mobile business

Lecture 1

Introduction to
Mobile Business II
Application Design, Applications,
Infrastructures, and Security

Mobile Business II (SS 2017)

Prof. Dr. Kai Rannenberg

Deutsche Telekom Chair of Mobile Business & Multilateral Security
Goethe University Frankfurt a. M.

- **The Chair of M-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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Vita of Kai Rannenberg

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

Dissertation on "**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
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

mobile business

Kai Rannenberg

Jetzabel Serna-Olvera

Sebastian Pape

Fatbardh Veseli

Welderufael Tesfay

Ahmed Seid Yesuf

Christopher Schmitz

David Harborth
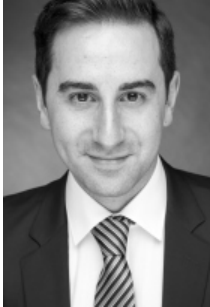
Majid Hatamian

Iulia Bastys

Akos Grosz

Shuzhe Yang

Gökhan Bal
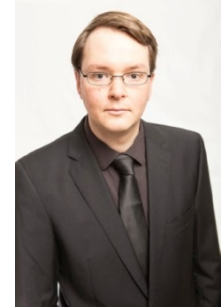

Mike Radmacher

Andreas Albers

Stefan Weiss

André Deuker

Markus Tschersich

Sascha Koschinat

Stephan Heim

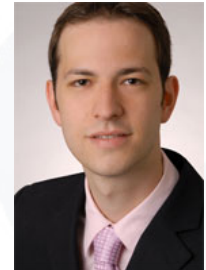Lars Wolos

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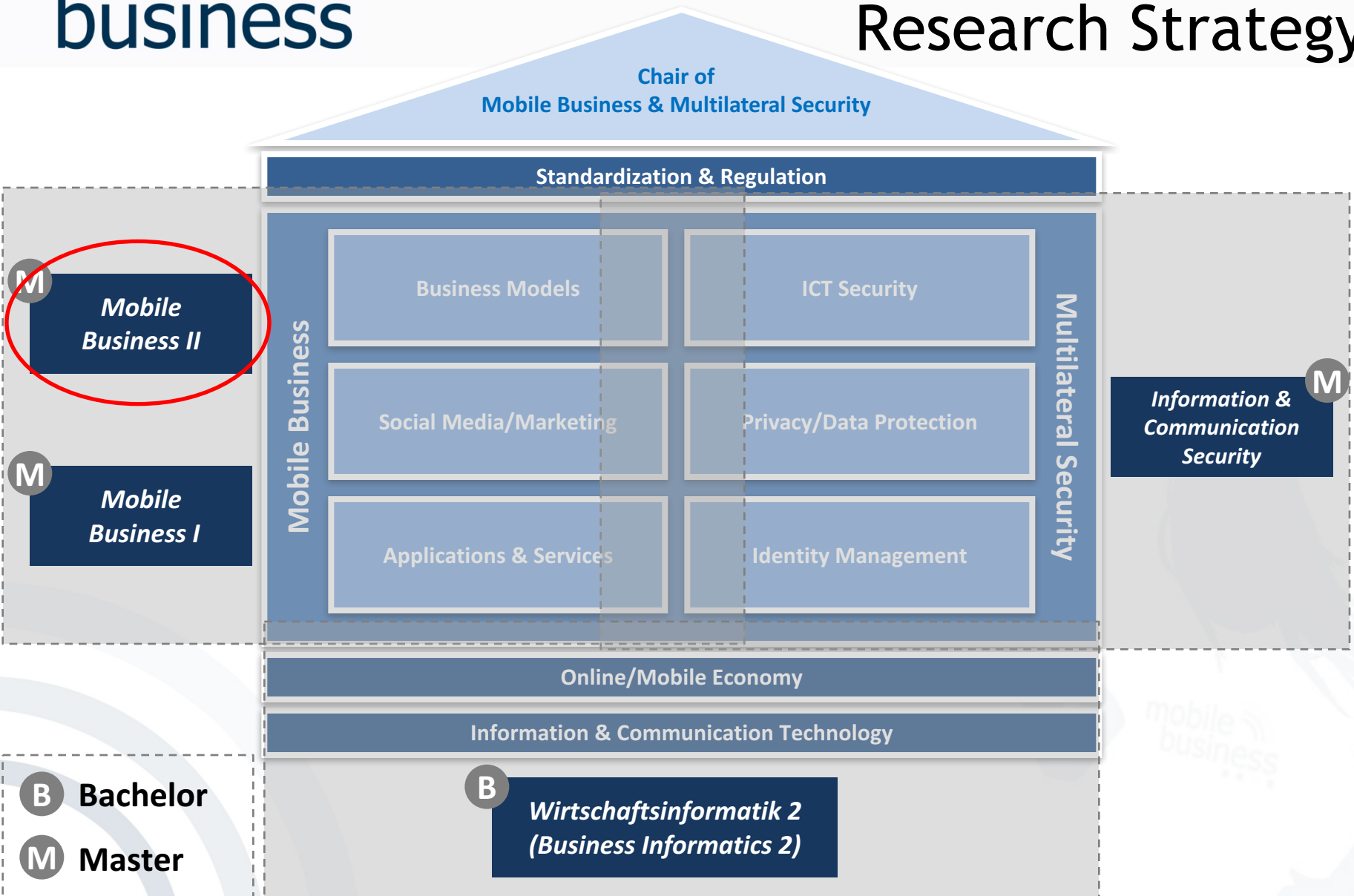twitter.com/mchair

