions for improving business productivity and performance | Mobile Phone/Handheld terminal-based solutions for improving business productivity and performance |
| Web and computer-based solutions that allow the launch of new business models | Mobile Phone/Handheld terminal-based solutions that allow the launch of new business models |

Source: Authors' research.

telecommunications, business software, and office technology industries. M-business, similarly, will happen because of the combined efforts of the world's mobile handset manufacturing, telecommunications, computers, software, and office technology industries. The Internet and e-business made the personal computer industry grow to a level where PC makers were shipping 100 million PC units every year by 2002. Even without a significant m-business base, by 2002, the mobile handset makers were already shipping 400 million units every year. In this massive global business, m-business is appearing as a new platform for creating product and service differentiation. Internet and e-business helped drive the supply and demand for multimedia computers. The underlying chip and display technology required for m-business is in its infancy, with the first "primitive" (by future standards) multimedia/application capable terminals introduced in 2002. As m-business matures, it would transform the handset – rendering it as different from its predecessors as today's desktop PC screen is from the green-tinted, non-graphic PC screen of the early 1980s.

So what do we understand by m-business and by m-commerce? Table 1 draws parallels between E-Business/E-Commerce and M-Business/M-Commerce. The descriptions in Table 1 are generalized and may give the impression that the only thing m-business does is to replace the PC-based Web access with Mobile Phone/Handheld Terminal based access. The Wireless Application Protocol (WAP), commonly viewed as



a failure (at least in its initial version), provided a web browser optimized for mobile phone and handheld terminal use. Among many reasons for the initial troubles of WAP was that it force-fit desktop-oriented screen content into small terminals. If m-business

were merely an extension of the desktop e-business into handheld devices, then its role would be quite limited.

The analogies in Table 1, derived from the perspective of today's e-business, are inherently limiting. Under this frame of thinking, m-Business would simply extend e-business out to the mobile terminal. This fails to take into account that the "M" is fundamentally different from the "E". A simple look at the vibrant consumer market for cell phones provides some clues. In this dynamic market place – visible especially in the electronic retail districts of cities like Tokyo, Hong Kong, and Singapore – hundreds of colorful models compete for the consumer (and business persons' attention), with new models brought out every month. The PC, on the other hand, basically looks like it has for the past 20 years, with only one or two dramatic innovations – usually introduced by Apple Computers – along the way. A look at Figure 1 hints as to why this is the case. Out of the 10 Experience/Function variables that m-business will draw its power from, e-business (and e-mail) can deliver at best only 4 or 5, and some of those are delivered with severe limitations.

M-business's ability to draw on all of these Experience/Function variables (and some that have not been imagined yet) is the key to its revolutionary power. The best way to describe this is to say that m-business solutions 10 years from now will be as dramatically different from today's terminal and e-business applications as today's multi-media PC is from the teletype interfaces to mainframe or mini computers of the 1970s.

In the following paragraphs, we provide short descriptions of each of the 10 Experience/Function variables that are likely to set m-business apart from e-business.

User Experience

Perhaps the biggest differentiator between e-business and m-business is the sensory experience of the user. In e-business, the user is in a stationary position in front of a PC terminal, and interfaces the content using a keyboard and point-and-click devices. In m-business, this is replaced by total mobility and the terminal can be voice or touch activated.

Different Terminals

A disposable terminal is probably the most radical way of describing how different terminals could be. This is not a far-fetched idea – in 1990, no one would have thought of a disposable camera. Today's manufacturing technology aided by the unrelenting progress of Moore's law² will allow an ever-increasing differentiation of terminal offerings. Terminals that are bendable, so that they can be rolled up, have been demonstrated at trade shows. Miniature sized terminals allow for packaging into ever-changing shapes and forms. Pre-paid phone service is just the introduction to other pre-paid services, complete with 'free' terminals. Multimedia is here to stay and will continue to evolve.

² This refers to the exponential decline in costs, and therefore prices, of information technology as a result of advancements in technological platforms and manufacturing methods. The name is derived from Gordon Moore, co-founder of Intel, who first commented on this phenomenon with respect to semiconductors.

Multi-Transaction Services

M-business services could be scheduled and delivered in multiple ways. Users can choose to have a variety of services delivered at the times and places that they specify. In some cases, the services can be pre-scheduled (for peak hours, late night, birthdays, etc.). In still other cases, the network and the device can make intelligent assessments of what services are needed and proffer such services.

Integration with Enterprise Applications

With m-business, a business enterprise could move most of its capabilities out into the field. Services and applications that required office visits and meetings could now be delivered on the go with full access to all enterprise applications residing on business IT and information systems.

Field Third Party Applications

Terminals that are m-commerce ready can receive services not just from the primary wireless service providers but also from a variety of third-party providers. Most of these third-party providers would work through the wireless service operators. In some cases, the terminal may be able to communicate directly to third-party wireless service providers, through ad-hoc information exchange set ups or direct connectivity. The source of applications and information therefore becomes transparent to the user.

Geographic Positioning

From a continent to the corner of a street, m-commerce networks would be able to locate the user and tailor the service mix to the geographical location, keeping in view the constraints and opportunities of the geographical setting as well as the preferences of the user. A service would therefore work differently in Singapore than in Honk Kong, London or New York based on profiles or regional preferences.

