mobile business

Lecture 1

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

Mobile Business I (WS 2019/20)

Prof. Dr. Kai Rannenberg

Chair of Mobile Business & Multilateral Security
Johann Wolfgang Goethe University Frankfurt a. M.

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Agenda

- 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

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Who we are

Business Informatics @ Goethe University Frankfurt

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

Agenda

- The Chair of M-Business and Multilateral Security
- Teaching & Research Agenda
- Organizational Issues
- Introduction into information and communication security
- Outline of this course

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

Chair of Mobile Business & Multilateral Security

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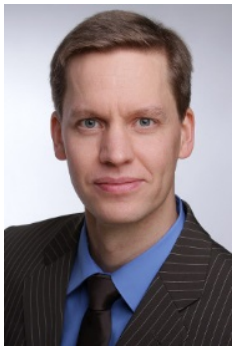
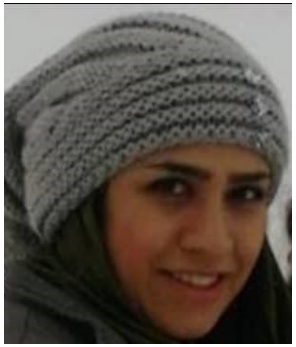
Team

Kai Rannenberg



Sebastian Pape



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Welderufael Tesfay

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Majid Hatamian

Peter Hamm

Ann-Kristin Lieberknecht

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Markus Tschersich


Jetzabel Serna-Olvera

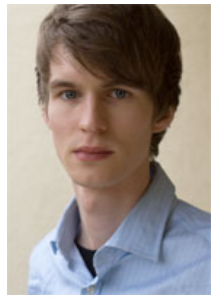

Mike Radmacher

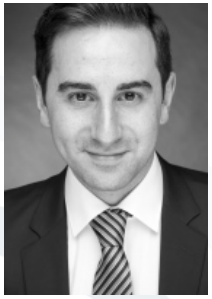

Andreas Albers


Stefan Weiss


Shuzhe Yang


André Deuker


Christian Kahl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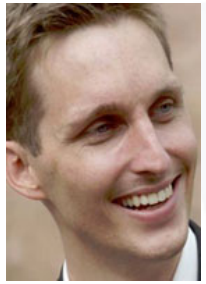
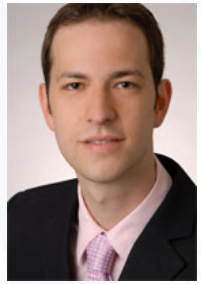
Ahmad Sabouri


Fatbardh Veseli


Tim Schiller


Niels Johannsen


Stephan Heim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Michael Schmid

Team

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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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Teaching

	WS 2019/20	SS 2020
Bachelor	*Course* **Business Informatics 2 (PWIN)**	
Master	*Course* **Mobile Business I:** **Technology, Markets, Platforms and Business Models** *Seminar* **Cryptocurrencies and Blockchain: Promise and Challenges**	*Course* **Mobile Business II:** **Application Design, Applications, Infrastructures and Security** *Course* **Information & Communication Security: Infrastructures, Technologies and Business Models** *Course* **Privacy vs. Data: Business Models in the digital, mobile Economy** *Seminar* **tbd**

Teaching in Frankfurt

Teaching Topics

- Identity Management
- Privacy
- ICT Security
- Mobile Business
- Business Informatics

Master Courses

Lectures

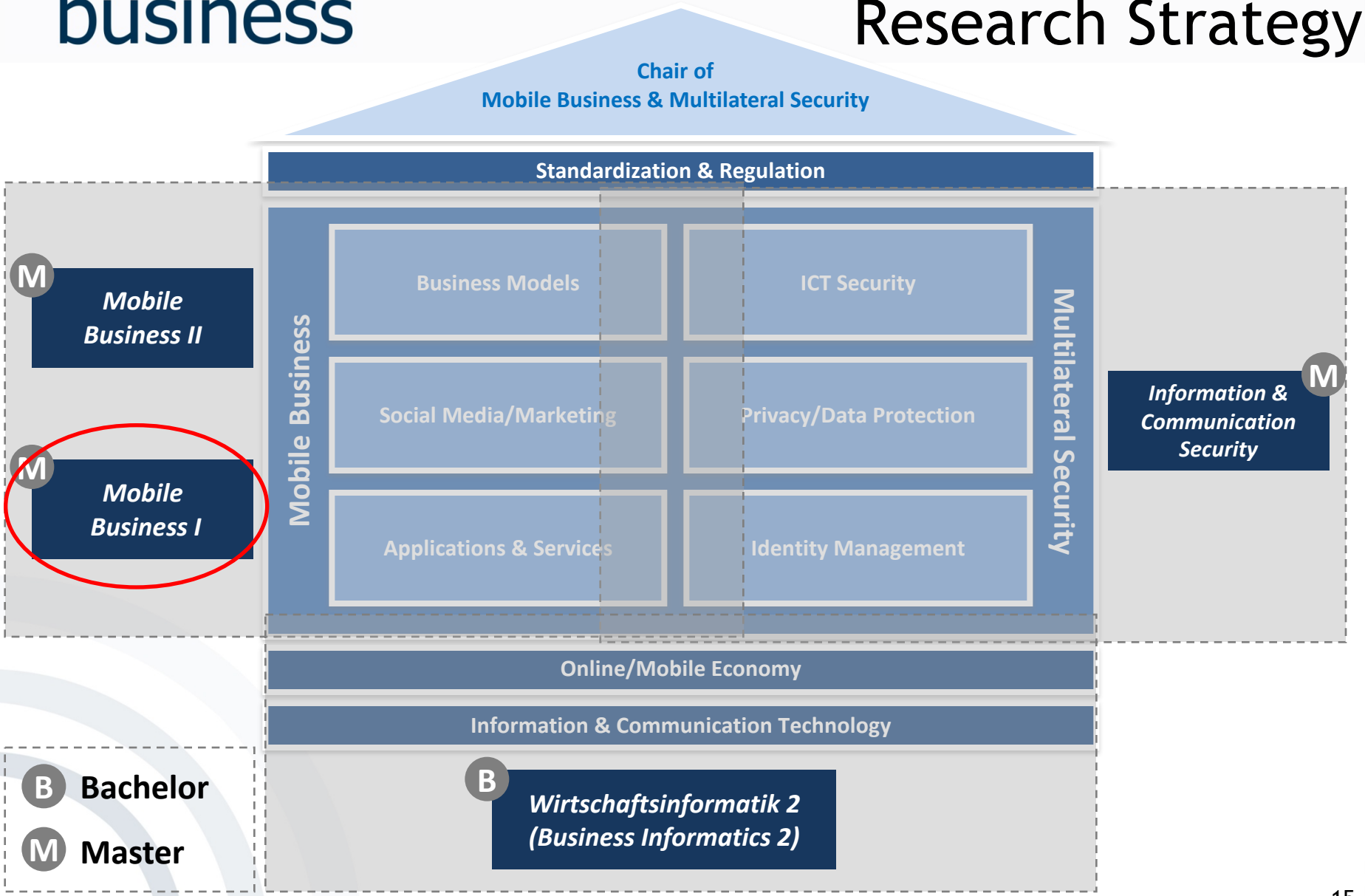
- Mobile Business 1
- Mobile Business 2
- I & C Security
- Privacy vs. Data
- Seminars
- Master Thesis

