mobile business

Lecture 1

Introduction to Mobile Business I:
Technology, Markets, Platforms,
and Business Models

Mobile Business I (WS 2014/15)

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- **Chair of Mobile Business and Multilateral Security**

- **Teaching and Research Agenda**

- **Introduction into Mobile Business – History of Mobile Business & Mobile Telecommunication Systems**

- **Outline of this Course**

Business Informatics @ Goethe University Frankfurt

E-Finance	Business Informatics (Informatics)	Information Systems Engineering
Prof. Dr. Peter Gomber	Prof. Dr. Mirjam Minor	Prof. Dr. Roland Holten
Business Education (associated) Prof. Dr. Gerhard Minnameier	**Business Informatics**	**Business Education** (associated) Prof. Dr. Eveline Wuttke
Information Systems & Information Management Prof. Dr. Wolfgang König	**Business Informatics & Microeconomics** Prof. Dr. Lukas Wiewiorra	**Mobile Business & Multilateral Security** Prof. Dr. Kai Rannenberg

Chair of Business Administration, especially Business Informatics, Mobile Business and Multilateral Security

Deutsche Telekom Chair of Mobile Business & Multilateral Security

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![mobile business logo]

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Marvin Hegen

Shuzhe Yang

Ahmad Sabouri

Fatbardh Veseli

Christopher Schmitz

Welderufael Tesfay

Ahmed Yesuf

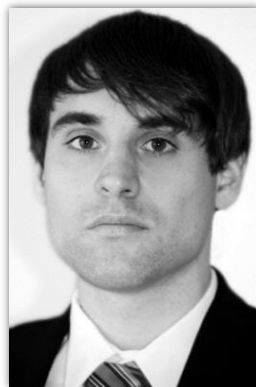Mike Radmacher   Andreas Albers   Stefan Weiss   Christian Kahl   André Deuker

Sascha Koschinat   Christian Weber   Andreas Leicher   Tim Schiller   Niels Johannsen   Thomas Leiber

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Vita of Kai Rannenberg

Einbeck, Göttingen, Eystrup, Wolfsburg, ...
TU Berlin (Dipl.-Inform.)
Uni Freiburg (Dr. rer. pol.)

Dissertation
"Kriterien und Zertifizierung mehrseitiger IT-Sicherheit"
Standardization at ISO/IEC JTC 1/SC 27 and DIN NI-27

Kolleg "Sicherheit in der Kommunikationstechnik"
Gottlieb Daimler- and Karl Benz-Foundation

Multilateral Security:
"Empowering Users, Enabling Applications", 1993 - 1999

Recent history of Kai Rannenberg

1999-09 till 2002-08
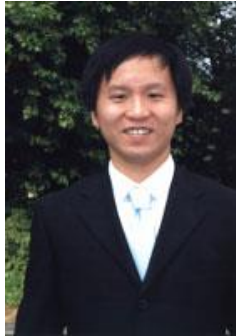　　Microsoft Research Cambridge UK
　　www.research.microsoft.com
　　Responsible for "Personal Security Devices and Privacy Technologies"

