KPMG

Mobile Internet

"Any place, any time, everything"

Contents

Creating the New World Wireless Operator

Mobile Internet - "Any place, any time, everything"

Executive summary

We are witnessing the collision of the world's two fastest growing sectors - mobile technology and the Internet - creating an opportunity that no organisation can afford to ignore. The revolution is called the Mobile Internet and the impact it will have on telcos, ISPs and any organisation wishing to transact in the new world economy will be immense.

The new world economy will see the mobile phone move away from solely a telephony device, toward that of a unique 'Personal Identifier and Assistant'. For telcos a new role will emerge - that of the wireless portal.

And it is only a matter of time before everyone and everything becomes 'connected'. Within three years, there will be more wireless connections to the Internet than fixed, and the majority of e-commerce transactions will terminate or originate on a wireless device.

Mobile usage is already enjoying a substantial increase across the globe, with mobile phone connections outstripping fixed lines in some European countries. This presents a host of opportunities across the board for those operators who seize the change now, and a threat for those who do not.

Delivering Mobile Internet services will be a radical departure from anything traditional operators have done before and not all will successfully make the transition. The scope of change required is considerable as both existing revenue and cost models become redundant. Already, the market for mobile e-commerce (or m-commerce) in Europe alone is estimated to be worth Euro23 billion, compared with a mere Euro323 million in 1999.

To succeed, telecommunications operators must:

- re-focus their corporate vision towards the new world of data-centric services;

- ensure customer management and service provision become key differentiators;

- formulate new business models to incorporate a wider range of third party relationships;

- implement technology investments in shorter time scales;

- develop application development cycles that generate more innovative and flexible solutions; and

- adapt operational resources and infrastructure to achieve necessary cost efficiencies.

Success in the Mobile Internet new economy, means getting to market quickly, armed with the right applications and the right services. However, telecommunications operators will need to do this with partners. They must develop new ways to address their relationships with customers, vendors, application developers, content and service providers. This includes entering risk sharing arrangements with equipment vendors and application developers, and opportunity sharing arrangements with information and content providers.

The first markets will be in Mobile Professional Applications - unchaining people from their desktops. Within three years, most laptops will come equipped with a Mobile Internet (or intranet) capability allowing service/knowledge workers to assess corporate email, knowledge and resource management systems remotely.

As a result, the distribution of value in the value chain will rapidly shift. In the old world, 70% of the value remained with the telco; in the new world, 75% of the value will belong to content providers, content creators and service providers. Few, if any, telcos can make the transition from old world voice products to new world Mobile Internet services without a partner - to share risk, maximise opportunity and minimise time to revenue.

Many of the challenges facing the new world operators remain unknown - those who succeed in the longer term will be those businesses dedicated to creating a customer centric orientation.

Their Mobile Internet customers will be more demanding. They will want personalised service to meet their individual wants and needs and will no longer be satisfied with being part of a mass market.

Survival and growth in the m-commerce world therefore will depend on how well telcos can harness the resources of many, to deliver to the new customer of one.
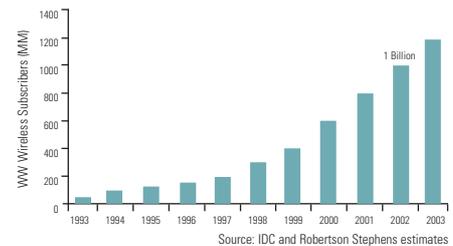
Introduction

The telecommunications industry is witnessing a new force - the galvanisation of mobile technology and the Internet with broadband services to form the Mobile Internet.

Over the next two years, people from around the globe will be using mobile communications as part of their everyday lives. It has already become a way of life for users in Japan and Europe - for communicating with others; for accessing the Internet and intranets; and for leisure and education. By 2005, the same pattern will have emerged in the US. This will take the tally to an estimated 1.2 billion mobile users globally: 750 million forecasted data users, easily outnumbering the predicted 670 million wired Internet users[1]. In all three regions (Europe, Asia Pacific and US), there will be more wireless connections to the Internet than fixed. In response, many mobile operators will need to transform themselves from voice centric network carriers to data centric service providers.