On-the-Go Flexible Configurations

Today's user profiles – whether in e-business or m-business settings – show the way to flexible configurations. But rather than requiring manual setups and changes, the m-services of the future will be automatically configured. So the minute a user leaves the home area, the service will be automatically configured with ring-tones, forwarding information and even downloaded information as the user travels. And should the user want to configure it in a new way, a simple code will download of a new configuration. This would be the world of hundreds of pre-packaged user experiences ready to be activated.

Integration with Mobile Services

New m-business services would be easy to integrate with preexisting mobile services. For example, m-business offerings could easily incorporate a variety of existing messaging services, SMS and e-mail. They could also use conference bridges, network based calling, voice mail as well as many emerging services like downloadable hand-set applications, Multi-Media Messaging and information services.

On-the-Go Flexible Services

With easier integration of services, users would be able to avail of pre-packaged as well as programmable service-mixes. Some m-business systems would offer a service palette from which the users would be able to choose and blend a variety of services.

Flexible Location

With m-business, the user can work, do daily chores, and/or play at work, home, recreational, shopping, and vehicular locations. The coming blurring of roles in the era of m-business will spawn multiple opportunities as well as trigger major social changes.

Network-enabled M-Business Services

Extrapolating existing business approaches and paradigms into new areas is the most obvious way of looking into the future. After all, we are comfortable with what we see today, and can easily see how it can be used tomorrow. For m-business, the problem with this approach – treating m-business as a simple extrapolation of e-business – is that it fails to take into account the dramatic differences (as well as different capabilities) between the two. Some of the most dramatic differences are screen size³ and the mobile user experience. But equally important are the fact that m-business services will be built (assembled) from different ‘piece-parts’ than e-Business. Wireless service operators will deliver some of these ‘new’ piece-parts and many of these are being discussed and implemented today. Examples include location information Application Programming Interfaces (APIs) and services. Needless to say, there will be other, as-yet-unknown service piece-parts.

There are obviously many m-business applications developed and deployed today. All major overnight package delivery services utilize specialized terminals and have web pages on which customers can track delivery progress. These solutions are developed directly for companies by systems integrators or IT suppliers. They are typically limited to using wireless services already offered by operators, although the size of some of these companies means that they are able to get special services developed and deployed by service operators. There will obviously continue to be a large market for customer specific data services that utilize wireless transport and messaging services. There is also a substantial standardization under way to develop and deploy network services APIs that allow third parties to tap into and directly interface with network services. This is clearly a first step towards network enabling of data services.

‘Network enabling’, however, can mean much more than just offering access to network-based data services and APIs for location, messaging, etc. A useful way to look at “network enabling” is in terms of successive categories associated with implementation or business focus. Figure 2 shows a progression of m-business value addition, as the service offering moves from mere data transport to additional services to

³ While it is unlikely that people will walk around with 17” display terminals, it is quite likely that large-format, flat, and foldable mobile terminals would appear as replacements for paper copies of newspapers and magazines.

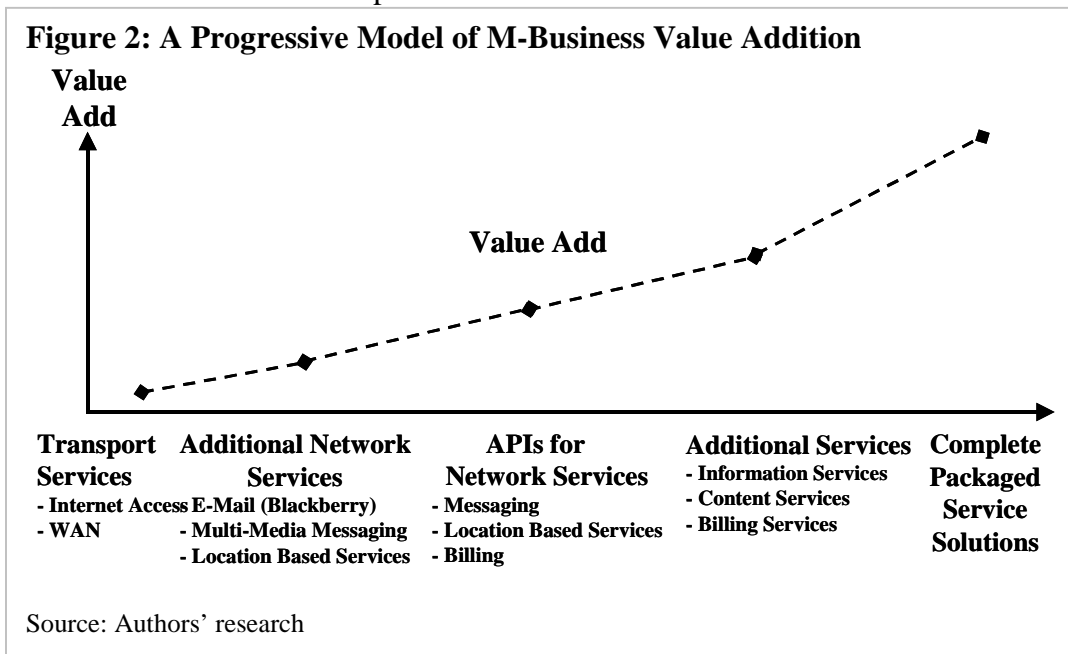
APIs for network services, and finally to complete integrated service solutions. It is at the right-hand extreme of Figure 2 that the true revolutionary potential of m-business becomes evident. In the following paragraphs, we describe the progressively higher stages of value addition and service integration.