2001-10 Call for this chair

2001-12 till 2002-07 Stand-in for the chair

Since 2002-07 Professor

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Dipl.-Kfm. Lars Wolos

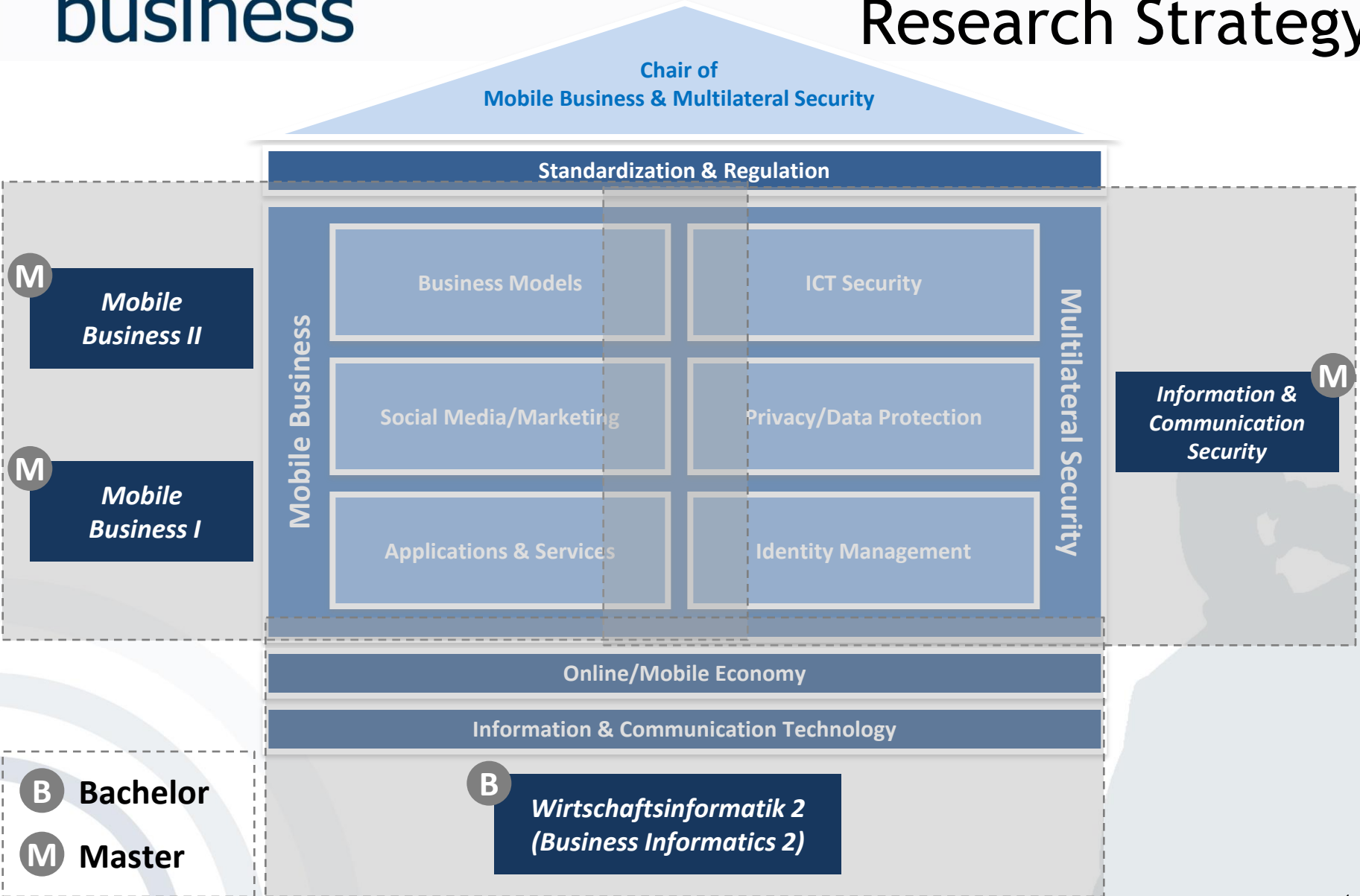RuW Building, Office 2.237

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- Chair of Mobile Business and Multilateral Security

- Teaching and Research Agenda

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	WS 2014/15	SS 2015
Bachelor		*Course* **Business Informatics 2**
Master	*Course* **Informations- und Kommunikationssicherheit: Infrastrukturen, Technologien und Geschäftsmodelle** *Course* **Mobile Business I: Technology, Markets, Platforms, and Business Models** *Seminar* **User-centric Privacy Enhancing Technologies and Mobile Services for Consumer Goods**	*Course* **Mobile Business II - Application Design, Applications, Infrastructures, and Security** *Seminar* **TBA** *Course* **Information and Communication Security: Infrastructures, Technologies, and Business Models** *Course* **Privacy vs. Data: Business Models in the digital, mobile Economy**

mobile business

**Chair of
Mobile Business & Multilateral Security**

Standardization & Regulation

Mobile Business

Multilateral Security

Business Models	ICT Security
Social Media/Marketing	Privacy/Data Protection
Applications & Services	Identity Management

M *Mobile Business II*

M *Mobile Business I*

M *Information & Communication Security*

Online/Mobile Economy

Information & Communication Technology

B *Wirtschaftsinformatik 2 (Business Informatics 2)*

B Bachelor

M Master

- **Multilateral Security**
  - Security, Trust and Privacy
  - Mobile Signatures
  - Personal Security Devices
- **Mobile Life, Work, and Business**
  - Location Based Services
  - Mobile Communities
- **M-Infrastructures**
  - Combination, Integration, Innovation
  - Standardisation, Regulation

The features

- User specified automatic call filtering
- Higher protection for caller and callee
- Range of possibilities to signalise urgency
- Range of reaction possibilities

Callee

Caller

Call

Call

Negotiation

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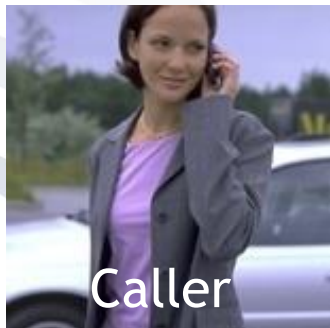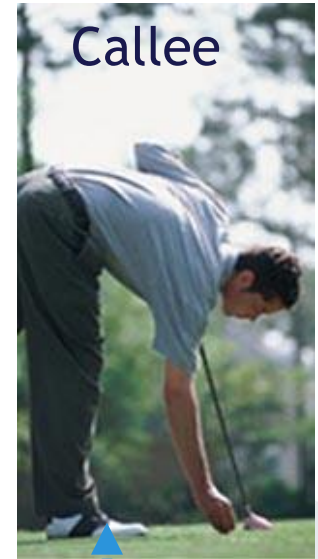
- Extent of identification
- Urgency of the call
- Security requirements
  - authentication
  - confidentiality
  - non-repudiation

RMS Call

Who   Rannenberg, Katrin

◆ My ID: none

◆ Subject: Meeting?

Urgency:
● Normal   ○ High   ○ Emergency

Security Settings: [View Details]
◆ Confidentiality: Important
◆ Authentication Don't care

[Cancel]   [Call]

Statement of urgency
> "It is really urgent!"

Specification of a **function**
> "I am your boss!"

Specification of a **subject**
> "Let's have a party tonight."