As a result of the massive increase in web enabled mobile terminals, the majority of e-business transactions, business or consumer, will originate or terminate on a mobile device. This simple change will have a fundamental impact on the business models of telcos, ISPs and content providers.

Growth in mobile terminals

WW Wireless Subscribers (MM)

1400 / 1200 / 1000 / 800 / 600 / 400 / 200 / 0

1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003

1 Billion

Source: IDC and Robertson Stephens estimates

"In 2005, there will be about one billion mobile phone subscribers, and a substantial portion of the phones sold that year will have multimedia capabilities."   *Nokia*

It will have an equally large impact on every organisation that wants to transact business in the new economy. This economy is known as the Mobile Internet world.

Global market trends: The world is moving to an online economy

Over the last decade, globalisation, the explosion of the Internet and convergence across telcos, computing and the media have caused massive changes in professional and social lifestyles. We can access information, shop and bank online, work from home, and speak and send messages via a mobile device throughout much of the world.

In fact, current data shows that the Mobile Internet revolution has already begun. The explosion of the Internet and intranets in the fixed world is driving the demand for mobile data services.

[1] ARC Group Jan 2000

- Of current mobile traffic volume, 3% of second generation mobile phones already offer basic data services[2]. By 2003, more consumers will access the web via mobile phones than by PCs.

- Currently, several European countries have more mobile phones than fixed lines.

- In Finland, 8% of mobile traffic is non-voice.

- Existing technology now being deployed provides bandwidth far in excess of those offered on today's telephone networks. Currently, data amounts to over 50% of traffic on these networks.

- The market for m-commerce in Europe alone is estimated to be worth Euro23 billion by 2003, compared with a mere Euro300 million in 1998[3].

Looking to the future the success of the Mobile Internet appears set to continue.

- The popularity of wireless devices for voice communications and the subsequent substitution of fixed phones will accelerate the adoption of broadband mobile services.

- In the next decade, the number of mobile users is predicted to quadruple at the same time as voice usage will triple[4].

- Mobile Internet-enabled laptops will free people from their desks creating mobile offices, mobile application hosting and mobile e-commerce, or 'm-commerce'.

KPMG is not alone in recognising the potential impact of Mobile Internet.

"We are very interested in accelerating the deployment of broadband access, and 3G is certainly an opportunity … that's the next big growth area."

Bill Gates, Chairman of Microsoft Corp

Not all will successfully make the transformation to m-commerce.

"[Mobile Internet] is going to be the most fantastic thing that a time-starved world has ever seen."

Jeff Bezos, CEO Amazon.com

Becoming a new world Mobile Internet provider

These massive changes create enormous opportunities for those who react first and a major threat for those who ignore them.

The scope of change required will be considerable as both existing revenue and cost models become redundant. Key areas of business will be altered including:

- a re-focus of corporate vision and culture toward the new world of data centric services;

  - customer management and service provision will be the key differentiators;

  - the formation of new business models to incorporate a wider range of third party relationships;

- technology investments implemented within shorter time scales;

- application development cycles that will need to collapse and generate more innovative and flexible solutions; and

- operational resources adapted to achieve necessary cost efficiencies.

For operators to succeed in the Mobile Internet world, they will need to not only adopt new business models but more importantly, forge new relationships with customers and vendors alike.

[2] Goldman Sachs Investment Research
[3] Durlacher
[4] KPMG, 'Communications in a converging world', 1999

In the Mobile Internet world, 45% or more of traffic revenues will be non-voice. The business focus for operators will need to rapidly shift from voice centric, circuit switched providers of products to data centric, IP based service providers. Not all will successfully make the transformation.

As a result, a number of critical success factors will govern the survivors.

- The ability to transfer risk, particularly technology and implementation risk, to those best able to manage it.

- The ability to develop innovative end user applications rapidly to gain first mover advantage.

- The implementation of state-of-the-art self-service operating and business support systems.

- 'Get to market first' ambition armed with the right services aimed at the right customers.

- Decreasing cost of operation utilising zero touch customer care.

- Providing not only transport, but creation, aggregation and personalisation of content and information.

To achieve this, the telecommunications industry will need to develop a new approach in its relationships with operators, vendors, content providers and service providers.

