

# Growth of Value Added Mobile Services Under Different Scenarios of Industry Evolution

NIKOLAOS A. MYLONOPOULOS AND IOANNIS A. SIDERIS



## INTRODUCTION

Early enthusiastic forecasts for the growth of the mobile web have been met with slow pace and unexpected failures (Fransman 2002). The present paper focuses on the growth of mobile value added services under different market structures. Much of the existing debate around the growth of mobile business has focused mainly on the deployment of technological innovations and on their comparative merits in terms of capability and cost. Similarly, recent media attention is directed towards competition and innovation in mobile device manufacturing (*Economist* 2004a). Certainly, the capabilities afforded by the network and the devices constitute key enablers for the growth in this industry. However, in saturated markets future growth is expected to come from value added services rather than new subscriptions and device replacements (ITU 2004).

For the purposes of our analysis, we propose a conceptual distinction between the actual actors (i.e., companies such as Nokia and Hutchinson) and the roles that these actors may play (e.g., content provider or network operator). Further, we suggest that three generic roles,

namely the mobile network operator, the service provider and the service integrator are central to the analysis of market structure and business strategies in mobile services. This is not meant to discount the importance of other roles, such as device manufacturers and software developers. Quite to the contrary, this paper is in line with the notion of an ecosystem of industry actors where competition and collaboration among business ‘species’ gives rise to innovation (Iansiti and Levien 2004; Natsuno 2003). We emphasize those three roles that have a direct impact on the design and deployment of value added services. These are summarized in Table 3 and explained in detail later in the paper.

Many of the new mobile services do not address pre-existing and well-defined needs of consumers. One problem with such services is that it is quite difficult if not impossible to predict exactly how (or whether) individuals will assimilate novel services in their daily routine (Mathew *et al.* 2004). For example, the notion of shooting video and sending it to a friend while on the move would have been unintelligible before the advent of MMS. As an intimately personal artefact, the

## A b s t r a c t

The deployment of new value-added mobile services has had mixed results in terms of adoption rates and revenue generation, despite the fact that mobile operators rely on such services for future growth, in view of saturated markets for the basic voice service. The paper suggests that innovation and growth in the mobile services industry largely depends on the extent to which structural conditions in the industry support widespread experimentation, collaboration and risk-taking. Based on the results of earlier scenario analysis research on mobile business, the paper explores the potential for growth in value added mobile services under different assumptions regarding competition and collaboration in the mobile industry. The paper deliberates the strategic challenges and opportunities for mobile operators, service providers and service integrators under four scenarios for the future of the mobile industry. Given the state of competition and collaboration among those three main roles of industry players in different scenarios, the paper examines the potential for growth in value added mobile services.

**Keywords:** mobile commerce, scenario planning, value-added services

## A u t h o r s

**Nikolaos A. Mylonopoulos** (nmylonop@alba.edu.gr) is Associate Professor of Information Systems at ALBA, Greece. His current research focuses on the adoption and social assimilation of mobile technologies and services.

**Ioannis A. Sideris** (isideris@aueb.gr) is Research Assistant at the Department of Management Science and Technology, Athens University of Economics and Business, Greece. His research focuses on the deployment of scenario foresight techniques in high technology industries.

mobile device penetrates all aspects of social interaction and being (Geser 2004; Katz 2003; Nardi and O'Day 1999; Sarker and Wells 2003; Schlosser 2002). In adopting mobile services, users restructure their lives around the mobile phone (Ling 2004). In effect, operators and service providers propose ways of living ordinary life with the use of mobile services, and users choose how to assimilate the technology, modifying its purpose and context of use on the way (Jarvenpaa *et al.* 2003; Stewart and Williams 1998). Further, people from different geographical and demographic backgrounds adopt mobile technologies and services in markedly different ways (Brown *et al.* 2002; *Economist* 2004b; Katz and Aakhus 2002; Zhang and Prybutok 2005). In such an environment, growth in the adoption and use of mobile services is more likely to be the result of end-user experimentation with new services (many of which will fail) on a large scale, rather than the outcome of carefully planned implementation of a few innovations.

We do not make any distinction as to the nature and kinds of mobile value added services. When referring to content and/or services we include all present and future possibilities ranging from person-to-person interactivity to multimedia broadcasting (Mathew *et al.* 2004; Middleton 2002). Even though the industry has abandoned the notion of a single 'killer application' (Middleton 2002; Minhee and Jinwoo 2004), much of new service development is constrained by bottlenecks in the ways the industry is configured to develop and deploy new services. The difference between i-Mode's tens of thousands of service and content providers in Japan (DoCoMo 2005), and the few dozens of third party services offered by European operators is indicative. While DoCoMo offers low entry barriers to potential third party content and service providers, European operators tend to favour a 'walled garden' approach (Conway *et al.* 2003; Feldmann 2002; Kodama 2001) with heavy-handed control over new services. If large scale growth of mobile services is to be made possible, one needs to consider more closely the industry conditions enabling innovative experimentation with propositions for novel user experiences, while tolerating failure as a precondition of learning and adaptation (Van den Ende 2003). This is the overarching perspective for the rest of the paper. By focusing on three archetypal roles of companies involved in value added services, and based on prior scenario foresight research in mobile business, we consider how different market structures hinder or support growth in the market for mobile value added services.

The next section introduces earlier scenario research in mobile business. The rest of the paper draws on insights from those scenarios in order to explore alternative industry structures, actor strategies, and their impact on the growth of value added mobile services. The paper then establishes the distinction between actors and roles, and defines the three archetypal roles

analysed. We then discuss the characteristics and expected strategies of each of the three roles under the four scenarios presented earlier. The concluding section draws together the issues raised and discussed.

## ANALYSING THE MOBILE INDUSTRY'S DYNAMICS THROUGH SCENARIOS

The discussion of actor strategies in the following sections is based on the scenario foresight exercise reported in (Aarnio *et al.* 2002). Following the methodological approach of Godet (1991, 1994, 2001), a group of experts got involved in various parts of the process. The aim of the research was to explore the long-term evolution of mobile commerce and to derive implications for regulation, social policy and business strategy, with a time horizon up to 2010. The structural scenario method by Godet is quite distinct among other well-known scenario approaches (e.g., Schwartz 1991) in that it relies heavily on analytical techniques for uncovering the latent convergence or 'consensus' among the experts' responses. This method was suitable for this particular project because contributions were solicited electronically from a decentralized pool of experts. The project was coordinated by universities and mobile operators from the UK, Germany, Finland and Greece. Practitioner and academic experts from the four countries were identified and personally invited to contribute. The scenarios were developed in three main stages (see Figure 1).

