Presentation Rationale

Successful business requires analysis of regulatory and market dynamics for whole system life cycle

see ITU Mid – Term Guidelines and Handbook on “Smooth Transition to IMT-2000”

Choice of complete network technologies becomes critical!

First steps towards IMT-2000 (3G)
- 270 commercial GPRS networks
- 137 networks deploying GPRS/EDGE
- 67 commercial EDGE networks (source: GSA, April 5, 2005)
- 115 commercial Cdma2000 1x networks (source: CDG, April 8, 2005)

IMT-2000 (3G)
- W-CDMA: 134 licenses awarded
- 67 commercial W-CDMA networks (source: GSA, April 12, 2005)
- 20 commercial CDMA 1x EV-DO networks (source: CDG, April 8, 2005)

Evolution of IMT-2000 (3G+)
- 3GPP has an evolution plan for inclusion of other radio technologies (HSDPA, WiFi, WiMax, …) (source: 3GPP)
- CDMA 1X EV-DV: Development stopped (source: various press releases)
GSM / UMTS Growth in India
Source: GSA (www.GSACOM.com)

Mobile subscribers growth in India – 31 December 2004
Source of data: Informa Telecoms & Media

GSM

CDMA

Q1 2004 Q2 2004 Q3 2004 Q4 2004

GSM / UMTS Growth in Latin and Central America
Source: GSA (www.GSACOM.com)

Mobile subscriber growth in Latin and Central America
31 December 2004
Source of data: Informa Telecoms & Media

Americans excluding USA & Canada

TDMA

GSM

CDMA

Q4 2003 Q1 2004 Q2 2004 Q3 2004 Q4 2004
GSM / UMTS Growth in Americas
Source: 3G Americas (www.3gamericas.org)

- From 17 Million in 2001 to 117 Million in 3/2005
- 160 licensed GSM operators
- Edge commitment: 69 operators in 35 countries
  (outside Americas: 89 operators in 51 countries)
  Total commitment: 158 operators in 86 countries
  Total deployment: 67 operators in 44 countries

- W-CDMA UMTS Launch in USA:
  AT&T wireless/Cingular: Detroit, Phoenix, San Francisco, Seattle, Dallas and San Diego

- 15 – 20 Cities by end 2005

GSM / UMTS Growth in China
Source: GSA (www.GSACOM.com)

Mobile subscribers growth in China – 31 December 2004
Source of data: Informa Telecoms & Media
What do users want?

What do operators need to know?

European Regulatory Environment

Standards / Technology Environment

Evolution towards UMTS/IMT-2000

Business model for the life-cycle (~ year 2015)

Conclusions

User Needs – users do not buy technology!

- Enhance (multi-media) life-style experiences
- Additional M2M applications & Services: 
  - Machine to Machine
  - Machine to Mobile
  - Mobile to Machine
- Ease of use across different networks (VHE)
- Global roaming for voice and data (~ 20% revenue!)
- SMS / MMS capability across networks (tourism!)
- Simple combined billing and/or pre-paid capabilities

These capabilities are only possible within the same IMT-2000 family member – see ITU work; this means that today GSM/GPRS/UMTS can not work with CDMA2000.
Contents

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Pressures on ARPU and Overall Revenue

- Competition and demography requirements
- Subscriber Acquisition / Retention Costs and
- attractive services customization & segmentation

<table>
<thead>
<tr>
<th>ARPU (US$/month)</th>
<th>Revenue (US$B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999 2000 2001 2002 2003 2004 2005 2010</td>
<td></td>
</tr>
</tbody>
</table>

ARPU CAGR

- North America 15.6% 3.7%
- Asia Pacific -13.0% 7.6%
- Western Europe 5.0% -5.8%
- Other -7.6% -4.8%

Source: Deloitte Consulting, Ovum

<table>
<thead>
<tr>
<th>Year</th>
<th>Voice ARPU</th>
<th>Data ARPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>2000</td>
<td>0%</td>
<td>0%</td>
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</tr>
<tr>
<td>2005</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

CAGR (1999-2005)

- Overall ARPU: +52%
- Voice ARPU: +50%
- Data ARPU: +30%
Operator Issues

- Wireless connectivity vs. Content Provisioning
- Infrastructure Ownership / sharing vs. MVNO
- Service Provisioning vs. Partnerships
- Regulatory & Financial Constraints
- Cultural & “disposable income” constraints
- International Roaming & VHE capabilities
- Customer Care Capabilities

Strategy and Business Plan Development

Various steps from conceiving a corporate vision up to detailing implementation activities are necessary.

