

# CONFIGURING M-COMMERCE PORTALS FOR BUSINESS SUCCESS

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## ABSTRACT

M-commerce entails transactions conducted via mobile telecommunications networks using communication, information, and payment devices such as mobile phones or palmtop units. Geographic positioning and location capabilities are also being added to such networks and devices. Rather than using general-purpose browsers, customers accessing mobile commerce applications often rely on specific mobile portals, or m-portals. These m-portals could be specific to the device that the user has, to the communications infrastructure provider, to the financial infrastructure provider, or to other service aggregators who act as gateways to a variety of mobile services. As the experience of the iMode platform of NTT DoCoMo has already shown, the ability to connect end customers and service providers through an m-portal is a key element for the success of m-commerce. To be commercially viable, such m-portals must attract and retain customers. Success in mobile portal markets will depend on dynamic strategies that blend elements of personalization, permission, and specification of content. This chapter reviews the key differences between traditional e-commerce and the emergent m-commerce. It reviews the core concepts of personalization, permission, and content specification as they apply to e-commerce and m-commerce. The chapter presents a framework for developing effective business strategies for developing and managing mobile portals.

**Keywords:** M-commerce, e-commerce, portals, Europe, USA, Japan, one-to-one marketing, permission marketing, personalization, customization, competition

## **GLOBAL RISE OF M-COMMERCE**

By the year 2000, mobile commerce or m-commerce had transformed from mere speculation to an economic reality, particularly in countries such as Japan<sup>1</sup> and in Europe, especially Scandinavia<sup>2</sup>.

M-commerce refers to monetary transactions over a mobile telecommunications network using a communication, information, and payment (CIP) device such as a mobile phone or a palmtop device. Adding another key capability, that of geographic “location”, transforms the m-commerce system to a Communication, Location, Information provision, and Payment – or CLIP – system. Success in m-commerce markets depends on dynamic strategies that blend elements of personalization, permission, and specification of content to create portals for CLIP devices. Once a mobile portal (or m-portal) gains a significant user base, it becomes an attractive platform for primary service providers and third-party value-adders.

This chapter presents a framework for developing effective business strategies for m-portals and their partners. The chapter is written for business managers, executives, and students whose primary interest is not in the technical aspects of m-commerce but are focused on the conceptual and practical aspects. For the technically oriented readers, the Appendix (at the end of the chapter) provides a brief overview of the evolution of mobile commerce technologies from first generation (1G) to the current third generation (3G) and beyond. More in-depth treatments of the competing technologies for m-commerce can be found in other chapters in this book as well as in other technically oriented works (see, for example, Funk, 2001; May, 2001).

### **M-COMMERCE: DISTINCTIONS FROM E-COMMERCE**

There are two user-oriented core dimensions on which m-commerce has an advantage over e-commerce: “mobility” and “locatability.” Simple CIP devices offer

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<sup>1</sup> See, for example, Brandt, 2000; Economist, 2000c; Hamilton, 2000; Hara, 1999; Hoffman, 2000; Kunii, 2000.

<sup>2</sup> See, for example, Baker, 2000; Bottomley, 1999; Brown-Humes, 2000a; Brown-Humes, 2000b; Dumiak, 2000; Economist, 1999a; Economist, 1999b; Economist, 2000b; Financial Times, 2000a; Financial Times, 2000b; Financial Times, 2000c; Financial Times, 2000d; Financial Times, 2000e; Financial Times, 2000f; Green, 2000; Hoffman, 2000; Kahn, 2000; Kruger, 2000; Müller-Veerse, 1999; Strategis Group Europe, 2000a; Strategis Group Europe, 2000b

mobility. Mobile data networks that employ geographical positioning systems, or use network elements to pinpoint the “cell” where the user is, offer locatability. With locatability, CIP devices are transformed into CLIP (Communication, Location, Information, Payment) devices. Taken together, these two dimensions create a range of distinctions between m-commerce and conventional e-commerce (see Table 1).

