

## WIRELESS AND MOBILE SERVICES

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**Abstract:** In Europe and Asia, transactions of mobile commerce and services are reaching billions of dollars per year. The European mobile market is expected to range between EUR 7,8 billion and EUR 27,4 billion in 2006, with a median forecast of EUR 18,9 billion. Successful new market creation requires that a set of convergent forces drive all players in the same relevant direction. Seven major forces have been identified that need to be in place to stimulate the feedback loops. Many content providers currently base their services on SMS, rather than WAP

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### 1 Introduction

The wide deployments of wireless networks and the explosive growth in the number of mobile users have created a very strong demand on mobile commerce applications and variety of mobile services that deliver contents. According to Nokia, in 2003 there are 1.4 billion mobile phone users in the world and the number is increasing rapidly. In Europe and Asia, transactions of mobile commerce and services are reaching billions of dollars per year [1].

We focus on innovative ideas in creating cutting edge mobile commerce systems and wireless information services and exchanges information regarding advancements in practice of mobile commerce and services.

The European mobile market is expected to range between EUR 7,8 billion and EUR 27,4 billion in 2006, with a median forecast of EUR 18,9 billion. However, this market remains to be created. In order to reach this forecast, the market players need to focus on:

- new services and applications
- new value map of players,
- new interactions between players,
- new business models,
- new customer segmentation

## **2 Identified Driving Forces**

Successful new market creation requires that a set of convergent forces drive all players in the same relevant direction. It is therefore particularly important to identify which are the required forces that ensure the mobile content market to take-up and, where appropriate, to positively influence those forces by relevant public initiatives.

Seven major forces have been identified that need to be in place to stimulate the feedback loops and enable the vicious effects to become virtuous. These forces are:

- Availability of compelling and formatted content
- Availability of relevant applications
- Education of users on the benefits of mobile content
- Development of a handset installed base
- Adequate revenue sharing between players
- Stimulation of investments in all enabling technologies
- Promotion of the uniqueness and inter-operability of standards

The latter three forces can be resumed into a single force: the creation of an ecosystem attracting all value chain players. All of these forces are not present today and therefore need to be fostered. To this end, a number of recommendations were developed throughout this paper. Each of these recommendations has been grouped by subject.

## **3 Technology and Development**

The 2G standard common to all operators in Europe is GSM [5]. Some operators have decided to upgrade their networks to HSCSD (High Speed Circuit Switched Data), enabling them to provide higher bandwidth (around 40 kbps) in a circuit switched mode. The majority of operators, however, have decided to directly upgrade their GSM networks to GPRS. It is unlikely that a significant number of operators will upgrade their networks to EDGE in Western Europe. In addition, a minority of operators have not considered GPRS in their transition plan towards 3G.

For 3G networks [1], the standard adopted is W-CDMA (Wideband CDMA - better known as UMTS). Within this technology there are 2 variants that operators will implement (probably simultaneously) in Europe. These are:

- FDD (Frequency Division Duplex): perfectly suited to voice applications as there are 2 channel uplinks and 2 channel downlinks;
- TDD (Time Division Duplex): suited to data applications as it allows a dynamic allocation of uplink and downlink channels according to the service provided;

In conclusion, the proliferation of network / bearer protocols will be very limited in Europe: almost all operators will support in the short term GPRS and in the longer term the two variants (FDD and TDD) of W-CDMA.

The major operating systems for handsets are:

- PalmOS: This OS is a proprietary platform developed by Palm and licensed to other companies such as Handspring, Sony and Qualcomm. This OS is very much a PDA-specific operating system.
- EPOC from Symbian: This OS has the backing of numerous players from the traditional mobile handset manufacturers. EPOC is powering Nokia's Communicator 9210 and Ericsson's R380 phone.
- Microsoft Pocket PC/Windows CE: Microsoft has publicly disclosed the importance of its mobile strategy and will back the system with sufficient resources. It is currently equipping PDAs and PocketPC devices.
- Linux.