Basic Data Transport Services

At the most basic level, adding data transport capabilities to simple mobile voice telephony opens up some opportunities for m-business. The evolution of Web-browsing from today's slow WAP speeds to higher data rates will revitalize some of this market. Pure data transport to support custom terminal based network applications, like those used by today's package delivery services, will continue to grow as enterprises start to capitalize on higher speed data transport to develop new business productivity and enhancement applications.

Additional Network Services

Enhancing basic mobile data access and web-browsing capabilities with additional network services and specialized terminals add more value to the m-business



concept. Examples of this include the Blackberry handheld device, which provided mobile email and messaging capabilities. Finland's Benefon provides GPS capabilities in the mobile phone, making it a useful device for navigating in cities as well as in wilderness. Multi-media messaging is certainly positioning itself as a major value added service, replacing today's SMS as a key data service. Some network data services will utilize location information, for example delivering messages only in certain areas.

APIs for Network Services

APIs for network services allowing for tighter service integration of Messaging, Location Based Services, Usage monitoring, and Billing. These API's are intended to be used by third parties or business enterprise applications to offer services that are more

closely integrated with network services, utilize network billing or deliver services that are based on where the user is located.

Additional Services

As an additional value-adding step, the wireless operator can offer additional m-business oriented services providing complete value added information, tracking, billing or messaging services. These complete service packages can be utilized by business customers in order to develop more complete applications for their users.

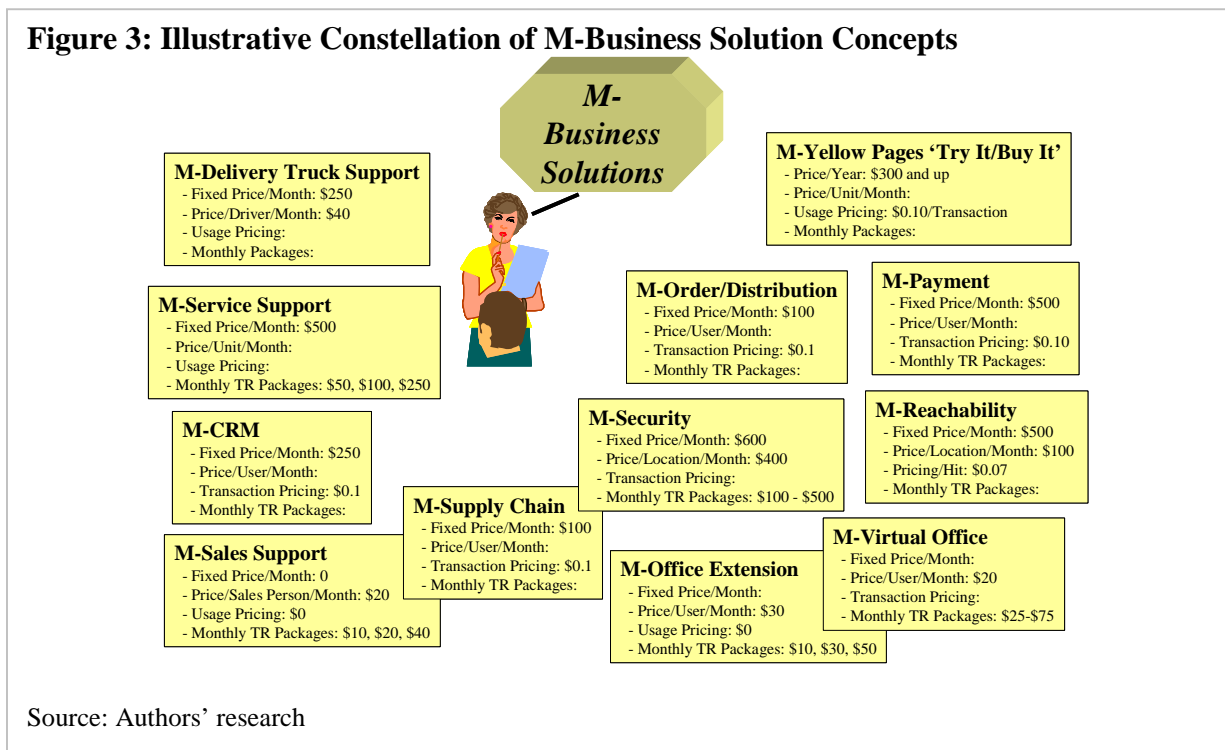
Complete Integrated Service Packages

Finally, as an ultimate value-adding step, the m-business service provider can design and offer fully integrated service packages that solve complete problems. In the next main section of this chapter, we illustrate and assess such service packages.

Crystallizing the Concept of Network-Enabling

Together, these five areas of service ‘add-ons’ represent the concept of *network enabling*, i.e. by integrating services with capabilities inherent in the network or offered by the network service providers, services become enabled by these.

Looked at in a slightly different way, they can be viewed as ‘value-adds’ to the core ‘transport function’ of the wireless network. They also represent a migration of the business that wireless operators are striving for. The wireless service operators want to move from basic ‘telephone’ service to more and more value-added services. Network enabling, the gradual enhancement of service offerings, with network capabilities is an important implementation aspect of this move. M-business services can of course be implemented in a simple fashion by using only transport services from wireless operators.