**Vision and Concept**
- Vision
- Corporate philosophy
- International alliances

**Market Definition**
- Assess market
- Understanding the market
- Positioning

**Entry Strategy**
- Develop a strategy
- Business units
- Products, Channels, Segments, Entry
- Regulator

**Business Planning**
- Build a business case with cost and turnover estimates
- Budgeting
- Investments

**Company build up**
- Organization
- Technology and network planning
- IT Systems
- Key functions
- Sales
- Customer Care
- Support functions

**Implementation**
- Update strategy
- Implement the concept to build and develop core capabilities
- Focus resources on market entry date

Integrated project management
Typical questions to be answered

- We intend to buy a 2G/3G license. Could the project be feasible from a financial point of view?
- How does market, penetration, ARPU etc. look like? Can investors expectations be met?
- Is our strategy in line with my financial expectations?
- When do we have to consider technology migration?
- What new services do we need to improve financial performance?

Contribution of Siemens

- Financial feasibility study
- Investors Case
- Development of fully comprehensive operators business plan
- Strategy assessment

Contents

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All 25 EU Member States need to follow EU Regulations

Bulgaria, Romania and Turkey are next accession countries and will need to prepare for EU harmonisation

Mandatory to follow Directives, Decisions, ... which de-facto implies:
- At least one UMTS operator (Single Market roaming)
- ITU Harmonised core bands for IMT-2000
- Number portability
- “Open Network” Provisioning (Access Directive)
- Conformance to ETSI Standards
- Compliance to R&TTE Directive

EU Harmonised Spectrum Allocation and usage for PAMR/PMR and emergency/security/public services (Police, Fire, Health, disaster Relief, ...)

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IMT-2000 Radio Technology Standards

- CDMA
  - IMT-DS Direct Spread (UMTS-Japan, UMTS-Europe)
  - W-CDMA
  - HSDPA
  - FDD
- TDMA
  - IMT-MC Multi Carrier (UMTS-China)
  - UTRA-TDD
  - TD-SCDMA
  - HSDPA
  - TDD
  - GERAN
  - Chinese

- FDMA
  - IMT-SC Single Carrier (UMTS-USA)
  - EDGE
  - IMT-FT Frequency Time (TIA – ETSI – T1)
  - Cingular, SBC and ATT-WS
  - >50% US mobile market

• Same core platforms
• Cost effective upgrade
• Technology flexibility
• Powerful release concept

Source: ITU

UMTS/IMT-2000 Standards

- Principle body is 3GPP – a partnership between China, ETSI, Japan, Korea and USA (ATIS) SDOs
- ITU-R WP8F and ITU-T SG19 transpose results
- Guarantees use of ITU Harmonised spectrum
- Follows release management concepts of GSM
- Guarantees multi-vendor interoperability
- Guarantees terminal roaming & compliance across networks and countries

3GPP    ITU-T
  - R-99   (Q.1741.1)
  - R4     (Q.1741.2)
  - R5     (Q.1741.3)
  - R6     (Q.1741.4)

GSM-A and EICTA work together to define ETSI test specifications
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Why Evolve to UMTS/IMT-2000?

Drivers for 3G
- Prestige / image for the 3G user
- Personalization and localization of services and content anytime, anywhere
- Multimedia capability (pictures, videos, etc. on colored screens)

Things yet to do for 3G
- Costs for handsets and usage of new services and content
- Full coverage and network interoperability

End user

Mobile
Operator

Supplier

New applications and content addressing business customers as well as consumer lifestyles
New revenue streams and revitalized, increasing ARPU

Value-based selling by providing End-to-end solutions
Operators “need” to invest in order to fulfill coverage requirements of the regulator

Frequency clearance, regulatory issues
Successful migration of existing customer base towards 3G
Convincing services and applications (“killer application”) to create customer’s demand

Standardization of interfaces
UMTS handsets for mass market rollout
### Challenges for the Mobile Network Operator

<table>
<thead>
<tr>
<th>Voice</th>
<th>Exceeding user expectations</th>
<th>Reducing – Total Cost of Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Voice quality</td>
<td>Investment protecting 3G introduction</td>
</tr>
<tr>
<td></td>
<td>Availability</td>
<td>OPEX reduction</td>
</tr>
<tr>
<td></td>
<td>Low time-to-market (3G)</td>
<td>Flexibility in network adaptation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Real-time Multimedia</th>
<th>Successful launch of attractive multimedia services</th>
<th>Optimal traffic routing for peer-to-peer multimedia services</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Data</th>
<th>Excellent service quality and throughput</th>
<th>Cost efficient management of strong traffic growth</th>
</tr>
</thead>
</table>