**Table 1. Distinctions between M-Commerce and E-commerce**

Dimension	E-Commerce	M-Commerce
<b>Core Dimensions</b>		
Mobility	<b>Limited:</b> User can transact from locations with Internet access.	<b>Ubiquitous:</b> User can transact from anywhere in mobile network area.
Locatability	<b>Client-specific:</b> Client computer locatable via IP address.	<b>User-specific:</b> User, device, and geographic location can be identified.
<b>Behavioral, Strategic, and Leadership Dimensions</b>		
Key customer concern	<b>Money:</b> Because of “free Internet” culture, e-commerce users are money conscious.	<b>Time:</b> Evolving from mobile telephony culture, m-commerce users are time conscious. They are used to paying for mobile services.
Customer location and market served	<b>Fixed Locations:</b> Customers can be served at locations where they have Internet-linked computer access.	<b>Ubiquitous and Global:</b> Customers can be served anywhere within the mobile network coverage area.
National and regional leadership	<b>USA-centric:</b> E-commerce evolved in USA.	<b>Europe and Asia-centric:</b> Scandinavia and Asian nations (Japan) lead in m-commerce.
Industry leadership	<b>New Players:</b> Newer companies such as Yahoo, AOL, Amazon.com, Dell, Cisco, and FreeMarkets have emerged as E-commerce leaders.	<b>Transformed Old Players:</b> Older players such as FSPs, Mobile Device Makers, WSPs, and Banks have chance to grab leadership. <sup>1</sup>

Source: Authors' research

Do the differences between e-commerce and m-commerce outlined in Table 1 translate into differences in terms of business strategies for these two types of Internet-

based commerce? We believe that m-commerce strategies will be different from e-commerce strategies in significant ways. In particular, we focus on three aspects of customer relationship – personalization, permission and specification – where m-commerce is likely to differ from e-commerce.

## **PERSONALIZATION, PERMISSION AND SPECIFICATION**

### **PERSONALIZATION**

M-commerce firms can link stated individual characteristics with a user-centric database. Although such linkages can be made in traditional e-commerce, they go further and deeper in m-commerce. Through relational links with mobile phone usage databases and to geographic positioning data, the scope and depth of a user-centric m-commerce database can be much greater than in the case of conventional e-commerce. M-commerce systems, thus, provide a perfect platform for delivering one-to-one marketing.

Personalization is about creating services that tailor the end-user experience to the idiosyncratic needs of the individual subscriber. In m-commerce, intelligent personalization platforms can be devised to learn from both user preferences and past behavior of the user. There are, of course, challenges in terms of optimizing the interaction path, enabling users to reach the services they want with as few buttons as possible, and presenting information in a compact form scaled for the smaller CIP device. Since the CIP device that enables access also serves as the customer's wallet (Müller-Veerse, 1999), m-commerce platforms can also serve as universal payment systems. Overall, m-commerce applications have the potential to provide a much more comprehensive and intelligent level of personalization than e-commerce applications.

There are of course risks associated with enhanced levels of personalization. Losing the mobile CIP device could have consequences that are worse than losing a wallet. That is why security and authentication have taken on a renewed urgency in m-commerce settings (Wolverton 2002). In the design of 3G devices, for example, strict security standards have to be incorporated.

## **PERMISSION**

Extending the Peppers & Rogers (1993) work on one-to-one marketing to the e-commerce arena, Godin (1999) introduced the concept of “permission marketing” to refer to a way of approaching customers intimately and personally by obtaining prior permission regarding the types of communications they would like to receive. In distinguishing older forms of marketing – disparagingly termed as “interruption marketing” – from permission marketing, Godin (1999) states:

Interruption Marketers spend all of their time interrupting strangers, in an almost pitiful attempt to bolster popularity and capture attention. Permission Marketers spend as little time and money talking to strangers as they can. Instead, they move as quickly as they can to turn strangers into prospects who choose to “opt-in” to a series of communications.

To be really useful, m-commerce applications require a much more comprehensive scope and depth of permission than e-commerce applications. For instance, m-commerce users must give permission to use their geographical location to pinpoint nearest service delivery points and also give permission to charge their purchases and service usage fees to their mobile network accounts or to pre-specified credit or debit cards.

