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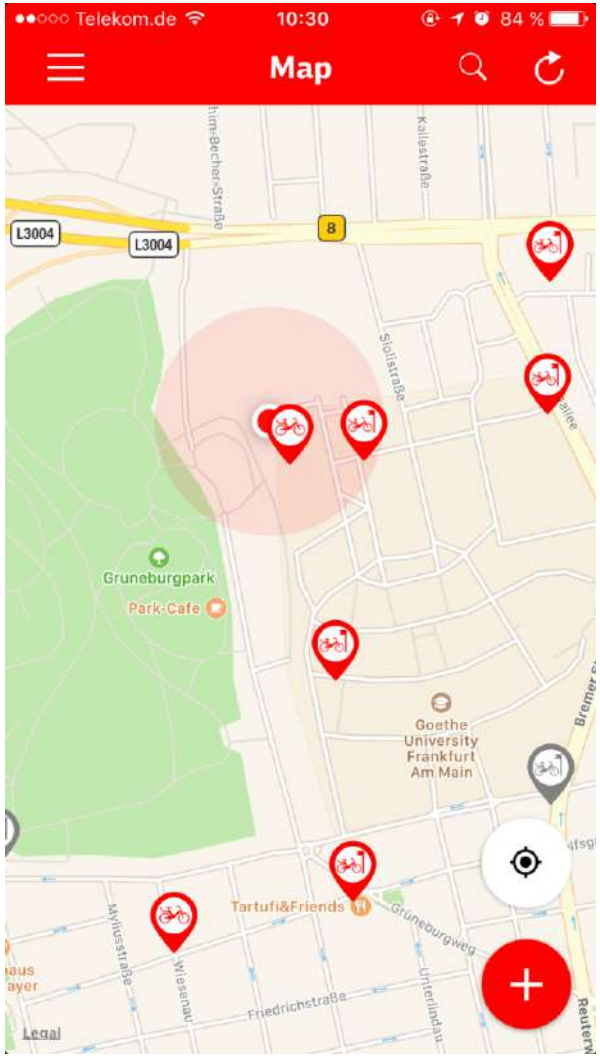
Lecture 3

Application Domains I: LBS Business Models & Use Cases



Mobile Business II (SS 2022)

Prof. Dr. Kai Rannenberg

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

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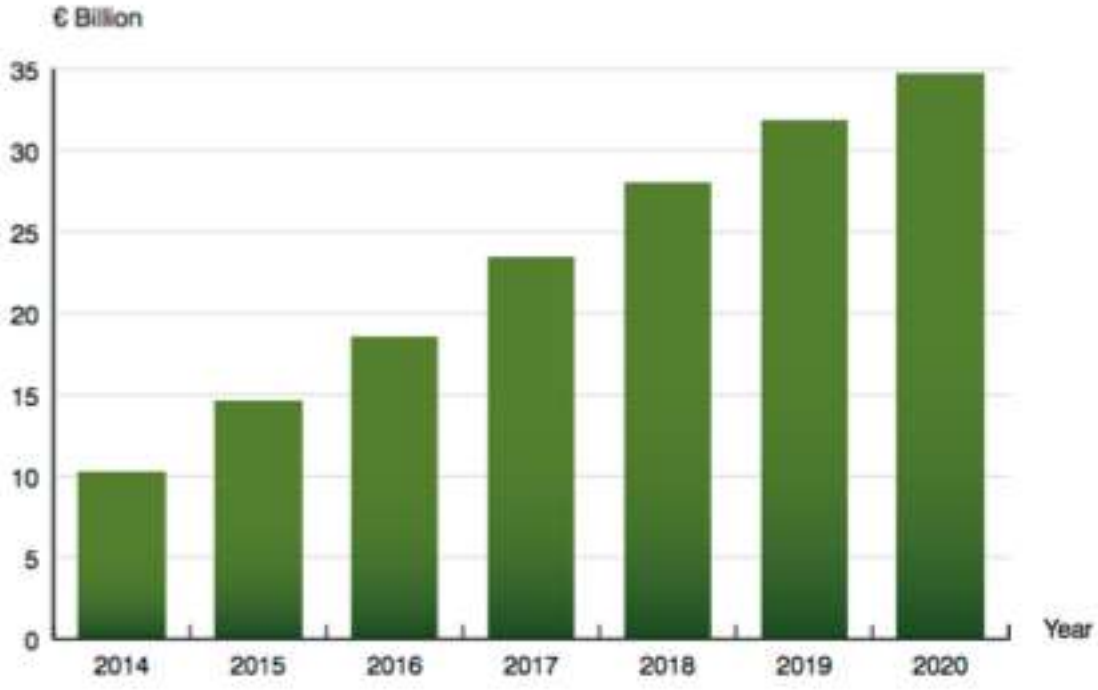
Agenda

- Market Analyses
- Business Models
- Requirements for Location-based Services
- A Situation-dependent Business Model
- Examples of LBS Business Models

Mobile LBS Revenues Market Expectations 2014-2020

- Total LBS service revenues in the EU reached € 325 million in 2012 and forecasted to grow to about € 825 million by 2017
- And forecasted to grow to about € 34.8 billion in 2020 worldwide.

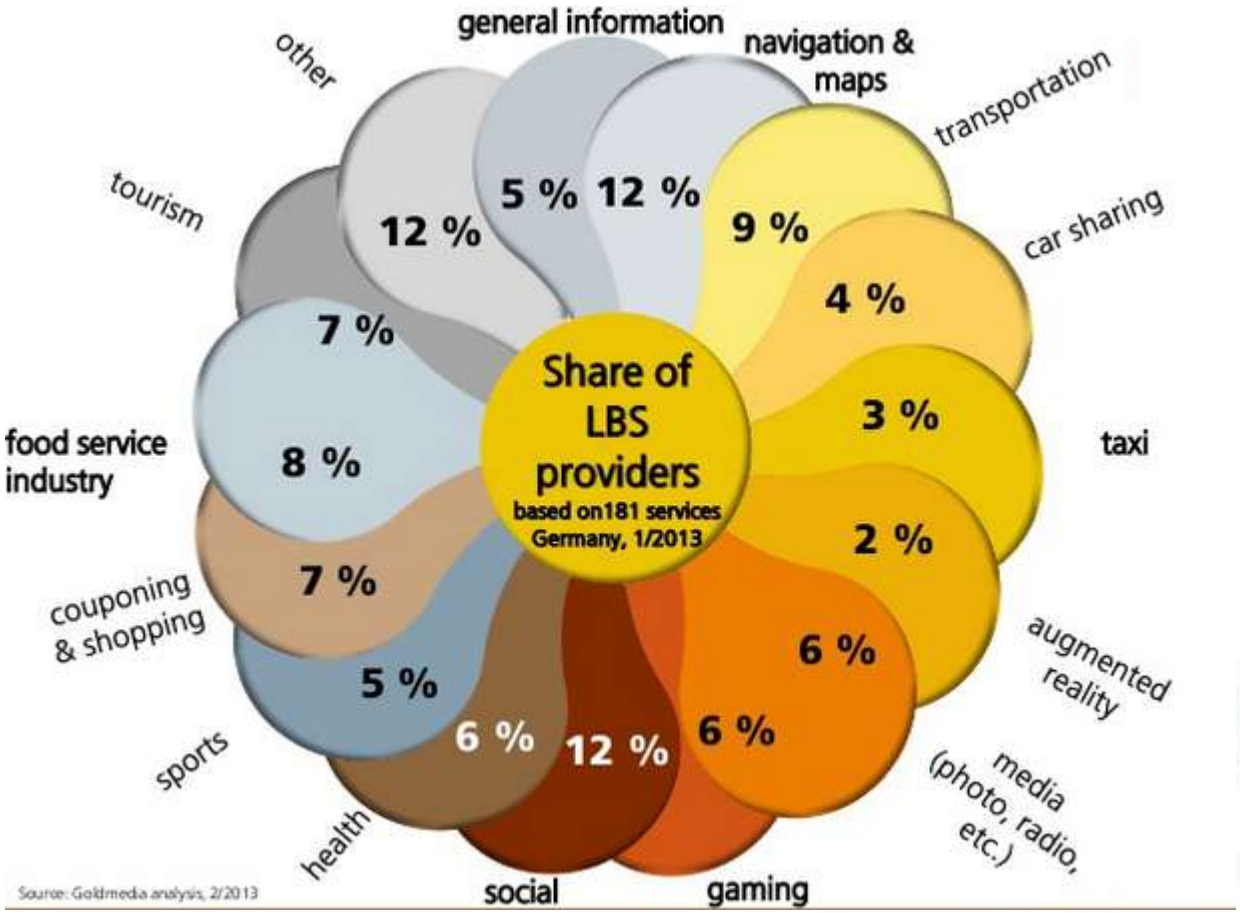


Mobile LBS revenue forecast, € billion (World 2014–2020)