### Economically Cost Effective Evolution Paths

- **2G**: PDC, GSM, TDMA
- **2.5G**: GPRS
- **3G**: UMTS, CDMA2000, W-CDMA, EDGE, HSDPA, 1xEV-DO, 1xEV-DV
- **CDMA2000**: 1xRTT, 1xEV-DO

Adapted from ITU Handbook and ITU News #6, 2003
Mobile vs. Fixed and Mobile subscribers by technology

Figure 1 — Mobile overtakes fixed
Number of fixed and mobile telephone subscribers worldwide (1989-2003) and distribution of mobile subscribers worldwide by technology (December 2002)

Source: ITU News #6, 2003

IMS – new multi-media services

Communication
- Push-to-talk / push-to-see
- Instant Messaging
- Multi-Party Chat
- Video Telephony
- Multimedia Conferencing

Entertainment
- Person-to-Person Gaming
- Audio and Video Streaming
- Interactive Shows and Events
- Multi-Media Mobile Advertising

Enterprise and on the road
- Dynamic Info Services
- Interactive guidance
- Remote Facility Control
- Collaborative working
- Interactive learning
IMS: Fixed / Mobile Service Convergence (NGN)

3GPP IMS permits Services Convergence: Same “look and feel”

ITU NGN studies are based on 3GPP IMS

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Subscriber Migration to new Technology: 2G Networks will be with us for a long time!

Legend:
- 2G
- IMT-2000

2G vs. IMT-2000 forecast

Many New market players – “mass market” standardized platform and Interoperability

**Today’s Scenario** (vertical segmentation)

Each operator own everything

**3G Scenario** (horizontal segmentation)

- Outsourcing
- Third parties
- Site / Network sharing
- VMNOs

User ➔ Mobile Operator ➔ Airtime, Revenue ➔ Service Provider

User ➔ Mobile Operator ➔ Service Provider

Content Provider ➔ Advertiser ➔ User

Content Provider ➔ Advertiser ➔ User
Structure of Siemens Business Plan model

From market share growth to:
- Reduce Churn
- Increase ARPU
- Increase use of services
- Affordable new services

Considerations:
- Regulations (old & new)
- Purchasing Power (pre-paid)
- GDP and major trade partners
- Virtual Home Environment

Siemens Business Plan Support is modular

The market and revenue simulations are the key modules of our business plan tool.
Our services cover all market phases from late 2G entrant to future IMT-2000 incumbent

Customer Market Phase

<table>
<thead>
<tr>
<th>New entrant in delayed market</th>
<th>Investors’ case</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fully comprehensive business plan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Migration 2G → IMT-2000</th>
<th>Detailed subscriber model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Migration benefits, operators’ market attractiveness, competitive churn, technology churn, retention mechanisms</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>“2nd wave UMTS” - UMTS new entrant</th>
<th>Data revenues, applications/solutions centric, bottom-up scenario modeling</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Build key strategic relationships</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>“2nd wave UMTS” - UMTS incumbent</th>
<th>Supplier/product related incremental revenues, OPEX, CAPEX</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Link to product business plans</td>
</tr>
</tbody>
</table>

Recipe for success: Flexibility and Cost-Efficiency

Networks and solutions are built around primary business drivers:

- **Superior User Experience**
  Best possible customer retention and differentiation on the basis of personalized, attractive services;

- **Make Money**
  Safe introduction of new data and multimedia services and industry-leading charging capabilities

- **Save Money**
  Maximum reliability, solid upgrade path, high flexibility and cost-efficiency
Mastering Both Opportunities and Challenges: Making and Saving Money with Your Mobile Network

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Conclusions

- Users will choose mass market technology
- M2M and cross border roaming, services, etc. towards major trading partners and tourists
- Develop 2.5G (GSM/GPRS) for transition to 3G
- Evolution to UMTS/IMT-2000 requires a new business model of “horizontal” partnerships
- Business model for the 10 year life-cycle
- Remember “back-office” applications

**UMTS is the only economical choice for Africa region!**

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Business and Technology Partnership with

Thank You very much!

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ITU-T SG19 Vice Chairman

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