## **SPECIFICATION**

In e-commerce, distinctions have emerged between the “home” and “work” roles of users. In many instances, users are free to use any type of e-commerce services from their home terminals but are barred from using personal services, such as shopping or browsing pornography, by the firewalls surrounding their office terminals. M-commerce challenges these distinctions. Questions such as the following arise: Is it possible to determine whether the individual is at work (on duty) or not (off duty)? Is it even preferable or necessary to maintain this distinction? If the segmenting, targeting, and positioning strategies for m-commerce are approached using the traditional distinctions between B2B and B2C marketing, this could create confusion and problems. M-commerce providers have to serve the user in multiple roles (on duty/off duty) and at varying locations (home/work/traveling/shopping/elsewhere) in a *dynamic* fashion. M-commerce portals have to be ready to handle the user’s dynamic specification of the role-location combination s/he *prefers*. In some cases, the m-

commerce provider will have to dynamically *infer* the role-location specification, depending on the context of the interaction. And in still other cases, the m-commerce *merchant would specify* the segmentation style and the m-commerce portal would have to handle such merchant-specified role-location combination. Thus, the m-commerce portals will have to become “dynamic specification hosts.” To become an effective and efficient specification host, the m-commerce portal will have to gather a lot of valuable, owner-specific information as well as service-capability and timing information from service and content providers.

**Table 2. Personalization, Permission, and Specification in M-Commerce and E-commerce**

Dimension	E-Commerce	M-Commerce
<b>PERSONALIZATION</b>		
User-centric database	<b>Slow Evolution:</b> Evolves from navigation and transaction behavior of the user	<b>Fast Evolution:</b> Evolves from daily communications and linking of multiple databases
Tailoring of services and content	<b>Somewhat Limited:</b> Depends on inferences about user’s preferences, roles	<b>Possibly Extreme:</b> User revealed preferences, inferred roles and preferences, and location factors can be used to tailor offerings
Learning and intelligence	<b>Limited:</b> Based on collaborative filtering, profiling	<b>Extensive:</b> Based on collaborative filtering, profiling applied to multiple databases
<b>PERMISSION</b>		
Scope of permission	<b>Relatively Narrow:</b> Merchant-specific, defined in User Agreement	<b>Relatively Broad:</b> Often unspecific and location based
Depth of permission	<b>Relatively Shallow:</b> Very specific transactions and charges are permitted	<b>Relatively Deep:</b> Extensive range of transactions and payments are permitted
<b>SPECIFICATION</b>		
Role demarcation	<b>Sharp:</b> Especially in firewalled work environments	<b>Blurred:</b> Difficult to tell whether user is on or off duty
Nature of role specification	<b>Static:</b> Determined by the location of the client terminal	<b>Dynamic:</b> Depends on user preferences, merchant preferences, and geographic location
Service or content specification	<b>Somewhat Configurable:</b> Depends on client terminal IP address and revealed user identity	<b>Evolving and Dynamic:</b> Depends on user preferences, merchant capabilities, location characteristics

Source: Authors’ research

## **REVISITING THE M-COMMERCE/E-COMMERCE DISTINCTIONS**

Based on the foregoing discussion about personalization, permission, and specification, some further distinctions between m-commerce and e-commerce can be made (see Table 2). In essence, m-commerce extends and elaborates the potential of personalization, permission, and specification that e-commerce provides. Without substantial extensions of these three dimensions, the very rationale of m-commerce becomes questionable. Just as a fixed telephone system with widely dispersed private and public phones cannot fully substitute a system with universal mobile telephony, similarly an e-commerce system with a wide distribution of terminals cannot fully substitute for a fully developed m-commerce system. Just as mobile telephony represents a wholly distinct communication pattern from fixed telephony, so does m-commerce represent a wholly distinct transaction system from e-commerce.

The distinctions between m-commerce and e-commerce create different strategic imperatives for each of these Internet-based systems of commerce. We turn our attention now to the strategic imperatives for m-commerce, based mainly on the dynamic impacts of personalization, permission, and specification.

## **STRATEGIC REQUIREMENTS FOR M-COMMERCE SUCCESS**

The factors that distinguish m-commerce from e-commerce (Table 1), together with the three customer relationship dimensions – personalization, permission, and specification (Table 2) – constitute the building blocks of a new worldview for the mobile end user (MEU) in m-commerce. The m-portal serves as the integrative factor. The m-portal is a location specific portal – as the user changes location, the m-portal also changes. Either the CIP owner pre-configures it for specific countries, cities, areas/districts, and the businesses that the user is visiting; or a dynamic specification host assesses where the user is and what role s/he is in, and configures the portal accordingly. A geo-capable CLIP device can automatically shift between locations.