Such services are in use today and are basically terminal applications that communicate with the business enterprise IT systems. But the future evolution of m-business services will be more and more 'network enabled' by adding and integrating various value added network services to the way they operate and are implemented.

Profiles of Selected, Proposed Network-enabled 3G/UMTS M-Business Services

The illustrative m-business service concepts in Figure 3 are intended as profiles of real service solutions that will become available to business and consumer users in the years ahead. In all cases, the business services capitalize on the network enabled business services infrastructure provided by 3G/UMTS operators or service providers. This infrastructure is connected to the business customers IT environment through standards-based interfaces for communication, information transfer and messaging. It also utilizes network information, thereby providing the business customer with enhanced information from terminals, input devices, locations, usage patterns, as well as the ability to interface with third party systems and third party service providers. In the following paragraphs, each of the Figure 3 constellation of concepts is elaborated upon.

M-Delivery Truck Support

This service is a delivery support service designed to increase the effectiveness and productivity in medium and small delivery fleets. It can also be targeted at larger delivery fleets in cases where the fleet operators do not have their own internal implementation, or to modernize older existing bulkier terminal and application implementation. The service provides drivers with one terminal based application that follows them throughout the day as they make deliveries. Information about each customer and delivery is downloaded as the delivery route progresses. Customers can be called by pressing a button (phone number downloaded), directions by pushing another button (map and directions downloaded), and detailed information for each customer can be downloaded prior to each delivery. Customers can be asked questions at the time of delivery with answers entered using application-assigned buttons. Such questions can include special promotions, offers or customer satisfaction feedback. Dispatch operation knows where each driver is (location based service) and can easily contact the drivers via messaging for changes in delivery or special pick-ups. Finally, the terminal can only be used for specified applications and phone numbers eliminating unauthorized use.

M-Yellow Pages – “Try It/Buy It”

The M-business version of Yellow Pages revolutionizes the service by adding total content flexibility and query specific information (code and location dependent) allowing each response to a yellow pages request to be customized.

The service works via 'Operator-branded' logos with an alphanumeric code located as part of a display (in store, billboard etc.) or in advertising (sign, magazine etc.). The user enters this code into a simple yellow-pages terminal application. This starts a yellow pages query service that connects to the right supplier's IT site. This site contains

yellow pages information – company, address, phone, product information, special offers, etc. – that can be dependent on:

- Time - different information during different time of day
- Date - changing information dependent on date
- Query site - information dependent on where yellow pages request originates
- Query code - single company can have multiple codes dependent on product, service, site etc.

M-Sales Force Support/Communication/Management Application

This application is a general field sales support m-business service that allows a mobile sales force to tie directly into their own company's IT support structure with a mobile device of choice. Designed to work with various types of mobile computing devices (and even cell phones), the application creates a user interface for the business situation at hand, whether downloading of product information, creation of orders and delivery schedules, delivery of sales campaigns or customer location information.

In a network based m-business implementation, the terminal application and its content drive the service function. For example, by choosing a product line button, the sales person will be connected to different office systems at different locations (and even different companies) depending on the product line. The network also automatically routes messages and voice calls to the right sales support functions, such as installation scheduling. The installation message not only contains the message information, but also which network service logic the response should communicate with. The network service logic routes the response to a third system or company together with a notification forwarded to the original sales person (and maybe a formal communication note to their end customer).

Many applications will consist of interfacing to the business customers' own IT environment (through standards-based Internet connectivity – Web-service, XML, messaging, etc.). Other application implementations will utilize services from third party providers or customize device applications depending on specific device applications or input commands. The result is a GPRS/3G terminal device application customized for the business customer's need, dependent on specified content interfaces to their business IT infrastructure rather than requiring the business customer to develop and integrate a complete business application.

M-Service Support Management & Information Application

An application similar to the previous one could focus on Service Force Management and provide customers with Support Information through mobile devices. As described above, this application is integrated into the customers' business IT and business process environment adding mobility to it. Features such as message content-driven service logic applications and third-party information and content services could be added.

An advantage of this application is the ability to interact with all the systems, service and support functions required for a speedy completion of a service call. This communication starts while the service representative is on the way to the job. The connectivity is driven by business specific service logic that interprets messages sent to the home office. So instead of initiating a number of separate communications with IT systems and support staff, the service representative can handle the whole service transaction as one application. First the GPRS/3G terminal is connected to the system being serviced and then relays information collected to the right supplier product support site for diagnostics. The support site can, for example, recognize a need for software upgrade, sending a message to a third-party system software upgrade site authorizing the distribution of a software download. Through network service logic this software gets distributed to the right GPRS/3G terminal (or end customer's IT system) at the same time as the network service initiates a service call transaction starting the creation of a billing transaction in the home MIS system. At the same time a signature application is initiated in the GPRS/3G terminal where the end customer can sign off on the service call. The service force management application then assigns the next service call to the service representative based on his/her position and time. As it does this, it places a call from the GPRS/3G terminal to next customer to advise them about technician arrival time. Again, this application shows how network based service process logic can coordinate multi-system/multi-company transactions using messaging, voice and XML.