Bachelor Courses

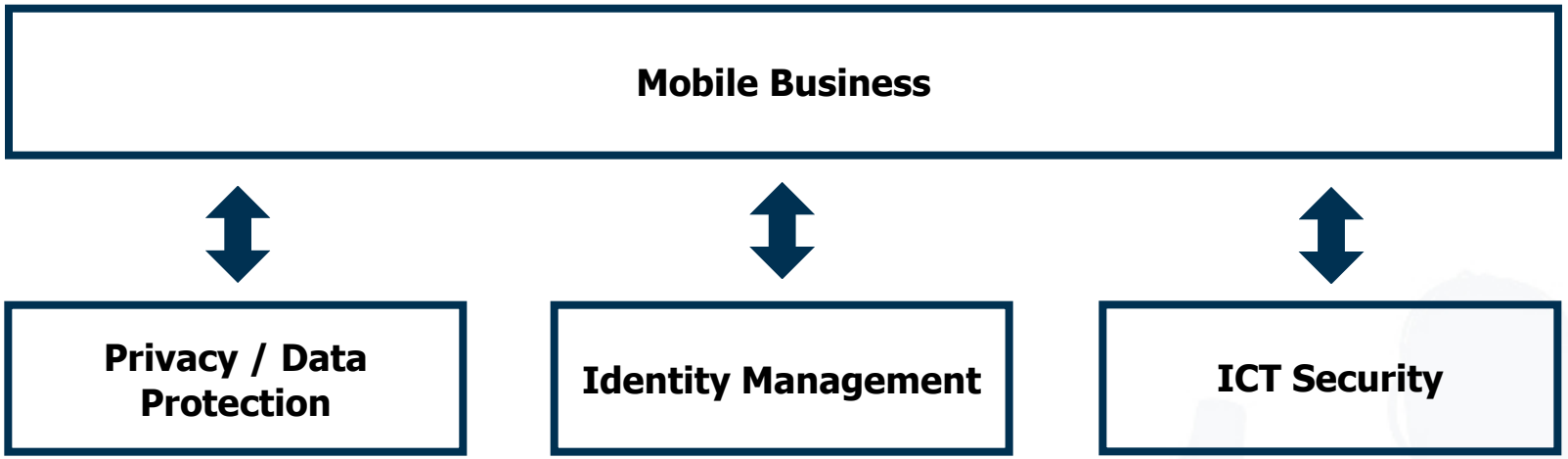
Lectures

- Business Informatics 2
- Seminars
- Bachelor Thesis

Teaching & Research Strategy

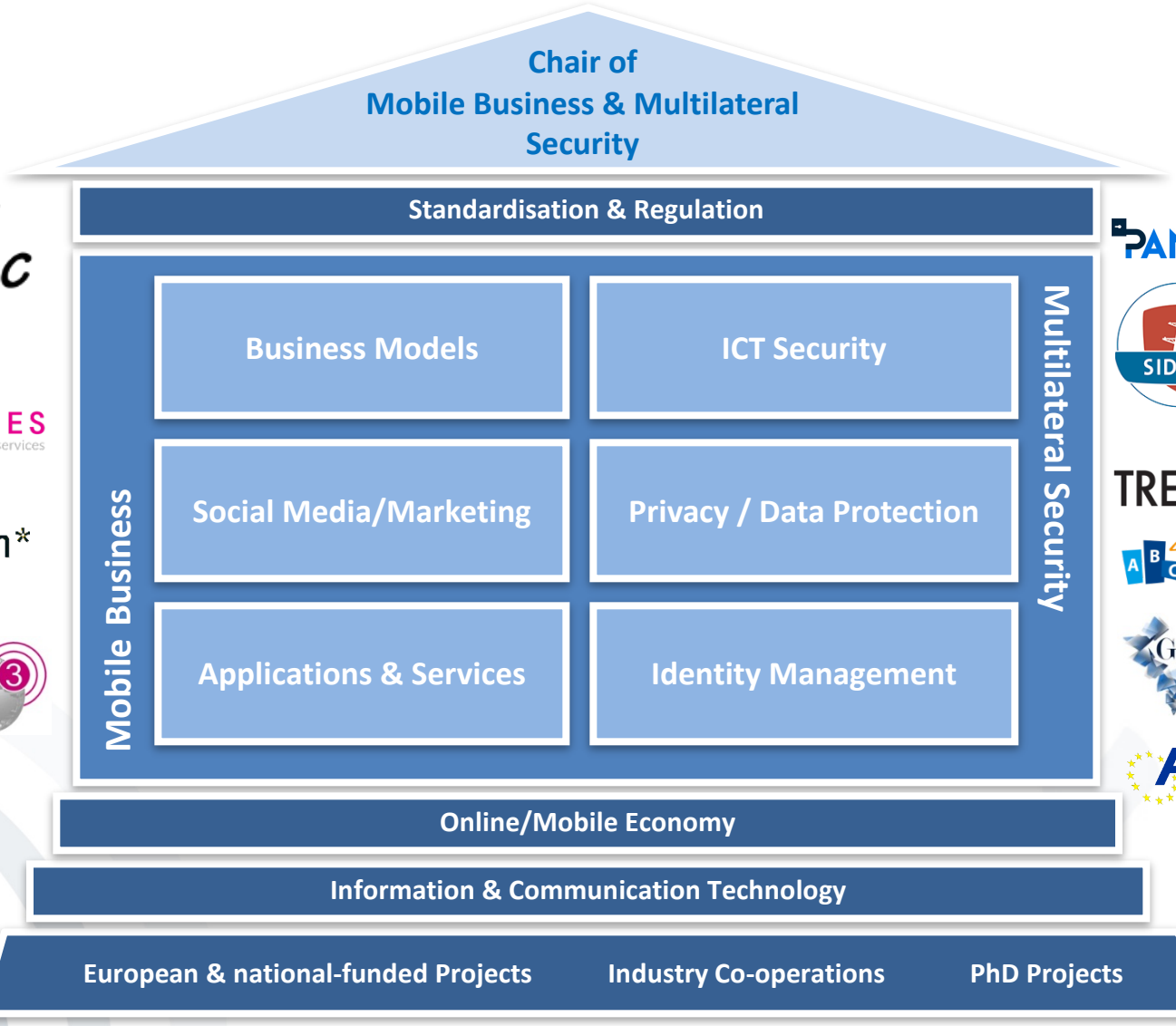


M-Chair Research Statement



Advancing *Mobile Business* while enabling individuals to be in control of their personal data by providing *Identity Management*, *Privacy Protection*, and *ICT Security* within the Digital Economy

Overview of M-Chair Research Areas & Projects

