The major concern among both vendors and clients at this time is the economy. Much depends on the form the recession takes and how effective governments are in minimizing its impact.

A shallow/short recession would see reductions in growth in many mobile markets and a small shrinkage in some areas (such as handsets). Corporations will defer spending which will put pressure on weaker vendors. Strong vendors and corporations would be inconvenienced, but not seriously threatened. In this scenario 2009 would be inconvenient but growth would return by 2010.

A long and deep recession would be very serious involving 10s of percent decline in key market indicators such as service revenue could trigger major failures and restructuring. In this scenario growth might not return before 2011 and survival would be the imperative for many users and technology suppliers.
Key Issues

1. What will be the key mobile and wireless technology and market trends through 2012?
2. How will corporations choose and use mobility solutions to support customers and employees?
Key Issues

1. What will be the key mobile and wireless technology and market trends through 2012?

2. How will corporations choose and use mobility solutions to support customers and employees?
Wireless performance and latency are improving and will likely continue to do so for a decade.

**HSUPA** delivers performance approximately equivalent to slow wired broadband.

**LTE** will likely unify CDMA and GSM, and has a defined path to LTE-A, which will be ITU-4G-compliant. LTE will start deployment around 2010 and should be able to deliver a reliable 10/10 experience (that is, 10 Mbps at 10 ms latency, which is sufficient for a wide range of applications).

**WiMax** will remain a relative niche, serving as a metro-area fill-in network in some countries.

**802.11n** will slowly replace 100 Mbps wired Ethernet to enable "all-wireless" homes and offices.

**Satellites** remain expensive, bandwidth will increase to around 10 mbps for Low Earth Orbit (LEO) services around 2012, experimental systems such as Japan's Kizuna achieved 150 Mbps downlink in 2008.

2G GSM technology will comprise approximately two thirds of all cellular connections through 2012 because many emerging markets will not adopt 3G rapidly. Low cost wireless broadband is stretching the capacity of some 3G networks and backhaul which may result in a reduction in flat-rate pricing.

**Action Item:** Plan for more complex tariffs and price increases for wireless broadband delivered over cellular networks. Understand which contracts and devices your customers have.
Key Issue: What will be the key mobile and wireless technology and market trends through 2012?

Short-term technologies for business and IT organizations to watch during the next three years include:

**Bluetooth 3.0** will deliver major improvements in power consumption and features with device shipments starting in 2010. Support of Wi-Fi as a bearer will delay UWB Bluetooth. Low Energy (LE) Bluetooth will also enable new sensor/peripheral devices and business opportunities.

**User interfaces** have emerged as a major area of differentiation and competition (for example, on devices from Apple and HTC). Considerable innovation will occur in this area during the next five years.

**Location** will be deduced using several technologies, and will be a key enabler for new mobile business propositions and services based on context and "moments of need."

**802.11n** enables "all-wireless" homes and offices, although it may be problematic for corporations because of its complexity, the need to "rip and replace" old access points and backbone network connections, and the myriad 576 data rate configurations covering 2.4GHz and 5GHz solutions.

*Action Item: Consider 802.11n for new-build office deployments but try to achieve return on investment from established 802.11 b/g deployments before replacing them with 802.11n.*
**Key Issue: What will be the key mobile and wireless technology and market trends through 2012?**

More short-term technologies for business and IT organizations to watch during the next three years:

- **Display technologies** are evolving fast and will enable improved battery life, new device form factors (for example, the Polymer Vision "Readius") and new use cases (for example, pico projectors).

- **Mobile Web and widgets** will become increasingly viable as networks improve and will provide a low-TCO solution for applications to target a wide range of device types. Web applications will get richer as standards bodies are define ways for Web applications to access persistent data and handset APIs.

- **HSUPA and LTE** make cellular networks viable for a broader range of applications, and will also make "built-in" cellular technically and economically viable.

- **Near-field wireless** is likely to emerge as a standard for secure mobile payment and proximity applications, although deployment will be slow because a new ecosystem must be built, including devices, retailers, operators and financial services organizations.

*Action Item: Organizations wanting to prepare for mobile payment should conduct NFC trials.*
Key Issue: What will be the key mobile and wireless technology and market trends through 2012?