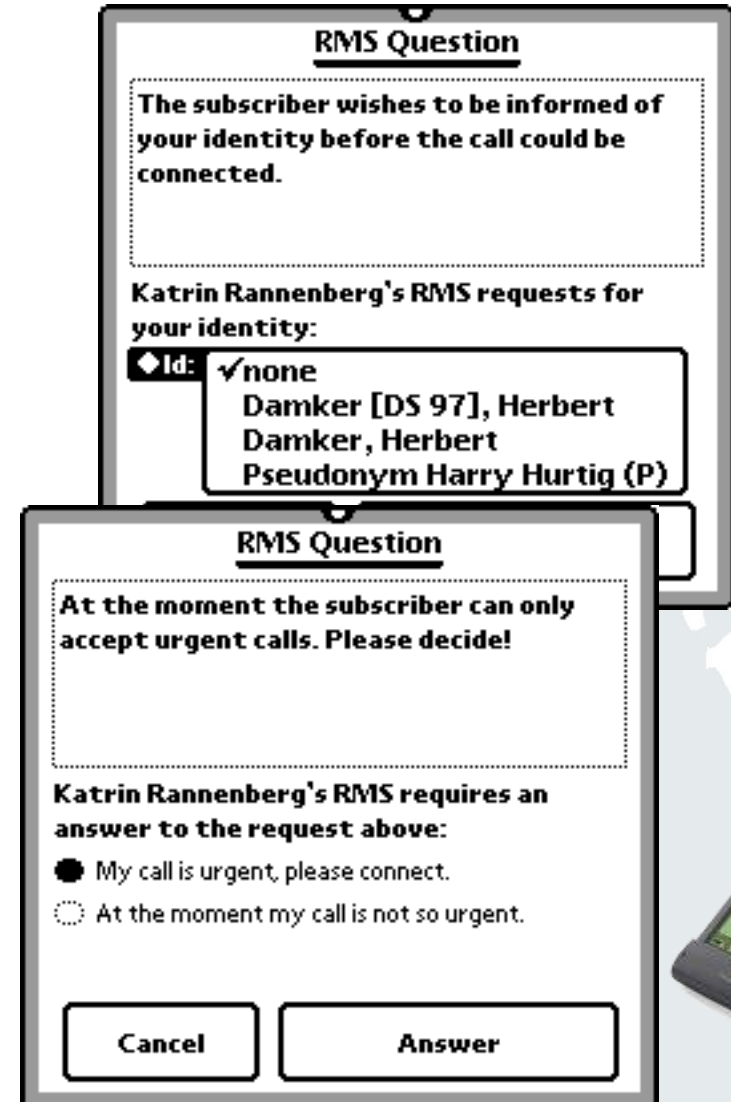Presentation of a **voucher**
> "I welcome you calling back."

Provision of a **reference**
> "My friends are your friends!"

Offering a **surety**
> "Satisfaction guaranteed
> or this money is yours!"

RMS Question

The subscriber wishes to be informed of your identity before the call could be connected.

Katrin Rannenberg's RMS requests for your identity:

◆ Id: ✓ none
Damker [DS 97], Herbert
Damker, Herbert
Pseudonym Harry Hurtig (P)

RMS Question

At the moment the subscriber can only accept urgent calls. Please decide!

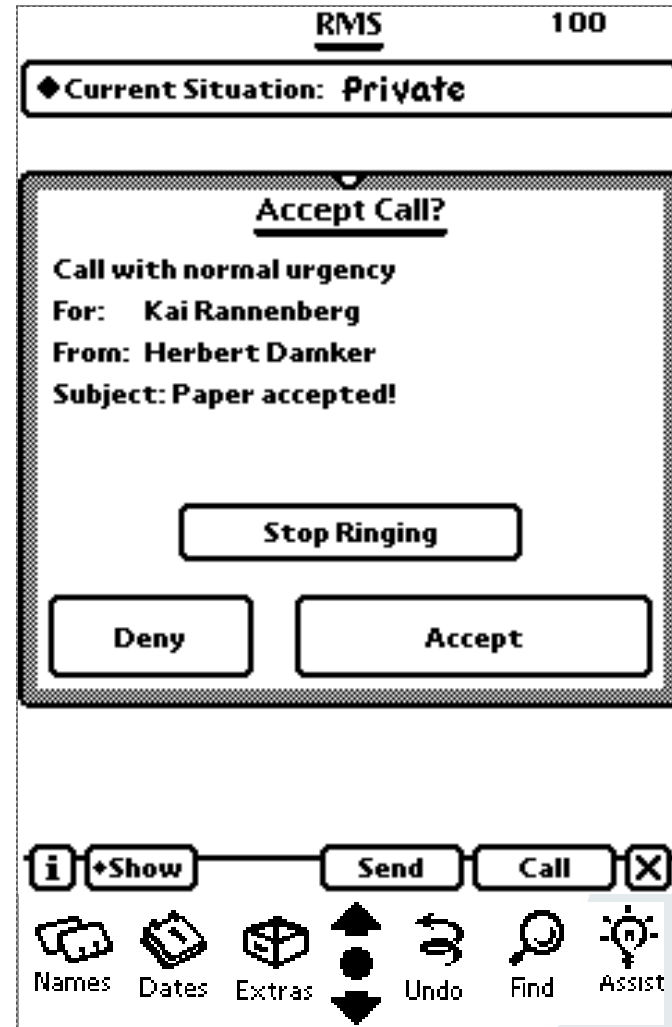Katrin Rannenberg's RMS requires an answer to the request above:

● My call is urgent, please connect.
○ At the moment my call is not so urgent.

Cancel   Answer

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- Bell is ringing!
- Callee notified
- Callee can still decide to accept or deny the call

mobile business

| RMS | 100 |

◆ Current Situation: **Private**

Accept Call?

Call with normal urgency
For: Kai Rannenberg
From: Herbert Damker
Subject: Paper accepted!

Stop Ringing

Deny   **Accept**

[i] [◆Show]   [Send] [Call] [X]

Names   Dates   Extras   Undo   Find   Assist

- Call not connected

- Caller gets information
  (configured by callee)

- Caller can leave a message or request a call back

RMS: Call denied

Unfortunately the subscriber can not accept the call at the moment.