The first stage entailed a cross-impact analysis on a large pool of variables drawn from secondary research. The final list had 44 variables addressing both demand and supply sides (e.g., convergence of devices, network coverage, standardization process, resistance to change, fashion, state of regulation). Through an online survey, 11 experts rated the perceived impact of each variable on every other on a scale from zero (no influence) to five (very strong influence). Participants were given the list of variables with short descriptions for each. Questionnaire items were of the form 'What is the influence of  $V_i$  on  $V_j$ ?', where  $V$  represents the variables. Subsequent statistical analysis (table multiplication) revealed the total degree of influence or dependence of each individual variable on the system, taking into account both direct and indirect effects. This analysis aims at reducing the complexity of handling so many variables, by bringing to light the strongest relations between them and the significance of each variable as determinant, mediating or dependent.

The second stage identified a wide range of actors, characterizing their profiles and assessing their strategies. A total of 17 types of actors have been identified, organized in six categories, namely service providers, technical infrastructure, trading infrastructure, inter-organizational arenas, terminal and subscriber mass

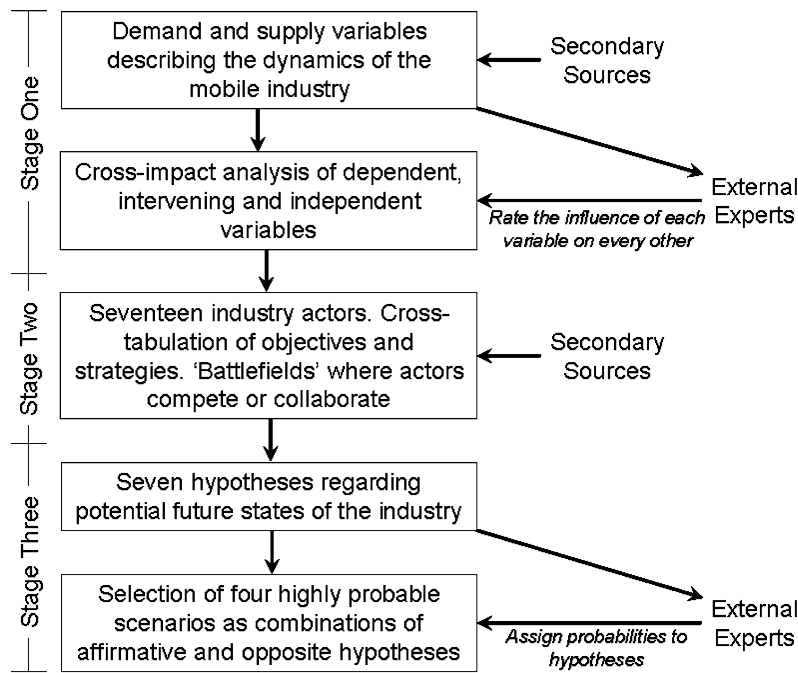


Figure 1. The scenario derivation process

Source: Based on Aarnio *et al.* (2002)

market, and customers. The cross-tabulation of actor objectives and strategies led to a map of nine areas where two or more actors are competing or collaborating. These so called ‘battlefields’ are: control of customer base; value chain dominance; role of the public sector; intellectual property rights; standards; privacy; alternative technologies; fulfilment of social needs; and seamless roaming.

In the third and final stage, the battlefields were reworked to articulate seven clearly defined hypotheses (Table 1), which later led to the derivation of scenarios. The term ‘hypothesis’ here has a different meaning compared to what we typically understand in statistical hypothesis testing. In Godet’s scenario method,

hypotheses represent a broad condition or situation that may materialize in the future, or the opposite may happen. For example, hypothesis 5 describes a particular state of affairs with respect to technology standards. The opposite is a situation where most mobile technologies are proprietary, controlled by a few actors, and locking-in their users (consumers or other third parties). With the use of another online questionnaire, 25 experts rated the independent and conditional subjective probabilities of these hypotheses materializing in the future in all possible combinations.

For each of the seven hypotheses, participating experts were asked to indicate their subjective probabilities for

Table 1. Hypotheses are expected to materialize, with some subjective probability, as expressed or in the opposite

H1: Mobile network operators have gained control of the value chain, with service providers pushed into a subcontractor position. Network operators control the customer base and determine the kind of services that will be offered and by whom.
H2: Seamless roaming exists between services, devices and networks and the revenue sharing problems associated with roaming agreements and interconnection fees are resolved.
H3: Investment by government in the public sector will provide the stimulus or the catalyst for the diffusion of mobile services. Examples may include healthcare and electronic payment.
H4: Disputes over copyrights (IPR) in the mobile context are rare. Control over copyright and use of copyrighted material is straightforward due to standardized handling of digital copyrights and clear principles for content licensing.
H5: Open standards are the norm in m-commerce. No single party controls the critical standards for m-services delivery, access and development.
H6: Effective regulation and operations models exist regarding privacy issues. It is possible for consumers to determine the type and quantity of information to give away in any transaction.
H7: Technological pluralism exists. UMTS is not the only platform. Content and services are available via multiple channels and can be accessed through various technologies.

Source: Amended from Aarnio *et al.* (2002).

four cases. First, the hypothesis will occur in the affirmative, independently of all other hypotheses. Second, the hypothesis will occur in the opposite, also independently. Third, the probability of each other of the hypotheses occurring in the affirmative, conditional on the focal hypothesis having occurred in the affirmative. Fourth, the probability of each other of the hypotheses occurring in the affirmative, conditional on the focal hypothesis having occurred in the opposite. Probability ratings were fixed on a scale from 1 to 5 (where 1: 1%–20%, 2: 21%–40%, 3: 41%–60%, 4: 61%–80%, 5: 81%–100%), with an additional out-of-scale option to indicate that two hypotheses are independent (there is no conditional probability). For each item, participants were additionally asked to indicate their level of confidence to the probability they assigned, on a scale from 1 (very low confidence) to 5 (very high confidence). Confidence levels were used to weigh the subjective probabilities in subsequent analysis.

