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ABSTRACT

The advent of the digital economy has brought about radical changes in traditional business channels and operations in several industries. This paper reviews opportunities and challenges that the digital economy has opened in the telecommunication industry in general, and more specifically for mobile telecom operators. It explores the key strategies and technological factors that are guiding the reshaping of the business models for mobile telecom operators, and discusses ongoing changes in the traditional mobile value chain. In addition to presenting a conceptual overview of emerging business models, the paper describes a methodological approach for determining the range of services, customers and product options that will be successful in the new mobile-business environment. The strength of this approach lies in its ability to closely meet the needs of the digital economy's more sophisticated customers, and therefore increase the potential success of the new business models.

Keywords

Mobile telecommunication operators, digital economy, value chain.

BACKGROUND AND KEY QUESTIONS

In the digital economy dramatic changes are driving the restructuring of several industries. These changes are affecting particularly the mobile telecommunication market, and are driven by a large number of factors that span from technological advances (convergence), market demand sophistication, regulatory evolution and more competitive industry dynamics.

- *Convergence* of technologies is blurring the boundaries of the traditional telecommunication value chain (Zeng, Yen et al. 2003): voice, video, and data are increasingly using the same infrastructure in a wired and/or mobile environment.
- *Customer demand* is becoming more sophisticated, and voice communication is being packaged with data on the same digital systems providing a large number of additional services.
- With regard to *regulatory evolution*, telecoms deregulation and privatization trends worldwide continue to impact consumers' demand (Singh 2000). The possibility to capture market shares in a highly deregulated framework drives industry expansion through new entrants and large-scale mergers & acquisitions (Macharzina 1999).
- The rate of expansions of both new entrants and incumbents' services clearly portrays a picture of intense *competitive pressures* that benefits customers through product diversification and value maximization.

The converging action of the above forces is opening new opportunities for mobile operators. Mobile telephone operators can support these converging trends by offering their communication channels as the backbone infrastructure for ubiquitous e-commerce, e-banking, on-line information services, video-on-demand, content-on-demand, and location-based services. As a result of the described industry changes and pressures, there are several key questions that face mobile operators:

- In the on-going blending of technology standards across industries and the emergence of network interconnectivity across wired and mobile platforms, *where will value be generated in the future telecommunication marketplace and which business models will enable capturing that value*?
- In the increasingly competitive market*, which technology strategy should mobile players follow*?
- In front of the evolving sophistication of customers' demand for new services, *which content and services should be created, managed, and delivered*?
- In the dynamic environment continuously in search of new market shares, *what are the 'killer applications' of the mobile communication market, and how can they be best determined*?

This paper attempts to answer the above questions by highlighting the imperatives that call for the redefinition of the mobile industry value chain and by presenting a methodological approach for determining the key characteristics of services; user needs; and preferred products.

WHERE WILL VALUE BE GENERATED IN THE FUTURE TELECOMMUNICATIONS MARKETPLACE? - NEW VALUE CREATION AND BUSINESS OPPRTUNITIES IN THE TELECOMMUNICATION INDUSTRY

The converging action of the forces discussed above (market demand, technology convergence, regulation and competition) determines a shift in the traditional value chain of mobile telephone services operators. If incumbents operators were mainly focused in setting up the infrastructure for mobile voice service provisioning, attending to marketing and distribution of voice services and setting up mechanisms for enhanced customer care, the emerging value chain appears more fragmented and opens a whole different set of prospects (see Figure 1).