Mobile Office Solution for Small/Medium Size Businesses

The Mobile Office Solution provides total mobility for the business including messaging and integration into business specific applications and business processes. This advanced integration is done through the XML/Web Services extension to the wireless device. Advanced messaging integrates with the office messaging system and a number of potential add-on applications allow for mobile meetings, note sharing, and application/time/location-based information and alerts. Mobile GPRS/3G devices can vary from today's laptops and PDAs to future specialized terminals and applications.

The advantage of the Network Enhanced Office Solution is that it can provide different support depending on where the user is and what terminals they use. A scenario illustrates the possibilities:

- When the user exits the office, the network automatically detects this and starts an automatic process of communications between office IT environment and the GPRS/3G terminal that the user carries. This interaction will be different for a PDAs, portable computers, ordinary cell phones, or the new 3G phones. Instead of having to download specific information by hand before leaving, this is automatically done for the user, in the right format for the right device. This filtering is then applied to the user requests. For example, all messages can be held until later in the day or when the user returns to the vicinity of the office. High importance messages are delivered in the right format to applications that can interpret responses (such as set up call in five minutes). Based on this information the network then creates a call or information interchange at the appropriate time, automatically. And as third party services are needed, they are automatically provided to the user. There is no need for individual subscriptions and

billing transactions: as part of the Mobile Office service, the service operator handles such details.

The M-Office solution truly becomes a mobile office where person/terminal/home office/interaction/mobility become one instead of just being a series of wireless messages and phone calls going back and forth. The partial mobility implementations prevalent today are replaced by tomorrow's seamless mobile office.

Mobile CRM Solutions for Small/Medium Size Businesses

The Mobile CRM application provides a flexible approach for each business customer to handle customer relationship management. By providing CRM support to both own employees and to the end customers' mobile environment, a small or medium size business can dramatically improve customer service.

This application allows a business to increase responsiveness and offer truly mobile CRM, a solution that follows the end customer and delivers appropriate timely information when, where and in the form that the customer wants it. It is again the concept of replacing a large number of point-to-point communications with a content and process driven service. Instead of making a phone call or surf through websites to straighten out a billing problem, the GPRS/3G terminal application defines the issue and then forwards this information to the supplier. Based on the nature of the issue, the supplier's CRM application defines a customer satisfaction response entailing multiple transactions. These are forwarded to the Mobile CRM Transaction and set in motion resulting in the following transactions:

1. Immediate message to customer acknowledging receipt of complaint.
2. Message communication to third-party service providers to correct the problem.
3. When responses are received a correction message is forwarded to the customer and an appropriate response and explanation is downloaded directly to the customer's terminal. If there is a financial transaction, this is also simultaneously downloaded to terminal (or bank account or mobile cash)
4. A personal phone call is placed (when customer is available, based on availability information entered from the GPRS/3G terminal) apologizing for mistake (can also be a friendly video message). A token gift (a glass of wine) is offered as an apology.
5. Download of the gift transaction to the customer favorite wine-bar (or one close by, based on mobility information) where the customer gets their wine by simply telling their name. Bartender would already have received name and message when the customer walked in the door, based on location information.

With the network based M-CRM service process logic, it is possible for an end user to set corrective action in motion through a CRM application on their GPRS/3G terminal. Once the event has been triggered and forwarded to the business, the enterprise's IT environment interacts with the network business process logic and communicates (using XML messages) with appropriate suppliers, functions, personnel, service and help desks, plus the appropriate relationship-cementing information to the appropriate places (such as the wine bar).

M-Supply Chain Management for Small/Medium Size Businesses

The supply chain management application introduces wireless supply management solutions to the small and medium sized enterprises. It adds smart mobility, transactions monitoring, and communication device transparency plus the ability for a company's ordering and supply systems to interact via network enhanced XML messages. The standard XML messages fit seamlessly within a Web Services Supply Chain IT application environment while XML fields controlling network services interact with these and other resources (network or third party applications) via XML-SN applications processes.

M-Supply Chain Management (M-SCM) can mean that a terminal application, rather than extensive (and expensive) IT applications, becomes the collecting point for supply information delivered by systems that have not been integrated. This is accomplished by specifying the XML enhanced fields that tie into and control the applications.

M-SCM also provides integrated views into all suppliers' ordering and shipment systems, without having to procure and integrate specific expensive software applications for the task. Users can also receive the exact information that they need wherever they are on the terminal of their choice.

M-SCM means that messaging is integrated with real time voice and data communications, and can be used to streamline supply processes.

M-SCM implies access to enhanced procurement services that are offered as part of the service by third-party service providers specializing in their respective fields. Since the third-party providers are fully integrated into the network, these services are provided seamlessly to the user.

M-SCM creates a platform for integrated ordering and shipping solutions, without the need for integration. The application comes together on the mobile terminal.