1. We expect the handset market to shrink a little in 2009, this could drive further vendor consolidation.

2. By 2012 smartphones (those with an identifiable operating system) will make up approximately 40% of shipments. The proportion of smartphones will vary dramatically by region, from as much as 75% to as little as 20%.

3. The market is still dominated by five large vendors, with three smaller companies (RIM, ZTE and Apple) trying to join the leaders. Changes in the positions and composition of the leaders are likely.

4. Nokia dominates with a strong presence in both mature and emerging markets. Nokia's Ovi services strategy continues to evolve based on core services such as music, games, image sharing and mapping. In 2008 Nokia exited the enterprise software and tools business. Motorola has failed to find a buyer for its handset division and is still struggling to stabilize the business. Samsung has a strong devices business but a weak services or enterprise strategy.

*Action item: Handsets will increasingly be differentiated by applications and services, all handset vendors should define a strategy for services.*
Strategic Planning Assumption: In 2010 Symbian will remain the dominant smartphone operating system shipping over 3 times the units of its nearest rival.

Key Issue: What will be the key mobile and wireless technology and market trends through 2012?

The growing importance of smartphones (those with an identifiable operating system) means that in the short term platforms are a major battleground because the best user experiences are platform-specific.

**Symbian** dominates in 2008 and will become an open-source platform by 2010, driven by Nokia's desire for more Symbian devices to access Ovi and the long-term view that owning a platform is less strategic.

**RIM** has a solid presence, but this is more a reflection of the small smartphone market size in 2008 than the number of RIM devices shipping. RIM's challenge is to make the platform more consumer-oriented and to grow the range of devices. The new touch-screen "Storm" is a good start.

**Windows Mobile** has a strong corporate presence but is struggling in the consumer marketplace. Windows Mobile 6.5 (expected in 2009) and 7.0 (expected in 2010) will be key to achieving consumer success.

The growing popularity of **Apple** iPhone is making **OS/X** a more significant platform.

**Android** is likely to dominate mobile Linux, but will take several years to mature.

*Action item: Widows Mobile users should prepare for significant changes in technology and business strategy as Windows Mobile becomes more consumer-oriented.*
Tactical guideline: The need for platform-specific mobile applications will decrease through 2015 but will not disappear.

Key Issue: What will be the key mobile and wireless technology and market trends through 2012?

In general mobile developers trade off two factors: audience size and quality of user experience. Simple technologies such as voice, SMS and MMS work on a very large range of handsets but deliver unsophisticated experiences. The mobile Web is more sophisticated, but in 2009 there are no standards for Web applications to manage persistent data and access handset features such as the camera and GPS. These will likely emerge through 2010. Mobile widgets are even less standardized. Technologies such as Flash Lite and Silverlight deliver a sophisticated media experience but are proprietary and not available on all handsets. MAGs are well suited to corporate applications, especially those accessing back-end packages. Native applications deliver the most sophisticated experience, but target the smallest range of devices.

Different applications and target devices need different technologies, so all will coexist through 2015. However the increasing sophistication of technologies such as the mobile Web means that the platform specific zone will shrink but will never disappear. Nokia's acquisition of Trolltech and the inclusion of Qt in Open Symbian will make this a more important platform independent tool.

Action Item: Develop platform-specific applications when the quality of experience is paramount.
**Key Issue: What will be the key mobile and wireless technology and market trends through 2012?**

These charts illustrate a Gartner global survey of several thousand mobile subscribers who were asked which mobile services they had used during the past month or were planning to use during the next year.

1. Communication services generate the most interest, including instant messaging and mobile e-mail.

2. In mature markets, few new services, such as video, banking and TV, are compelling. Most have under 20% use and the number planning to use the service during the next 12 months is much smaller than the number using it. This suggests that most people who are interested in a service have already experimented with it.

3. Most mobile services are more interesting to subscribers in emerging markets than in mature markets, perhaps because of less Internet availability and the potential for mobile devices to provide services, such as banking, that subscribers don't yet have.

A key conclusion is that the major problem the mobile industry faces in mature markets is not delivering services, but discovering new services that subscribers actually want.