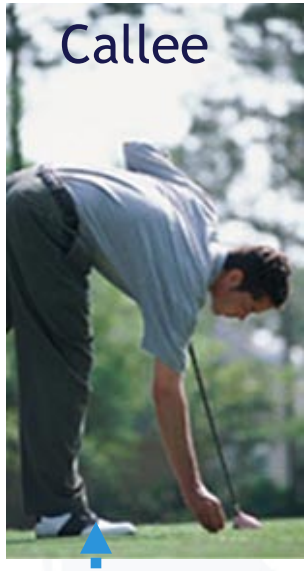


Example

Reachability Management System (RMS)

The features

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



Call

Call

Negotiation

Topics of Negotiation

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

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Expressing Arguments for Your 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**

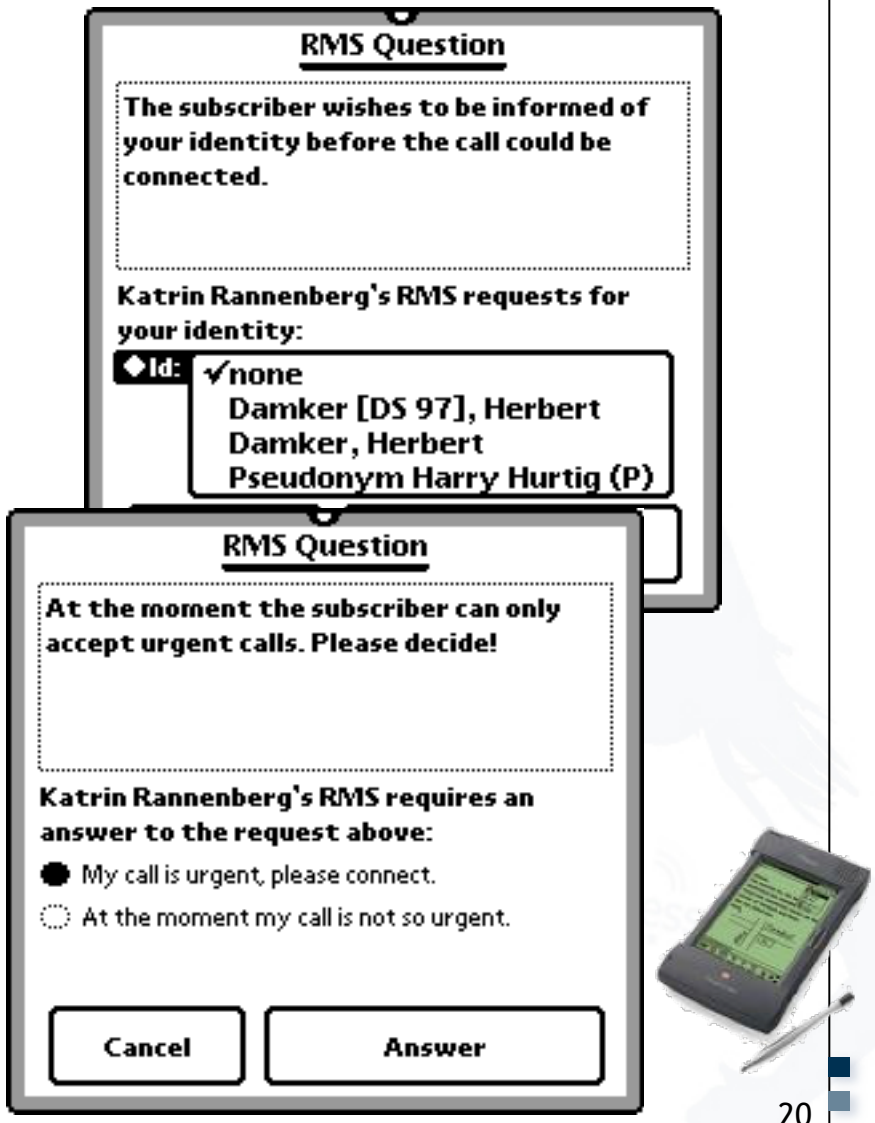
"I welcome you calling back."

