Developments and Directions in Telecommunication Markets

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The revival of the ICT sector: Preconditions and enabling factors
University of Padua
24th November 2003
Developments and directions in telecommunication markets

1. Characteristics of telecommunication markets
2. Market developments
3. Challenges and opportunities
4. Directions in telecommunication markets
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1. Characteristics of telecommunication markets
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Definitions

Telecommunications in the broader sense:
transmission of any kind of data (text, charts, pictures, audio, video, voice)

Telecommunications in its stricter sense:
Two-way communication between some/few subscribers

Broadcasting:
One-way transmission of contents from a sender to a variety of receivers

Information technology:
all technologies based on digital technology and microelectronics

Positive Feedback

The cycle of positive feedback

The implications of positive feedback on competition

New users supervene

The network value increases

Number of network users increases

Market share (in %)

0 %

50 %

100 %

Winner

Battle zone

Loser

Some interesting principles

**Moore's law**
Processor performance doubles every 18 months

**Gilder's law**
U.S. volume of long distance calls (1997 = 1)

**Metcalfe's law**
Networking counts!

- **Moore's law**
  - $/MIPS

- **Gilder's law**
  - U.S. volume of long distance calls (1997 = 1)

- **Metcalfe's law**
  - Benefit, costs
  - Time

- **Processor performance doubles every 18 months**
- **Bandwidths triples every year**
- **Networking counts!**
Development of the value added chain in the telecommunications market

Time

Intelligent networks

Telecommunications sector

Simple telecommunications value added chain

Value added chain in the telecommunication market
Vertical (dis)integration

Provision of transmission lines
Implementation of transmission service
Provision of IN switching equipment
Introduction of basis service
Introduction of network – dependent integrated service
Billing and customer care
Introduction of network – independent integrated service
Acquisition provision of point of sale
Introduction of value – adder services
End Consumer

Network operator
Service operator
Reseller
Trader
End consumer

Convergence in the TC, IT and media sector is a two stage process

Convergence changes technologies, applications and markets

Examples of convergence

- Implementation of different *services and applications* on a single platform
  Example: Convergence of data and voice communications
  - Internet telephony -

- Convergence of *network technologies*
  Example: Convergence of fixed and mobile networks
  - O2 Genion service – phones for both applications -

- Merging of *industries* into one market
  Example: Convergence of telecommunications, IT and media sectors

Base for convergence: digitalization and development of the Internet
The convergence of communications services is closely linked to the internet

- Change in the meaning of communications services
- Continuous improvement of data quality
- Multimedia options of the Internet
- Increase in transmission capacities
- Lack of Internet-based voice phone service

But:
- Internet & multimedia
- Internet telephony
- E-commerce
- Mobile phones

Increase in the number of Internet users

Advantage in costs concerning transmission activities

24/11/2003

Prof. Dr. Dres. h.c. A. Picot
Towards a new value added structure

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Current development on the German telecommunication market

Development of the number of telecommunications service providers

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of licenses</th>
<th>Number of providers of telecommunications services which are not subject to licensing</th>
</tr>
</thead>
<tbody>
<tr>
<td>02/1998</td>
<td>269</td>
<td>1066</td>
</tr>
<tr>
<td>07/1998</td>
<td>395</td>
<td>1222</td>
</tr>
<tr>
<td>02/1999</td>
<td>491</td>
<td>1355</td>
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<tr>
<td>09/1999</td>
<td>554</td>
<td>1593</td>
</tr>
<tr>
<td>02/2000</td>
<td>611</td>
<td>1629</td>
</tr>
<tr>
<td>08/2000</td>
<td>674</td>
<td>1780</td>
</tr>
<tr>
<td>02/2001</td>
<td>711</td>
<td>1876</td>
</tr>
<tr>
<td>08/2001</td>
<td>772</td>
<td>1917</td>
</tr>
<tr>
<td>02/2002</td>
<td>811</td>
<td>1939</td>
</tr>
<tr>
<td>08/2002</td>
<td>850</td>
<td>2007</td>
</tr>
<tr>
<td>01/2003</td>
<td>861</td>
<td>2045</td>
</tr>
</tbody>
</table>

Source: RegTP (2003)

* Licensees, operating in sectors of licensed service and of services not subject to licensing are counted single. Therefore, the addition of individual figures does not equal the number per capita.
Current development on the German telecommunication market

**Market Volume 2001: 59,9 bn Euro**

- Fixed-network customers, voice phone services: 35,1%
- Cable TV: 4,5%
- Carrier business: 10,5%
- Rental lines: 2,0%
- Miscellaneous: 15,9%
- Mobile phone services: 32,1%