It is still unclear which of the OS will emerge, or whether, a particular OS will actually emerge as a leader. Should devices start to converge, competition in the OS marketplace will increase. As shows the table below, most of the device manufacturers are, for that fact, hedging their risk so as not to back an OS that may not emerge.

From the perspective of the user, their most commonly heard complaints are that WAP is slow and cumbersome. To a large extent it is the networks over which the transmission happens that causes these problems. i-Mode in Japan has been deployed over a packet-switched telephone network, PDC-P, while WAP (used in all countries using the GSM standard) has been deployed over the circuit-switched telephone network.

The fact that WAP is over a circuit-switched network adds to the slowness of the service given that a "connection" has to be established with a WAP server every time information wants to be consulted. As is illustrated below, WAP in a "packet-switched" GPRS environment reduces the time needed to consult information. It should be noted that "always on" still means between 4.5 seconds and 8.5 seconds to download the first WAP page and 2 to 6 seconds to download subsequent WAP pages.

The i-mode transmission, on the other hand, sticks as close as possible to the Internet standards, so it passes through the web content but converts the underlying Internet protocol.

Many content providers currently base their services on SMS, rather than WAP. This is mainly because premium content SMS can be charged for on SMS. But SMS messages, with their 160 character text only features, are cumbersome and represent a barrier for many potential content consumers. Equipment manufacturers issued two new (open) standards to enrich the messaging experience: EMS (Enhanced Messaging Services) and MMS (Multimedia Messaging Services).

In an environment with many operating systems, a standardised cross-platform application development standard becomes very important. Integrated development across platforms increases the potential user-base and thus the market for application developers. One of the technologies that could solve this problem is Java, a language for platform independent development that has existed for some time already. The problem with implementing Java across mobile devices is that it requires a significant

amount of processor speed, storage and power. Sun Microsystems developed a scaled-down version of Java developed specifically with the constraints of mobile devices in mind. It has given the product that enables mobile Java the unwieldy title of 'Java2 Platform Micro Edition'. It is transparent to the end user or subscriber and allows to custom content and new applications for mobile phones even after they have been sold to the subscriber. This is done in a similar way to downloading ring tones or SMS logos.

#### **4 Mobile Industry's Players**

The value map of the mobile data industry can be considered as an ecosystem [6] of 7 interrelated roles. The mobile content value map can basically be seen as the integration of the value maps of two distinct industries – those of the mobile voice and the media / content industries.

The main roles in the mobile content value map can be defined as follows (Fig. 1):

- Device manufacturing deals with the development and the marketing of the end-user mobile devices that will be used to access mobile data services;
- Network manufacturing involves the development and manufacturing of the network equipment over which mobile services are delivered;
- Traffic transport providers ensure the maintenance and the operations of the mobile network transmission infrastructure;
- Service provision can be sub-divided into technical and commercial service provision. The technical side deals with the operational support services (billing, user localisation, etc.) whereas the commercial side deals with the market facing aspects of service provision (distribution channels, brand name, etc.);
- Content aggregation concerns the development and maintenance of the primary interface for the delivery of content over mobile devices. In that role, content aggregators often take the role of packaging individual information sources and applications into a bouquet that is sold to customers;
- Application development and provision handle the development of applications for use on mobile devices (applications such as games) or the development of applications that allow the delivery of content in a format that adds value to the end-user (news alerts);
- Content provision deals with the production of content that is distributed over mobile devices. This means that content providers are responsible for the creation of ideas, the organisation of production and the delivery.

#### **5 Mobile Services**

Mobile services (applications) are defined as services that are accessible on mobile devices. The first service that was available over mobile devices was that of voice communication, the first call being made back in 1973. Since their introduction, mobile applications have come a long way. Data networks being currently deployed in-

crease bandwidth availability, paving the way for a wealth of new applications beyond the initial voice communication application. These new applications will be referred to as “data applications”.