Leave with Katrin Rannenberg:

● Text message
○ Request for callback (with voucher)
○ No message

| Cancel | OK |

Situations

Set of *rules* how to deal with an incoming call

Rules

Combination of features

Users can reconfigure initial rules and situations as they like.

Define Situation 'Meeting'

- Emergency
  -> connect
- Callback voucher
  -> connect
- Caller in group Colleagues
  -> let caller decide
  Text: 'Request decision'
- Else
  -> deny
  Text: 'Not available'

Define Rule

In the situation 'Meeting'
my RMS should for ...

- ● all calls
- ○ business calls
- ○ ◆ calls of class:
- ○ private calls

... and ...
- ○ no caller ID
- ○ caller want to be anonymous
- ● callback voucher
- ○ ◆ caller in group:
- ○ ◆ caller is:
- ○ every caller
- ○ Emergency

... do the following:
- ● connect
- ○ deny
- ○ ◆ divert to:
- ○ require surety of $10 and connect
- ○ require subject and connect
- ○ let caller decide
- ○ require caller ID

Text to send: -

[Cancel] [OK]

- **Fictitious**, but **realistic** cases
- **Real users:** ca 40 doctors, nurses, admin people, etc.
- 1 week **"Playtime"**
- 18 months **preparation and analysis:** workflow analysis usability tests, script writing, attack planning

- Reachability manager
- Negotiating security
- Identities and pseudonyms
- Signing device
- Medical information (patient records and knowledge base)
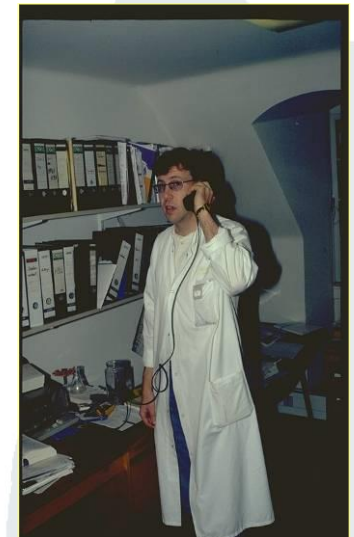- Hospital communication

Overall results

- High benefit for everyday tasks
- Increasing awareness of security
- Integration of asynchronous messages very useful
- Manual filtering of calls often used

User demands

- Smaller device – RMS functionality in mobile phone
- Integration of full-flavour email
- Authentication also during a call

Many more *design* hints

- Chair of Mobile Business and Multilateral Security

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What is Mobile Business ?

- There are as many definitions as interested parties.

- "Ask again in 5 years at best, then we will have further information …"

- A multitude of related notions: E/C/V-Business, Mobile Commerce, Mobile…

- Hypes and myths
  - "Mobile Business is THE future!"
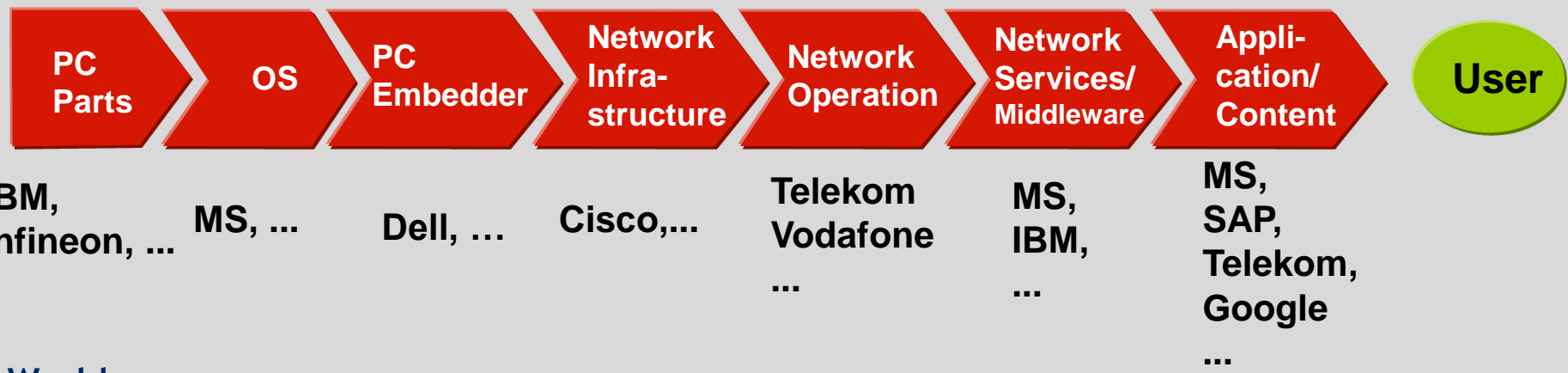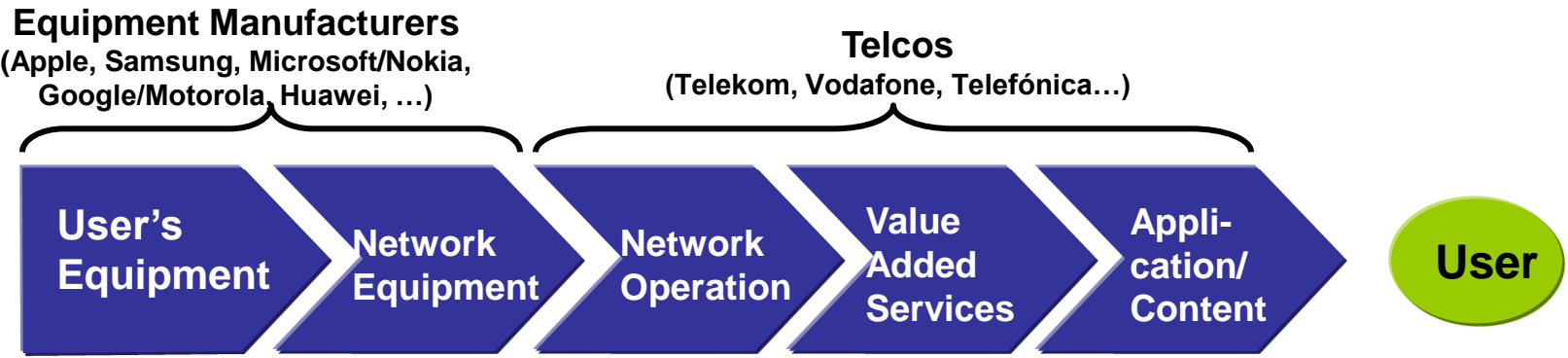 - "Mobile Business is just a hype!"