[Source]: Berginsight 2014. Mobile Location-Based Services

LBS Market Segments

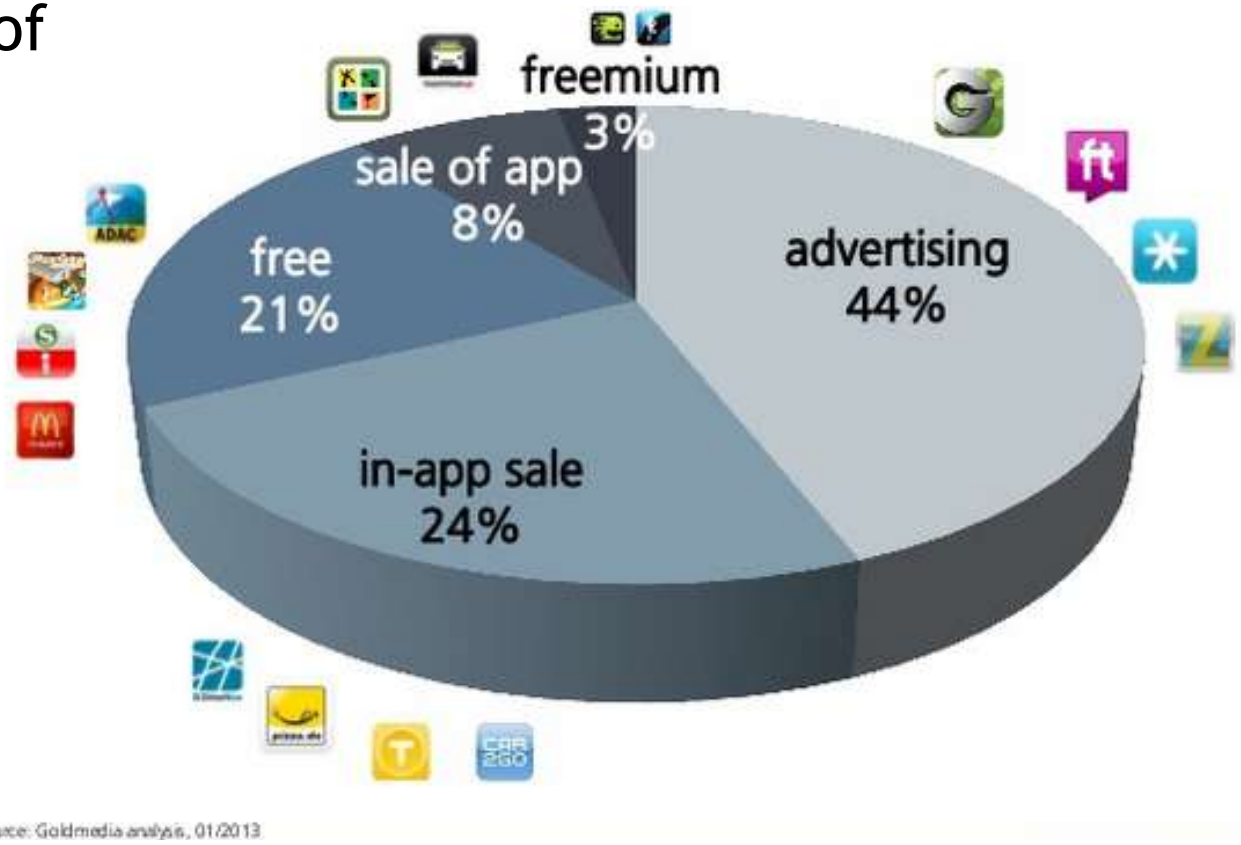
- LBS applications available in all market segments
- No distinct focus: LBS horizontally attractive



[Source]: Goldmedia Analyses 2013

Share of LBS Business Models

- Almost half of LBS are ad-financed.



[Source]: Goldmedia Analyses 2013

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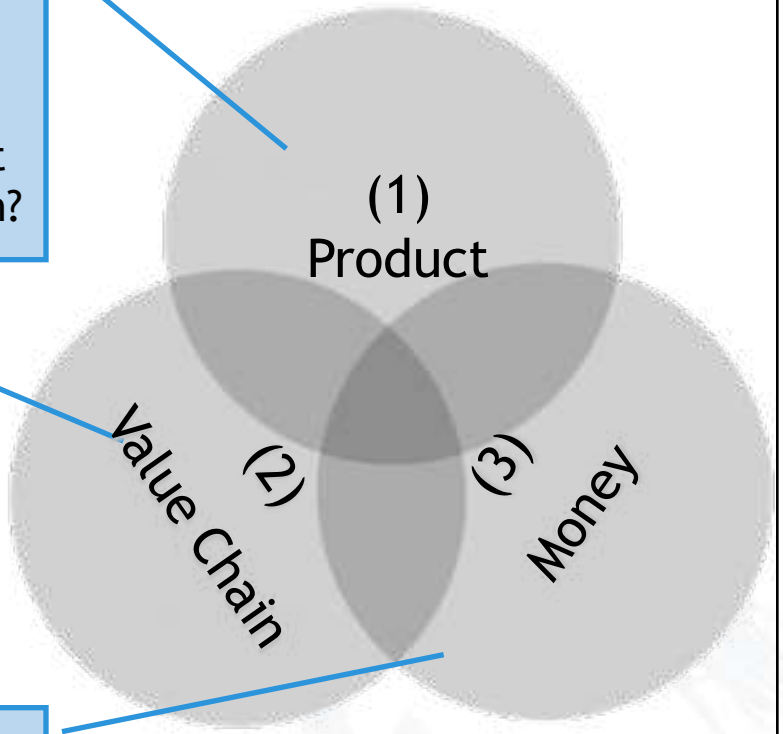
Elements of a Business Model

(1) Value Proposition
- How does the organisation benefit customers and partners?
- What are the advantages of players that are in relationship with the organisation?

(2) Architecture of added value
- How is the manufacturing of the output presented?
- In which configuration is the output produced?

(3) Revenue Model
- Which revenues will be generated from which sources?
- What are possible types and forms of revenue?

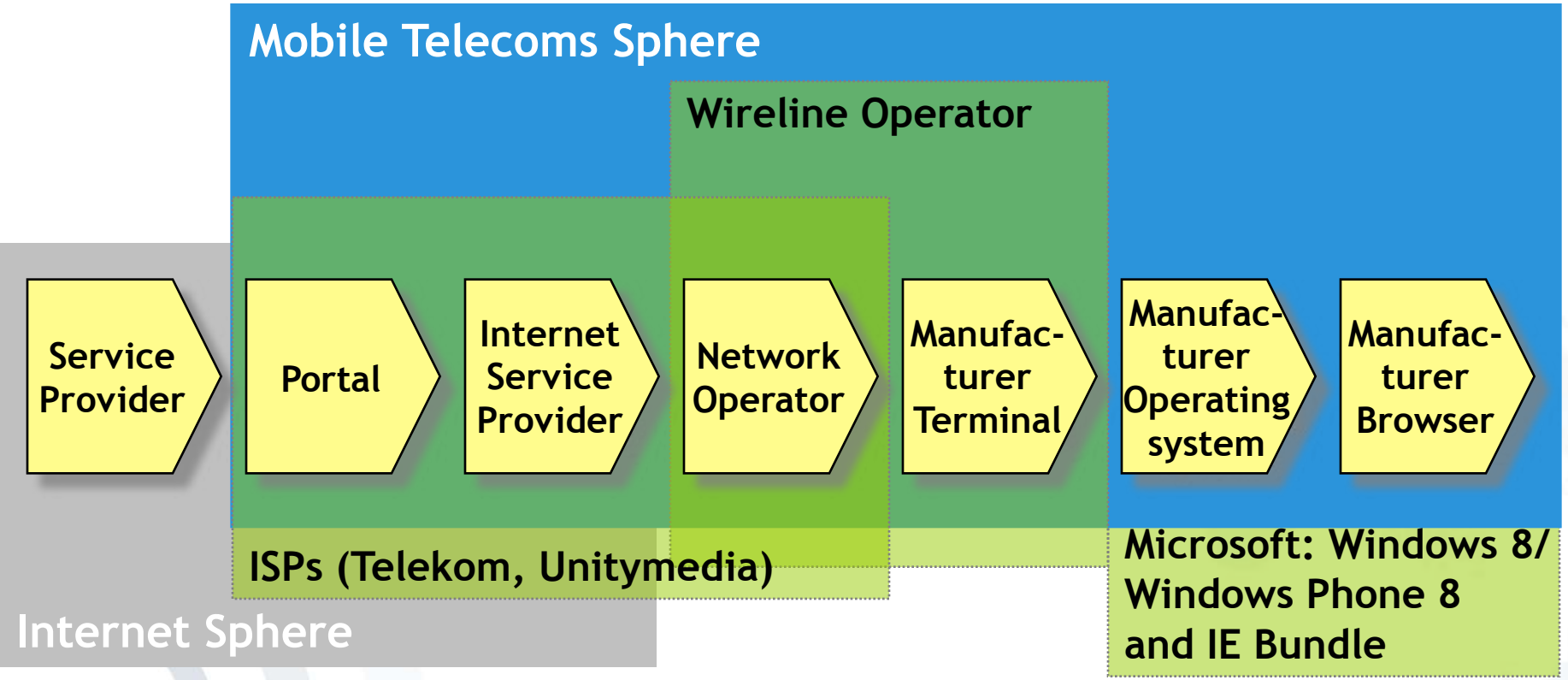


(1) Value Proposition

- Access to digital information services and products at any time and any place
- Location information can be used for enhancement of these services:
  - Ease of use
  - Enabling of new services
- As there are personal data involved there are high privacy requirements.
  - Especially when mobile (location-based) services are provided in a distributed manner

(2) Architecture of the Added Value

- Value chains to model the architecture of the added value.