**Market Volume 2002: 61,1 bn Euro**

- Fixed-network customers, voice phone services: 36,0%
- Cable TV: 4,6%
- Carrier business: 10,0%
- Rental lines: 1,6%
- Miscellaneous: 15,2%
- Mobile phone services: 32,6%

**Market Volume 2003e: 62,6 bn Euro**

- Fixed-network customers, voice phone services: 35,9%
- Cable TV: 4,5%
- Carrier business: 10,1%
- Rental lines: 1,4%
- Miscellaneous: 14,1%
- Mobile phone services: 34,0%

Source: RegTP (2003)
Current development on the German telecommunication market

Development of minutes of connection in fixed-telephony services (1997-2003)

Development of competitor`s shares of minutes in fixed-telephony services (1997-2003)

Source: RegTP (2003)
Current development on the German telecommunication market

Development of subscribers` numbers and forecast in mobile services

In international comparison the German penetration rate lies in front of the USA (47.7%), Japan (62.1%) and Eastern Europe (30%). In comparison with Western Europe, Germany`s penetration rate lies 4% behind the average (77%).

Sources: RegTP (2003); RegTP (1999); EITO (2003)
Deregulation leads to an increase in competition in private and corporate customer sectors

Structure of competition on the German market (2003)

Local calls

- Deutsche Telekom ↓
- Service operators ↑
- City network operators (e.g. Netcologne)

Long-distance international calls

- Deutsche Telekom ↓
- National and international operators of own networks ↑

private customers

↑ Decrease in market power

↑ Increase in market power

corporate customers

↑ Decrease in market power

↑ Increase in market power
Current development on the German telecommunication market

Market share of minutes of connection in fixed-telephony networks (1st quarter of 2003)

- **local calls**
  - DTAG: 90.9%
  - Competitors: 9.1%

- **Internet access (broadband)**
  - DTAG: 94.2%
  - Competitors: 5.8%

- **long distance calls**
  - DTAG: 47%
  - Competitors: 53%

- **mobile calls**
  - DTAG: 58%
  - Competitors: 42%

- **international calls**
  - DTAG: 60%
  - Competitors: 40%

- **Internet access (narrow band)**
  - DTAG: 66%
  - Competitors: 34%

- **miscellaneous**
  - DTAG: 68%
  - Competitors: 32%

- **total**
  - DTAG: 56%
  - Competitors: 44%

Source: RegTP (2003)
The new European directives

In March 2002 the European Parliament and the Council adopted four directives and one decision to be implemented by EU members national governments until July 25th 2003:

- Authorisation Directive
- Radio Spectrum Decision
- Access Directive
- Framework Directive
- Universal Service Directive
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The Markets for ICT in Europe and around the World

Western European ICT market growth 1994-2004, in %

Market value 2003: 607 billion Euro

Source: EITO (2003)
The Markets for ICT in Europe and around the World

Western Europe ICT market growth by segment 2002-2004, in %

Computer hardware: -6.9% (2002), 1.6% (2003), 2.3% (2004)
Software & IT services: -7.5% (2002), 0.9% (2003), 2.6% (2004)
Telecommunications equipment: -7.5% (2002), 0.5% (2003), 3.9% (2004)
Carrier services: -6.9% (2002), 4.8% (2003), 4.7% (2004)

Market value 2003: 607 billion Euro

Source: EITO in corporation with IDC (2003)
The Markets for ICT in Europe and around the World

Worldwide ICT market growth by region 2002-2004 in %

Market value 2003: 2,250 billion Euro

Source: EITO in corporation with IDC (2003)
Developments and directions in telecommunication markets

Internet users as a percentage of population 2002 and 2006(e)

Source: EITO in corporation with IDC (2003)
Distribution of broadband internet access in % of private households (2003; 2008e)

Source: Arthur D. Little (2003)
Broadband subscribers (end 2002)