Statistical analysis revealed the highest probability scenarios as combinations of affirmative and negative hypotheses. Following Godet's (2001) recommendations, among the most probable scenarios we distinguished four that cover as broad a range of future states as possible, including mainstream, contrasting and controversial scenarios. Table 2 shows the combination of hypotheses comprising each scenario and provides a summary of the main tenets of each scenario. A plus sign indicates that the respective hypothesis materializes in the affirmative (as expressed in Table 1), whereas a minus sign indicates that the respective hypothesis materializes in the opposite. For example, scenario 3 ('The world changed: Telecom is backing off') is defined by the following combination of hypotheses. Mobile operators do not dominate the value chain (H1 in the opposite), there exists seamless roaming (H2 in the affirmative), the public sector provides a stimulus for further diffusion of mobile services (H3 in the affirmative), there are

Table 2. The MobiCom scenarios

	H1	H2	H3	H4	H5	H6	H7
<i>Scenario 1: Business as usual: slow growth in search of business models.</i> This is the current trend scenario, whereby mobile commerce faces slow growth, with the economic downturn and the aftermath of the UMTS licensing rounds having stagnated earlier expectations.	+	–	–	–	–	–	+
<i>Scenario 2: Institutionalization: Consensus of institutions for controlled growth.</i> The big players have taken control of the development of infrastructure, standards and services for mobile business. Thanks to industry-wide consensus, there are little or no problems in technology standards, privacy, IPR, etc, thus giving rise to unencumbered growth. Some criticize this situation as large operators raise entry barriers and limit competition.	+	+	+	+	+	+	+
<i>Scenario 3: The World Changed: Telecom is backing off.</i> The industry has agreed upon seamless roaming of mobile services as they see it in their interest to boost usage. Operators are specializing in data transmission and keeping up the infrastructure, offering competitively priced transmission and interconnectivity services. This has opened up opportunities for new entrants on the value-added services end of the market. As a consequence, consumers face a growing number of options for getting access to content, shopping and paying over mobile networks.	–	+	+	–	+	+	+
<i>Scenario 4: The Invisible Hand: Deregulated, liberal markets.</i> Regulators have been very effective in creating and implementing a liberal mobile commerce policy, in order to boost competition. This policy has been successful in terms of instigating the collaboration of businesses on nearly all aspects of technology and service provision: last mile competition, portable subscriber addressing, transparent pricing, seamless roaming at service level. Effective competition policy has given rise to many innovative new entrants, though few of them survive. Concerns remain in relation to the protection of personal information and related civil rights.	–	+	–	+	+	–	+

Source: Amended from Aarnio *et al.* (2002).

problems with enforcing copyrights for digital content (H4 in the opposite), open standards are the norm (H5 in the affirmative), privacy regulation is effective (H6 in the affirmative), and technological pluralism exists (H7 in the affirmative). The combinations of affirmative and opposite hypotheses provide the definitional basis for each scenario. The textual explanation in Table 2 offers a more interpretative gist for each scenario.

The scenarios present feasible states of the industry but they are not expected to materialize in their pure forms. They are not predictions or forecasts. Instead, they represent characteristic cases for the purpose of widening and refining our understanding of how things might evolve, and of informing the basis on which decision makers may influence future developments. Any future reality is more likely to incorporate elements of more than one scenario. The practical value of the scenarios is that they provide practitioners with a wealth of material to debate desirable and feasible courses of action. These scenarios are generally congruent with other published scenario foresight exercises in mobile business (see, for example, Camponovo *et al.* 2004; Karlson *et al.* 2003; Lindgren *et al.* 2002; Van de Kar and Van der Duin 2004).

The possible content of the scenarios was explored in the first two stages of scenario derivation (see Figure 1) and has been captured in summary within the seven hypotheses. The scenarios are selected configurations of hypotheses and, for the purposes of this paper, they have been taken as given. Their interpretation has been extended to deliberate alternative industry structures and their likely impact on the growth of value-added mobile services. This interpretative extension has been realized by 'interrogating' each scenario with the following question: 'if this scenario is to be possible, what should the competitive structure of the industry be like?' Answering this question entailed repeated cycles of successive attempts at articulating industry conditions, checked for congruence with the defining hypotheses of each scenario until a coherent and distinct picture could be drawn for each scenario. In order to maintain consistency in the granularity of analysis, the ensuing discourse on industry structures and mobile services makes use of an additional abstraction, that of industry roles. Instead of making the discussion of hypothetical future states of affairs specific to particular companies, and in order to focus attention on broad strategic trends rather than specific tactics, this analysis employs three generic abstract industry roles, as explained in the next section.

## ACTORS AND ROLES IN MOBILE BUSINESS

Analysts and researchers have modelled the structure of the mobile business value chain as linear with a large number of participants (Durlacher 1999; Paavilainen

2001). Typically, value chain participants include, but are not limited to, technology platform vendors, infrastructure and equipment vendors, application platform vendors, application developers, content providers, content aggregators, mobile portal providers, mobile network operators and mobile service providers (Tsalgatidou and Pitoura 2001). Although such value chain models are illuminating in many respects, they limit our ability to draw conclusions regarding the structure of an uncertain, emerging industry (Camponovo and Pigneur 2002) for two main reasons.

First, we observe that mobile operators, technology vendors and other third parties collaborate in much more flexible and, certainly, non-linear arrangements (e.g., Norman and Ramirez 1993; Pousttchi *et al.* 2003; Van de Kar 2000). In the emerging market for value added mobile services, companies may be simultaneously competitors and partners in flexible and varying ways depending on the market opportunity, their core capabilities and the foreseeable developments in the technology and market environment (Bovet and Martha 2000; Nalebuff and Brandenburger 1996). Second, an analysis of the dynamics among ten or fifteen actors in their entirety is too complex simply because of the sheer number of interactions.

In order to overcome this limitation, we make an analytic distinction between actors and roles. Actors are the actual business entities (e.g., Vodafone, Nokia), which may undertake one or more roles. Further, we focus on three roles, namely the mobile network operator, the service provider and the service integrator. It is important to make reference primarily to roles rather than actors, because the strategic capabilities that an actor should invest in derive from the roles that this actor chooses to assume. Since we observe that actors may assume various roles in different moments in time and under different conditions, an understanding of roles offers a more stable anchor for our analysis. For example, mobile operators today also act as service integrators. These roles relate directly to the development and delivery of a mobile value added service which is the focus of this analysis. Table 3 summarizes the description, examples and the key characteristic of each role.