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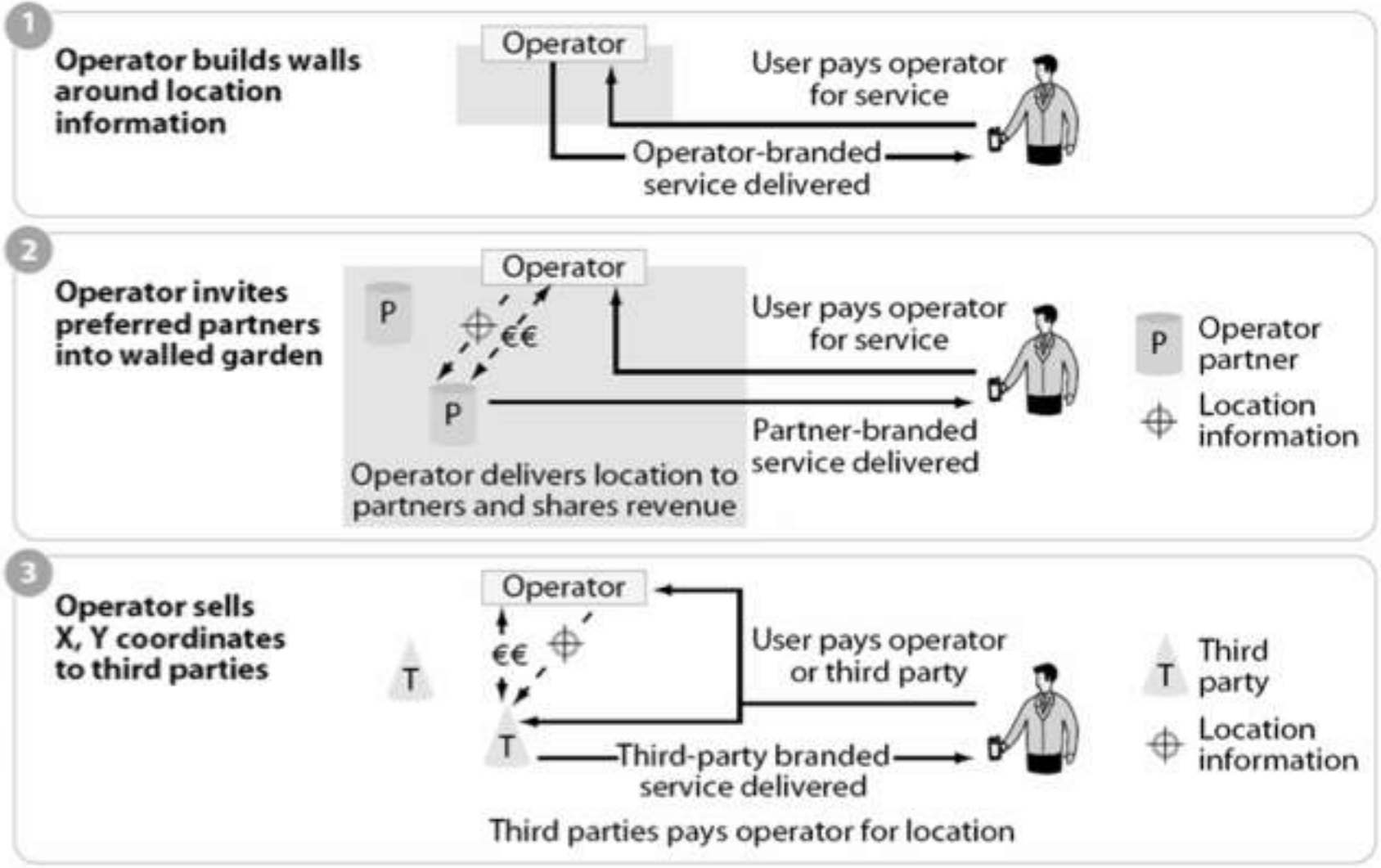
Options for the Mobile Network Operator (MNOs)



Source: Forrester Research, Inc.

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(3) Revenue and Revenue Models

Revenue models			
Subscription	**Single transaction**	**Advertisements**	**Miscellaneous**

Revenue types				
Direct			**Indirect**	
Utilisation dependent	Utilisation independent		Via enterprise	Via state
	One-time	regular		
Single transaction depending on quantity or period of use	e.g. connec-tion fee	e.g. subscrip-tion, (broad-cast) fee	e.g. advertisement, commission	Subsidisation

Target Groups and Revenue Models

Teenagers	Little money available	Advertisement-based revenue models
Students	Little money available	Advertisement-based revenue models and services of the university
Business people	Money but no time	Information on Demand based on single transactions, services to save time

[TimeLabs]

Sources of Revenue for Mobile Network Operators (MNOs) in M-Commerce

Data (from customer)

Pricing dependent on medium, time (CSD, HSCSD) or quantity (GPRS, UMTS)

Mobile Services (from customer)

Single transaction (Download of ringtone) or subscription (news-subscription)

Commission (from service provider)

Commission based on turnover

Foundation Services (from service provider)

For the messaging of SMS, MMS or ***access on location information***

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Requirements

Digital maps - Roads, rivers, cities etc.



Location-based content - e.g. position of friends, sights, banks etc.

Content (faces and lines)

Content (Points of Interest (POI))

Service initiation (at any place and any time)

Geographical information system
Mapping and editing

Service forwarding

Forms of transmission
Voice:
- Call Centre
- Voice dialogue systems

Text based:
- Short Message Service (SMS)
- Multimedia Messaging Service (MMS)
- Wireless Application Protocol (WAP)

Positioning (WGS84)

Network based
- Cell of Origin (Cell-ID)
- Time of Arrival (TOA)

Terminal based
- Enhanced Observed Time Difference (E-OTD)
- Global Positioning System (GPS)

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Geographical Information Systems

Mapping

Display of Points of Interest (POIs) in geographic context

Routing

Calculation of optimal routes from A to B considering different aspects (traffic, max. speed etc.)

Geo coding

Translation of addresses into geographic coordinates and vice versa

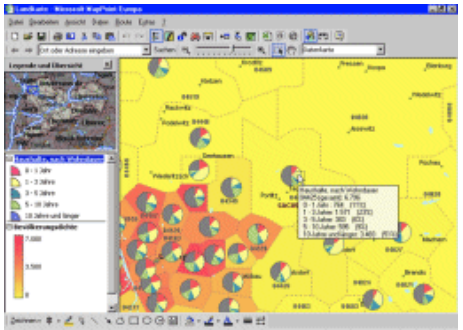
Digital Maps

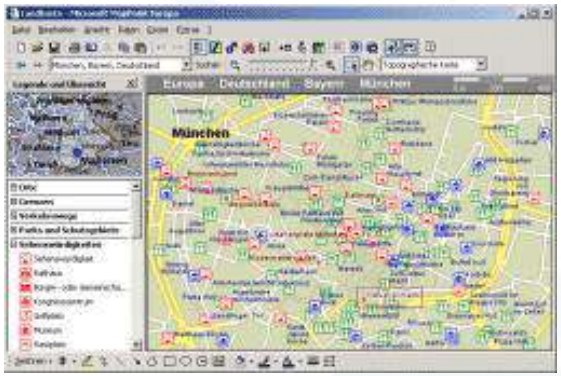
- Digital copy of the geographic reality
- Combination of geographic information (e.g. path of a road) and meta-data (e.g. highway, country road, street name etc.)
- Different „layers“ can be integrated into a purpose oriented combined map.
  - Roads
  - Buildings
  - Rivers

- Specialised providers for map maintenance, e.g. Navteq (owned by Nokia), Tele Atlas (integrated into TomTom), OpenStreetMap

Location-based Content

- Points-Of-Interest: positions of hotels, stores etc.
- Demographic data (via specific providers, e.g. Schober)
- Meta data can be derived from addresses via „Data-enrichment“
  - Rating of individual houses: type of building, address, neighbourhood etc.
  - Basic scores for e.g.:
    buying power, age group, social position, etc.





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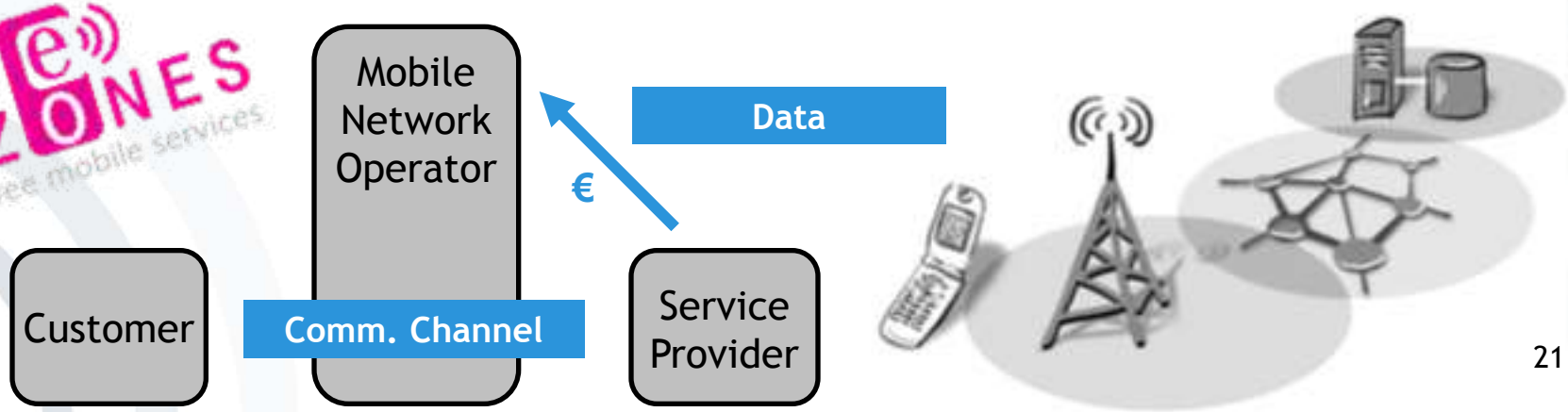
Advertisement-based Financing