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We chose a definition that (hopefully) lets us do interesting things:

"The usage of

mobile devices, infrastructure,

communication and interaction
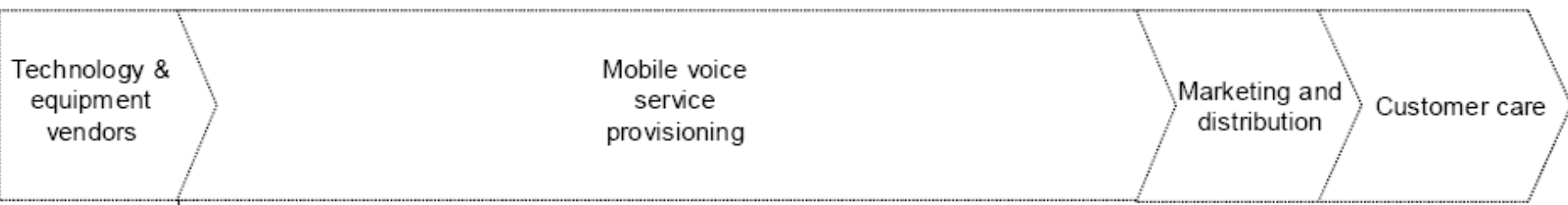
for

mobile applications and

transactions."

- Workplaces and private life will change thoroughly through mobile technologies and services.

- This implies extraordinary challenges and chances.

- The development will be strongly affected by international factors.

Mobile equipment & IT value chain

GSM World

Equipment Manufacturers
(Apple, Samsung, Microsoft/Nokia, Google/Motorola, Huawei, …)

Telcos
(Telekom, Vodafone, Telefónica…)

User's Equipment → Network Equipment → Network Operation → Value Added Services → Appli-cation/Content → **User**

IT World (Based on: SAP)

PC Parts → OS → PC Embedder → Network Infra-structure → Network Operation → Network Services/Middleware → Appli-cation/Content → **User**

IBM, Infineon, ...

MS, ...

Dell, …

Cisco,...

Telekom Vodafone ...

MS, IBM, ...

MS, SAP, Telekom, Google ...

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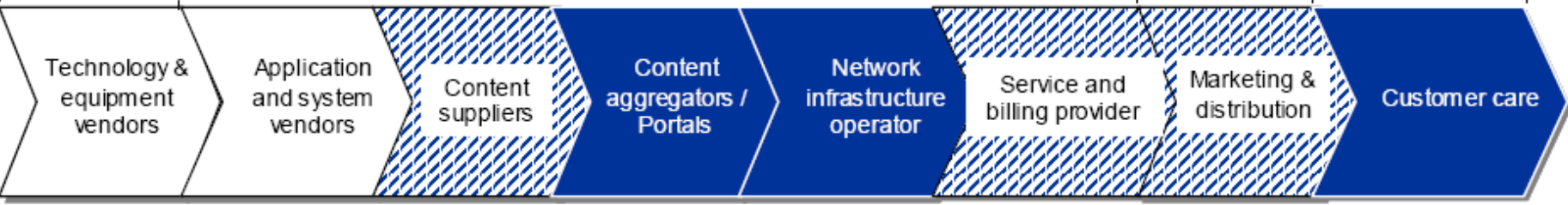**TRADITIONAL VALUE CHAIN OF MOBILE SERVICE DELIVERY**

Technology & equipment vendors | Mobile voice service provisioning | Marketing and distribution | Customer care

EMERGING MOBILE OPERATOR VALUE CHAIN

Technology & equipment vendors | Application and system vendors | Content suppliers | Content aggregators / Portals | Network infrastructure operator | Service and billing provider | Marketing & distribution | Customer care

Primary opportunity for operator Some opportunity Opportunity through alliances

[Passerini et al. 2004]

What makes Mobile Business mobile?

- Customers?
- Terminals?
- Service provisioning?
- Means of payment?
- Possibilities of interaction?
- Business cases for Mobile Operators (and others)?

➲ One instrument for analysing are scenarios & visions.

- Not every country's scenario (e.g. health care) can simply be transferred to another country.

- Mobile Business does not only relate to mobile phones. Other platforms are important, too.