It is important to note that these roles are not unitary. Instead, they represent rather broader categories. For example, the mobile network operator category may be seen as including virtual mobile network operators and wireless LAN operators. The criterion defining this category is that the mobile network operator provides users access to wireless and mobile network infrastructures and to related services (such as roaming). Similarly, the role of the Service Provider covers a multitude of different business models, including the content provider (e.g., a financial database, a magazine or a newspaper archive), the wireless application service provider (WASP, e.g., a mobile payments service or a gaming

Table 3. Roles in the mobile services market

<i>Role</i>	<i>Mobile network operator</i>	<i>Service provider</i>	<i>Service integrator</i>
<i>Description</i>	Provides access to wireless mobile networks and additional infrastructure services such as roaming, interconnection and quality of service.	Manages and delivers value added information, entertainment, commerce and other services to businesses and end-users.	One-stop-shop for users of mobile services, aggregates demand and supply, bundles services, segments the market
<i>Key characteristic</i>	Currently the dominant actors, enjoy significant strategic advantages.	It is expected that the growth of the mobile services market will accelerate with the proliferation of service providers.	Is expected to emerge as key intermediary in the mobile services market.
<i>May include</i>	<ul style="list-style-type: none"> <li>• Established mobile telephony operators</li> <li>• Virtual mobile network operator</li> <li>• Wireless LAN operator</li> </ul>	<ul style="list-style-type: none"> <li>• Content providers</li> <li>• Application service providers</li> <li>• Full service providers</li> </ul>	<ul style="list-style-type: none"> <li>• Content aggregator</li> <li>• Mobile portal</li> <li>• Bundles of various access, content and transaction services</li> <li>• Niche aggregators</li> </ul>

service) and the full service provider (e.g., banking services or retail sales). The defining characteristic here is the provision of value added on top of the access and transmission infrastructure. Service integration is also a potentially multifaceted role, including many different business models. For example, setting up a mobile portal, aggregating content from various sources, customizing service packages for different market segments (e.g., youth or corporate), are initiatives that

service integrators may choose to base their market positioning upon. Service integrators play a pivotal role in the mobile services market, equivalent to that of web portals and electronic intermediaries on the wireline Web. This intermediation constitutes the defining characteristic of service integrators.

Table 4 summarizes the present position and key strategies for each role. The discussion in the following sections extends the implications of the four scenarios in

Table 4. Current position and strategies for key roles

<i>Role</i>	<i>Mobile network operator</i>	<i>Service provider</i>	<i>Service integrator</i>
<i>Present position</i>	Mobile network operators currently dominate the value chain for value added mobile services.	Service providers are highly dependent on the network operator or service integrator, to the extent that these players dominate the customer relationship	The role of service integration is currently played mainly by mobile network operators.
<i>Opportunities</i>	Operators have the first mover advantage in service provision and can exploit it to secure their competitive position while the industry growing.	Technological evolution is expected to spawn a wave of new kinds of services.	Service integration is a 'winner-take-all' market. This is a big prize for the first mover with a good strategy.
<i>Threats</i>	Apart from the cost of next generation infrastructures, they face the potential emergence of new entrants in service provision with strong brands and large customer bases.	Tight financial markets, lack of IPR protection, problems with service roaming, uncertain demand and entry barriers raised by mobile network operators.	Entry barriers raised by operators, limited prior experience, sluggish demand and lack of a sound business model.
<i>Strategies</i>	Operators need to defend against commoditization by strengthening their dominance over critical components such as billing and digital rights management.	Service providers need to invest in the right business models and to establish their own channels and brands.	Service integrators need to innovate in interconnection and licensing agreements for bundling, reusing and reselling third party content, applications and services.

relation to the three main roles identified here. A summary of this analysis is presented in Table 5. The three roles provide generic categories serving this macroscopic scenario analysis. Having said that, the same broad-based scenario analysis can be employed to assess the competition and collaboration among actors and their roles in a specific context, such as a particular service or business model (e.g., Maitland *et al.* 2005).

## MOBILE NETWORK OPERATORS

Mobile network operators currently dominate the value chain for value added mobile services. As a consequence of their dominant position, operators act as gatekeepers on the way of service ideas to the market. However, there is a limit to the number of value added services that they can develop, simply because it is impossible for them to be sufficiently responsive to market needs and also because there is a limit to how much development

and how much business risk they are prepared to undertake while launching new services. This is the key message from the first scenario ('Business as usual' in Table 2).

Further, billing infrastructures are complex, costly and inflexible. Mobile network operators have invested heavily in billing systems and processes, which may be seen as an idiosyncratic investment (Williamson 1996). Consequently, they own the customer relationship, and they control an essential service (billing) on behalf of third party service providers. This is probably the single most important source of customer and supplier lock-in for any mobile network operator today.

Another factor that strengthens the dominance of mobile network operators is the lack of widely adopted Intellectual Property Rights (IPR) protection policies. IPR owners today mitigate the threat of misappropriation of their content by limiting the means and the extent to which they distribute it. In a similar vein, lack of effective privacy regulation means that consumers will

Table 5. Scenario implications for each role

Scenarios	Mobile network operator	Service provider	Service integrator
Scenario 1: Business as usual: slow growth in search of business models	Operators compete on every front seeking exclusivity and temporary first mover advantage. Users locked-in to their operator's service offerings.	Service providers operate in the shadow (and the bargaining power) of the operators. Limited opportunity for innovation and growth.	Service integration is undertaken by operators. No scope for third party mobile portals or other integrators.
Scenario 2: Institutionalization: consensus of institutions for controlled growth'	Operators maintain their dominance of the value chain but competition is characterized by openness, interoperability and roaming of all services across networks. Limited scope for exclusivity and differentiation on services service integration is the main opportunity.	A unified user base through seamless service roaming across operator networks makes service innovation more attractive and less risky. Opportunities for third party service providers and innovative new entrants.	Opportunity for new entrants in service integration. Successful (and forward-looking) third party service providers are best placed to expand in service integration, but new entrants from other industries (e.g., media) may also succeed.
Scenario 3: The world changed: telecom is backing off	Operators are suppliers of infrastructure to service providers and integrators. Universal open standards in technology. Industry consolidation.	Lack of systematic IPR protection forces service providers to control the distribution of their services more tightly. The absence of operator dominance fuels competition among service providers for brand building, by increasing spending on marketing communication.	This is a growth scenario for service integrators. There are significant economies of scale and network externalities in intermediation to be exploited. Enforcing and protecting intellectual property rights on mobile content is the main challenge.
Scenario 4: The invisible hand: deregulated, liberal markets	Same as scenario 3. An operator may profit from <i>de facto</i> proprietary technologies.	Intense competition among service providers. Large and trusted service providers emerge as dominant players in the market.	This is a maturity scenario for service integrators. Privacy concerns among end-users will favour established and trusted brands. Service providers will rely on trusted integrators for effective distribution. Consolidation in service integration.