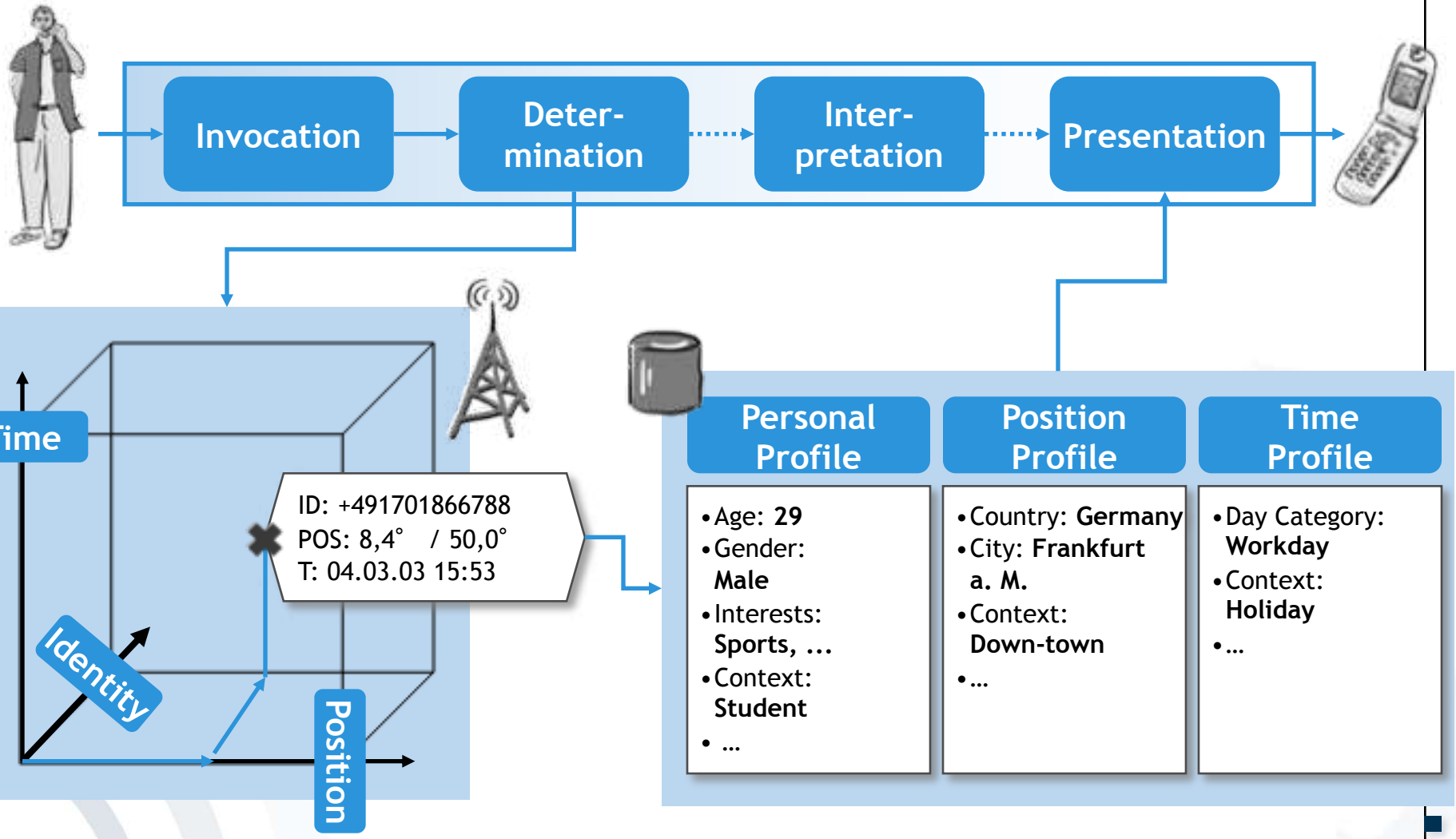
- Advertisement market
  - Market for advertising media in Germany: $340 **per person** in 2014, ca. $270 in 2001.
  - Mobile advertising spending in Germany is forecasted to increase from $225 millions in 2012 to $1.393 millions in 2016.
  - Mobile advertising and mobile marketing are a joint application area
- Earlier approaches hardly successful
  - GSM based media not attractive enough
  - Transfer of personal data to small/unknown enterprises necessary
- UMTS and the participation of established market players
  - mitigated trust problems
  - made the mobile channel usable for transmitting advertisements.

Developing a New Value Proposition

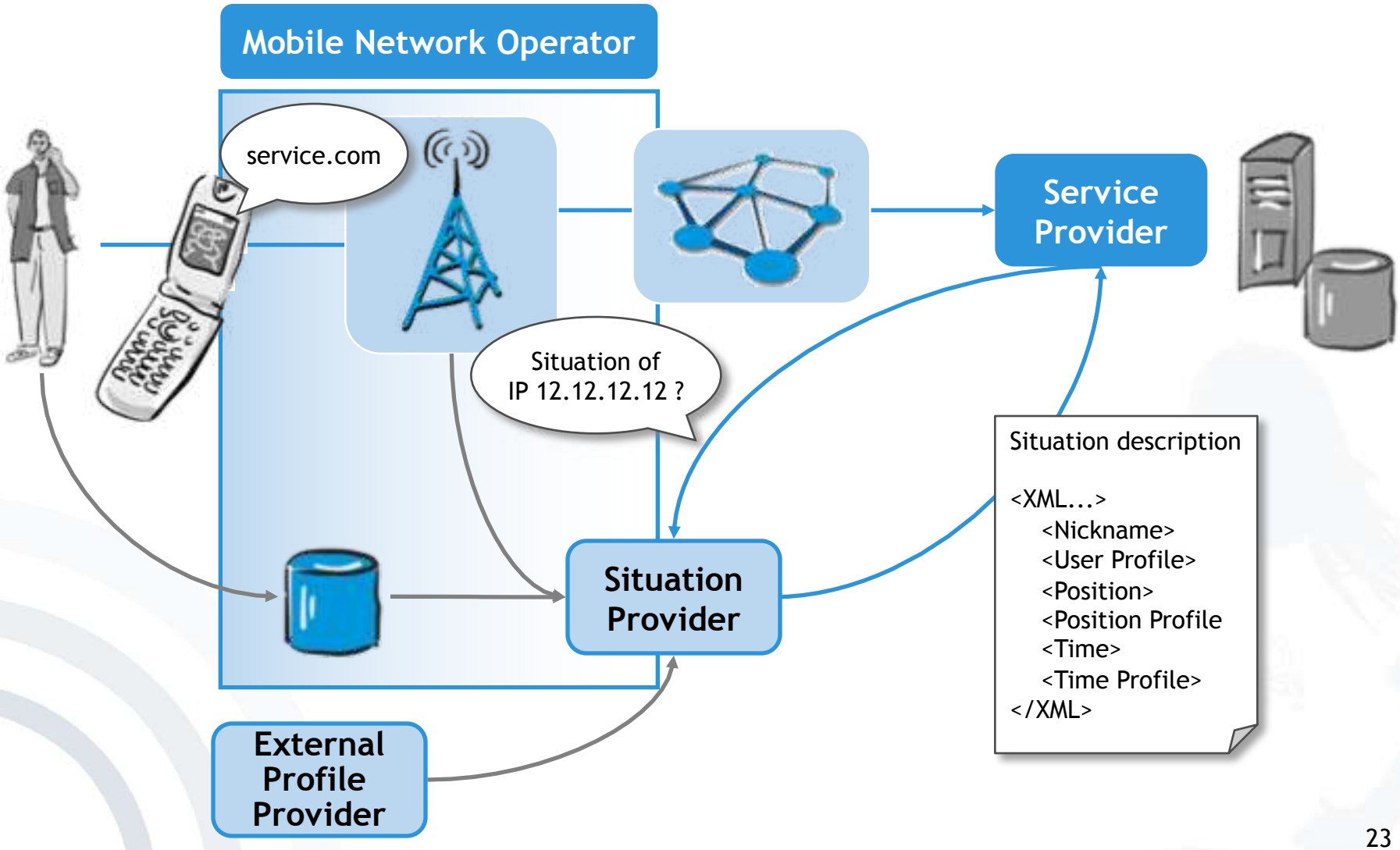
- **Potential:** Mobile network operators have a customer relation with more than 80% of the German population!
- **Offering:** Mobile network operators are providing service providers with a communication channel to potential customers.
- **Motivation:** Service providers gain higher, mobile initiated revenues in their business.
- **Objective:** Eliminating data costs for customers while making them marketing costs for service providers.