What are the global market trends?

In the developed world, growth will be driven by the demand for, and convenience of, Mobile Internet services. While in developing countries conversely, the lack of an alternative fixed network means wireless broadband networks (whether mobile, satellite or fixed wireless) may offer the only means of communications. However, each of the major regions are at different stages of readiness for the explosion of Mobile Internet services.

Asia Pacific region

Japan, Australia, Hong Kong and Singapore are by far the most ready markets for wireless data in the Asia Pacific region. Most carriers and mobile service providers have developed their Mobile Internet strategies, and are currently aligning with necessary partners, developing affiliate programs and building up their application portfolios.

The Japanese market, with over four million wireless Internet users, is the world leader in narrowband wireless data.

i-mode: a cellular success story

Since the impressive launch in February 1999, NTT DoCoMo's i-mode information service has captured four million subscribers, representing 13% of DoCoMo's subscriber base, and nearly 8% of Japan's 49 million mobile users.

i-mode is based on a per-packet charging (users pay a basic subscription fee per month and an amount per 128 bytes of information received). Subscribers are permanently connected to specifically designed Internet pages offering information, internet browsing, transaction services, and network games.

i-mode has also experienced the reverse of the European trend with Average Revenue Per User (ARPU) actually rising.

USA

The USA has suffered from multiple standards but the adoption of a single third generation (3G) standard will create the platform for a true nationwide Mobile Internet service. Mobile penetration is currently 30%, relatively low compared with other regions. However, it is predicted that in the next two years, 80% of mobile phones will have mobile data capabilities[5]. The rollout of Nextel's iDEN-based high speed mobile network may finally cause analogue cellular operators to realise that the Mobile Internet age has arrived.

Europe

The 'mobile data wave', although a global trend, has surged ahead in Europe. European markets are currently one to two years ahead of most of the world, with only Japan offering more advanced services. Currently, 117 million Europeans have mobile phones, most of them digital and three countries (Finland, Spain and UK) have already awarded 3G licences. At the moment, Finland has a mobile penetration of 70%, with users shopping via wireless terminals. And in several countries including Finland, Austria and Italy, mobile customers outnumber fixed line subscribers.

Mobile transactions services are already on offer with the ability to purchase a range of services from banking, to chocolate bars and car washes via a mobile phone.

The world is moving towards a mobile online economy - the explosion of the Internet, intranets and other information services in the fixed world is driving the demand for data services. Similarly, the popularity of wireless devices for voice communications and the subsequent fixed wireless substitution will strengthen the market adoption of broadband cellular services.

■ The market demand for mobile broadband services has been rising, and will continue to rise, due to a shift towards multimedia as data rates increase, improvements in handset technology continue and access tariffs decrease.

■ Internet access will become free with revenue based on advertising and commission from e-commerce.

■ Lifestyle trends include the growing demand to always be contactable and the emergence of the mobile office.

■ Increased work-related travel and working hours will lead to more efficient use of leisure time.

■ More widely dispersed social activities, friends and families will also demand continued access to mobile communications.

■ Personal security awareness will lead to a need for communications-based solutions such as vehicle breakdown callout services.

Benefits of mobile broadband

For new world broadband mobile service providers to succeed, they must develop service applications that combine the traditional attributes of mobile technology (ubiquity, security and convenience) with the new enablers of localisation, personalisation and instant "always on" connectivity. 3G networks can provide this, as well as:

■ greater bandwidth allowing for mobile office-type applications and even video transmission;

■ wireless packet-based switching offering an "always-on" connection similar to the fixed environment;

■ installation and access to broadband services via cellular that are quicker and cheaper than the fixed alternatives;

■ location-based services enabling both push-advertising, as well as allowing subscribers to request information; and

■ crucial security measures for m-commerce applications and several new standards to ensure the safety of these services.

[5] Yankee Group

Barriers to user adoption of mobile broadband - some myths

Old world "wisdom" suggests that mobile networks are not suitable for broadband services. This, and other commonly held views, can be challenged.