To illustrate, consider the case of Kathy, a sales engineer traveling from New York's JFK airport to Copenhagen's Kastrup airport. Upon arrival in Copenhagen, her CLIP device automatically shifts to the Copenhagen Portal and only shows the related links relevant to Kathy and to Copenhagen. When she enters a specific shop in Copenhagen the m-portal lists goods offered in that shop based on her previous purchase history – even pointing out the shelf location of her preferred brand of mint. After some personal shopping, while taking a taxi to the customer's firm, Kathy checks her CLIP device for new e-mail messages. In one of the e-mails, a new purchasing officer at the client firm introduces himself and explains that he will be at Kathy's impending sales presentation. She checks out the profile of the purchasing officer on the client company's WAP site, adjusts two slides of her presentation located at her own company's Intranet, and leaves the taxi, paying with the CLIP device.

The m-portal is an individual specific portal tailored for both personal and professional tasks. In addition to the personalization features evident in the Copenhagen trip illustration, the m-portal is PIM-based<sup>3</sup>. It can draw on all of Kathy's contact, schedule, and task information and use such information to automatically generate the content of the portal. The success of the m-portal depends on a continuous-loop personalization. Such continuous-loop personalization makes it very difficult to maintain the distinction between Kathy's private and professional lives.

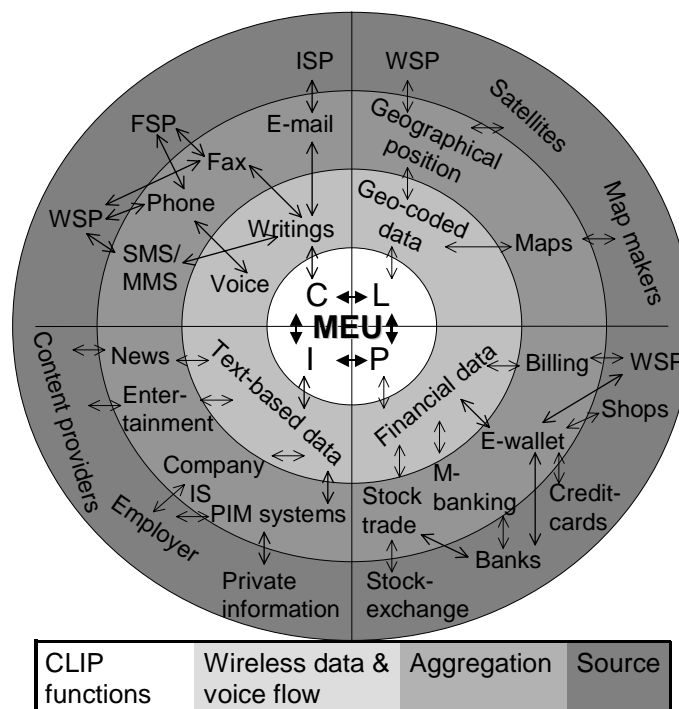
Figure 1 shows the need for integration, which is a primary key success factor for the m-portal. In order to make the communication (C) functions work, there is a need for integration of the Internet (ISP), fixed-line service provider (FSP) and wireless service provider (WSP) offerings. Regarding voice, the phone should be able handle calls supplied by both WSPs and FSPs. Text messages come in multiple flavors like e-mail, fax, SMS (Short Message Services) and its cousin MMS (Multimedia Message Services). In many countries it is possible to route calls from the FSP to the WSP and to get the e-mail messages sent to the mobile phone. Sometimes, to accomplish such integration, users have to buy a mobile phone that is WAP-enabled or can handle POP3 protocol and therefore e-mails. In other words, the communication (C)

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<sup>3</sup> PIM stands for Personal Information Manager. It refers to software, devices, and databases that keep track of personal calendars, addresses, notes, etc.

functionalities are already fully integrated if the user chooses the right service provider and buys the right mobile phone. The state-of-the-art regarding the information (I) functions is almost also at this level of integration. Through SMS and WAP, text-based data can be accessed. Many m-portals team up with content providers to deliver news and entertainments and some also gives access to the employing company's information system and/or private information stored in the personal information manager like MS Outlook. When it comes to the payment (P) functions, based upon efficient and secure exchange of financial data, the total aggregation is still evolving. We are not aware of any portal that can handle stock trades, m-banking, e-wallet, and billing at the same time. Terminals and services offering such applications separately do exist in some countries. Billing information flows directly form the WSP to the MEU as SMS. Most of the bigger Scandinavians banks offer m-banking solutions with stock trades included. Also in Scandinavia, some e-wallet trials are underway, focused on