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	SS 2017	WS 2017/18
Bachelor	*Course* "Business Informatics 2 (PWIN)"	*Course* "Business Informatics 2 (PWIN)"
Master	*Course* **Mobile Business II - Application Design, Applications, Infrastructures, and Security** *Course* **Privacy vs. Data: Business Models in the digital, mobile Economy** *Seminar* **Augmented Reality: "The Next Big Thing"** *Seminar* **Project-Seminar, "Privacy in smartphone ecosystems"**	*Course* **Mobile Business I: Technology, Markets, Platforms, and Business Models** *Seminar* **Project-Seminar, Topic tbd**

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) Bachelor

(M) Master

(B) Wirtschaftsinformatik 2 (Business Informatics 2)

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- Usage and trial of "Mobile Services & Devices"
- Experience "M-Business" life
- Experience security issues
- Compare with state of the discussion in research
- Feedback to designer and developers
- Influence future work environments

- **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
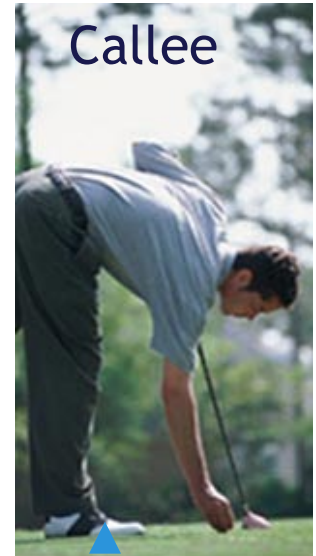- Range of reaction possibilities

Callee

Caller
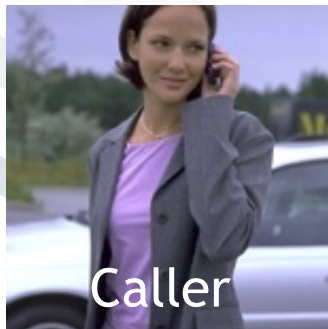
Call

Call

Negotiation

- **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 |

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

- 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   ○ ◆ calls of class:
○ business calls   ○ 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