- Classification of videos
    - Videos are useful because they convey visions.
    - Visions have to be benchmarked by reality.
    - Which aspects of visions are reasonable / useful?
    - What is necessary for their realization?
    - Can a business model emerge from this?
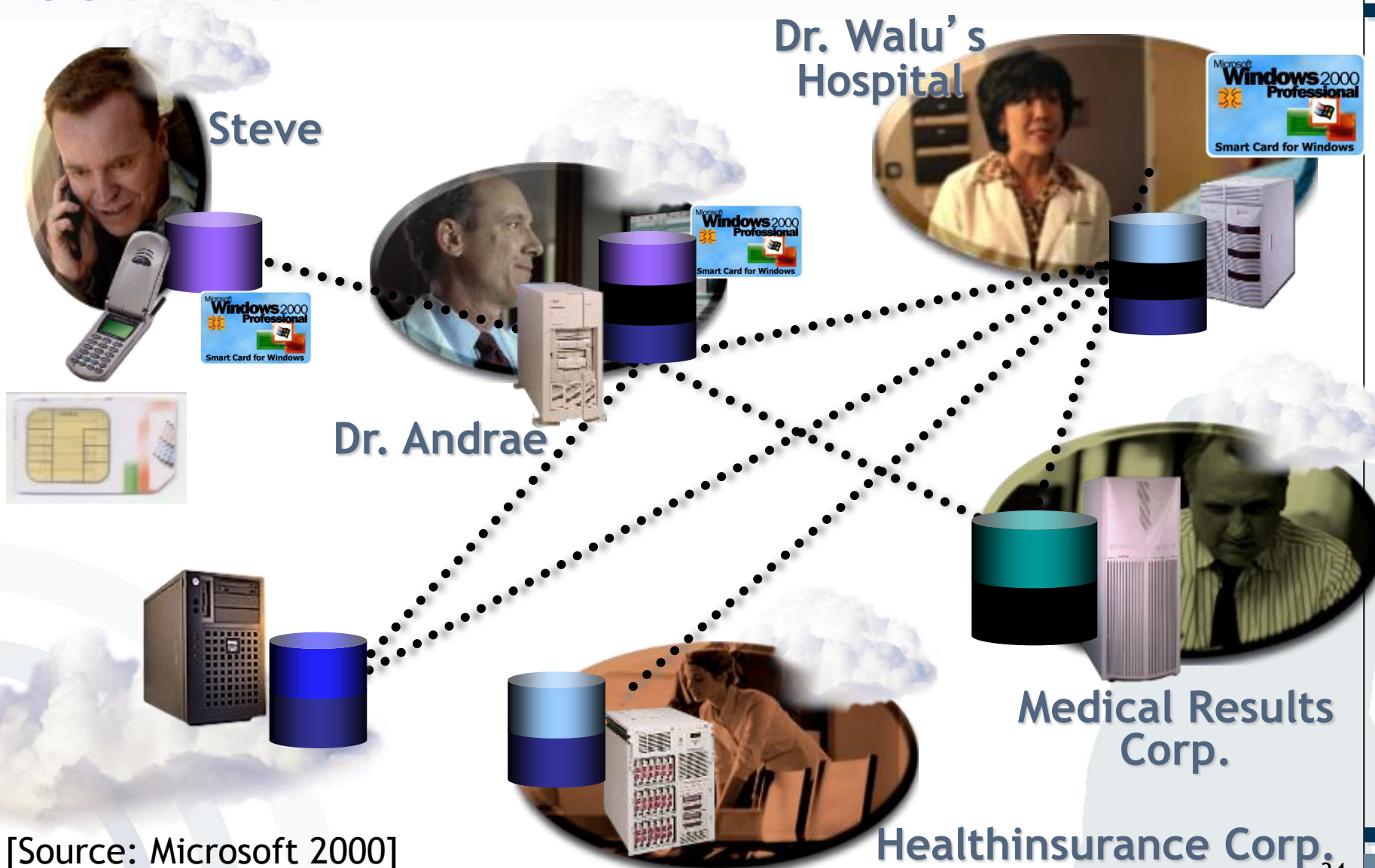   - For whom?

Illustrative Microsoft Video

Parties Involved

Steve

Dr. Andrae

Dr. Walu's Hospital

Medical Results Corp.

Healthinsurance Corp.

[Source: Microsoft 2000]

- February 14, 1876. Alexander Graham Bell, a Scotch deaf-mute teacher, patents his telephone (no. 174.465).

- June 17, 1946. AT&T and Southwestern Bell introduce MTS (mobile radio telephone service) in St. Louis, Missouri.

GE DTD/DTO Mobile Telephone

DIAL CONTROL UNIT   MANUAL CONTROL UNIT

POWER/CONTROL CABLE   POWER/CONTROL CONNECTOR   ANTENNA CONNECTOR   ANTENNA

BELL SYSTEM MOBILE RADIOTELEPHONE SERVICE ST. LOUIS, MO.
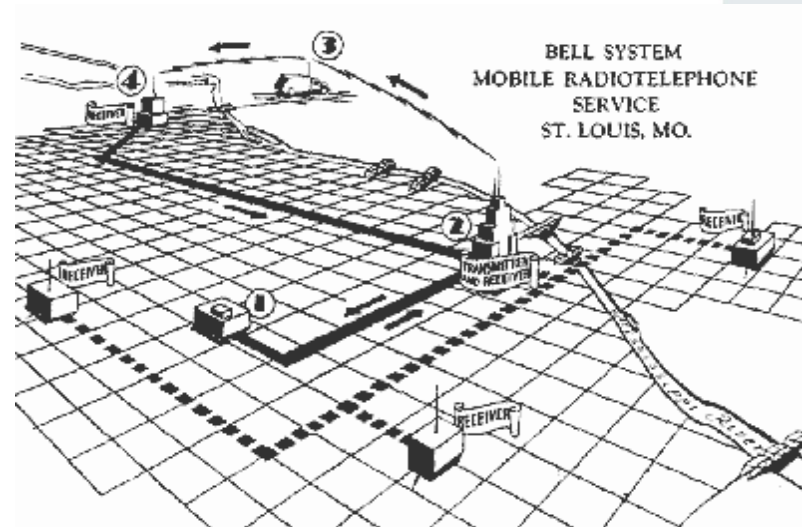
- 1958 A-Net (till 1977)
- 1972 B-Net (till 1994)
- 1986 C-Net (till 2000)