*Action Item: Operators and aspiring mobile ecosystem owners should offer incentives to developers to create new mobile services.*
Key Issue: What will be the key mobile and wireless technology and market trends through 2012?

Operators in mature markets face many challenges. There are few if any new subscribers, prices are under pressure, products are undifferentiated. Even successful new offerings such as wireless broadband are stressing network capacity. We believe operators — like other businesses — should expand their portfolio of offerings both horizontally and vertically to find new sources of revenue. Strategies include:

**Horizontal expansion.** Expand the current service portfolio, for example by investing in emerging markets where there is still growth and rolling out new network technologies such as LTE.

**Vertical expansion.** Become part of vertically integrated value chains in a Web 2.0 world. For example, take a part in delivering music, advertising, TV, m-payment.

**Diversification.** Move into entirely new areas where there is little or no direct competition. For example cloud computing, green IT (perhaps selling communications as an alternative to travel).

An operator's new service portfolio is likely to contain all of these.
Market: Owning an ecosystem will be one of the most valuable roles in the mobile application and services marketplace.

**Mobile Ecosystem Competition Q1 2009**

<table>
<thead>
<tr>
<th>Customers need...</th>
<th>Rich and innovative application and service portfolio</th>
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<tbody>
<tr>
<td></td>
<td>Apple</td>
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<tr>
<td>Developers and authors need...</td>
<td>Large customer base</td>
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<td></td>
<td>Business support services</td>
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<td>Technology support</td>
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<tr>
<td>Ecosystem owners need...</td>
<td>Extensible Foundation services</td>
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<tr>
<td></td>
<td>Ecosystem profit potential</td>
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<td>Agility/innovation</td>
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**Key Issue: What will be the key mobile and wireless technology and market trends through 2012?**

There will be many ways to monetize mobility; however ecosystem owners will be in one of the strongest positions. An ecosystem consists of an interwoven group of customers, application developers, content and service providers, and a technology platform on which business propositions are built. No dominant ecosystems have yet emerged in the mobile space, although many organizations are fighting to become an ecosystem including Google, Nokia, Apple, RIM, Microsoft, Yahoo and some network operators such as Vodafone. By 2015 we expect that around three dominant ecosystems will have emerged.

A successful ecosystem will satisfy the needs of all three participant roles: developers, customers and the ecosystem owner. Nokia for example has a large customer base and provides excellent developer support, but has few open and extensible services. However we do expect that some Ovi services will become more open in 2009. The Apple app store provides good business support, but the total number of users is relatively small in mobile terms. Google has excellent foundation services such as search, Street View, Earth and Maps but very few Android users to buy applications. Microsoft is working to improve the Windows Mobile ecosystem, its developer technology support is strong but business support is weaker.
Tactical Guideline: In the short term, concentrate on finding the steps in a multichannel business process where mobile adds the most value, rather than trying to create new "mobile-only" business propositions.

### Mobile Business 2.0 Opportunities

**Mobile Business in 2009 - 2010**
- Concentrate on those steps in your business process where mobility adds value
- Understand your customers
  - Focus on the demographics who are likely to try mobile solutions
  - Understand what devices and habits they have
- Breadth/simplicity will be more effective than depth/complexity

<table>
<thead>
<tr>
<th>Awareness</th>
<th>Information search</th>
<th>Evaluation</th>
<th>Purchase</th>
<th>Post-purchase</th>
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**Key Issue: What will be the key mobile and wireless technology and market trends through 2012?**

There are many views of business transactions; a simple five-step model illustrates some of the ways in which mobile and wireless technology can support business activities. In 2008, mobile business is a tiny proportion of all commerce; most mobile business is concerned with simple activities, such as advertising or purchasing ring tones and media. Opportunities include:

**Awareness:** Many opportunities, especially in areas such as mobile marketing and advertising

**Information search:** Many opportunities, such as finding products, services and shops.

**Evaluation:** More limited opportunities (perhaps price comparison, for example)

**Purchase:** Limited in Western Europe and the U.S., where mobile payment has little traction

**Post-purchase:** Some opportunities for services, product consumption or support, long-term opportunities for telemetry, and "smart products" (for example, in the auto industry).