keep their business with established, well known and, therefore, trusted brands. Small new entrants in third party services will find it difficult to win the trust of end users without sufficient support or certification from established players.

Scenarios one and two (Table 2) explore two opposing trajectories of an industry with dominant mobile operators. In the first scenario ('Business as usual') operators compete on every possible front, striving to achieve uniqueness and exclusivity in devices, technology standards, and content services. From the point of view of the user and the third party service provider, this amounts to a fragmentation of possibilities. Unlike the Internet experience, users subscribing to one mobile network forfeit the content and services of all others. Users locked into one network cannot share their exclusive mobile experience with users locked into another network. Similarly, third party service providers face higher cost and risk if they are forced into exclusive commercial agreements or technical standards with each operator. This environment breaks potential positive network externalities (Shapiro and Varian 1999) and affords limited scope to experiment with innovative services. Therefore, this scenario involves slow growth in value added services.

The second scenario ('Institutionalization') maintains the dominance of mobile operators but explores the possibility of broad collaboration among them in service roaming, technology standards, digital rights and privacy protection. This industry is characterized by openness, interoperability and seamless roaming of all services across all networks. The market is still dominated by a few mobile operators but competition among them is transparent in the sense that there is no differentiation in the services and content available over different networks. This structure is expected to enable greater user participation, extensive sharing of data and services among users, and the cross-fertilization of innovative ideas. Evidently, this scenario allows more scope and lower entry barriers for third party service providers to invest in novel ideas. With harmonized standards and interoperable networks, every third party has access to the entire market avoiding potential exclusive or otherwise limiting agreements. Although operators still control the billing relation with customers and the technology standards, this industry structure enables faster growth because it reduces the total risk to innovation and facilitates positive network effects.

Next we consider hypothetical scenarios where mobile network operators do not dominate the value chain and are generally confined to commodity voice and data transport over wireless networks. The transition to such a point is not obvious and only marginally foreseeable at present. However, under certain conditions, mobile network operators might be driven to the backstage by a flourishing industry of third party service providers. It is also conceivable that regulators may actually impose a

vertical separation of the value chain for mobile services. Such a move would mandate that infrastructure/connectivity services and value added content/application services are offered by separately owned business entities. Such intervention would accompany a significant shift in current policy, but it is certainly not unprecedented (e.g., the history of telecoms deregulation in the US in the 1980s and the recent separation of mobile and fixed telephony operators in parts of Europe).

In scenarios three and four (Table 2), mobile network operators are subcontractors for infrastructure services to service integrators and to service providers. They do not control the customer relationship anymore and they are not the sole providers of billing services. The latter becomes a special kind of application service that may be offered by various third parties (clearly, there are many hidden assumptions here regarding the nature and cost of billing technologies and business models). Such an industry is likely to consolidate with a few infrastructure players, similarly to the global internet backbone market. It is noticeable in this respect how mobile network operators are currently trying to preempt such an adverse (for them) development by increasingly outsourcing the operation and maintenance of parts of their infrastructures to their technology suppliers in order to focus on value added services.

Scenario three ('The World Changed') explores the case of tight regulatory control. Technological standardization, service roaming, and protection of privacy are enforced by regulatory fiat. As a result there is a level playing field for all actors and potential new entrants. Service integrators have an opportunity to capture significant portions of mobile traffic by setting up generic or niche portals. This scenario envisages the proliferation of a multitude of content providers, application providers and service integrators. On the other hand, strong regulatory intervention may stifle innovation in regulated areas of technology.

In the fourth scenario ('The Invisible Hand') regulation is heavy on eliminating entry barriers and all obstacles to competition but remains hands-off with respect to all issues of technology standards, privacy protection and intellectual property rights. In this *laissez faire* environment the industry converges to common standards for interoperability, roaming and content distribution, even if some of these are proprietary and become established as *de facto* universal standards. Privacy protection is not a commercial priority and, therefore, there is no uniform code of practice or technologies for safeguarding sensitive personal information. As a result, end users tend to favour service providers with strong and trusted brand names, as well as companies implementing voluntary restrictions on the use of personal data. This scenario anticipates the growth of a few dominant players in service provision and service integration.



## SERVICE PROVIDERS

Service providers are highly dependent on the network operator or service integrator for distribution purposes, to the extent that these players dominate the downstream market. Currently, value added services capture a relatively small portion of total spending and of total user activity (the Far East being a notable exception). The uncertainty regarding user demand for value added services and the level of investment involved in launching and marketing such services is an obstacle to potential new businesses entering the market as service providers. Another obstacle to the proliferation of third party service providers is that different operators may demand exclusivity in distribution and/or unfavourable revenue-sharing structures. Thus, the supply of value added services may not meet the size of the potential demand. As competition intensifies, over time we should expect content and service providers to reach out to end customers directly and establish their own channels and brands. Pushing this prospect even further, successful service providers may choose to diversify their portfolio horizontally by developing, acquiring or licensing services in order to become service integrators.

Service providers and, in particular, content providers are highly dependent on the Intellectual Property Rights (IPR) regime and its effectiveness. Where IPR protection is not fully operative, content providers will attempt to protect their rights by selling direct to end-users or through exclusive (and, therefore, easier to monitor) agreements with service integrators and network operators. This is equivalent, for example, to the way music artists grant exclusive rights to producers and distributors, who, in turn, have the resources and capabilities to distribute music widely while protecting the rights of original creators. Similarly, mobile content providers will rely on the widespread adoption of Digital Rights Management technologies and a supportive regulatory regime. The wireline Web experience has shown that this is far from straightforward and that it has been difficult to build sustainable revenue streams for digital content distributed over the network (*Economist* 2004c).