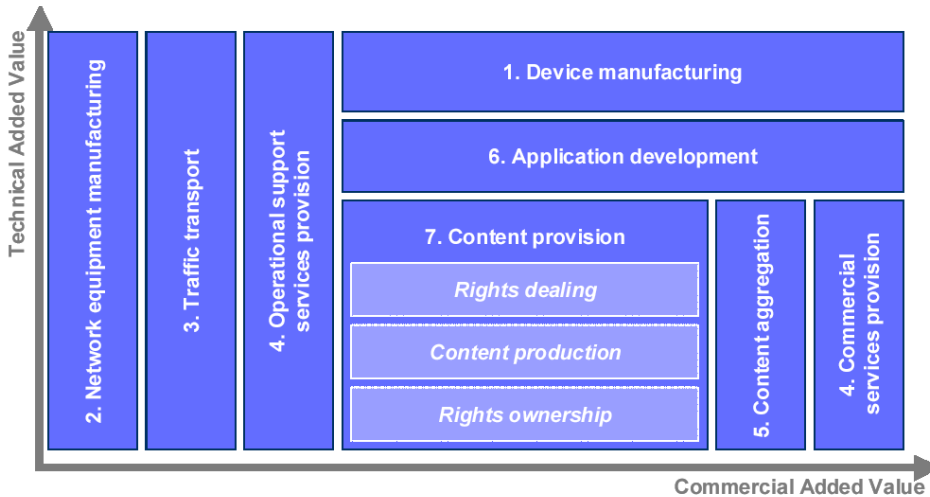


Fig 1: Mobile Industry - Added Value (Source Andersen 2003)

Applications can be consumer or business oriented. Applications can be related to person-to-person, person-to-machine or machine-to-machine communication. A third segmentation categorises mobile applications acknowledging their nature of being communication-centric, transaction-centric or content-centric. Considering the scope of this report, the latter segmentation has been adopted.

- **Communication-centric**: the essence of these mobile data applications is to enable the communication between two people, two machines, or between a machine and a person over a mobile network.
- **Transaction-centric**: the essence of these mobile data applications is the conclusion of a transaction over the mobile network. These applications relate to the field of m-commerce.
- **Content-centric**: the essence of these mobile data applications is to deliver content over a mobile network to a person.

Although both transaction-centric and content-centric applications involve the communication between a human being and a machine, the communication is no more than an enabler, servicing respectively the transaction or content delivery. Equally, although content-centric mobile data applications always involve a transaction under the assumption that the services need to be paid for, the difference resides in the fact that with content-centric applications, the good/service is delivered over the air onto your mobile device.

## 6 Key Drivers and Barriers

The following points arise as important drivers and barriers for the development of mobile services [4]:

- Rights Management
- Personalization of information
- Content management
- Application development
- Business models
- Handsets
- Standardization
- Access to Public Service Information

The marketing of WAP, GPRS and UMTS as the “mobile Internet” [2] will most likely have a detrimental effect on the overall market development as it raises users’ expectations of 3G above what 3G will actually be able to deliver. Devices constraints, the fact the mobile content will be different from rich media available on the fixed-line Internet and the fact that content will need to be paid for n mobile devices are some of the differences between mobile-content applications and fixed-line Internet which users do not perceive. In Japan, DoCoMo paid particular attention to promote i-mode as a mobile information service from the outset rather than the “mobile Internet”. Part of i-mode’s success has been attributed to this fact.

## 7 Conclusion

Considering the above mentioned a new market development model for Europe is a MUST for successful mobile services scenario. The market is rising and a successful model will boost the revenues. Successful new market creation requires that a set of convergent forces drive all players in the same relevant direction.

In this paper we have identified the major key players and technology enablers and barriers. In order to valorize the potential market, the European Union has published several recommendations that are in force.

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