**Figure 1. Integration: Primary Key Success Factor for the M-portal**



Source: Authors' Research

payment in supermarkets, for parking, and for paying highway tolls. The Location (L) functionalities are also still evolving. These are based upon geo-coded data and the

aggregation and integration are still at low levels. We are aware of mapmakers making it possible to download maps to palmtop units that also can be equipped with a GPS receiver. Also a few trials are underway where the users can get the nearest restaurant, bar, or convenience store based upon geographical position determined by the WSP. Geo-coded datasets, however, are not made available in a way that the m-portal can use the data to personalize the CLIP-functions.

Figure 1 illustrates the business opportunities for the m-portal where the arrows symbolize the needed integration. The first-level integration of the communication, location, information and payment functions happens in the CLIP device. The figure also shows that the m-portal owner has to integrate already existing offerings or build applications that integrate the possible wireless data flows, aggregations and sources. Seamless and smooth-functioning partnerships with shared revenue are needed for effective integration of sources and services.

In the initial phase of the evolution of m-commerce, for some of the larger players, the key strategic goal will be the attainment of leadership, i.e., to become an m-portal. For other firms, and for the firms that fail to become m-portals, strategies will have to evolve in terms of becoming effective m-portal partners. While it is too early to predict what the competitive field of m-commerce will look like, we can utilize Figure 1 to delineate some of the success requirements. We can do so for three situations: the battle for leadership, the m-portal, and the m-portal partner.

### **THE BATTLE FOR LEADERSHIP**

Figure 1 illustrates clearly that the Wireless Service Providers (WSPs) are well positioned for m-commerce business. WSPs have some exceptionally strong opportunities for being the winner of the game. Besides being in charge of the wireless data and voice flow to and from the CLIP device, WSPs also have access to sources that provide the value-adding communication, location, information, and payment features. Additionally some WSPs are also building applications that access the information systems of the users' employers. For example the Danish WSP Sonofon has teamed up with HP to create access to the company Intranet (Hewlett-Packard, 2000). In a report, the consultant firm Strategis Group Europe (2000a; 2000b)

concludes that “wireless portals will provide operators with key competitive edge in Europe” and the WSP and the device manufacturers have core competencies in creating m-portals. Durlacher, another European consultancy, suggests that WSPs team up with traditional Internet portals because they have complementary strengths. WSPs bring experiences with mobile communications, billing, and location information to the table. These elements represent the weaknesses of the traditional Internet portals that, in return, have strengths in portal configuration, content creation and presentation, application and partnering experiences (Müller-Veerse, 1999). Partnering will be a key success factor for m-portals, a theme that we will visit later in this chapter.

With the exception of Japan’s NTT DoCoMo (see Bradley & Sandoval 2002), WSPs did not have a very good start in the m-portal business<sup>4</sup>. There have also been a lot of teething troubles with the first version of the preferred WAP protocol<sup>5</sup>. Also, many WSPs bet on the previously used “walled garden” content model, which restricts subscribers' access to third party portals. That approach had no success at all<sup>6</sup>.

Winners of the battle for leadership will be the m-portals that can utilize the key success factors for m-commerce – mobility and locatability – and offer high degrees of integration. Even though we are in the first stage of m-commerce where locatability is not fully implemented yet, any future-oriented discussion of effective business strategies for m-commerce must be based on locatability being a key feature of the m-commerce network.

## **THE M-PORTAL**

The m-portal strategy will be effective when it blends elements of personalization, permission, and specification of communication, information, payment, and location features in m-commerce services. The essential task of m-portals is to be an intermediary and mediator. In principle, the m-portal can be a database permit, specify and personalize the communication, provide information, enable payment, and

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<sup>4</sup> See Brandt, 2000; Economist, 1999c; Economist, 2000c; Hamilton, 2000; Hara, 1999; Hoffman, 2000; Kunii, 2000.

<sup>5</sup> See Baker, Gross, Kunii, & Crockett, 2000; E-business Forum, 2000; Economist, 2000b; Financial Times, 2000g; Hara, 1999; Müller-Veerse, 1999; Nielsen, 2000a; Nielsen, 2000b; Young, 2000).