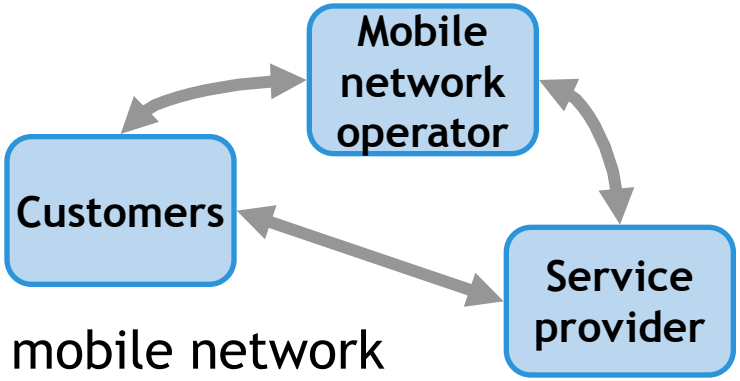
The “Situation Process”



Situation Dependency and its Technical Implementation

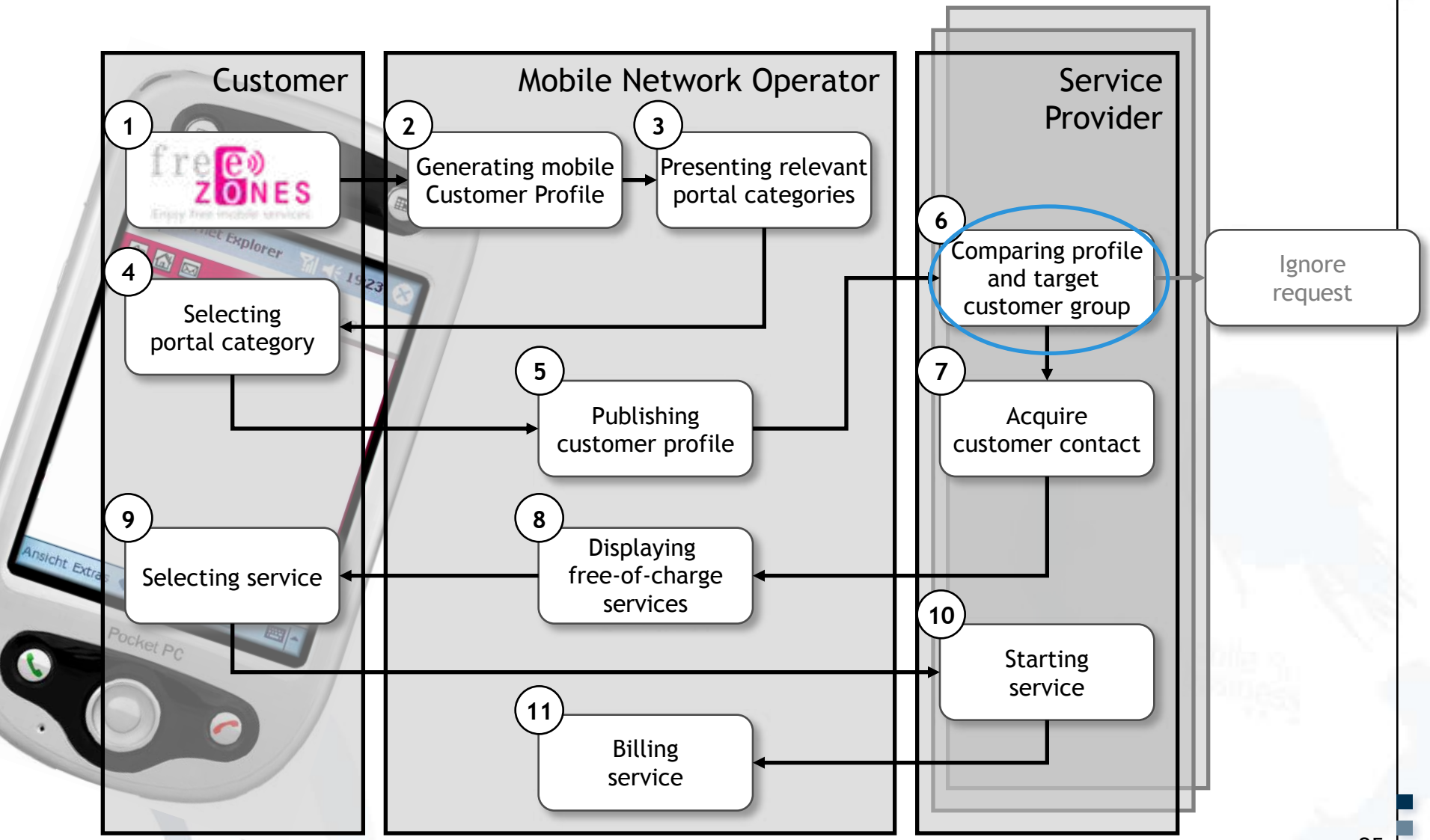


Multilateral Security



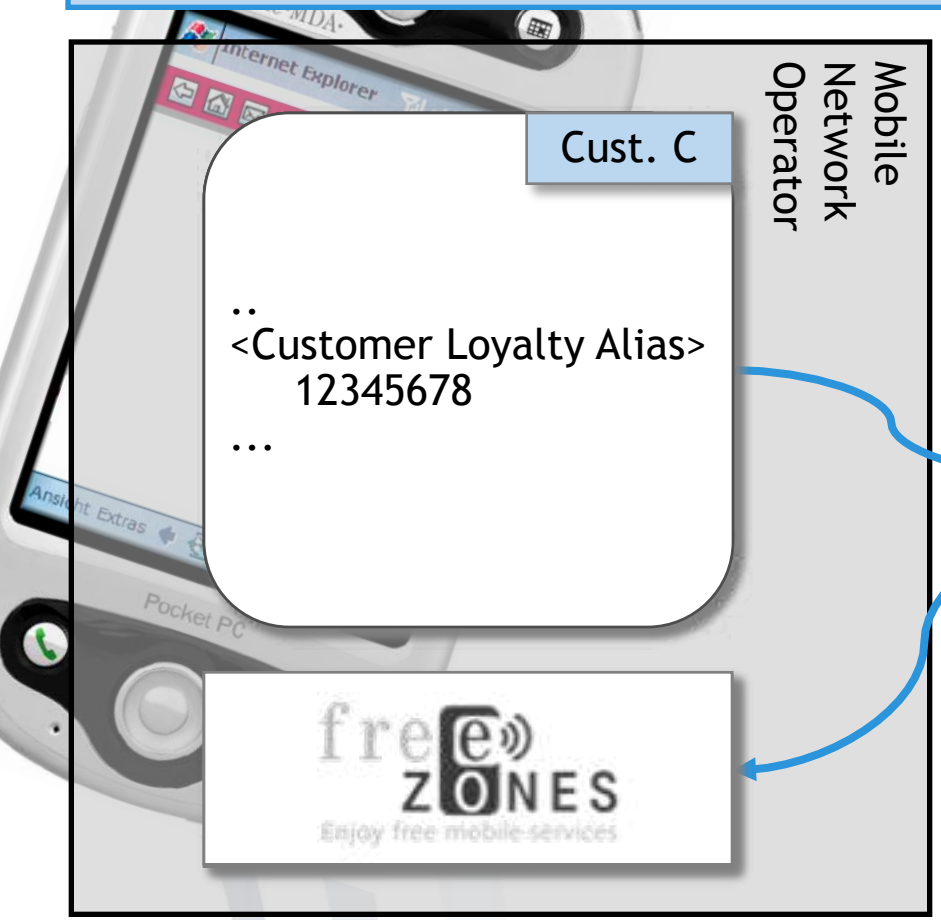
- Balancing of the security and information interests of
  - Customers
  - Mobile network operator
  - Service provider
- Interests of service providers and mobile network operators
  - Accessing and utilising of customers' personal data
- Why consider customers security interests?
  - Customers' trust and intensive use of the services
  - ➢ Investment buy-in and acceptance of continuous costs by service providers
  - ➢ Higher revenue for mobile network operators
- Precondition: mobile network operators provide self-administration of personal information to customers and service providers.

Dedicated Advertiser Location – Process Overview



Comparing Profile and Target Customer Group

- **Customer:** Selects portal category *Food & Meals*
- **Mobile Network Operator:** Generates customer profile and transfers it to relevant service providers (e. g. McDonalds, Coca-Cola etc.)
- **Service Provider (example):** McDonalds with branches in Berlin and Frankfurt



Mobile Network Operator

Cust. C

..
<Customer Loyalty Alias>
12345678
...

free ZONES
Enjoy free mobile services

Service Provider

...
<Age>
<Min>15</Min>
<Max>35</Max>
</Age>
<Location>
Berlin
</Location>
<Location>
Frankfurt
</Location>
<Temporal Context>
Night
</Temporal Context>
<Customer Loyalty Alias>
12345678
...