The four scenarios (Table 2) present different opportunities and challenges for third party service providers. In the first scenario, a third party service provider has little scope to grow commercially outside the sphere of influence of a mobile operator. Service providers need to build strong partnerships with mobile operators in order to get access to the latter's customer base (via the operator's portal and through its marketing/sales campaigns), to capitalize on the technological capabilities of operator-branded devices, and to exploit other infrastructure (network), service (e.g., billing), or strategic advantages (e.g., superior technology or market share) that the operator may possess. Evidently, the balance of bargaining power in this scenario is heavily in favour of the operator and this will be reflected on the

revenue sharing agreement. Since stakes are high for both parties, neither can afford to take large risks. Therefore, innovation will be incremental (as opposed to trying out radical, thus risky, ideas) and industry growth will be comparatively slow.

The second scenario presents important opportunities for third party service providers. First, service roaming means that end users have ready access to any and all third party services, independently of the mobile operator they subscribe with. This is akin to the wireline Internet experience where companies and end users connect with different Internet Service Providers (IPSS) but full interconnection means that all users have access to all content and vice versa. This prospect has implications for operator revenues, pricing and revenue sharing agreements. What matters most for third party providers is that they are not limited by the technologies and market shares of individual operators. However, the availability of service roaming would not, in itself, make a lot of difference without effective technologies and regulation for IPR protection. This scenario envisages that such matters will be resolved through consensus between key players and that content owners will be able to distribute multimedia content broadly with minimal risk of misappropriation. As a result of service roaming and IPR protection, the risks of entry and new product development are limited while the potential gains are much greater in comparison to scenario one. Therefore, this is envisaged to be a higher growth scenario.

From the point of view of service providers, the third scenario is similar to the second, except that matters of IPR protection are not resolved. For this reason, content owners need to establish their own distribution or exclusive agreements with service integrators in order to safeguard their revenue streams from content misappropriation. Another difference is that in this scenario mobile operators do not dominate the end-user relation. As a result, service providers will be competing for market positioning and presence, mainly by investing in marketing communications. There is an opportunity here for service providers to establish mobile portals. Currently, mobile operators act as service aggregators through the exclusive interface that each provides to its customers. If operators become confined to an infrastructure service position (as this scenario posits) there will be a market opportunity for new entrants in service aggregation and this can be an attractive option for major service providers.

Scenario four envisages an intensively competitive market with minimal governmental regulation. This environment favours service providers with an established customer base, a strong portfolio of products and the resources to innovate. Entry in mobile service provision is limited by the financial resources available to the new entrant in order to compete against incumbent service providers on price, distribution, advertising and infrastructure. In this highly competitive

environment the ability to capture end user attention by building a strong brand name will be essential to success. It is likely that there will be opportunities for service providers to nurture niche markets profitably. This may be an attractive lower-cost strategy for service providers. Given the multitude and ubiquity of third party services, users will rely on service integrators in order to identify and manage the sources of content and services that they need. Thus the service integrator may emerge as the new dominant role.

## SERVICE INTEGRATORS

The role of service integration is currently acted by mobile network operators and virtual operators. Their dominance raises entry barriers against potential new entrants. Virgin Mobile (currently operating in the UK, US and Australia) is an interesting case in point. Acting as virtual mobile operator, Virgin Mobile differentiates itself in terms of airtime and message bundles (i.e., pricing). Acting as service integrator, the company offers a broad collection of fun and fashionable value adding services for the youth market, such as ring tones, concert passes and others, by capitalizing on its brand positioning.

Service integrators are expected to invest in the standardization of technologies, interconnection agreements and licensing contracts, in order to be able to bundle, reuse and resell third party content, applications and services. Under certain conditions, a service integrator may dominate its market, because integration services are subject to powerful network externalities. The greater the customer base or the breadth of services offered, the more attractive the service integrator to potential new customers and the greater the effect of customer lock-in. Thus, critical mass builds dominance. Further, the lack of sufficient protection of privacy, especially with respect to personalized and location-based services, will lead consumers to seek large and trusted integrators to do business with. Well-known brands are expected to be the leaders in this field. The corollary of the above is that it is difficult for a start-up integrator to establish itself. Finally, the more mobile network operators become marginalized as commodity sellers, the greater the potential for service integrators to fill the gap operators will be leaving behind as gateways to value added services.

In the first scenario (Table 2), the domination of mobile operators and the lack of universal service roaming impede the entry of service integrators. For mobile operators today, establishing an exclusive mobile portal (service integration) appears as the only possible strategy aimed at maintaining some differentiation and customer lock-in. This strategy would not be equally sustainable in the second scenario. Although operators in this case maintain their market dominance, the

availability of universal roaming and open technological standards means that service integration becomes attractive for new entrants, as end-users can have access to services across operator networks. Therefore, mobile portals that remain exclusive to users of one operator's network will find it difficult to sustain the competitive pressure from universal service integrators.

Scenarios three and four open up broad opportunities for service integrators. If mobile network operators do not dominate the market and if value added services are the most attractive element of the mobile experience (in comparison to the device and the basic services), there will be a growing market for coordinating supply and demand, aggregating content and services, and serving differentiated customer segments. The absence of effective IPR protection in scenario 3 is likely to constrain the copying and redistribution of content because the only way to control intellectual property would be to control its distribution. In contrast, scenario 4 envisages a situation where legal and technical mechanisms for IPR protection are effective while the regulatory regime affords little protection of private information. To the extent that privacy weighs heavily on users' preferences, trust is expected to play an important role. Customers will prefer to entrust their personal information to few well known service integrators, rather than a multitude of small third parties. Service integrators with a strong brand, an established presence and rich content, stand to gain the most.