<sup>6</sup> See Baker, 2000; Economist, 2000a; Economist, 2000b; Nielsen, 2000b; Smith, 2000; Strategis Group Europe, 2000b; Young, 2000.

provide location functions, where the primary mobile communications provider delivers all the data and voice. This is illustrated in table 3.

The m-portal will handle the permission element by giving the user rights to define the types of communication, information, and payment features. The m-portal will also offer one-button (or voice activated) disabling functions so that pre-set permissions – such as determining and communicating the user’s location – can be suspended for a while. Successful m-portals would have to allow users to become partly or totally invisible to the commercial side of the network, if the users so desire.

Based upon the general permissions set by the user, the m-portal will be able to specify content dynamically. The m-portal could use the geographical position of the

**Table 3: Contents of an Effective Business Strategy for M-Portals**

	<b>Communication</b>	<b>Location</b>	<b>Information</b>	<b>Payment</b>
<b>Permission</b>	Types of communication and senders can be permitted or forbidden	Types of information and senders can be permitted or forbidden	Payment features can be enabled or disabled, individually or collectively	Locatability and geo-positioning features can be enabled or disabled
<b>Specification</b>	Off/on duty “button”, preferences, current time of the day and location of the user specify which messages go through	Off/on duty “button”, preferences, current time of the day and location of the user specify types of information	Off/on duty “button”, user and merchant preferences, current time of the day and location of the user specify types of transactions	Geographical position feeds CLIP specification features
<b>Personalization</b>	Dynamic unified inbox	Me & My: Personalized information portal for news, travel information, PIM, company information and entertainment	Personal E-wallet, stock portfolio and phone bills	Dedicated maps

Source: Authors’ research.

user, the time of the day, and an analysis of services consumed to infer specification features and feed it to other CLIP provides and devices. A virtual off/on duty “button” on the CLIP device could allow the user to tailor the data and voice flow to and from the CLIP device. When it comes to using the CLIP device as an e-wallet, merchant preferences will also play a role in the detailed specification of the CLIP device functionality.

In these ways it is possible to create an ultra personalized m-portal. The CLIP device will handle all types of communication through a unified inbox. The information retrieval will be under the concept “Me & My”, meaning dedicated information when and where the user needs it. Payments and financial transactions of many types will go through the CLIP device too. The location feature will be used to create dedicated maps and driving directions.

The essential task of the m-portal is to be an intermediary and an integrator of information. The versatile m-portal has to be simultaneously a database permit, specify and personalize the communication, information, payment, and provide location

**Table 4: M-portal Partner Products and Services**

	<b>Communication</b>	<b>Location</b>	<b>Information</b>	<b>Payment</b>
<b><i>Device Manufacturers</i></b>	Mobile Phones, PDAs, Pagers	Mobile Phones, GPS receivers	Mobile Phones, PDAs, Pagers	Mobile Phones, PDAs
<b><i>Infrastructure Enablers</i></b>	ISP, FSP, WSP	WSP, GPS Network	Content aggregators, Internet portals	WSP, Banks, Credit card firms
<b><i>Content Providers</i></b>	WSP	Map makers	News agencies, Travel firms, Entertainment firms, PIM firms, Employers	Banks, Exchanges, WSP, Virtual and Physical businesses

Source: Authors' research.

functions. The appropriate partners deliver the necessary data, services, approvals, and communications.

### **THE M-PORTAL PARTNER**

Many firms have to cooperate in order to create effective and attractive m-portals. Three vital groups of partners are central for m-commerce: Device Manufacturers, Infrastructure Enablers, and Content Providers. Table 4 shows these types of firms according to the communication, information, payment, and location features in m-commerce.

Mobile phone manufacturers such as Nokia, Ericsson, Sony, Samsung, and Motorola are working intensely to create standard devices for m-commerce communications and transactions. Firms such as Palm, Psion, Handspring and

Microsoft are also working on wireless strategies using the handheld Personal Digital Assistant (PDA) as the main m-commerce device. These firms will attempt to drive m-commerce in the directions they think are most profitable. Some outsiders, however, will also be in the game. These include Pager firms such as Research in Motion (maker of Blackberry devices), Glenayre, and Tandy Radio Shack; and GPS receiver manufacturers such as Garmin, Lowrance and Magellan. No *de facto* standards and protocols have emerged yet, so it is too early to describe the general interface between the devices and the m-portal. It seems reasonable, however, to focus strongly on the mobile phone producers because they already have developed solutions for all four primary CLIP functions – communication, location, information and payment – of the m-portal.