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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
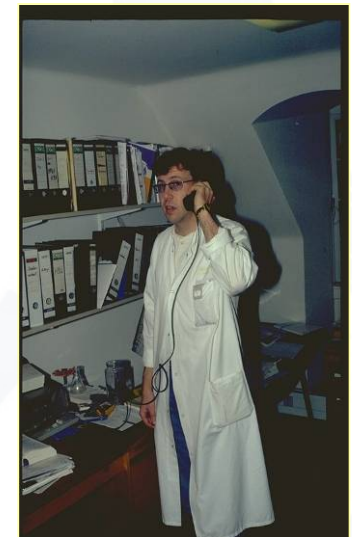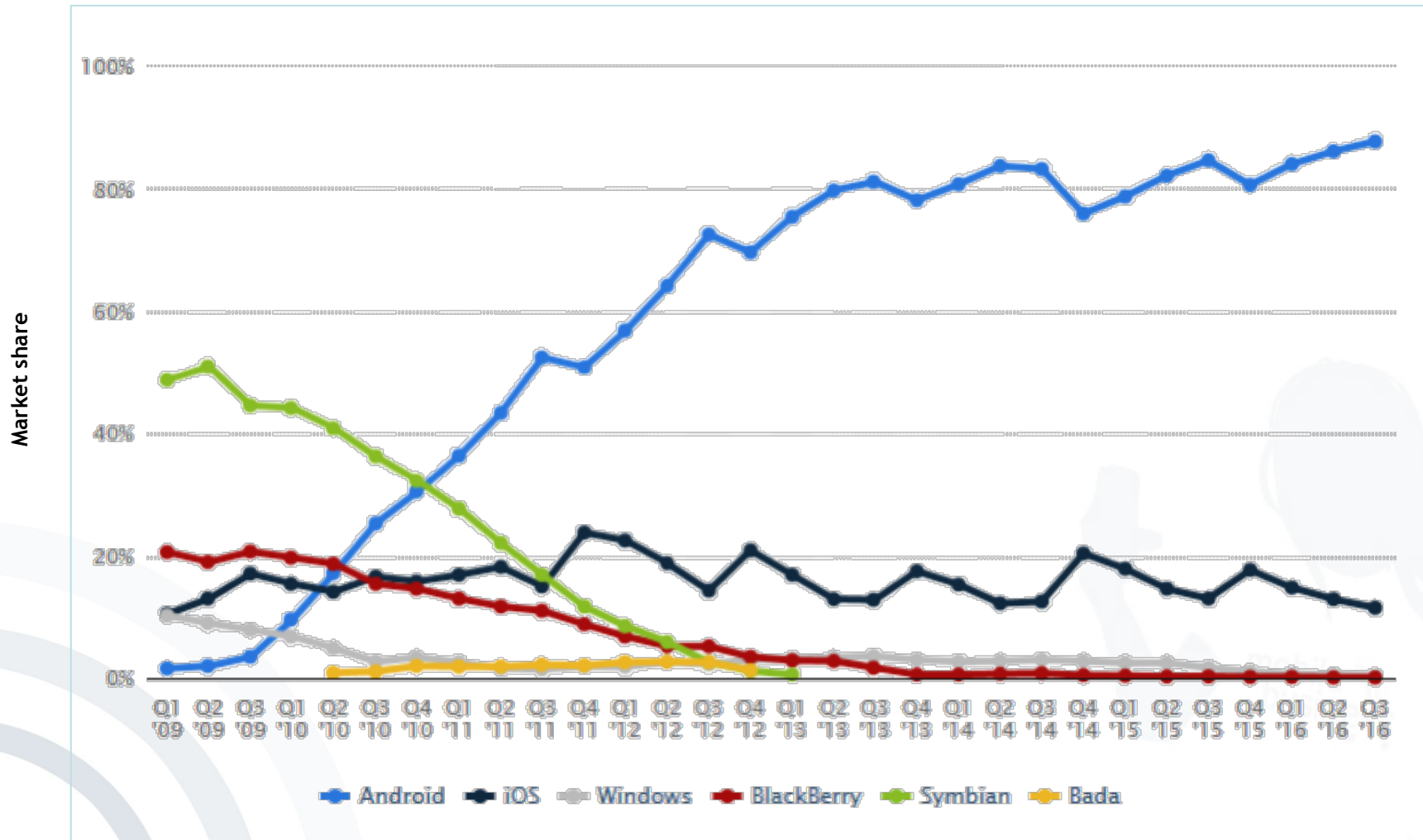
Mobile Applications are getting more and more popular