### Broadband Prices

#### Broadband subscription charges, July 2003 Us $

<table>
<thead>
<tr>
<th>Country</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>$24.9</td>
</tr>
<tr>
<td>Netherlands</td>
<td>$32.48</td>
</tr>
<tr>
<td>Austria</td>
<td>$32.59</td>
</tr>
<tr>
<td>United States</td>
<td>$33.18</td>
</tr>
<tr>
<td>Germany</td>
<td>$33.93</td>
</tr>
<tr>
<td>Belgium</td>
<td>$34.41</td>
</tr>
<tr>
<td>HK, China</td>
<td>$38.21</td>
</tr>
<tr>
<td>New Zealand</td>
<td>$38.34</td>
</tr>
<tr>
<td>Cyprus</td>
<td>$39.64</td>
</tr>
<tr>
<td>Norway</td>
<td>$40.61</td>
</tr>
<tr>
<td>UK</td>
<td>$44.56</td>
</tr>
<tr>
<td>Israel</td>
<td>$45.20</td>
</tr>
<tr>
<td>Macao, China</td>
<td>$46.16</td>
</tr>
<tr>
<td>Denmark</td>
<td>$47.63</td>
</tr>
<tr>
<td>Korea (Rep.)</td>
<td>$49.23</td>
</tr>
<tr>
<td>Jordan</td>
<td>$49.72</td>
</tr>
<tr>
<td>France</td>
<td>$50.56</td>
</tr>
<tr>
<td>Sweden</td>
<td>$51.46</td>
</tr>
<tr>
<td>Canada</td>
<td>$51.55</td>
</tr>
<tr>
<td>Switzerland</td>
<td>$51.82</td>
</tr>
<tr>
<td>Singapore</td>
<td>$52.99</td>
</tr>
<tr>
<td>Malta</td>
<td>$53.34</td>
</tr>
<tr>
<td>Lithuania</td>
<td>$57.36</td>
</tr>
<tr>
<td>Slovenia</td>
<td>$57.84</td>
</tr>
<tr>
<td>Iceland</td>
<td>$58.03</td>
</tr>
<tr>
<td>Ireland</td>
<td>$61.69</td>
</tr>
<tr>
<td>Italy</td>
<td>$73.59</td>
</tr>
<tr>
<td>Portugal</td>
<td>$73.66</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>$79.54</td>
</tr>
<tr>
<td>Australia</td>
<td>$91.77</td>
</tr>
</tbody>
</table>

#### Cost of 100 kbit/s as % of monthly income

<table>
<thead>
<tr>
<th>Country</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>&lt; 0.01%</td>
</tr>
<tr>
<td>Korea (Rep.)</td>
<td>0.03%</td>
</tr>
<tr>
<td>Belgium</td>
<td>0.06%</td>
</tr>
<tr>
<td>Hong Kong, China</td>
<td>0.06%</td>
</tr>
<tr>
<td>Singapore</td>
<td>0.12%</td>
</tr>
<tr>
<td>United States</td>
<td>0.13%</td>
</tr>
<tr>
<td>Canada</td>
<td>0.17%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.17%</td>
</tr>
<tr>
<td>Macao, China</td>
<td>0.2%</td>
</tr>
<tr>
<td>New Zealand</td>
<td>0.2%</td>
</tr>
<tr>
<td>Germany</td>
<td>0.23%</td>
</tr>
<tr>
<td>Norway</td>
<td>0.24%</td>
</tr>
<tr>
<td>Israel</td>
<td>0.3%</td>
</tr>
<tr>
<td>Austria</td>
<td>0.3%</td>
</tr>
<tr>
<td>Slovenia</td>
<td>0.36%</td>
</tr>
<tr>
<td>Italy</td>
<td>0.39%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>0.43%</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>0.48%</td>
</tr>
<tr>
<td>Sweden</td>
<td>0.55%</td>
</tr>
<tr>
<td>Australia</td>
<td>0.55%</td>
</tr>
<tr>
<td>France</td>
<td>0.6%</td>
</tr>
<tr>
<td>Ireland</td>
<td>0.6%</td>
</tr>
<tr>
<td>Portugal</td>
<td>0.62%</td>
</tr>
<tr>
<td>Switzerland</td>
<td>0.8%</td>
</tr>
<tr>
<td>Cyprus</td>
<td>0.86%</td>
</tr>
<tr>
<td>Iceland</td>
<td>0.88%</td>
</tr>
<tr>
<td>Lithuania</td>
<td>1.14%</td>
</tr>
<tr>
<td>Malta</td>
<td>1.36%</td>
</tr>
<tr>
<td>Jordan</td>
<td>1.42%</td>
</tr>
<tr>
<td>Denmark</td>
<td>1.55%</td>
</tr>
</tbody>
</table>


Overall subscription charges are important. But factoring in the speed of the connection and income is the more telling story.
The telecommunication industry is confronted with difficulties – Many players do not earn their cost of capital

US Telecommunication Players WACC vs. ROIC (2002)