Mobile Multimedia as Advertising Medium

Example: Distribution of a 30-seconds commercial spot

Television - RTL

- CPT for a booking on a Saturday morning in the childrens' program of RTL: € 0,12
- CPT for a booking at a simulcast of a popular sports show at primetime: € 154,00
- **CPT: € 0,12 – 154,00**

Preset costs based on assumptions and statistical analyses

UMTS-Streaming

- Assumptions:
  - Resolution 128x96 Pixels (ITU H.261)
  - 15 frames/sec. in an MPEG4 coding
  - Mono Audio channel in a mp3 coding
  - Average necessary bandwidth 64 kbps
- 30 seconds x 64 kbps add up to 234 KB broadcasted data volume
- Current GPRS rate: € 0,20 per megabyte
- So the transmission costs € 0,0468
- **CPT: € 46,80**

Variable costs based on matching of Customer profiles

Not the same model, but related …

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Categories of LBS

Navigation:	• *Navigational Services*: Navigation on mobile phones. Some interactive information services; • *Tourism*: Spare-time services for non-daily environments.
Community:	• *Friend finder*: Social service with high lock-in; • *Dating*: Location-based partner discovery and dating; • *Price Finder:* e.g. for cheapest Gas Station
Security & Safety:	• *Safety & Emergency*: 112 localization, emergency tracking, disaster warnings; • *Law enforcement*: localization for law enforcement
Entertainment:	• *Games*: Mobile Gaming with location component.
Information:	• *Cultural information:* Information service for Location-based spare time planning; • *Financial Services:* Location-based services with local financial information and services. • *Medical Emergency Services*: Location in medical emergencies;

Based on [Fritsch and Muntermann 2005]

Former Navigation Services T-NaviGate

- GPS positioning
- Server-based route planning
- Transmission of the route
- Guiding via mobile phone
- Traffic jam update via GPRS/UMTS
- Since V 2.6 also pedestrian navigation

Former Navigation Services
T-NaviGate – Costs

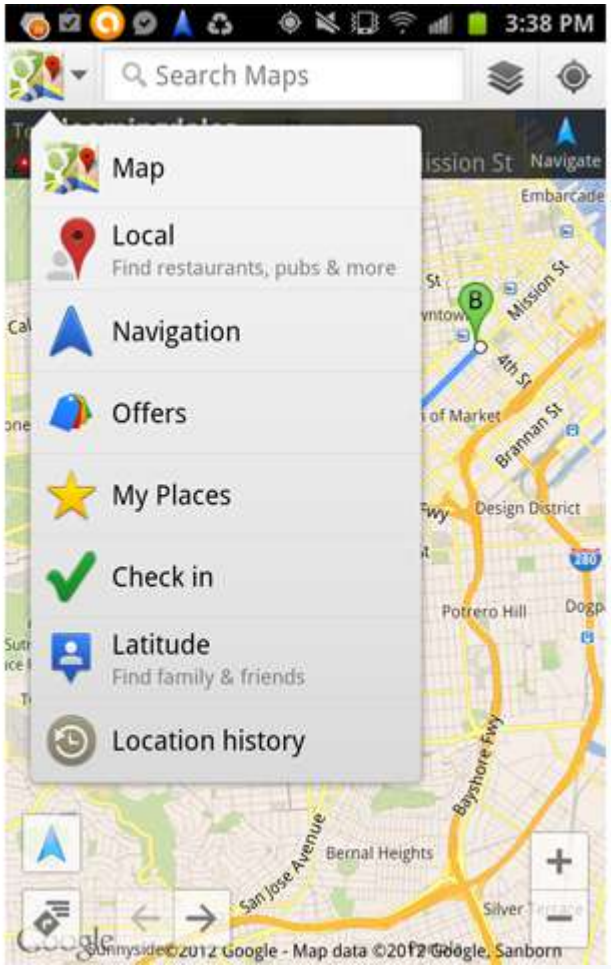
- Costs for standard mobile subscription and data service
- Costs for the NaviGate Service
  - Germany:
    - 0,99 € per day
    - 4,95 € per month
  - Europe: 2,99 € per day

More Recent Navigation Services
Navigon

- Navigon uses offline maps and GPS for navigation.
- No data connection required
- Business Models:
  - Navigon Select (Free for Deutsche Telekom customers)
    - D-A-CH local mobile map for Germany, Austria, Switzerland and Lechtenstein
  - Navigon Europe (79,99 €)
  - In-app purchases (traffic, 3D, etc.)

More Recent Navigation Services
Google Maps

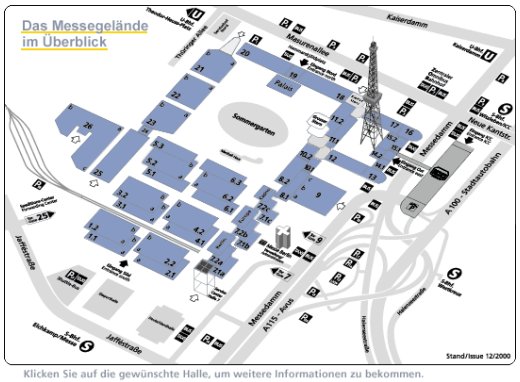
- Google Maps
  - Navigation based on GPS, online maps and traffic conditions
  - Data connectivity required
  - Traffic flow information based on the speed of other cars
- Business Models
  - Free app
  - Ad-financed

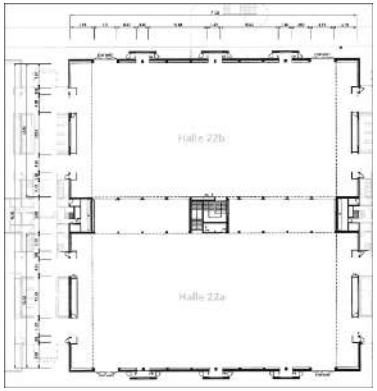


Navigation through Buildings

- Navigation in buildings, on fairs, in museums with PDA or smartphones
- **Two possible scenarios:**
  - Active Navigation (WLAN, Bluetooth)
  - Passive Navigation (QR-Codes)

Navigation through Buildings: Information on Different Levels





Territory plan
Index of exhibitors
Index of products
Newstickers for fairs

Plans of the hall
Subject areas
Forums
Hall-Newsticker

Stall plans
Exhibits
Corporate infos
URLs

Indoor Navigation
Active Indoor Navigation

Value added services with position sender (WLAN, Bluetooth)

free.wifi service

Indoor Navigation
Active Indoor Navigation

Advantages:

- Measuring customer flows and behavior at the POS / POI (e.g. length of stay or hotspots)
- Notification services
- Locating staff or equipment
- Recognition of customers

Disadvantages:

- WLAN of customers must be active
- WLAN Access Points needed

Indoor Navigation
Passive Indoor Navigation

- QR Codes are based at fixed locations.
- When the phone scans the QR Code it reveals the fixed user position to a service and thereby allows the delivery of location based content.

Indoor Navigation
Passive Indoor Navigation

- **Advantages:**
  - Low setup costs and cheap to run
  - Available without additional app
  - Sufficient for a rough positioning
- **Disadvantages:**
  - Only fixed locations
  - No measurement of customer flows or frequencies
  - Users must have a QR-Code reader

Services for Security/Safety

- Location identification during emergency calls via mobile phone in the USA and EU: E911 and E112
- Emergency Tracking
- Disaster Management
- Law Enforcement

USA: E911 Emergency Call Localization (1)

- Wireless Communications and Public Safety Act of 1999 (911 Act):

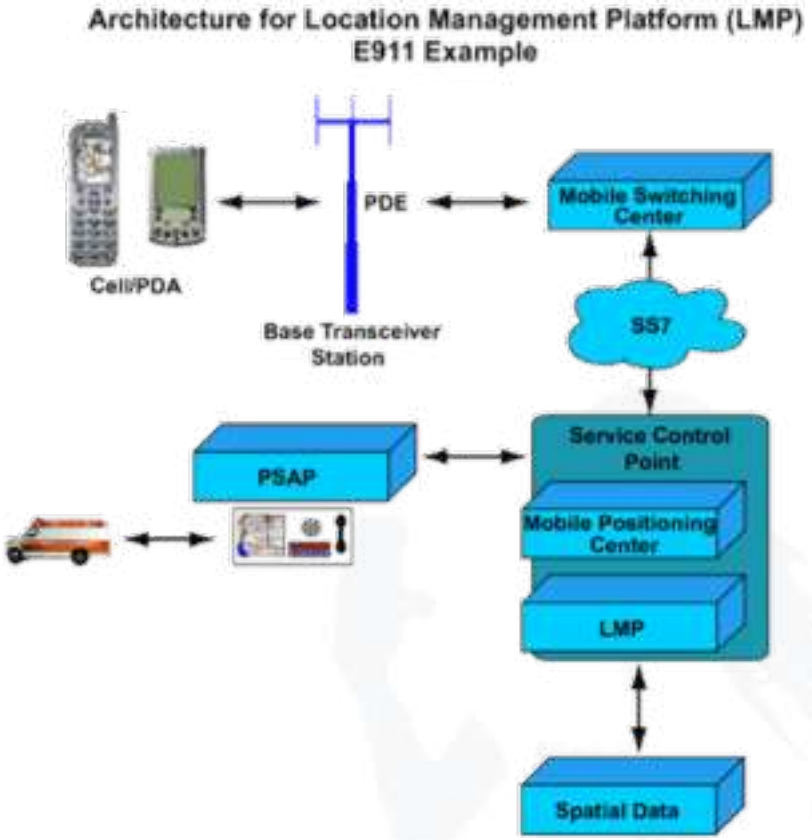
Improvement of 911- emergency calls and transfer of information about the location to control centers of all licensed mobile radio networks and other networks.

- 2 phases:
  - Phase 1, January 2004:
    Mobile radio operator delivers number and cell information to the control station
  - Phase 2, December 31st, 2005:
    All sold new mobile phones must possess localization technology; 100% of the network area / of the users must deliver information about the location.