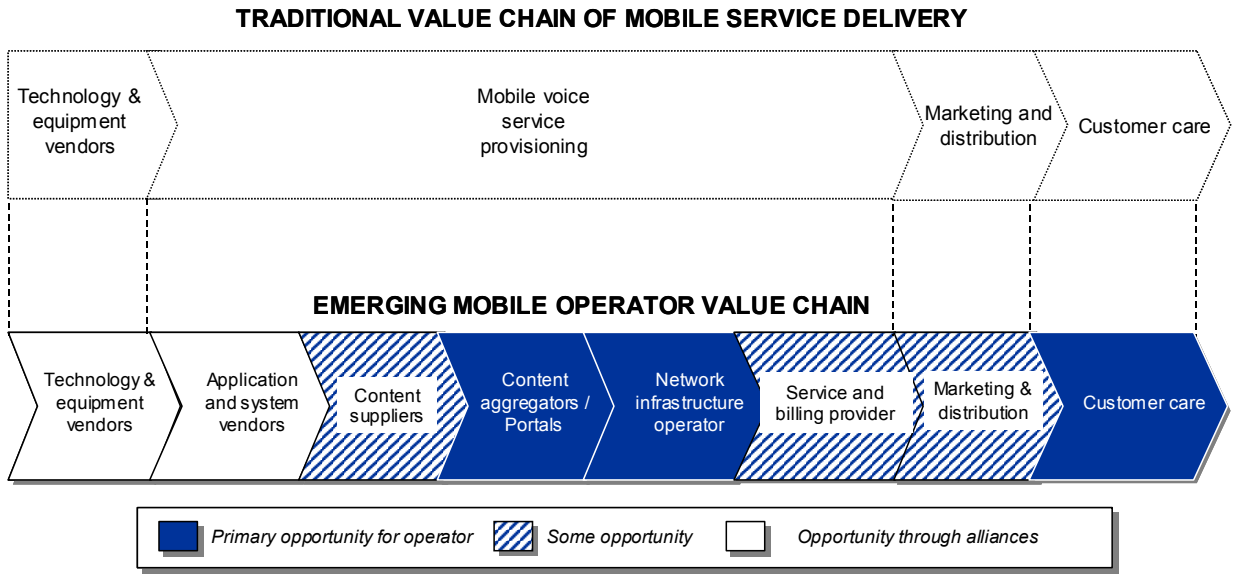

Figure 1. Traditional vs Emerging Value Chain

The fragmentation and re-intermediation of the traditional value chain is brought about by the development of new mobile technology standards, which enable packet switching over fast mobile cellular phone connections (the third generation –3G- mobile standards such as the Universal Mobile Telephone Standard – UMTS). In these digital cellular networks, not only voice can continue to be delivered at a high quality level, but additional data services can be packaged with traditional voice connectivity options. To succeed in the emerging value chain, mobile operators must learn to leverage new technologies beyond their traditional assets (i.e. the network infrastructure in Figure 1) (Rupp and Smith 2002). Their position as primary customer contacts gives them an advantage to learn from users' needs. By leveraging both ends of the new mobile value chain (the emerging technologies and terminal equipments, and the customer needs knowledge-capture by sophisticated CRM systems), mobile operators will be able to expand their market shares against competitors.

In the re-intermediation of the traditional value chain, mobile operators need to be prepared to play a greater role as non-infrastructure players. Following the examples identified as 'primary opportunity areas' in Figure 1, they could implement several of the following business models:

- In the content area, operators could guarantee a single point of entry trough multi-access portals as well as provide value added customized value for their subscribers (the ***'content aggregator'*** model). This will enable them to capture and retain new customers by satisfying the need for richer-media and information aggregation in a single device (a sophisticated cell phone or mobile PDA which uses the cells connectivity to route calls and access data services).
- In the network area, the extensive quality of coverage and ubiquitous connectivity options that mobile operators currently offer could be coupled with investments in more efficient IT systems. With such a robust infrastructure, mobile operators could offer connectivity opportunities also within traditional local campuses dominated by technologies such as wired LANs, or the less stable wireless LANs. They could provide local connectivity guaranteeing a true anywhere/anytime mobile connection to company data (the ***'cellular network provider'*** model).
- In the billing and shared services area, mobile operators experiences with dynamic billing (pay-per-use, subscription, or pre-paid card) provides opportunities to offer multiple services such as mobile/fragmented

billing, financial, and roaming schemes of multi-shared communication channels (the ***'shared services provider'*** model).