- Over 1.500.000 Applications in Apple's App-Store in July 2015 (over 725.000 native iPad Apps)

- Centralised marketplace for software

- Several (dis)advantages compared with websites like
    - Access to hardware resources (like GPS)
    - Offline functionalities
    - Has to be developed for each OS individually
    - Mobile Native Apps vs. Mobile Web Apps

- HTML5 may integrate the advantages of Apps and mobile websites

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- 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!"

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.

Value Chains merge

GSM World

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

Telcos
(Telekom, Vodafone, Telefónica…)

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

| 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 ...

IT World (Based on: SAP)

TRADITIONAL VALUE CHAIN OF MOBILE SERVICE DELIVERY

Technology & equipment vendors | Mobile voice service provisioning | Marketing and distribution | Customer care
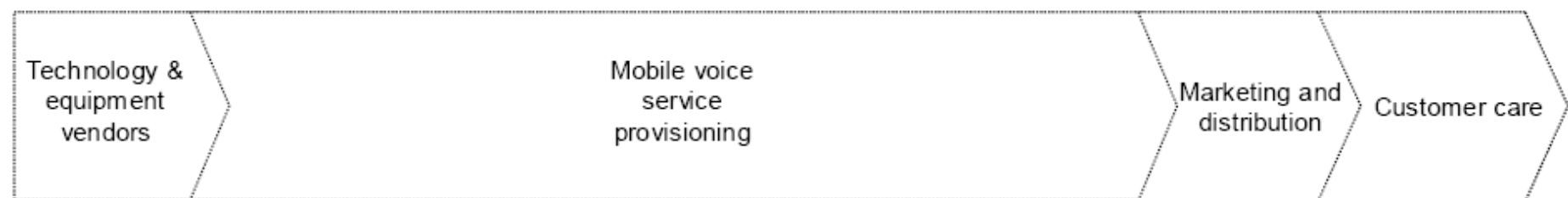
EMERGING MOBILE OPERATOR VALUE CHAIN

Technology & equipment vendors | Application and system vendors | Content suppliers | Content aggregators / Portals | Network infrastructure operator | Service and billing provider | Marketing & distribution | Customer care
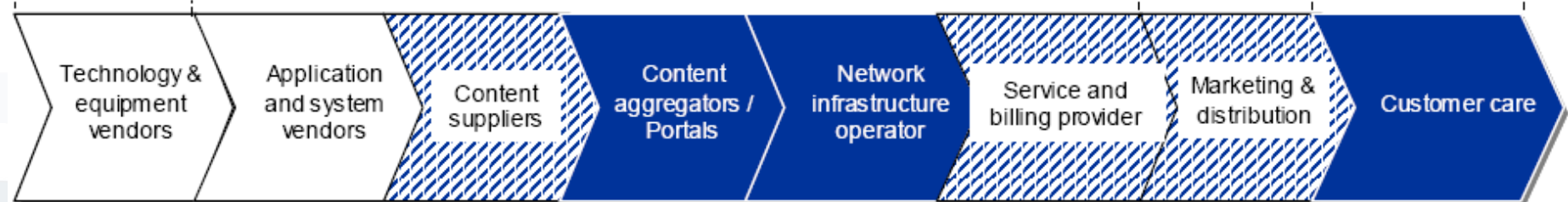
Primary opportunity for operator | Some opportunity | Opportunity through alliances

[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?