USA: E911 Emergency Call Localization (2)

In this E911 example, the Mobile Positioning Center gathers location data from Position Determining Equipment located on the cell tower.

The Service Control Point uses the Location Management Platform to translate the location of the E911 call to the corresponding Public Safety Answering Point, ensuring that the emergency call is properly routed.



[Source: www.mapinfo.com]

EU: E112 (1) eCall

- eCall (short for emergency call) is an emergency call system for motor vehicles planned by the European Union as a project of the eSafety initiative.
- Its purpose is to rapidly initiate rescue measures to reduce the number of road deaths and reduce the severity of injuries in road traffic.
- eCall will be available to all citizens free of charge.

[Source: http://ec.europa.eu/digital-agenda/en/ecall-time-saved-lives-saved]

EU: E112 (2)
eCall – Timeline

- The concept of eCall was presented in 1999 by European civil servant Luc Tytgat, at the launching of the Galileo project, by the European Commission.
- In 2007, the project was delayed.
- In 2011, the project was pushed again by the European Commission.
- In the summer of 2013 the project was adopted and the corresponding Regulation (EU) 2015/758 was published on May 19, 2015.
- The eCall infrastructure was made available on October 1, 2017.
- The system is mandatory for all new models of cars and light commercial vehicles as of April 2018.
- E.g. BMW, Volvo and PSA have had SOS systems even prior 2018.

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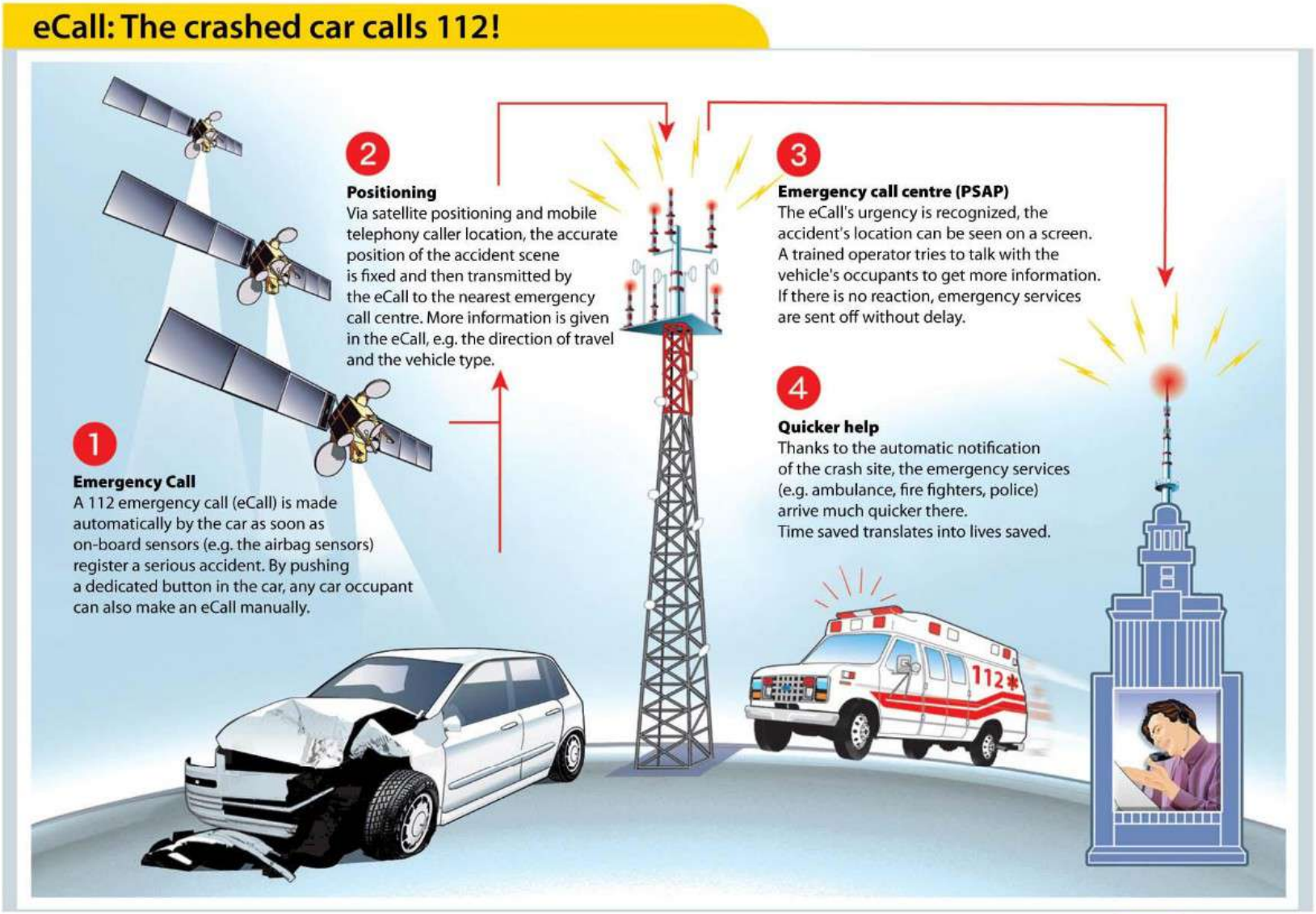
EU: 112 (3) eCall



[Source: http://ec.europa.eu/digital-agenda/en/ecall-time-saved-lives-saved]

EU: E112 (4)

- Differentiation between traffic information and location information
- Explicit consent and right of withdrawal of the users with commercial localization services
- Emergency calls get location information without consent, partly still incompletely defined.
- Many technical and legal questions are still open: Europe-wide roaming, differences in national data protection, compatibility of locating techniques, MNO spanning location information exchange, compatibility of the technology in emergency call centres.

EU: Commercial eCall Alternative

eCall-Alternative

Versicherer starten eigenes Notruf-System

16. März 2016

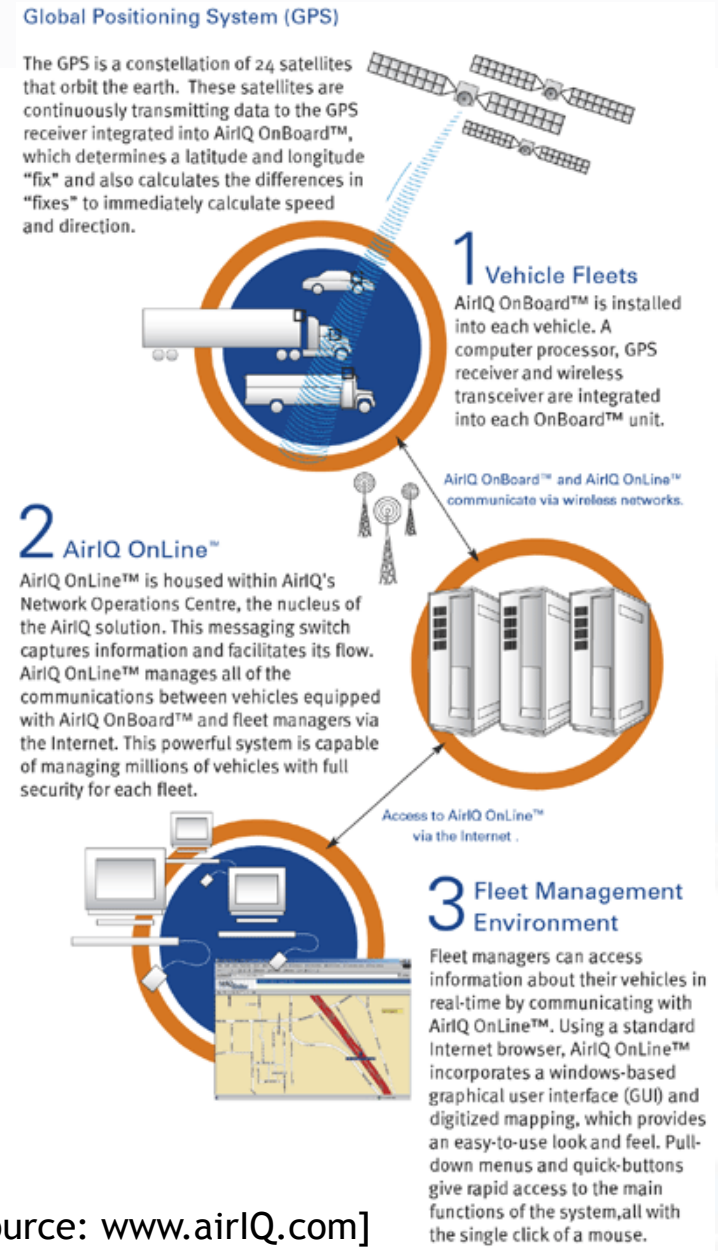
Die deutschen KfZ-Versicher bringen ein Konkurrenzsystem zum eCall auf den Markt. Bild: GDV

- Operated by a service firm of the GDV (Gesamtverband der Deutschen Versicherungswirtschaft) and offered by car insurance companies
- Car adapter (12V) that recognizes the collision and its impact
- If collision is registered, smartphone app gets the information and shares it with the emergency call center (including last location and direction of drive).

See: http://www.car-it.com/versicherer-starten-eigenes-notruf-system/id-0045556 and http://www.versicherungsmagazin.de/Aktuell/Nachrichten/195/22307/Assekuranz-plant-Einstieg-in-neues-Geschaeftsfeld.html

Driver Control

- Car renter ACME equips cars with GPS & GSM.
- $150 contract penalty on speed limit violation.
- Model for the state-run driver control?
- Commercial utilization of the traces?