- Since 1981 NMT-450 (Nordic Mobile Telephone) in Norway, Sweden, Saudi Arabia, Denmark, Finland, ...

- First GSM trials 1991

- Commercial usage since 1992

- First digital mobile radio network with high voice quality and reliability (roaming).

- Global diffusion in more than 212 countries with more than 1 billion users.

- In February 2004 the first commercial mobile radio network (based on GSM) was launched in Iraq.

- GSM is the basis of data services like GPRS and EGDE.

1960	1970	1980	1990	2000	2010

| 1958 A-Network | 1972 B-Network | 1985 C-Network | 1992 GSM | 1999 WAP | 2005 UMTS HSPA |

2000 GPRS

2002 UMTS

2001/2 EDGE (EGPRS)

2009 UMTS Evolved HSPA (HSPA+)

2009 Long Term Evolution (LTE)
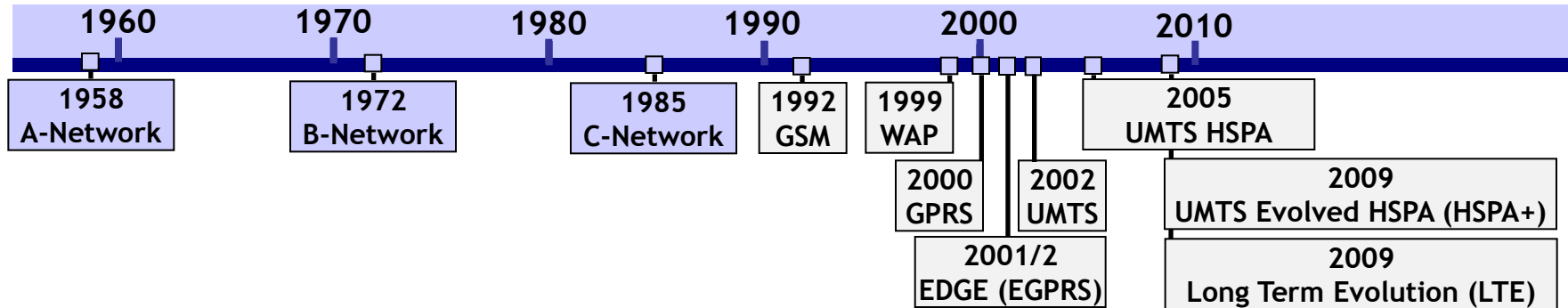
A-Network
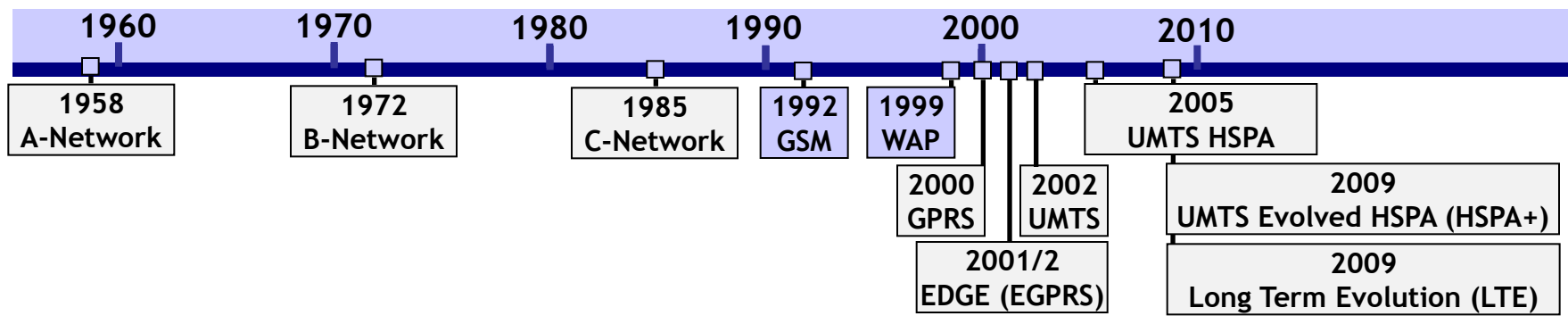First analog mobile radio system in Germany: Switching was done manually. Discontinued 1977

B-Network
Further development of the A-Network: The caller who wanted to reach a mobile station had to know the other's location. Discontinued 1994-12-31

C-Network
Analog, cellular mobile radio network of Deutsche Telekom. Discontinued 2000-12-31

1960	1970	1980	1990	2000	2010

| 1958 A-Network | 1972 B-Network | 1985 C-Network | 1992 GSM | 1999 WAP | 2005 UMTS HSPA |

2000 GPRS   **2002 UMTS**

2009 UMTS Evolved HSPA (HSPA+)

2001/2 EDGE (EGPRS)