ROIC: Return on invested capital
WACC: Weighted average cost of capital

<table>
<thead>
<tr>
<th></th>
<th>ROIC</th>
<th>WACC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verizon</td>
<td>7</td>
<td>7,7</td>
</tr>
<tr>
<td>SBC</td>
<td>8,4</td>
<td>8,5</td>
</tr>
<tr>
<td>Bell South</td>
<td>10,9</td>
<td>6,5</td>
</tr>
<tr>
<td>Qwest</td>
<td>0,8</td>
<td>6,8</td>
</tr>
<tr>
<td>Alltel</td>
<td>8,4</td>
<td>7,9</td>
</tr>
<tr>
<td>AT&amp;T</td>
<td>2,5</td>
<td>10</td>
</tr>
<tr>
<td>SprintFON</td>
<td>6,1</td>
<td>6,6</td>
</tr>
<tr>
<td>Wireline Aggregate</td>
<td>5,4</td>
<td>8</td>
</tr>
<tr>
<td>Sprint PCS</td>
<td>5,3</td>
<td>11</td>
</tr>
<tr>
<td>AT&amp;T Wireless</td>
<td>2,6</td>
<td>10,5</td>
</tr>
<tr>
<td>Cingular</td>
<td>10,2</td>
<td>7,5</td>
</tr>
<tr>
<td>Verizon Wireless</td>
<td>6,3</td>
<td>7,7</td>
</tr>
<tr>
<td>Nextel</td>
<td>7,5</td>
<td>11</td>
</tr>
<tr>
<td>T-Mobile</td>
<td>-3,4</td>
<td>8,2</td>
</tr>
<tr>
<td>Wireless Aggregate</td>
<td>3,7</td>
<td>10,8</td>
</tr>
</tbody>
</table>

Source: Booz Allen Hamilton (2003)
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Telecom`s Paradoxon

Telecom industry is in crisis in the midst of technological progress and strong user demand

Source: CITI (2003)
The telecom industry is confronted with difficulties

- Telecom capital spending is down by two thirds since 2000, threatening future innovations.

- Some European companies must earn $10 million a day for debt service.

- Telecom firms face costlier access to financial markets, as investors adjust their perception of risk.

- Cellular is reaching saturation, while 3G lags behind projections that led to extravagant auction bids in Europe.

- Equipment firms face bankruptcy unless investment picks up.

- R&D and innovation are slowing down, with long-term implications.

- Investment slowdown and cost cutting is leading to decline in service quality.

How can the telecom industry cope with the new situation?
How can the telecom industry cope with the new situation?

• New sources of revenues

• The impact of economies of scale is significant. At least on the network level, oligopolies seem to be more successful in fixed and in wireless.

• Review of strategic positioning

• Network outsourcing opportunities have to be considered
New Sources of Revenues

- In 2002 German subscribers sent 21 billion shortmessages via SMS and recently also via MMS.

- Short message services share nearly 14% or more than 2.5 billion euro of providers’ sales revenues (in comparison to 12.4% in 2001).

- As shown the number of broadband accesses is rising rapidly.

- The traffic in mobile communication is still rising (voice and data).

- New services will offer new business opportunities; experimental approach needed.
The industry structure comprises too many players

**Example wireless telecommunication:** link between number of competitors and EBITDA Margin – also true for other telecom areas with high network and scale effects

Source: Booz Allen Hamilton (2003)
Economies of Scale in the wireless industry

Cost per Sub vs. Subscribers (National Operators USA)

Source: Booz Allen Hamilton (2003)
Different strategic positionings are possible

- **"bit-pipe"**
  concentrate on traditional key competences thereby becoming utility providers who offer transmission capacities as a kind of physical infrastructural layer for manifold specialized suppliers of intermediate and endcustomer services in telecommunications

- **"comprehensive service provider"**
  evolve into vertically integrated value added generator with broad service portfolio, direct contact to the endcostumer and control over the entire value chain

- **"platform provider"**
  concentrate on design and operation of technologically advanced network, IT and service infrastructure as basis for third party service provisioning
Currently, each strategic option evokes open questions

- **bit-pipe**
  - profitability?
  - revenue sharing?
  - monopoly and regulation?

- **comprehensive service provider**
  - too large a portfolio of necessary horizontal and vertical competences to be manageable?
  - efficiency problems due to lacking scale and synergy advantages?

- **platform provider**
  - sustainable competitive advantage possible?
  - revenue sharing?
  - access regulation?
Network Outsourcing Opportunities

**Plan / Design**
- Network planning and architecture
- Product (Systems) management, QM
- Network tuning/optimization
- Development / programming
- Network operators
- Application operation core system
- Network maintenance

**Operate**
- Infrastructure installation
- IT Operations
- Application operations
- IT Infrastructure/Data Center
- Applications operations support systems (fin./admin)

**Products & content**
- Architecture design
- System selection
- Demand Management
- Product/Service definition (Product Marketing)
- Service delivery platform development
- Service level definition
- Billing requirement specification

**Customer Care & Billing**
- Network Operators
- Application operation core system
- Customer segmentation
- Billing mediation
- Billing operations

**Marketing & Sales**
- Network Operators
- Application operation core system
- Pricing (Product Marketing)
- Branding
- Advertising
- Points of Sale

Source: Eikelmann (2002)

*Generally outsourced or under construction already or delivered in part.*

*Outsourcing considered in some cases/in mid term future
Kept in house*
In the end the markets will decide what strategy will prevail
Thank you for your attention