## CONCLUDING REMARKS

How is the market for mobile services expected to grow under different market conditions? The preceding analysis sheds some light to this question by highlighting three archetypal roles of business actors in the mobile services market and by exploring their strategies under alternative future scenarios. In this analysis we have explicitly chosen to set aside other important industry players, such as the device manufacturers (e.g., Nokia, Samsung) and the operating system platforms (e.g., Microsoft, Symbian). Our motivation for this selective approach stems from our objective to concentrate on the growth of value added services, since this is an area that has not met earlier industry expectations, at least in Europe and the US. In addition, we observe that technology development on the device and the operating systems front is faster than the ability of users to absorb all that innovation into daily life. In other words, current device and software technology is more advanced than the common uses to which individuals put their mobile phones. Thus, if there is slow growth in value added services, this is more likely to be an issue of devising the right services and the right business models, than an issue of further innovating the device.

This paper focuses on industry dynamics and sets aside considerations pertaining to the role of end-users. Admittedly, end-users do not passively accept or reject new service introductions but, instead, they are active co-creators of the mobile service to the extent that they re-interpret and thus modify the purposes and uses of the service in the process of assimilating it into their daily routines. Consequently, the development and introduction of new mobile services is not so much about catering to pre-existing user needs, as it is about proposing new experiences of social interaction enabled by the use of mobile technologies (Fontana and Sorensen 2005; Mylonopoulos and Doukidis 2003; Oudshoorn and Pinch 2003). Seen from this viewpoint, the strategies of the mobile operator and/or the service provider take a different slant: from designing a few profitable services, to offering a multitude of service options for user experimentation. A few of these services will make it to the mainstream while others will fail to win the hearts and habits of end users. In this kind of product market, the scenario analysis brings forth a number of opportunities and challenges for mobile operators, service providers and service integrators.

The main opportunity for incumbents and potential new entrants is to gain and maintain control of customer access to multiple services. Those who control user access to services possess the greatest bargaining power *vis-à-vis* other industry parties. Currently, mobile operators hold this position. Generally, however, this is the role of service integrator, which is akin to the role of portals on the wireline Web. Mobile operators may see their position eroded if third party service providers with strong brand names and a wealth of content manage to make significant inroads into the mobile market, with direct channels to the end user. We may expect to witness a growing battle as mobile operators try to enhance their additional role as service integrators, while new entrants in service integration and existing service providers try to establish their own channels with end users.

If the market for mobile value added services is to grow, the main challenge is to enable the creation of multiple services while affording the risk of several of those services failing. On a large scale, this is not feasible for any single operator. NTT DoCoMo in Japan has successfully met this challenge by minimizing barriers to entry to third party service providers. Evidently, relinquishing control of service creation engenders the risk of losing control of customer access. DoCoMo has weathered this threat by maintaining its leadership as service integrator, through its mobile portal and by handling key processes such as billing, as well as the device capabilities.

The discussion of market structures and actor strategies in this paper is based on scenario foresight analysis. The method employed has been shown to be efficacious and productive in many long-term planning

contexts (Christensen *et al.* 2004; Ringland 1997). However, our approach has some limitations, notably that it is constrained by the subjective outlook of the participating experts. Although care has been taken to maximize the variety of available perspectives, this remains a potential source of bias. These results are conditioned by the historical context of the study and by the identity of the participating experts. Further research may attempt to update the assumptions and findings of this exercise and to focus on a less subjective empirical assessment of the relation between market structure and growth in mobile value added services.

## References

- Aarnio, A., Enkenberg, A., Heikkila, J. and Hirvola, S. (2002) 'Scenarios for mobile commerce in 2006', Report D.5.1, MobiCom European Fifth Framework Project IST-1999-21000. In *Evolution Scenarios for Emerging M-Commerce Services: New Policy, Market Dynamics, Methods of Work and Business Models*, Athens, Greece: Mobicom Consortium.
- Bovet, D. and Joseph, M. (2000) *Value Nets*, New York: Wiley.
- Brown, B., Green, N. and Harper, R. (2002) *Wireless World: Social and Interactional Aspects of the Mobile Age*, London: Springer Verlag.
- Camponovo, G. and Pigneur, Y. (2002) 'Analyzing the Actor Game in m-business', in *Proceedings of the First International Conference on Mobile Business*, 8-9 July, Athens, Greece, online at: [www.mobiforum.org/mbusiness-2002](http://www.mobiforum.org/mbusiness-2002).
- Camponovo, G., Debetaz, S. and Pigneur, Y. (2004) 'A Comparative Analysis of Published Scenarios for m-business', *Proceedings of the Third International Conference on Mobile Business*, July, New York.
- Conway, S., Combe, I. and Crowther, D. (2003) 'Strategizing Networks of Power and Influence: The Internet and the Struggle Over Contested Space', *Managerial Accounting Journal* 18(3): 254-62.
- Christensen, C. M., Anthony, S. D. and Roth, E. A. (2004) *Seeing What's Next: Using the Theories of Innovation to Predict Industry Change*, Boston: Harvard University Press.
- DoCoMo (2005) 'NTT DoCoMo: Subscriber Growth', online at: <http://www.nttdocomo.com/companyinfo/subscriber.html>, accessed 22 June 2005.
- Durlacher (1999) Mobile Commerce Report. Durlacher Reports, May ([www.durlacher.com](http://www.durlacher.com)).
- Economist* (2004a) 'Battling for the Palm of your Hand - Mobile Phones', *The Economist* 371: 71-3.
- Economist* (2004b) 'Vision meets reality - Mobile 3G Telecoms', *The Economist* 372(8391): 63-5.
- Economist* (2004c) 'Music's brighter future', *The Economist* 373(8399): 71-3.
- Feldmann, V. (2002) 'Competitive Strategy for Media Companies in the Mobile Internet', *Schmalenbach Business Review* 54: 351-71.