mobile business

video

[Source: Microsoft]
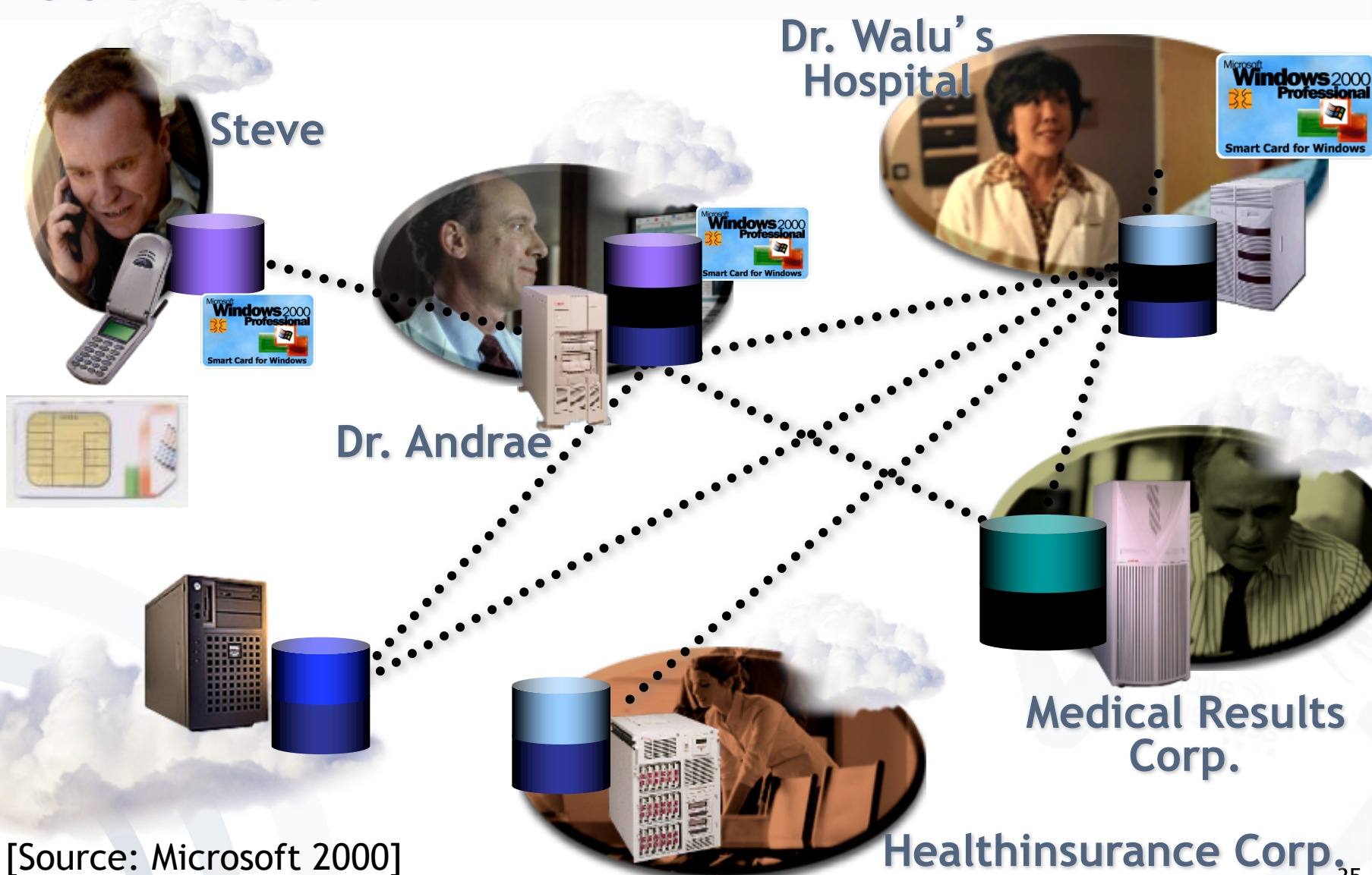
[Source: Microsoft 2000]