When it comes to infrastructure enablers, the most important partners for the m-portal are the wireless service providers (WSPs). Other contenders include Internet service providers (ISPs), fixed-line service providers (FSPs), GPS network providers, content aggregators, Internet portals, banks and credit card firms. In some cases, electric utility companies, transportation firms, and television firms may play a role in enabling m-commerce. In the initial years, WSPs hold an advantage – they are already positioned as the mobile communications companies that have either their own or strongly dedicated infrastructures. Over time, however, other firms could make inroads – just as they did in the fixed line and ISP businesses in the recent past.

Perhaps the most important group of partners is the content providers. Each of the CLIP elements has specialized partners. The appropriate partner to handle the communication part will be the WSP. For location-related services, mapmakers are best positioned to provide location-related content. Lots of third-party information and entertainment providers could be partners in providing information. In order to handle the payment function, banks, exchanges, WSP, virtual and physical stores are likely to provide content. A big challenge for all will be the need for supplying geo-coded information so that specification of the m-portal services can be appropriate to the location-role of the user. Another and even bigger challenge is to integrate multiple and often competing technologies such as the following:

- Network Technologies (GSM, HSCSD, GPRS, EDGE, 3G)

- Service Technologies (SMS, MMS, USSD, Cell Broadcast, SIM Application Toolkit, WAP, Web Clipping, MexE)
- Mobile Middleware (Mobile Portal Platforms, Mobile Commerce Platforms, Mobile Payment Platforms, Mobile Banking Platforms)
- Mobile Commerce Terminals (Operating Systems, Physical Terminals, Microbrowser, Bluetooth, Smartcards, PKI, Synchronization)
- Mobile Location Technologies (GPS, TOA, E-OTD, COO, LFS Independent)
- Mobile Personalization Technologies
- Content Delivery And Format (XML, WML, VXML, cHTML)

While the competitive picture at this stage is emergent and blurred – with many potential m-portal partners – it is a good strategic stance to have a strong focus on the specific business strengths of each potential m-portal partner.

## **SUMMARY AND CONCLUSIONS**

The m-commerce revolution has already begun. It will really accelerate when the m-portals – whether provided by mobile operators, financial institutions, or value-added service providers – focus on permission, specification, and personalization; and offer extended mobility and locatability for the user. M-portals become really useful when the user can transact from anywhere in a mobile network area and that the user, device, and geographic location can be identified.

Leading m-commerce actors offering such services can be found in Scandinavia and Asian nations (Japan, South Korea). In these places as well as in other nations, older players such as FSPs, Mobile Device Makers, WSPs and Banks have a chance to grab leadership in the emergent new m-commerce sectors.

It is important to understand that m-commerce users are time conscious and wish to be served anywhere within the mobile network coverage area. Personalization is based upon user-centric databases that evolve from daily communications and linking of multiple databases. Starting with the user's revealed preferences, personalization tailors services and content by constantly inferring roles and preferences (according to the context in which services are demanded), and by taking into account characteristics of the geographic location. Personalization relies on learning and intelligence based on collaborative filtering and profiling applied to multiple databases.

The scope and nature of permission are often unspecific and location based. The depth of permission, on the other hand, relies on an extensive range of transactions and payments that are explicitly or tacitly permitted by the user.

Specification faces the challenge of figuring out what “role” the user is in, at any particular moment. It is difficult to tell whether user is on or off duty. The role depends on user preferences, merchant preferences/capabilities, and geographic location/characteristics.

Integration is a key issue where location in the form of geo-coded data is essential. Integration of the communication, location, information and payment functions happens in the CLIP device, in a real-time fashion. It is also important, however, for the m-portal owner to integrate already existing offerings or build applications that integrate the possible wireless data flows, aggregations and sources. Seamless and smooth-functioning partnerships with shared revenue are also needed.