- **The cost of mobile usage is considered expensive.** In many mature mobile markets, this is no longer true and we are beginning to see increasing levels from fixed to mobile substitution. However, pricing will remain one of the key market drivers for mobile technology. In Japan and several European markets, mobile prices are already at or below fixed prices.

- **The network service quality will become crucial with the transition to a nearly all-data network**. 3G will provide end-to-end IP networking. This will create a challenge in guaranteeing service quality for latent sensitive services such as voice. At the same time, many features of IP will provide operators with the opportunity to use Quality of Service as a key service differentiator. Quality of Service must become one of the key dimensions of the service development cycle deployed by operators.

- **Complexity of products and pricing structures alienates many subscribers**. Active customer management will become synonymous with successful mobile service providers. To avoid subscriber confusion over the many new applications, selective targeting strategies matching individual users with personalised applications to fit their requirements should be employed. This 'mass market of one' principle is achieved by the strategic deployment of customer management systems and processes which allow operators to develop detailed profiles of each subscriber.

- **Equipment suitability (display, keyboard) with devices unable to compete with traditional screens**. Traditional mobile handsets are evolving to be 'data enabled' smartphones. However, it is still essential that services and applications are specifically adapted for use with wireless devices. As the most simple example, Internet information must be re-formatted from HTML to WML or XML. WAP (wireless application protocol) does this. Other applications will utilise voice activation and voice-to-text translation to alleviate issues regarding the usability of keypads. Many mobile internet terminals will have significantly larger screens than today's handsets eg, laptops, PDAs.

What applications and services will generate value?

The mobile phone is moving away from solely a telephony device, and toward a role as a unique 'Personal Identifier and Assistant'. It is only a matter of time before everyone and everything becomes 'connected'.

Broadband capacity allows operators to differentiate across a wider range of service

attributes. In parallel, end users are increasingly demanding interactive data applications. Application or service dimensions such as guaranteed quality of service, security, personalised content, location sensitivity and consistency of presentation across a range of access devices will be the new differentiators.

The Mobile Internet offers a range of applications for various user groups.

Lifestyle applications are broken down into three separate customer segments.

- The *'Lost Traveller'* who requires local information and directions for services such as hotels, restaurants or entertainment.

- The *'Time Poor'* leads a busy life conducting maintenance transactions (shopping, bill payment, ticketing and administration) when mobile.

- *'The Socialites'* are demanding of data services for interactive media and messaging.

Segment Applications allow a quicker and more efficient method of update between mobile workers (technicians, sales people, maintenance workers and couriers) and their base.

Mobile Professional Applications allow professionals to combine the functionality of their desktop with the advantages of timeliness, location, flexibility and mobility. 3G will create a new generation of service professional, unchained from the desktop with LAN like functionality while on the move.

- The *organise* function will facilitate real-time synchronisation and notification of address books and calendars.

- *Company intranets, email, knowledge management systems and extranets*, will be available on the move, on an "always on" basis.

Examples of applications

Remote access: email, Internet, TV, calendar, shared scheduling, Intranet applications, Extranet.

Information and directory services: news, weather, stock prices, horoscopes, sports scores, train times, restaurant guide, dictionary, recipes.

Entertainment: gambling, chat, jokes.

Interactive: banking, stock trading, ticket purchasing, m-commerce, insurance, car rental, billing, videoconferencing.

Telematics and Telemetry: remote automotive diagnostics, vending machines, car parking meters.

Sales Force and Field Administration: customer records, product availability, delivery scheduling.

Mobile Office: "always on" connectivity to corporate e-mail, and knowledge management systems.

Operations and maintenance: remote machinery diagnostics, fleet tracking and diagnostics.

Retail/POS: credit card authorisation, lottery.

What are the key technologies and enablers?

Broadband mobile services will build on existing 2G digital networks.

The first step up will be the 2.5G services.

- *High Speed Circuit Switched Data* (HSCSD) extends the current GSM systems to allow for improved data rates, and is cost efficient to implement requiring only software upgrades.

- *General Packet Radio System* (GPRS) will introduce packet-based technology, optimised for short, 'bursty' traffic and will theoretically increase data speeds up to 115kbps.