Provision of a **reference**

"My friends are your friends!"

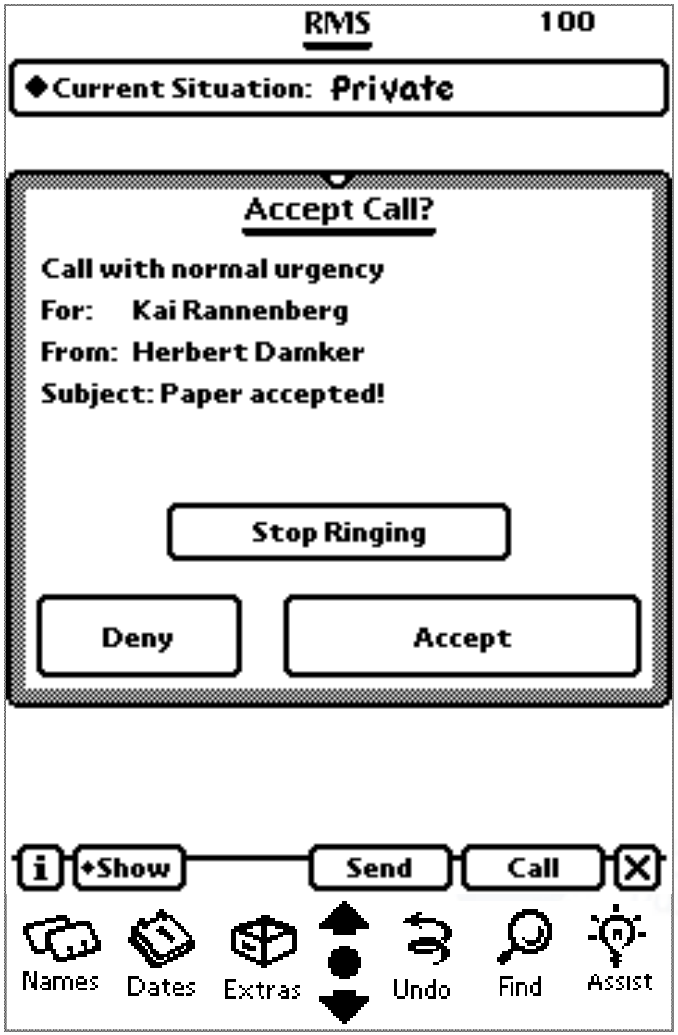
Offering a **surety**

"Satisfaction guaranteed
or this money is yours!"



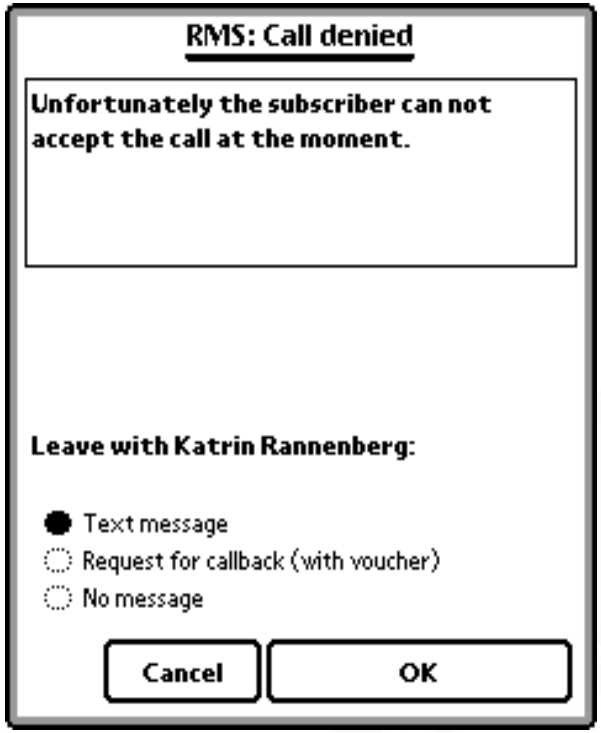
RMS Accepted Call (Callee Display)

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



RMS Denied Call (Caller Display)

- Call not connected
- Caller gets information
  (configured by callee)
- Caller can leave a message or request a call back