- Lastly, in the marketing and distribution area, mobile operators could leverage their increased ability to segment market product offers (and bundles), extending their reach both through established distribution channels and new Web based channels. By leveraging their efficient use of CRM, they could become (with a premium fee) the single point of entry, maintenance and follow up for all the entities involved in the customers' transactions (the ***'customer-liaison'*** model).

Of the above, being able to capture customers' throughout their interaction lifecycle by maximizing their services returns and post-sales experiences is a model that yields high potential for lasting success.

WHICH TECHNOLOGY STRATEGIES SHOULD MOBILE PLAYERS FOLLOW? - HOW TO LEVERAGE CONVERGING TECHNOLOGIES

Based on their privileged position in the value chain (see the primary opportunity areas in Figure 1) and the opportunities for alliances with technology and equipment providers, mobile operators can effectively pursue four technology strategies that closely map each of the business models discussed in the earlier paragraphs (see the business and technology strategy integration presented in Figure 2). These technology choices will complement and support the business choices illustrated in the previous section.

- First, mobile operators can use their market power and portals to **aggregate** users, contents, and applications. The spread of new *application* integration technologies (e.g., Web Services, Enterprise Portals), along with new types of *connectivity* and devices (e.g,. Embedded Sensors, Tablet PCs) are allowing for a more flexible and secure access to data and processes (Schlosser 2002). This can become a key anchor in integrating the private, public, and professional lives of mobile customers.

- Second, they can build network solutions and services that provide users with flexible **channels**, giving customers freedom of mobility while guaranteeing reliability and quality of service.

- Third, mobile operators can partner with small IT vendors (Barnes 2002) to bring innovative intelligent applications to help their customers **optimize** their mobile and non-mobile activities. The development of *intelligent applications* specifically for the mobile environment (e.g., GPS and GPRS-related tools, instant access optimization) is significantly increasing the processing and reach capabilities of mobile *devices* (Nikolaou, Vaxevanakis et al. 2002), and is changing their relative value for content-rich users, compared to existing non-mobile alternatives.

- Fourth, they can **enrich** customer functionality, primarily by partnering with existing web sites and service providers to embed rich content.

WHICH CONTENT AND SERVICES SHOULD BE CREATED, MANAGED, AND DELIVERED? – A SAMPLE APPROACH TO SERVICES IDENTIFICATION

Operating according to the business and technology strategies described in this paper implies the identification of a new content-driven product mix that meets the new-sophisticated demand of old and new customers. Thorough methodological strategies can be applied to identify product offers that have the potential to play the 'killer application' role in the new mobile market. The following examples based on a large new entrant telecom operator in Europe show a methodological approach to determine the successful product mix of the mobile-economy. The framework in Figure 3 suggests the utilization of both quantitative (large surveys in different markets) and qualitative analyses (interviews and focus groups) to determine customer needs and services desired.