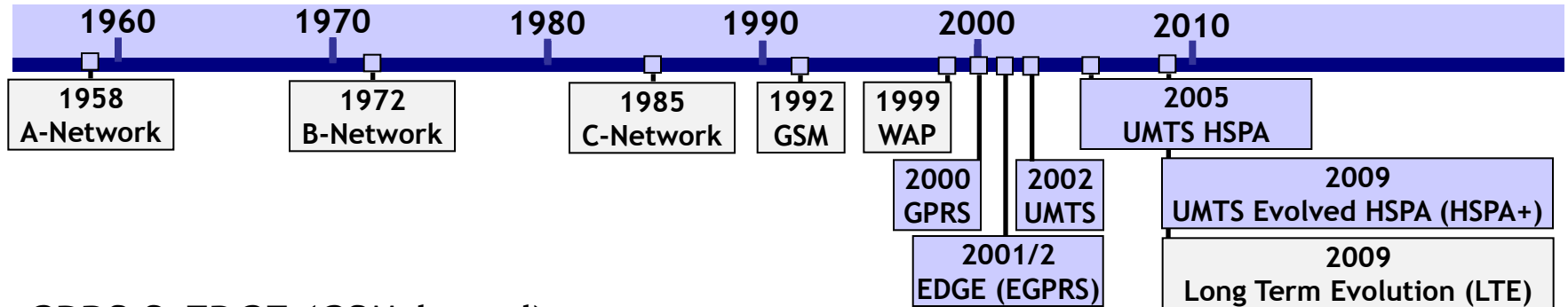**2009 Long Term Evolution (LTE)**

GSM
The technical standard for digital mobile radio networks in more than 100 countries; GSM includes data transfer services.

WAP
The WAP standard describes a protocol suite. With special mobile phones certain mobile contents (pages) are accessible using WAP-enabled mobile phones.

[Source: WAP 2010]

Timeline:

1960	1970	1980	1990	2000	2010

- **1958 A-Network**
- **1972 B-Network**
- **1985 C-Network**
- **1992 GSM**
- **1999 WAP**
- **2000 GPRS**
- **2002 UMTS**
- **2001/2 EDGE (EGPRS)**
- **2005 UMTS HSPA**
- **2009 UMTS Evolved HSPA (HSPA+)**
- **2009 Long Term Evolution (LTE)**

GPRS & EDGE (GSM-based)

Further development of the GSM standard: Data is transferred in packets. EDGE is an enhancement to GPRS and provides increased data transmission rates (3 to 4 times faster than GPRS).

UMTS (3G) network

Third mobile radio standard and the successor of GSM for mobile multimedia incl. video and audio transmissions.

UMTS High Speed Packet Access (HSPA), UMTS Evolved HSPA (HSPA+)

HSPA and Evolved HSPA (HSPA+) provide enhanced performance in speed and latency.

Long Term Evolution (LTE)

LTE is the first all-IP mobile network technology. It provides significantly higher data rates, capacity and lower latency than HSPA and HSPA+.

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- ## Interest …

  … in new topics

  … in the interaction of technology, business, economy and society

  … in experiments

- ## Other Business Informatics lectures help but are not mandatory.

Lectures

1. Introduction to Mobile Business I
2. Basic Communication Paradigms and Mobile Telecommunications Infrastructures
3. Wireless Internet-oriented Infrastructures and Protocols
4. Mobile Communication Services
5. Electronic Business vs. Mobile Business
6. Market Structure and Value Creation
7. Business Models
8. Smartcards and Related Application Infrastructures
9. Mobile Devices
10. Concepts of Mobile Operating Systems
11. Market Overview of Mobile Operating Systems and Security Aspects
12. Mobile Trusted Devices
13. Acceptance and Success Factors in Mobile Business

mobile business

Practical Exercises, Case Study, Guest Lectures, and Exam Preparation

1. MapCase Guest lecture

2. Technology Basics I (Lectures 2, 3, 4)

3. Case Study Introduction (Guest lecture by PwC)

4. Economic Basics I (Lectures 5, 6, 7)

5. Case Study Workshop (Workshop by PwC)

6. Technology Basics II (Lectures 8, 9, 10, 11)

7. Economic Basics II (Lectures 12, 13)

8. Exam Preparation – Questions and Answers (Q&A)

Please keep yourself updated

1. Schedule:

http://www.m-chair.de/wps/wse/lv/det/rannenberg/173/

2. Exam:

http://www.wiwi.uni-frankfurt.de/mein-wiwi-studium/pruefungsamt.html

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Electronic library of magazines, access to more than 2000 magazines

www.ub.uni-frankfurt.de/banken.html

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www.ub.uni-frankfurt.de/login.html

search.epnet.com/login.asp
www.jstor.org

Online search engines:
scholar.google.com
academic.live.com

[Microsoft 2000]
Microsoft (2000) Materials for the Introduction of .net

[Passerini et al. 2004]
Passerini, K.; Gagnon, S. Cakici, K. (2004) Opportunities in the Digital Economy: A New Value Chain and Services for Mobile Telecom Operators, in: C. Bullen and E. Stohr (Eds.) *Proceedings of the 10th American Conference on Information Systems*, New York, NY, USA, pp.2530-2535.

[Sauter 2008]
Sauter, M. (2008): Grundkurs Mobile Kommunikationssysteme (3. erweiterte Auflage), Vieweg, Wiesbaden.

[WAP 2010]
WAP Forum Releases: What Is WAP?
www.wapforum.org/what/technical.htm, accessed 01-10-2010.