The rectangles indicate the likely opportunity and suggest where organizations should focus their effort.
Key Issues

1. What will be the key mobile and wireless technology and market trends through 2012?

2. How will corporations choose and use mobility solutions to support customers and employees?
Key Issue: How will corporations choose and use mobility to support customers and employees?

In the cost-constrained environment we expect during 2009 organizations are likely to be cautious, and reluctant to spend large amounts of new capital. So from a mobile perspective:

"Run the business" mobility such as voice, wireless connectivity in laptops and mobile e-mail will continue albeit with a strong focus on cost control. For example, consolidating cellular contracts, exploring telecomms expense management solutions, perhaps delivering more functions on employees own devices. Some investments such as wider mobile e-mail deployment may be deferred.

"Grow the business" mobility involves classic mobile applications, such as field force automation, sales force automation and logistics. These applications provide good ROI even in a recession, but finding capital expenditure may be a challenge so organizations may look for more creative funding solutions such as subscription pricing. Also, be cautious, some of the vendors operating in this space are small and may be vulnerable to a recession.

"Transform the business" mobility is usually a high risk/high return activity which will be an unattractive investment for most organizations in a recession.
The Mobile and Wireless Scenario

Tactical guideline: Establish formal policies for teleworkers, mobile workers and informal home workers.

Mobile Work and Teleworking

Percentage of officially sanctioned remote workers in the workforce. Gartner survey 2008

<table>
<thead>
<tr>
<th>Country</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Germany</td>
<td>20%</td>
</tr>
<tr>
<td>France</td>
<td>15%</td>
</tr>
<tr>
<td>UK</td>
<td>10%</td>
</tr>
<tr>
<td>USA</td>
<td>5%</td>
</tr>
</tbody>
</table>

Over 80% organizations have remote workers
- Demand from Employees
- Job functions require mobility
- Pressure for cost reduction
- Environmental concerns
- Consumerization

Mobile applications
- Security
- Management and metrics
- Cellular contracts
- Mobile devices, corporate and personal
- Policies and HR
- Unofficial remote work and teleworking
- In-home wireless, home VoIP
- IT Support

Key Issue: How will corporations choose and use mobility to support customers and employees?

Remote workers include both mobile workers and teleworkers. Between 84% and 95% of the organizations surveyed by Gartner in the U.S., the U.K., France and Germany had a remote workforce, so although the total proportion of remote workers is still small it is an issue which affects most organizations. Note also that most organizations will also have some level of unofficial or unsanctioned remote workers, for example, staff using home technology or personal mobile devices for work purposes.

Mobile application deployments such as sales or field engineering systems create more remote workers, and as such demand new policies and management techniques.

It's important to have formal policies and strategies for remote working because it raises a large number of personnel, process, management and technology issues.
Key Issue: How will corporations choose and use mobility to support customers and employees?

As technologies such as mobile e-mail proliferate the amount of enterprise data on handheld devices grows as does the risk of security breaches and data loss. The cost of recovering from a security failure is usually far greater than the cost of prevention. For example, In 2007, the U.K. Financial Services Authority fined a bank £980,000 for the loss of a laptop that contained "confidential customer data" on 11 million customers.

Key strategies include managing configurations, encrypting data at rest, strong passwords, device lock and wipe, VPNs and Wi-Fi intrusion detection. Device backup is also important in the event a device is lost or has to be wiped. The four tests of a good security strategy are: consistency, minimizing exposure (for example, through thin client applications), commitment and reasonableness.

However personal devices are increasingly being used to access corporate data. These cannot be managed and encrypted in the same way as corporate handhelds. Safe use of these implies both new access mechanisms like thin client and a move away from traditional perimeter security models to authentication and security associated with individual applications.
Integrate Wireless Devices Into Communication/Collaboration Strategy

**Communication-Enabled Business Processes (CEBP)**
- Rich information sharing
- Business process integration
- Conferencing
- Presence
- Messaging (e-mail, IM, SMS)
- Voice

**Collaboration**
- (coordination, decision making, working, socializing)
- file and image sharing, social networks
- presence- and voice-enabled apps.
- videoconference, video calling
- status and location
- text and image messages
- cellular or IP voice, voice mail

**Wireless Voice**
- (wireless VoIP, FMC/FMS, cellular/PBX integration), single number

**Unified Communications**
- (voice + messaging + presence + conferencing)

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**Key Issue: How will corporations choose and use mobility to support customers and employees?**

Many organizations have four communications initiatives under way: IP voice, unified communications, communication-enabled business processes and collaboration. These are inter-related and all demand a strategy that defines the role of wireless devices, networks, mobile applications and mobile services. This must be considered across all initiatives, not addressed separately in each.