Configuring your RMS

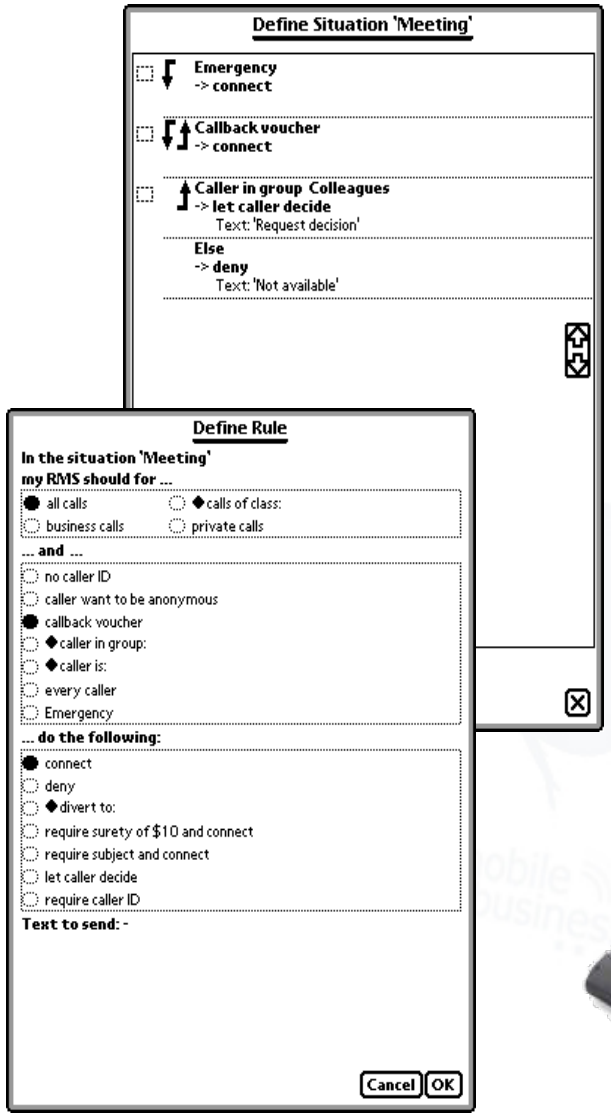
Situations

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

Rules

Combination of features

Users can reconfigure initial rules and situations as they like.



Simulation Study in Heidelberg Health Service

- **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

Some Lessons Learned

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

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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!“

What is Mobile Business ?

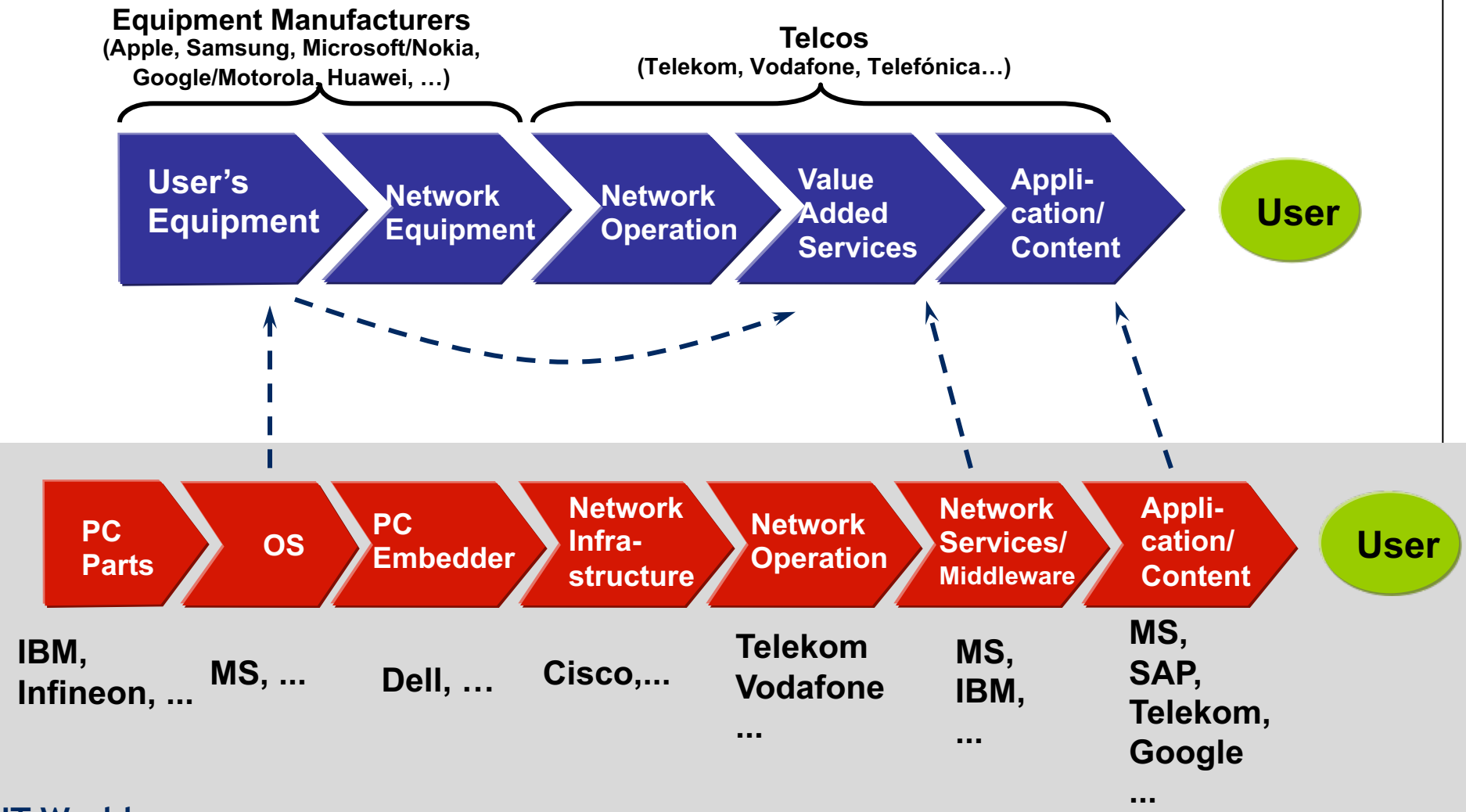
We chose a definition that (hopefully) lets us do interesting things:

"The usage of
mobile devices, infrastructure, communication and interaction
for
mobile applications *and transactions."*