- 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
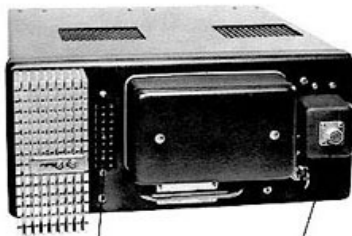
POWER/CONTROL CABLE   POWER/CONTROL CONNECTOR   ANTENNA CONNECTOR   ANTENNA

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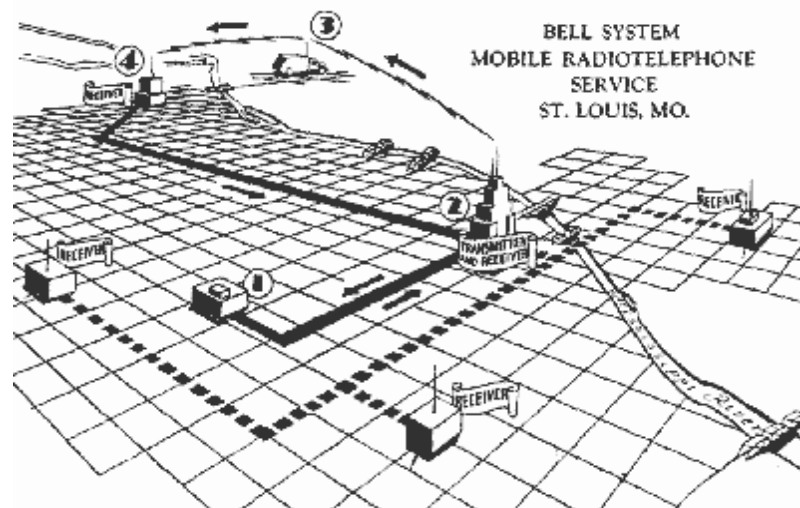
- 1958 A-Net (till 1977)
- 1972 B-Net (till 1994)
- 1986 C-Net (till 2000)

- 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	2015

1958 A-Network

1972 B-Network

1985 C-Network

1992 GSM

1999 WAP

2000 GPRS

2002 UMTS

2005 UMTS HSPA

2001/2 EDGE (EGPRS)

2009 UMTS Evolved HSPA (HSPA+)

2009 Long Term Evolution (LTE)
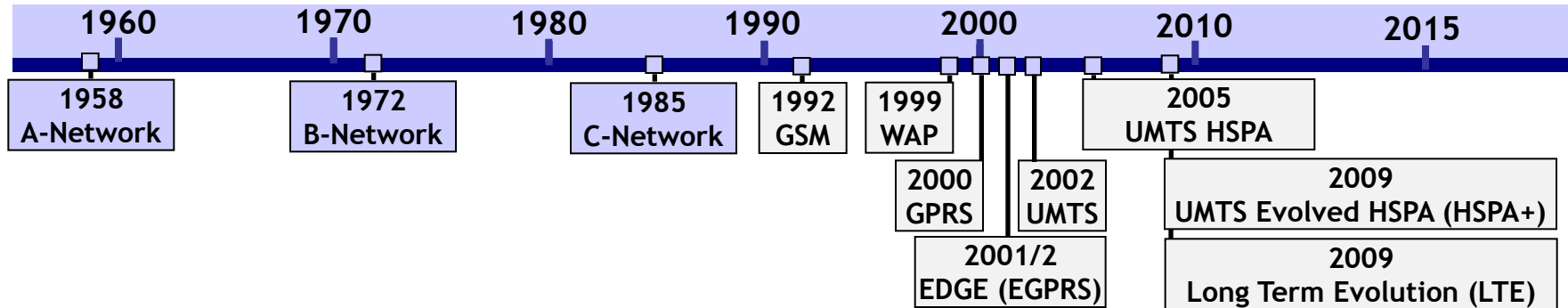
A-Network (1958 - 1977)
Switching was done manually by operators (switchboard clerks). To call one needed to know the location area of the mobile station.

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.