M-Security and Alert Generation Application

The Business Security application integrates a GPRS/3G terminal security application with the business security procedures of small/medium-sized companies. Whether there is a need for interaction with a live security person or automated voice, pattern or password protection, this application extends company facility and data

security to mobile security devices allowing the business to reduce costs and increase security reliability. Some features included in such a service:

- Remote video monitoring (from any GPRS/3G video capable terminal)
- Voice print recognition
- Entry of numerical codes
- Alert messages that are context dependent, i.e. time, day, sequence of events, circumstances, etc.
- Third party monitoring and alarm applications

Retail Order/Distribution Application

Using wireless service providers and customized terminals, this application provides the same wireless business order/delivery applications to small/medium sized companies that large corporations have implemented through extensive integration efforts of enterprise IT environments. Viewed as a sort of captive 'FedEx' for every business, this application provides interface capabilities similar to those used by suppliers and customers in order distribution systems, replacing custom terminals with GPRS/3G JAVA applications. The network based service flow applications provide not only the order distribution connectivity but also the ability for suppliers, distributors, and customers to have the right information on their handheld devices at the right time. By specifying a general purpose XML interface for this application, each part of the supply chain can implement their information interface on an XML website, thereby simplifying integration with their respective IT order management and billing systems.

M-Reachability and Location Communication Application

The M-Reachability Application provides the business user with a way to communicate with their customers based on proximity, service, or promotional agreement. As the user walks down the street or drives along the road, the terminal M-Reachability application displays information from businesses along the way on the user's terminal, as each business establishment comes within walking or stopping range.

In addition, a business location or event (such as sports event, art fair, street festival, etc.) will now know how many of their customers or 'fans' are nearby and are able to communicate with them instantly when the potential fans are in the vicinity of the event. This application provides micro-broadcasting capabilities from a location specific to its selected target audience within specified driving or walking ranges.

Electronic Payment Application

Electronic payment applications have slowly emerged in the GSM world. GPRS/3G adds a location/service process dimension, as well as integration with third-party payments and applications providers. Products and services can now suddenly be paid for without dependence on traditional credit card companies or banks. The network version of this brings the application to the masses, giving every small and mid-sized business the ability to create electronic payment business models without the need for web browsers or Internet business models.

This application can be as easy as creating a mobile ‘cash register’, employing a third-party payment application while the end customer is standing in front of the checkout clerk. Card sliding and passwords are replaced by a screen message and OK button on the customer’s own GPRS/3G terminal. Alternatively, advertising is augmented by a code (or barcode) that instantly brings all necessary information to the terminal where simple button clicks set in motion messages and interactions between the customer and the small business, free from expensive overhead infrastructures. Services and messages of the following type can be provided:

- Where can I get it – Map to closest location
- Have it ready for me – Sure
- Send it to this address – Sure

The ‘Officeless’ Business Applications

This business application provides a mobile location-less office environment, complete with computing, messaging and business process functions. The only difference is that such an “office” is virtual, i.e., not associated with a physical business address or facility. The “Officeless” back office is housed in a secure unmanned hosting location and all LAN and PBX functions and connectivity are provided by the network. Connectivity within the ‘Officeless’ business is provided with 3G, managed by an Officeless business process application capable of integrating all 3G terminal-based applications with back office and communications.

By eliminating the need for office and administrative space and replacing it with 3G terminal applications and a business process communication/information application, the service provider can offer a cost saving solution that will be the foundation for new small and mid-sized business models. Virtual offices could become virtual businesses.

As a network application, the network manages all connectivity and information exchanges through permanent virtual connections to all users 3G terminals. ‘Sending e-mail’ and ‘Dialing Phone Calls’ is replaced by instant application, voice and face-face communication between all participants. New or temporary employees simply connect into the ‘Office Less’ environment participating in the communication and information transfer needed for their work.

In Sum: Advantages of Network-enables M-Business Solutions

Network-enhanced 3GPRS/3G applications are a way to create new types of service implementations that are closely integrated with the wireless network. Such applications replace the end-to-end applications (terminal communicating with customer’s IT system) with 3G service processes, wherein the terminal communicates with the service operators’ business applications, that in its turn manage the communications to multiple IT systems, third parties and other application providers.

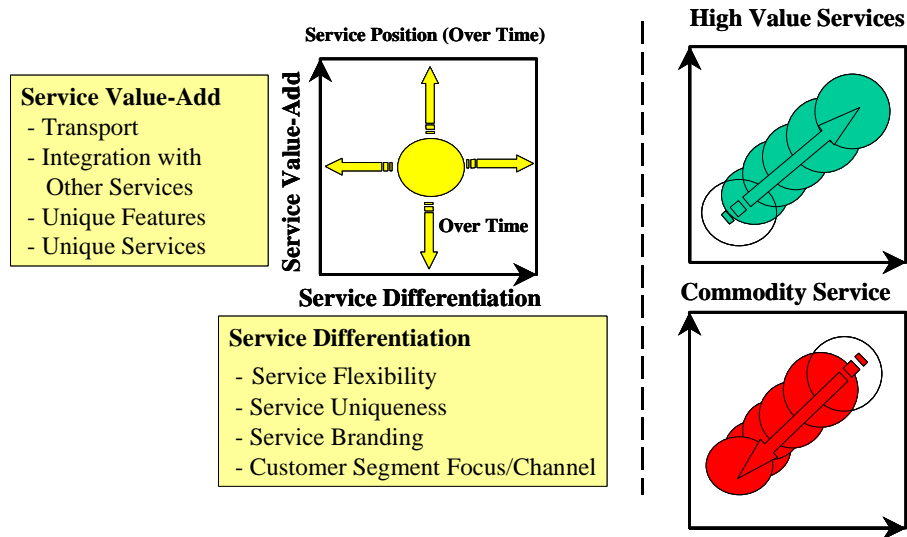
The technologies making such services possible are being developed today (XML, Web Services, High Performance Service Process Engines, Smart IP switching,

XML based UMTS applications). What is lacking is the right network service element that can integrate the parts and combine them with service development and operational tools allowing for large network deployment. Innovative efforts to develop such network elements are currently under way.