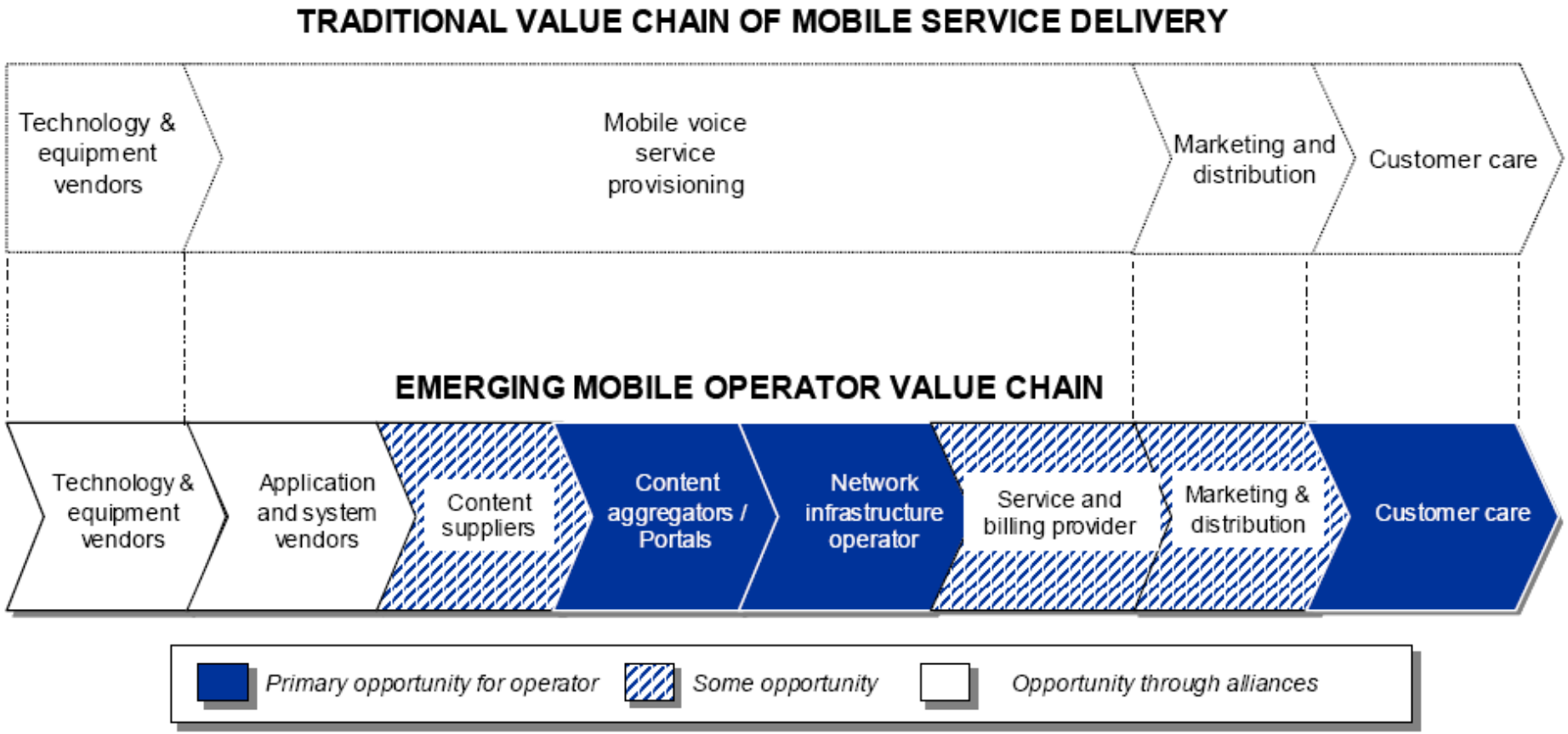
Beyond Hype and Myth

- 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



Value Chains split



[Passerini et al. 2004]

Factors

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.

Popular Misunderstandings

- 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.

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Between Hype and Scenario

- 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

[Source: Microsoft 2000]