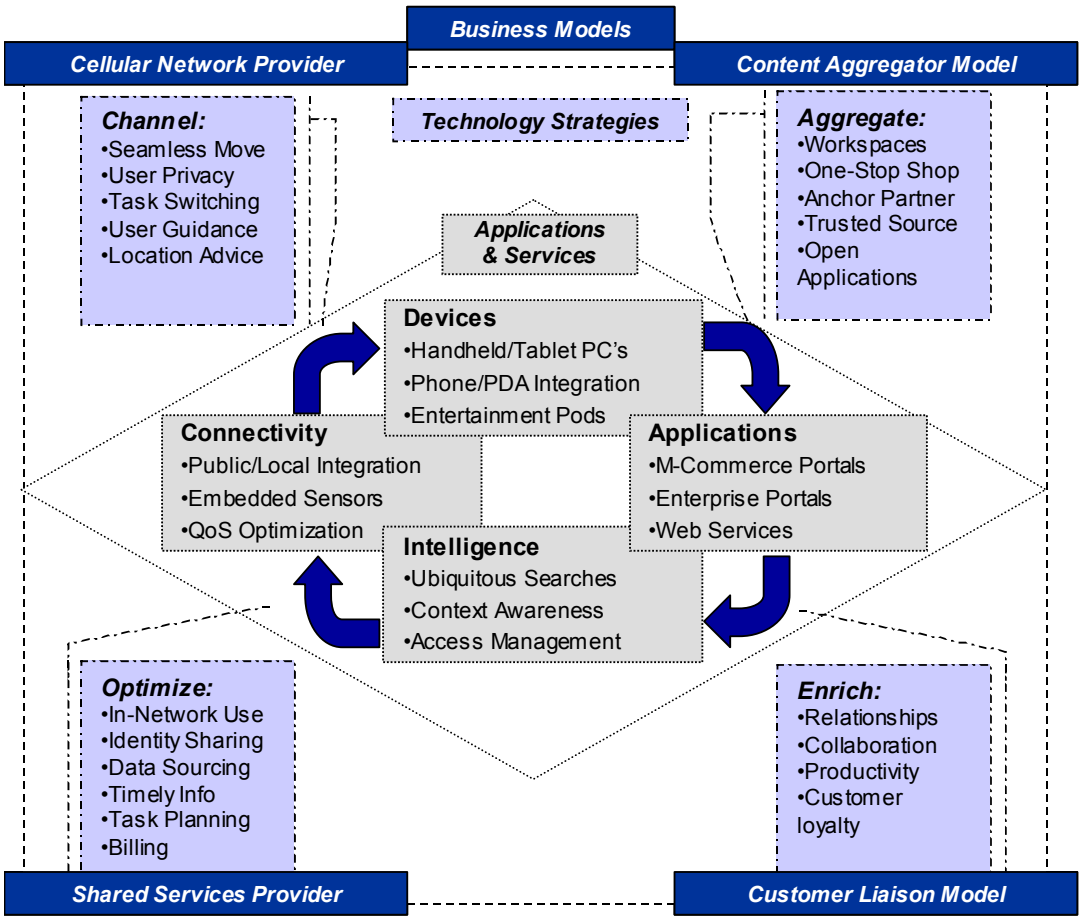

Figure 2. Technology Strategies and Business Models Alignment

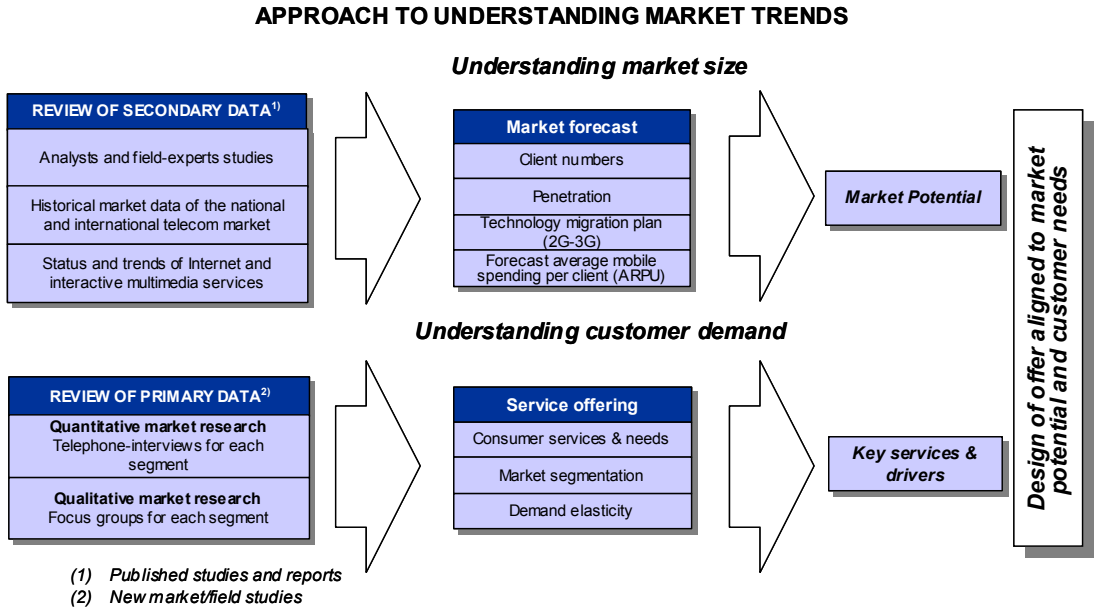

Figure 3. Framework for Market Identification

Results from the application of the methodology in Figure 3 by a mobile European operator are presented next. The findings from the secondary data analyses were used to determine the market size and the business case for returns on investments in the third generation mobile technologies (3G). These market analyses were then compared with the revenue calculations obtained through primary data collection (surveys). Of particular methodological and practical

value were the qualitative approaches for the definition of product preferences (Anckar and D'Incau 2002), which is a fundamental element for the success of the business propositions herein discussed.

WHAT ARE THE 'KILLER APPLICATIONS' OF THE MOBILE COMMUNICATION MARKET AND HOW CAN THEY BE BEST DETERMINED?

Qualitative research methodologies and findings

The qualitative market research was based on the traditional marketing technique of focus group interaction analysis. A marketing research firm under the guidance of the mobile operator and the authors conducted the study. Twelve focus groups were run, and involved representatives of three market segments: private sector and government, small and medium-sized enterprises (SME), and residential. The focus groups had six participants per group, for a total of 72 people. All participants in the focus groups were selected among cellular telephone holders in diverse geographical areas within the same southern European country.

Each focus group reviewed 3G cellular services and discussed buying preferences. In addition to the service preferences, qualitative research also revealed the characteristics and the needs of the segments analyzed. The analyses suggested that the residential segments could be divided into two groups (young people and adults) distinguishing by the various needs for mobility. Also in the corporate, SME and professional segments, the analyses highlighted the different motives for using cell phones. These motives entail different information requirements and time management optimization (for example, interest in avoiding unnecessary travel).

Quantitative analyses