Comparative Assessment of Profiled Applications

Comparing the ‘service profiles’ of Figure 3 can be like comparing apples and oranges. Many such services exist in various rudimentary or specialized forms today but will obviously evolve over time. The initial phase of business oriented wireless services

Figure 4: Core Dimensions for Comparing Network-enabled M-Services



Source: Authors' research.

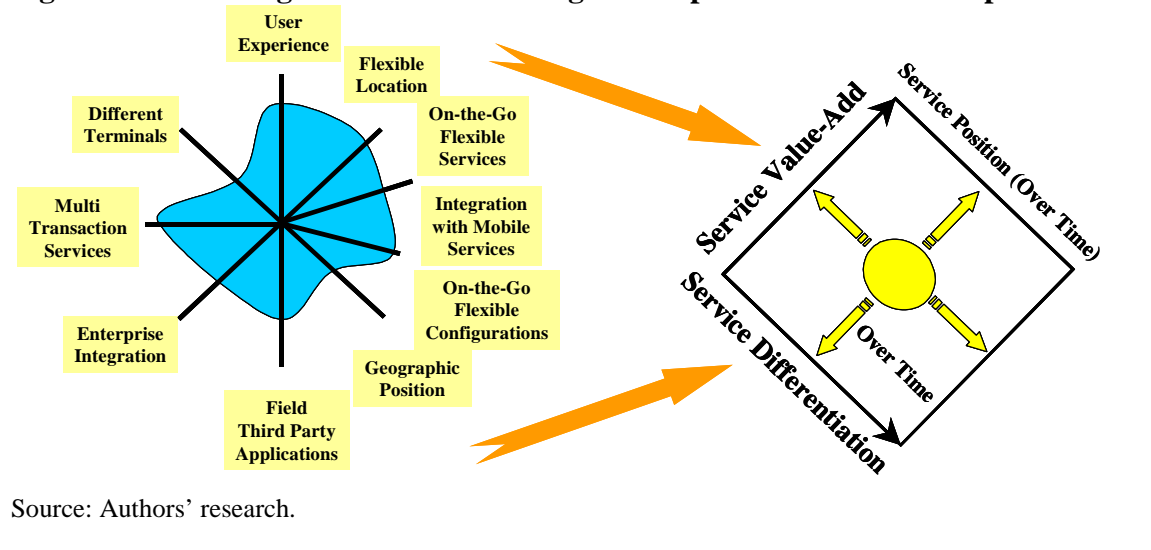
services in the previous section. Service differentiation introduces a new and fundamental marketing aspect to the assessment. The opportunities presented by the network-aided “mobility” aspect, described in the preceding section, create new ways for differentiating service offerings over time. This variable is critical for the m-business services marketplace; it is what makes the m-business offerings unique. For example, a simple M-Yellow Pages service may be implemented and priced in a totally different way for a year-round delivery through a business terminal than for a one-time delivery through a disposable consumer terminal. The service may be limited in both implementations, the first focusing on B-to-B Yellow Pages and the second on information from, for instance, a specific retail chain that gives away the disposable terminals to be used by their customers while visiting the store.

At the same time, real service value-add often tends to be reflected in whether a service becomes a commodity service or a fully differentiated service over time. Existing mobile services tend to be a poor guide in this evaluation. They represent the results of addressing yesterday's opportunities instead of tomorrow's opportunities. The values are therefore skewed, overemphasizing existing business models instead of evolving business models. Consider, for example, the ability to imagine web-based document distribution in the year 1990. No one today would print and distribute binders of documentation instead of just providing them online, but in 1990 this "business model" would have made little sense. In the evolving mobile business models, information and effectiveness/efficiency improvements would be critical in deciding (high) value while more mundane information distribution services will become 'commodities'. If implemented along these lines, high value services have the opportunity to become high profit services while broadly defined commodity services would tend to be under constant price pressure over time. This is where service differentiation and value-add both come in. In order to continue to position the service in the upper right-hand corner (Figure 4), the service provider must be able to continuously add new service value-adds and provide differentiation. Unless supported by a very strong external differentiator or truly unique value-adds, services tend to drift towards the lower left corner over time.

General Guidelines for Assessing New M-Business Services

The market potential for new m-business services is driven both by the volume of users that would use and buy a service and the pricing associated with service usage. Most service development starts with a simple market analysis – How many users will be