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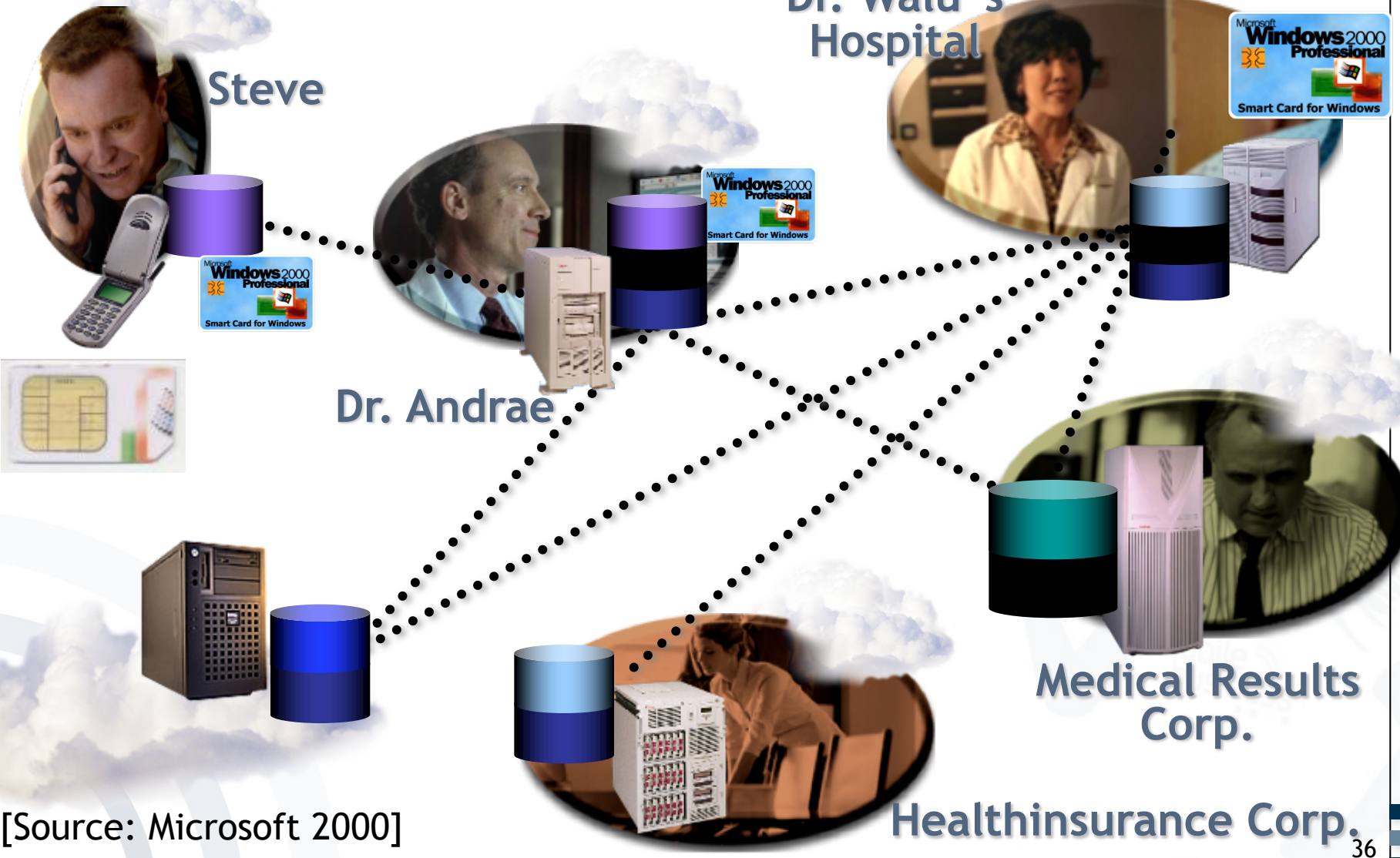
Parties Involved



[Source: Microsoft 2000]

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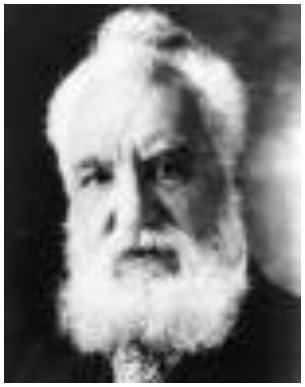
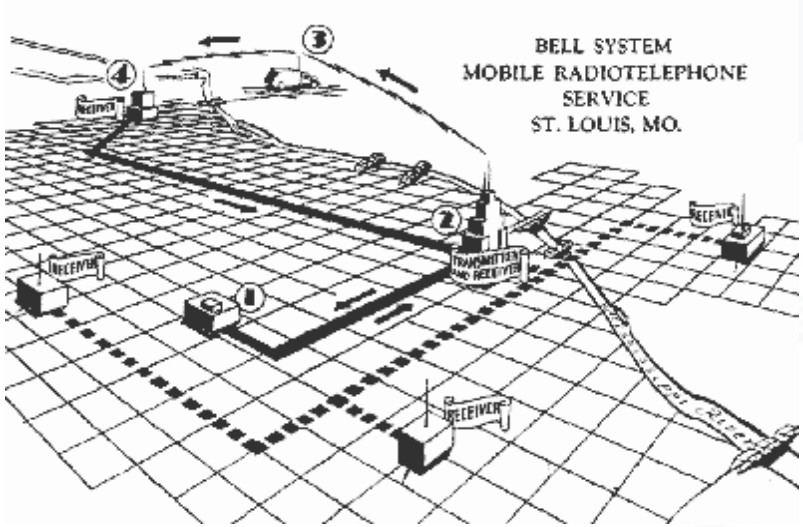
History of Mobile Business Early Approaches



- 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.



History of Mobile Business
Early German Mobile Networks

- 1958 A-Net (till 1977)
- 1972 B-Net (till 1994)
- 1986 C-Net (till 2000)

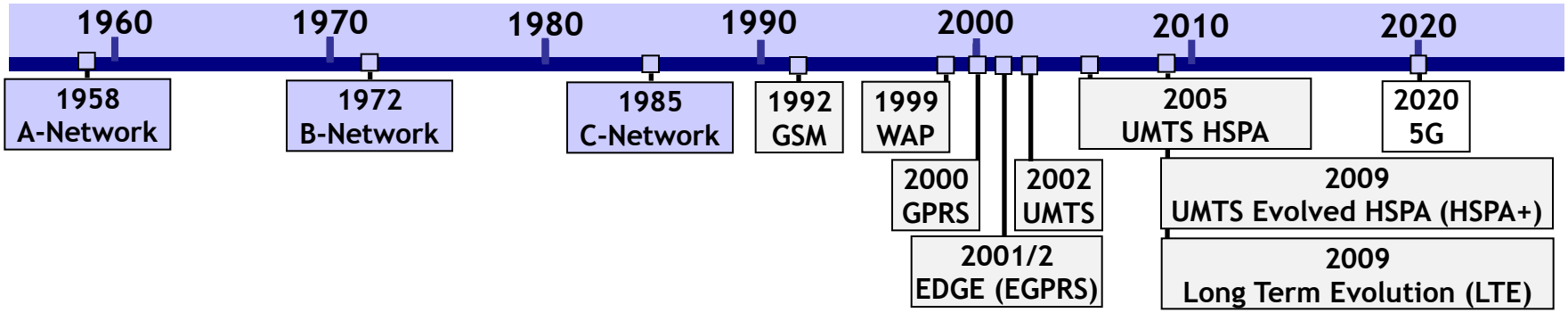
History of Mobile Business
NMT-450

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

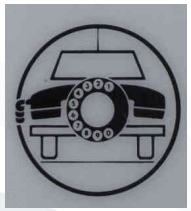
History of Mobile Business GSM

- 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.