The quantitative study was based on home-based interviews on segments making up the corporate, SME and professional and residential groups in multiple cities. Structured interviews involved 206 participants from the corporate segment, 104 from the SME and Professional segment and 960 representatives of the Residential segment. Only interviewees between 14 and 54 years of age were considered, as primary users of the new digital services. Results from the analyses were reconciled with results and feedback from the focus group meetings. In particular, the list of killer applications identified by each group was mapped. Key new data services that emerged as appealing in all groups include those listed in Figure 4. These services emerged in both analyses as a 'must do' of the product mix of a successful mobile provider operating in southern Europe.

❑ **Information services**
– Traffic information
– Navigation (GPS based directions)
– Information to citizens (Public administration services)
❑ **Mobile-commerce services**
– Financial transactions (on-line trading)
❑ **Advanced communication services**
– E-mail on-the-go
– Video-telephony
– Remote control and access to company data
❑ **Corporate solutions**
– Mobile office suites

Figure 4. Mobile Killer Applications

CONCLUSIONS AND FUTURE RESEARCH

Various forces and factors are leading changes in the mobile industry. Mobile operators need to reposition their traditional strategies to meet these changes by building capabilities that support the new strategic imperatives. In particular, success will be determined by their ability to leverage technologies and content services, and by providing the right product mix. This paper has discussed new strategic options and models that incumbents and new entrants can follow, and presented methodologies for evaluating the customer base and their-need based preferences. Qualitative analyses results were mapped with quantitative research results, which showed common preferences across market segments for eight types of data services - the 'Killer application services.' These services include information, mobile-commerce, advanced-communication and corporate solutions.

While the discussion of the strategic framework applies across geographies, the product mix results are focused on data collected in one specific region (Southern Europe). Additional research is needed in other geographies (Siau, Lim et al. 2001) to further define products and opportunities. Of particular interests are results for the United States, where product mix and customer segmentation is expected to be more fragmented due to a larger PC diffusion and a lower cellular phone penetration compared to European countries. Strategies for market penetration of US mobile operators might need to be adjusted accordingly.

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