- *Enhanced Data for Global Evolution* (EDGE), will be a higher bandwidth version of GPRS, offering speeds up to 384kbps and enabling high-speed, mobile multimedia applications.

The next step will be the 3G networks.
The first 3G network is expected to be
operational in Japan by late 2001. However, it
will not reach the estimated bandwidth of 2Mbps
and will require a new network.

- *Universal Mobile Telephone System* (UMTS)
  will offer the first true 3G IP native broadband
  mobile network. Although not available until
  next year at the earliest, it will offer speeds
  up to at least 384 kbits/s, with later stationary
  bandwidth up to a maximum of 2 Mbits/s.

- *Operating systems*, of which several exist,
  that enable mobile devices to display and use
  wireless applications. The main challenger to
  Microsoft's *Windows CE* is EPOC which is
  able to handle Wireless Application Protocol
  (WAP), can support Bluetooth (the future
  standard low power radio communication
  between PCs and a range of supporting
  peripherals) and can use Java.

How will operators succeed in maximising value?

These technology advancements are critical
enablers for new world services, but it is
essential that operators do not treat the
transition as just another technical roll out
programme.

Delivering Mobile Internet services will be a
radical departure from anything that traditional
mobile operators have done before and needs to
be managed accordingly. Each face fundamental
challenges if they are to continue generating
shareholder value at current rates.

- The *corporate vision* and mindset needs to be
  re-focused towards the new world of data
  centric services.

- *Customer management* must be structured as
  a key differentiator in an increasingly
  competitive market.

- *New business models* should be developed
  and adopted, incorporating a wider range of
  third party relationships.

- *Technology investments* must be justified and
  implemented within shorter timescales.

- *Application development cycles* should
  generate more innovative and flexible
  solutions.

- *Operational resources* and infrastructure has
  to be adapted in order to achieve the
  necessary cost efficiencies.

Operators must develop business models that
potentially generate multiple sources of revenue
through commercial transactions with third party
content providers.

As an example, mobile banking (m-banking)
applications offer benefits to a banking
organisation including additional distribution
channels and the opportunity to reduce fixed cost
investments in retail branches' infrastructure. As
a consequence, the mobile operator or mobile
portal may drive indirect revenues from the bank
in relation to subscriber usage of the service.
Service differentiation will be created through a
continued understanding of key customer
requirements. Detailed market analysis to define
user segments, growth rates and propensity to
purchase is essential.

The implications for mobile operators in terms of Operational Support Systems and Business Support Systems (OSS/BSS) will be substantial. Billing, mediation, service provision and customer management environments will require substantial change. New systems must be deployed to provide greater flexibility and functionality; organisational resources need to be re-scoped and re-trained; and business processes must be re-engineered.

Tariffing has always been a critical lever in establishing penetration and usage of traditional voice services. The arrival of continual access via packet switched networks will necessitate new pricing models to support and encourage the adoption of new services. Traditional charging methods such as time incremental subscriptions will remain, however per minute pricing will no longer be relevant. Charging structures will be based on data volume (per Kbyte) or events (pay per view, pay per play, etc).

Cellular operates in marketplaces with increasing competition from fixed networks and other wireless technologies. Critical success factors include:

- *first to market* with new products and services;
- *personalisation* of applications and customer management services to capture customer appreciation and loyalty;
- *orderly yet rapid migration* of network and OSS/BSS from old world to new for existing operators;
- *rapid deployment* of infrastructural support systems for new entrants; and
- *innovative commercial models* developed to realise collective value with partners and third party suppliers.

A new role is emerging - that of the wireless portal.

Mobile commerce (m-commerce) represents one of the key application segments that will emerge over the next five years, enabled by the technology transitions described below. The European m-commerce market is expected to grow from Euro323 million in 1999 to more than Euro23 billion by 2003, and is currently estimated to be two years ahead of the US in development terms.[6]
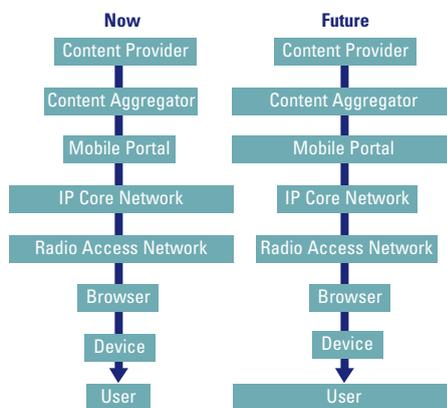
How should an old world telco react?