Wireless Service Providers (WSPs) have some exceptionally strong opportunities for being the winner of the game but partnering will be a key success factor for m-portals. The winner of the battle for leadership will be the m-portal that can utilize the key success factors for m-commerce – mobility and locatability – and offer a high degree of integration. The essential task of the m-portal is to be an intermediary and an integrator of information. In principle the m-portal can be a database permit; as well as specify and personalize the communication, information, payment, and location functions. Appropriate partners deliver the necessary data, services, approvals, and communications that flow via the m-portal. Three vital groups of partners are central for m-commerce: Device Manufacturers (Mobile Phones, PDAs, Pagers and GPS receivers), Infrastructure Enablers (ISP, FSP, WSP, GPS Network, Content aggregators, Internet portals, Banks, Credit card firms), and Content Providers (WSP, Map makers, News agencies, Travel firms, Entertainment firms, PIM firms, Employers, Banks, Exchanges, and Virtual and Physical businesses).

A big challenge for all is the need for supplying geo-coded information so that specification of the m-portal services can be appropriate to the location-role of the user. Another and even bigger challenge is to integrate multiple and often competing technologies. The early experiences of m-commerce pioneers worldwide need to be

watched closely to figure out the combinations of technologies, partnerships, and business models that work well.

Even as the USA is attempting a grudging transition from 2G to 3G mobile networks and Europe is struggling to usher in 3G on a wider scale, efforts have begun for the successor 4G mobile networks – especially in Japan. These 4G networks would guarantee service quality and security in wireless networks comparable to wired circuit-switched networks, provide multimedia communications of television quality, and allow users to roam globally as well as across LANs and WANs – with smooth, seamless handovers. The framework presented in this chapter lays out service delivery parameters for m-commerce that should be of value in mobile networks as they evolve from 2G to 3G, and on to 4G and beyond in the future.

## APPENDIX: BRIEF OVERVIEW OF MOBILE GENERATIONS

Mobile communication technologies constitute the technical foundations of m-commerce. Such technologies have evolved from first generation (1G) technologies of the 1980s to third generation technologies of early 2000s. Further evolution into 4G (and even 5G) is already being planned and promoted by leading mobile technology players. The table below provides brief comparisons of these evolving generations.

Characteristics	1G	2G	3G	4G
<b>General Aspects</b>				
Approximate Start	1981	1991	2000	2006 (first deployments)
Analog or Digital	Analog	Mostly Analog	Mostly Digital	All Digital
Traffic Type	Voice	Mostly Voice	Voice and Data	Multimedia
<b>Network Architecture</b>				
Network Coverage	Metropolitan Area Networks	Wide Area Networks	Wide Area Networks, Some LAN links	Hybrid: Seamless LAN, MAN & WAN integration
Switching	Circuit-switched	Mostly circuit-switched	Mostly packet-switched	All packet-switched
Terminal Devices	Clunky large phones	Variety of phones and handholds	Variety of phones, handholds, laptops, electronic devices	Vast variety of terminals, especially high-end portable audio and video devices
<b>Standards and Protocols</b>				
Network standards and protocols	NMT, AMPS, TACS	GSM, TDMS, CDMA, PDC-JDC, PCS  Also, 2.5 G: HSCSD, D-AMPS, GPRS	IMT-flavors, including UMTS, CDMA-FDD, W-CDMA, EDGE, DECT	OFDM, MC-CDMA, LAS-CDMA
Devices	Network-proprietary	Variety of phones and	Emergence of multimedia	Multiple Input, Multiple

	phones	some handheld devices	devices	Output (MIMO) "smart" antenna, multimedia devices
<b>Transmission Rates</b>				
Data transmission rates	No data transmission	Upto 64 Kbps	384 Kbps to 2 Mbps	50 to 100 Mbps
<b>Roaming and Handovers</b>				
Roaming	Within defined metropolitan area	Roaming within same-type network	Roaming across networks	Global roaming
Handovers	Very limited handovers	Cell-to-cell handovers within a network, cross-network handover agreements	Goal of smooth 2G-3G handovers for interworkability and backward compatibility, Some WAN to LAN handoffs	Seamless handover within/across all generations and types of networks
<b>Quality of Service</b>				
QoS Standards and Experience	No QoS standards or expectations	Frequent dropped calls, QoS a competitive factor for Digital PCS, etc.	Efforts to monitor, control, negotiate, and guarantee QoS levels	At least 99.99% reliability expected (similar to wireline networks)
<b>Security</b>				
Transmission security	Insecure transmission	Authentication and encryption algorithms introduced – relatively weak	High data integrity, secure links, 2GPP specified strong security levels	Highly secure transmissions

Source: Authors' research

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