Development of the Mobile Radio Network



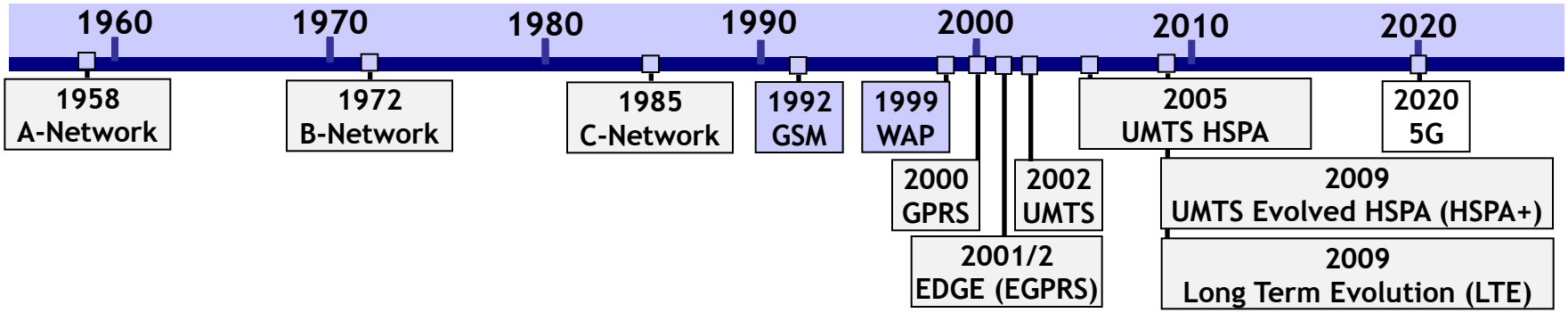
A-Network (1958 - 1977)
Switching was done manually by operators (switchboard clerks). To call one needed to know the location area of the mobile station.



B-Network (1972 - 1994-12-31)
Callers could call mobile stations directly, but needed to know the current mobile station's area and use the respective area code.

C-Network (1985 - 2000-12-31)
First German cellular mobile radio network with centralized management of the mobile station's location

Development of the Mobile Radio Network



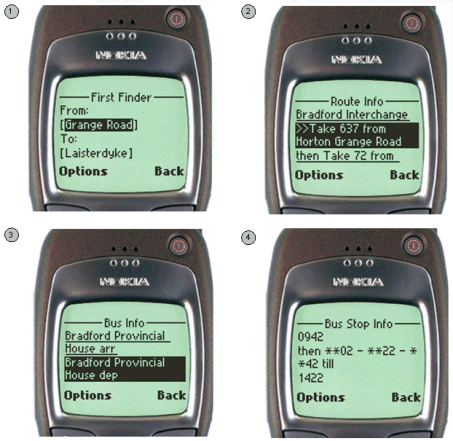
GSM

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

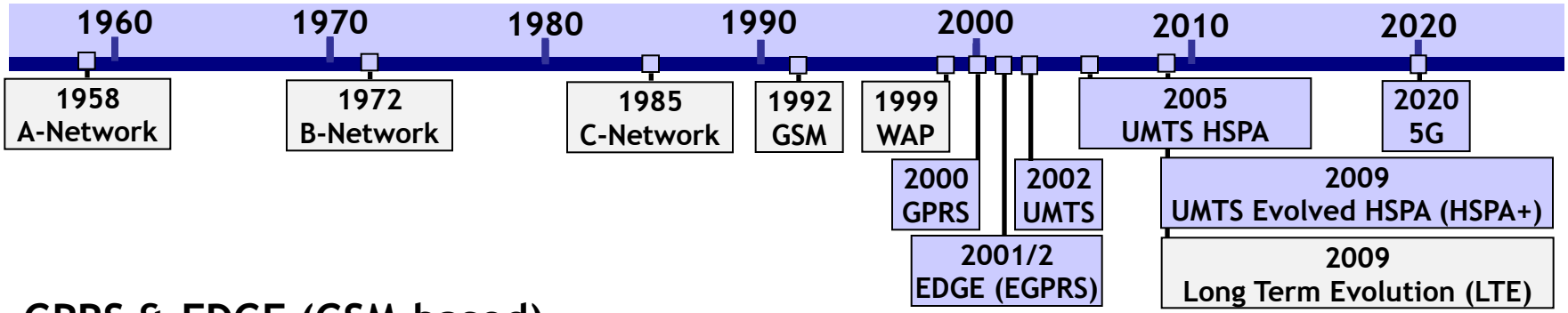
WAP

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]



Development of the Mobile Radio Network



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+.

Fifth generation cellular network technology (5G)

5G offers higher data rates (up to 10 Gbit/s), lower latency and use of higher frequency spectrums.

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Requirements

- Interest …
  - … in new topics
  - … in the interaction of technology, business, economy and society
  - … in experiments

- Other Business Informatics lectures help but are not mandatory.

Outline of Mobile Business I

Lectures

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

Outline of Mobile Business I

Please keep yourself updated

1. Schedule:
https://m-chair.de/index.php?option=com_teaching&view=lecture&id=41

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

Literature

Please Note:

Electronic library of journals, access to more than 2000 journals

http://www.ub.uni-frankfurt.de/online/emedien.html

Available only for university members via HRZ account (141.2.XXX.XXX IP-addresses; PC Pool) or via university library login:
www.ub.uni-frankfurt.de/login.html

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

Internet search engines:

scholar.google.com
academic.live.com

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Literature

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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.