- Fontana, E. R. and Sorensen, C. (2005) 'From Idea to Blah! Understanding Mobile Services Development as Interactive Innovation', in: E. L. Riccio and M. T. L. Fleury (eds), *2nd CONTECSI: International Conference on Information Systems and Technology Management*, Sao Paulo, Brazil.
- Fransman, M. (2002) *Telecoms in the Internet Age*, Oxford: Oxford University Press.
- Geser, H. (2004) 'Towards a Sociological Theory of the Mobile Phone', online at: [http://socio.ch/mobile/t\\_geser1.htm](http://socio.ch/mobile/t_geser1.htm), accessed 22 May 2005.
- Godet, M. (1991) 'Actor's Moves and Strategies: The MACTOR Method – An Air Transport Case Study', *Futures* 23(6): 605–22.
- Godet, M. (1994) *From Anticipation to Action: A Handbook of Strategic Prospective*, Paris: United Nations Educational.
- Godet, M. (2001) *Creating Futures: Scenario Planning as a Strategic Management Tool*, London: Economica.
- Iansiti, M. and Levien, R. (2004) *The Keystone Advantage. What the New Dynamics of Business Ecosystems Mean for Strategy, Innovation, and Sustainability*, Boston: Harvard Business School Press.
- ITU (2004) *ITU Internet Reports: The Portable Internet*, 6th Edn, ITU Reports, [www.itu.org](http://www.itu.org).
- Jarvenpaa, S., Lang, K. R., Takeda, Y. and Tuunainen, V. K. (2003) 'Mobile Commerce at Crossroads', *Communications of the ACM* 46(12): 41–4.
- Karlson, B., Bria, A., Lonnqvist, P., Norlin, C. and Lind, J. (2003) *Wireless Foresight. Scenarios of the Mobile World in 2015*, Chichester: Wiley.
- Katz, J. (2003) *Machines That Become Us: The Social Context of Personal Communication Technology*, New Brunswick: Transaction Publishers.
- Katz, J. E. and Aakhus, M. (2002) *Perpetual Contact: Mobile Communication, Private Talk, Public Performance*, Cambridge: Cambridge University Press.
- Kodama, M. (2001) 'Innovation through Strategic Community Management: The Case of NTT DoCoMo and the Mobile Internet Revolution', *Creativity and Innovation Management* 10(2): 75–87.
- Lindgren, M., Jedbratt, J. and Svensson, E. (2002) *Beyond Mobile. People, Communications and Marketing in a Mobilized World*, Basingstoke: Palgrave.
- Ling, R. C. (2004) *The Mobile Connection: The Cell Phone's Impact on Society*, San Francisco: Morgan Kaufmann.
- Maitland, C. F., van de Kar E. A., M., Wehn de Montalvo, U. and Bouwman, H. (2005) 'Mobile Information and Entertainment Services: Business Models and Service Networks', *International Journal of Management and Decision Making* 6(1): 47–64.
- Mathew, J., Sarker, S. and Varshney, U. (2004) 'M-Commerce Services: Promises and Challenges', *Communications of the Association of Information Systems* 14(26).
- Middleton, C. A. (2002) 'Exploring Consumer Demand for Networked Services: The Importance of Content, Connectivity and Killer Apps in the Diffusion of Broadband and Mobile Services', *Twenty-Third International Conference on Information Systems*: 391–9.
- Minhee, C. and Jinwoo, K. (2004) 'Do Size and Structure Matter to Mobile Users? An Empirical Study of the Effects of Screen Size, Information Structure, and Task Complexity on User Activities with Standard Web Phones', *Behaviour and Information Technology* 23(3): 165–81.
- Mylonopoulos, N. and Doukidis, G. (2003) 'Mobile Business: Technological Pluralism, Social Assimilation, and Growth', *International Journal of Electronic Commerce* 8(1): 5–22.
- Nalebuff, B. J. and Brandenburger, A. M. (1996) *Co-opetition*, London: HarperCollins Business.
- Nardi, B. A. and O'Day, V. L. (1999) *Information Ecologies. Using Technology with Heart*, Boston: MIT Press.
- Natsuno, T. (2003) *The i-mode Wireless Ecosystem*, Chichester: Wiley.
- Norman, R. and Ramirez, R. (1993) 'From Value Chain to Value Constellation: Designing Interactive Strategy', *Harvard Business Review* 71(4): 65–77.
- Oudshoorn, N. E. and Pinch, T. (2003) *How Users Matter: The Co-construction of Users and Technology*, Boston: MIT Press.
- Paavilainen, J. (2001) *Mobile Business Strategies: Understanding Technologies and Opportunities*, London: Wireless Press.
- Pousttchi, K., Turowski, K. and Weizmann, M. (2003) 'Added Value-based Approach to Analyze Electronic Commerce and Mobile Commerce Business Models', in: R. A. E. Andrade, J. M. Gomez, C. Rautenstrauch and R. G. Rios (eds) *International Conference of Management and Technology in the New Enterprise*, La Habana, pp. 414–23.
- Ringland, G. (1997) *Scenario Planning: Managing for the Future*, London: Wiley.
- Sarker, S. and Wells, J. D. (2003) 'Understanding Mobile Handheld Device Use and Adoption', *Communications of the ACM* 46(12): 35–40.
- Schlosser, F. K. (2002) 'So, How Do People Really Use their Handheld Devices? An Integrative Study of Wireless Technology Use', *Journal of Organizational Behavior* 23(4): 401–23.
- Schwartz, P. (1991) *The Art of the Long View*, New York: Currency, Doubleday.
- Shapiro, C. and Varian, H. (1999) *Information Rules*, Boston: Harvard Business School Press.
- Stewart, J. and Williams, R. (1998) 'The co-evolution of Society and Multimedia Technology: Issues in Predicting the Future Innovation and Use of Ubiquitous Technology', *Social Science Computer Review* 16(3).
- Tsalgatidou, A. and Pitoura, E. (2001) 'Business Models and Transactions in Mobile Electronic Commerce: Requirements and Properties', *Computer Networks* 37: 221–36.
- Van de Kar, E. (2000) 'Development of business models for WAP services', in *Proceedings of the Americas Conference on Information Systems*, online at: [http://aisel.isworld.org/subject\\_by\\_publication.asp?Subject\\_ID=17#2000](http://aisel.isworld.org/subject_by_publication.asp?Subject_ID=17#2000), accessed 22 June 2005.
- Van de Kar, E. and Van der Duin, P. (2004) 'Dealing with Uncertainties in Building Scenarios for the Development of Mobile Services', in *Proceedings of the 37th Annual Hawaii*

- International Conference on Systems Sciences, 5–8 January 2004*, IEEE Computer Society: 77–87.
- Van den Ende, J. (2003) 'Modes of Governance of New Service Development for Mobile Networks. A Life Cycle Perspective', *Research Policy* 32: 1501–18.
- Williamson, O. E. (1996) *The Mechanisms of governance*, Oxford: Oxford University Press.
- Zhang, X. and Prybutok, V. R. (2005) 'How the Mobile Communication Markets Differ in China, the US, and Europe', *Communications of the ACM* 48(3): 111–14.