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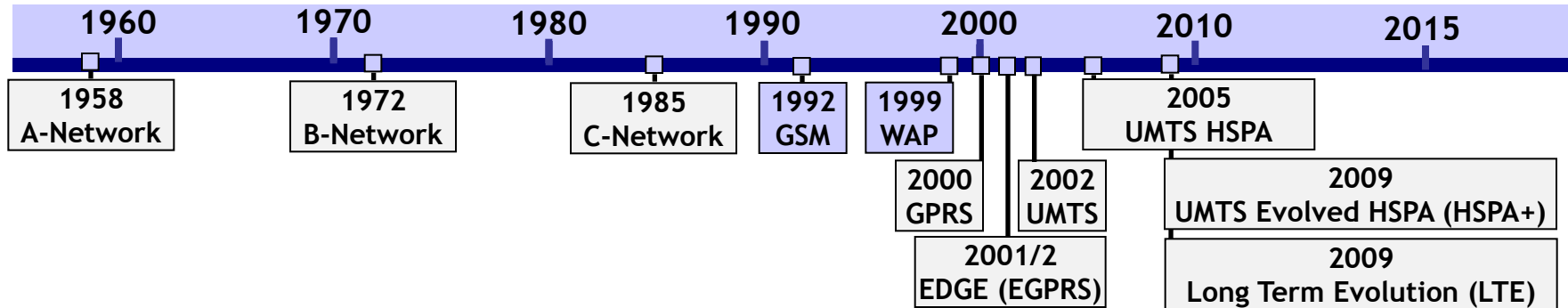| 1960	1970	1980	1990	2000	2010	2015

| 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]

① First Finder
From: [Grange Road]
To: [Laisterdyke]
Options   Back

② Route Info
Bradford Interchange
>>Take 637 from Horton Grange Road then Take 72 from
Options   Back

③ Bus Info
Bradford Provincial House arr
Bradford Provincial House dep
Options   Back

④ Bus Stop Info
0942 then **02 - **22 - *
*42 till 1422
Options   Back

Development of the Mobile Radio Network

1960	1970	1980	1990	2000	2010	2015

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)

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 and Exercises

20-Apr-17	VL1	Introduction by Sebastian Pape	Lecture
27-Apr-17	VL2	Positioning Methods for Location-based Services	Lecture
27-Apr-17	VL3	LBS Business Models	Lecture
4-May-17	Ü1	LBS and Mobile Communities	Exercise
11-May-17	VL4	Cryptography	Lecture
11-May-17	VL5	M-Payment I	Lecture
18-May-17	Ü2	Cryptography	Exercise
1-Jun-17	VL6	M-Payment II	Lecture
8-Jun-17	G1	PWC: IoT Business Models	Guest Lecture
8-Jun-17	Ü3	M-Payment	Exercise
22-Jun-17	VL7	Regulation of Mob. Telec.	Lecture
22-Jun-17	VL8	Regulation by Licensing	Lecture
29-Jun-17	G2	TBA	Guest Lecture
6-Jul-17	VL9	Data Protection / IdM	Lecture
6-Jul-17	Ü4	Regulation	Exercise
13-Jul-17	VL10	HCI Issues	Lecture
20-Jul-17	VL11	Design Evaluation	Lecture
20-Jul-17	VL12	Current Research / Q&A	Q&A

Please keep yourself updated

1. Schedule:

http://m-chair.de/index.php?option=com_teaching&view=lecture&id=30

2. Exam:

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

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

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

Microsoft (2000) Materials for the Introduction of .Net

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.

Statista2014a, http://de.statista.com/statistik/daten/studie/73662/umfrage/marktanteil-der-smartphone-betriebssysteme-nach-quartalen/

Statista2016a, Marktanteile der führenden Betriebssysteme am Absatz von Smartphones weltweit vom 1. Quartal 2009 bis zum 3. Quartal 2016.
https://de.statista.com/statistik/daten/studie/73662/umfrage/marktanteil-der-smartphone-betriebssysteme-nach-quartalen/