We are seeing a clear shift in the mobile market value chain. With regards the Mobile Internet, market value will shift from transmission to content, from the operators to content providers. We estimate that only 25% of the total revenue will be in the transmission of traffic and the remaining 75% divided between content creation, aggregation, service provision and advertising.

In the old world, power and therefore value, was invested in the radio access and core network provider. In the new world, this balance will shift to users, content providers and portal operators.

New world value shift

Now	Future
Content Provider	Content Provider
Content Aggregator	Content Aggregator
Mobile Portal	Mobile Portal
IP Core Network	IP Core Network
Radio Access Network	Radio Access Network
Browser	Browser
Device	Device
User	User

[6] Durlacher

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An example of a value chain model
The One-Bill Model

The Mobile Transaction Value Chain involves all consumer account providers including utility companies, banks, and telecommunication companies. By adding mobility with constant access anywhere, efficiency could be improved if everything was billed to the mobile phone or credit card bill. Analysts predict it will take less than five years for the One-Bill Concept to emerge. The key question is which provider will own the customer interface? It could equally be the portal companies - the current interface owners of fixed Internet users, the banks with the large customer databases at their disposal, or the telcos with the correct infrastructure in place.

The convergence of the Internet and mobile will create a discontinuity in the traditional value chain. A new role is emerging - that of the wireless portal. The portal acts as an aggregator of services, gathering user preferences and behaviour, customising the portal to operators and users needs, enabling the location and accessing of specific services.

Questions still remain on how each player should position themselves.

- Who is in the best position to meet this challenge?
- Can operators optimise their direct contact with customers and own them by providing a packaged product to their subscribers?
- Should they control customer information, as well as acting as a driver for content development?
- Will Internet portals extend their activities to the wireless world?

- Is the wireless web paradigm similar to the Internet model?
- Are customers expecting the same kind of content on their handsets as on the Internet?
- How can synergies between content and the handset interface be optimised?

How can KPMG help?

Many of the challenges facing new world operators remain unknown - those that will succeed in the longer term will be those that are dedicated to creating a customer centric orientation, that retains the organisational flexibility to remain dynamic in an ever changing market place.

New world survival is dependent on several elements.

- Develop the vision and ambition to succeed as a new world Mobile Internet service provider.

- Be prepared to throw away old technology and old business models.

- Use new technology to offer personalised, specifically tailored services to a wider customer base - one-to-one marketing.

- Reduce the cost to operate by web enabling all key processes within the business.

- 'Get to market first'. In the new world, first mover advantage cannot be underestimated.

KPMG is one of the world's leading advisors to the communications industry. We have the skills and experience to assist our telecommunications clients to create value from the opportunities offered by the discontinuities in the mobile communications world.

- Our strategists can assist in identifying trends in technology, regulation and markets before your competitors. We have successfully helped several of the world's leading telcos create ground breaking strategy.

- Our strategic alliance with Cisco allows us to provide company wide solutions to transform today's telcos into tomorrow's mobile internet winners.

- Our joint venture with Qwest gives us unparalleled insight into developing new world operating systems.

- Our transaction services teams have advised mobile communications clients on some of the largest mergers and acquisitions in the industry.

- We have assisted clients and banks in raising the finance required to facilitate billion dollar transformations.

- Using world leading systems capabilities we have worked with leading telcos in implementing new world operating systems.

- We have designed, tested and implemented world leading customer support and billing systems for some of the world's largest mobile communications operators.

- Our tax advisors have saved millions of dollars for the world's largest telecommunications operators.

- Our Information Risk Management (IRM) group has helped clients manage the technology and security implications of pursuing their new world business strategies.

Our focus

With 110,000 staff in more than 160 countries, KPMG has the commitment and resources to build on our existing global experience, allowing us to meet the unique needs of our global clients ■ No matter how complex your business issues may be, our services are designed to bring clarity.

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