**Wireless voice** addresses mobile to IP PBX integration, one-number solutions, handoff between Wi-Fi and cellular calls, fixed-to-mobile convergence, and substitution.

**Messaging** includes wireless e-mail, IM, MMS and SMS. IM will grow substantially through 2014.

**Presence** extends corporate presence to mobile devices, and mobile location to corporate presence.

**Conferencing** includes voice, video and Web conferencing, some of which can be on mobile devices.

**Business process integration** involves communication-enabled business applications, such as ERP.

**Rich information sharing** uses new mobile tools, such as "moblogs," picture sharing, file and document sharing, location-based communities, social networks.

**Action Item:** Define the role of mobility and wireless across all corporate communications initiatives.

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Key Issue: How will corporations choose and use mobility to support customers and employees?

One of the most important constraints on what a device can be used for is its screen size.

Small screens (around 2 inches) such as are found on handsets are suitable for simple messaging and Web snacking but not well suited to extended Web browsing or watching video for long periods, for example. The minimum screen size for extended Web browsing or comfortable video is around 3.5 inches, illustrated by devices such as iPhone, iPod touch or small Web tablets such as the Nokia N810.

Although it's possible to run Vista on very small devices most users find that 7 to 8 inches is the minimum. Users with weaker eyes or users creating complex content creation will need a minimum of 10 inches.

Windows Mobile will dominate corporate application platforms with RIM as an alternate choice. Appliance level tasks (for example browsing or mobile e-mail) are achievable on Apple OS/X and Nokia S60. The various Linux-based systems including Android will remain consumer platforms for several years.

On mobile Windows devices like laptops key trends include the increasing viability of embedded 3G and the falling cost of robust solid state disks.
Control Costs With Managed Diversity

<table>
<thead>
<tr>
<th>Unconstrained</th>
<th>Platform</th>
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<tbody>
<tr>
<td>&quot;I will build applications if you accept constrained device choices&quot;</td>
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<tr>
<td>&quot;I will do anything for money&quot;</td>
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</table>

$X = Generic TCO example

Key Issue: How will corporations choose and use mobility to support customers and employees?

Mobile devices cannot be managed like PCs, it's impossible for most organizations to mandate a very small range of devices for all employees. The organization must be prepared to support a sufficient number of devices to satisfy employees, too few is as bad as too many. Costs can be controlled by defining three classes of support:

**Platform.** This support level is usually applied to devices which need a significant application portfolio. By standardizing on a single platform such as Windows Mobile the organization can develop and support applications, at a cost of supporting a smaller number of device types.

**Appliance.** This support level allows a wider range of devices, but at the cost of a smaller range of services and applications. For example, if the organization allowed only mobile e-mail and PIM then it might be possible to support both Windows Mobile and Nokia E and N series devices at an acceptable cost.

**Concierge.** When special cases arise, such as the CEO who demands an iPhone then special case "concierge" support is required. This is acceptable as long as he or she pays the full cost.

Strategic Imperative: Apply the principles of managed diversity to mobile devices.
Business Imperative Action Plan

Today

- Concentrate on "grow the business" mobile applications delivering fast ROI
- Identify cost reduction opportunities for "run the business" mobile services such as cellular voice/data and mobile e-mail.
- Establish architectures, standards and tools to enable mobile application deployment and innovation by business and the IT organization.

During the Next 12 Months

- Encrypt data on mobile devices, it's less expensive than cleaning up after data loss.
- Develop/refine your mobile work/teleworking strategy
- Use managed diversity principles to control costs

Long Term

- Identify post-recession mobile opportunities, for example involving context and business transformation.