Figure 5: Enhancing M-Business Offerings via Experience/Function Improvements

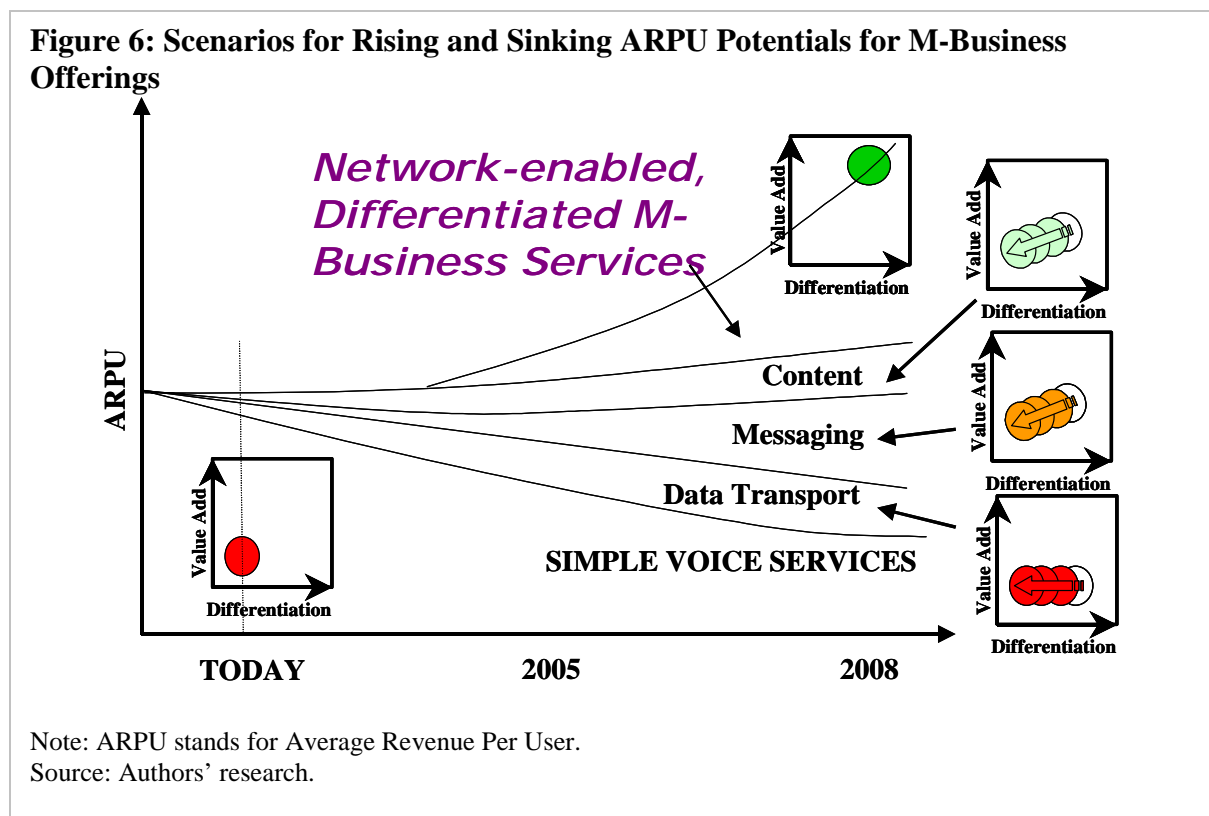


Service Value-add and Service Differentiation play crucial roles in determining what the true potential of a service is over time. Ability to differentiate services increase their market penetration while innovative service value-adds can keep service pricing high. So factors drive the Value-add and Differentiation dimensions of Figure 5? In looking at many past service examples and assessing some new ones, the Experience/Function parameters described earlier can be used to provide Service Value-add or Service Differentiation over time. The challenge for the designers and marketers of new m-business offerings is to augment the Experience/Function parameters that are most appealing to the specified target segments and can be engineered into the designs in cost effective ways. If such steps are taken, then m-business offerings with potentially rising Average Revenue Per User (ARPU) can be developed. New m-businesses that fail to take advantage of the Experience/Function parameters discussed in this chapter, are likely to face declining ARPU scenarios, and sink into “commodity traps” where aggressive (and usually ruinous, from a profitability perspective) pricing is the only option left (see Figure 6).

When carefully designed for “value-add” and “differentiation,” m-business services offer a substantial opportunity to create services that can be improved, evolved, and profitably marketed for extended periods of time. In a world where commoditization is a threat to both revenues and profitability, this offers an opportunity to GPRS/3G Wireless operator to defend their service offerings by evolving and enhancing them with new features and add on services. Well-crafted m-business services designed for business users and consumers may just be the answer to the telecom operators’ dilemma of declining revenues per user.

Summary and Conclusions

We have outlined the key differentiators of m-business, the Experience/Function



parameters that set m-offerings apart from e-business. For true value adding, m-business offerings should also take advantage of new m-business network services that can seamlessly handle many of the service features, thus freeing the business adopter and the end user in the field from the burden of constantly dealing with the challenges designing, redesigning, configuring, integrating, upgrading, troubleshooting, maintaining, and billing for m-service offerings. This is what will create the true value of m-business for 3G/UMTS wireless operators. For business users, we have presented a number of m-business service offerings that take advantage of new wireless network capabilities (based on new and evolving network infrastructure) Finally, we have offered an approach to add value and differentiate m-service offerings so that they continue to remain profitable businesses. This requires a concerted effort on the part of service providers to understand their customers' business needs and the ability to offer an evolving m-business solution to these needs. It is difficult to foretell what exact service mixes would take off. Service providers, for example, may end up giving free 3G terminals/handsets to business customers (and maybe even to the customer's customers) in order to support highly profitable services. The alternative may to developing high-value network-enabled services may be sinking into 'the commodity trap' - where ever lower prices rule and profitability virtually evaporates!