[Source: www.airIQ.com]

Child Watch (1)

- Children have GSM-GPS system on wrist.
- Price: 199,99 US$
- Example Service Plan: „Liberty“ (19.95 US$ / Year > 4 free calls, any further call 15 US$, 3 free positioning, additional ones 0,95 US$)

www.wherifywireless.com/corp_home.htm

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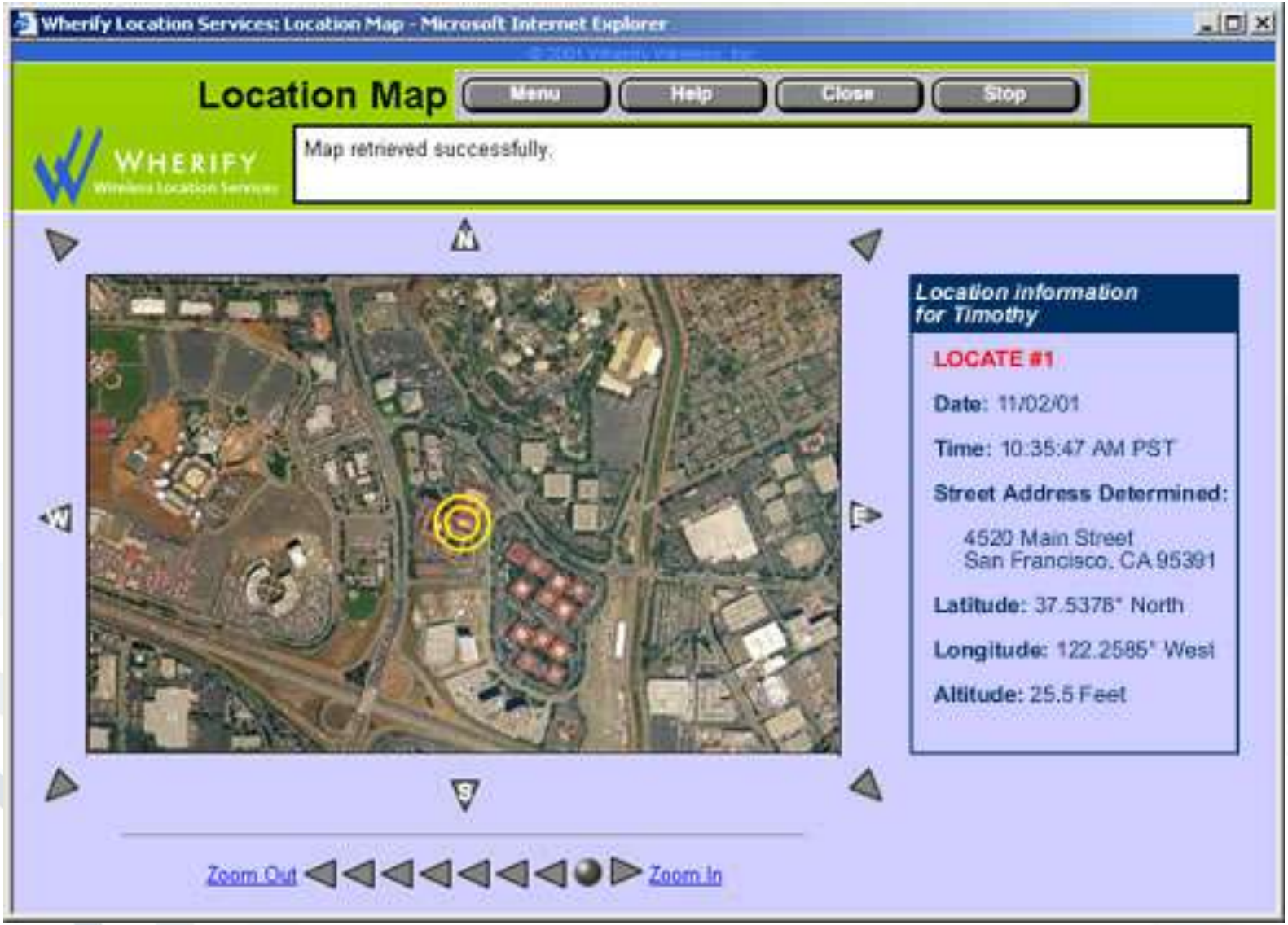
Child Watch (2)



German Corona-Warn-App

- German Corona-Warn-App launched in June 2020
- Technical architecture (centralised versus decentralised) fiercely debated prior to launch
- As a result, it is now one of the most privacy respecting tracing apps.
- April 2021: new features announced

1) Results of rapid antigen tests (“Schnelltests”) are directly insertable.

2) “Event function” for restaurants, bars, etc. (similar to the Luca-App)

Former Dating Services
T-Mobile-SMS-Dating

T-Mobile

English Warenkorb Hilf

Aktionen & Aktuelles | Handys & Shop | Tarife & Optionen | So funktioniert | Klingeltöne & mehr | Mein T-Mobile

> Home > So funktioniert > Mobil ins Internet > Dating & Chat

- Mein Handy
- MMS & SMS
- Mobil ins Internet
  - per Handy
  - zu Hause
  - per Laptop
  - Mobiles Web 2.0
  - MobileTV
  - Dating & Chat
  - Banking
  - mehr Speed
- t-zones
- E-Mail
- Navigation
- Telefonieren...
- Mobilbox
- Hilfe rund ums Handy
- T-Mobile Vertrag
- Prepaid mit Xtra
- HotSpot
- Netzqualität & Technik
- T-Mobile Widget

Dating & Chat - So funktioniert es

Dating per Handy | per MDA/Sidekick

Mobile Dating findet Leute, die zusammen gehören.

Gesucht: ein Partner für ein romantisches Date, die richtigen Leute für das nächste Konzert oder der Gegner auf Augenhöhe für den Squash-Court. Gefunden! Mit Mobile Dating.

Und das geht so:

t zones

Geben Sie in t-zones unter "Meine Profile" Ihre persönlichen Daten und die gewünschten Eigenschaften des Partners ein. Sobald Mobile Dating jemand passenden gefunden hat, erhalten Sie eine SMS.

Beantworten Sie diese Matching-SMS und starten Sie einen SMS-Chat mit Ihrem Partner - natürlich anonym und per Nickname. Jetzt können Sie sich verabreden. Sollte der Kontakt nicht Ihren Vorstellungen entsprechen, sperren Sie unter "Meine Dates" einfach diejenigen Nicknames, von denen Sie keine weiteren Nachrichten mehr erhalten möchten.

Per SMS-Chat mit alten Freunden chatten und neue Freunde finden!
Auch das geht. Einfach Chat-Kanal abonnieren - oder selbst einen Chat-Kanal anlegen - Nickname festlegen und los geht's. Hier geht es zum SMS Chat. Eine Chat SMS kostet 0,29 €. Für alle weiteren SMS, wie z.B. Hilfe, Anmeldung und Verwaltung des Dienstes werden die im gebuchten Tarif üblichen SMS-Preise für netzinterne SMS abgerechnet.

Mobile Dating
Jetzt anmelden

- Weitere Informationen
- Handy-Berater
- Lexikon
- FAQ

Former Dating Services
T-Mobile-SMS-Dating

- **Matching-SMS**
  - Informs about matching dating partners
  - Contains nickname, sex, age, zip code and flirt text of the partner.
- **Chat-SMS**
  - Via a chat-SMS one can contact a dating partner directly and anonymously.

Former Dating Services
T-Mobile-SMS-Dating

- Matching-SMS **0,19 Euro**
- Chat over GSM/GPRS connection
- Forwarding into SMS album **0,19 Euro**

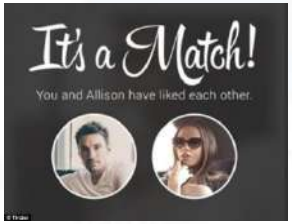
- Notice: Matching-SMS are generated by the dating system, so costs are generated for actions initialised externally.
  Location matching is made via zip codes.

More Recent Dating Services
Tinder

- Using Facebook Connect allows Tinder to access basic profile information about users (e.g. picture, age, name).
- During the initial state only the pictures of users are provided. By swiping left or right the user decides whether he likes the picture or not.
- Only after both users have classified the picture of each other as attractive, profile data will be exchanged and chat will be possible.
- To optimize dating proposals, location data plays a major role. Tinder uses GPS to propose only people in a radius of the user's choice (e.g. 50 km).

More Recent Dating Services
Tinder – Business Model

- Since 2012 Tinder is available as free app.
- In March 2015 the service was transformed into a **freemium business model:**
  - Number of likes has been limited (additional likes can be acquired with in app purchases).
  - Tinder Plus allows users to change their location manually (user input instead of GPS), as well as change their geographic location.
  - Tinder Gold additionally lists received likes, for a significantly higher price.



Former Friend Locators
Mobiloco Buddy Alert

MOBILOCO

Login

Vorwahl

Handynummer

Passwort

OK

Passwort vergessen?

ANMELDUNG

MOBILOCO
Buddy Alert.

Jetzt anmelden!

BUDDY ALERT | **DATE MAKER** | **MOBILE MARKET** | **SERVICE**

Sind deine Freunde in Nähe?

Mit dem Buddy Alert fragst du per Handy ab, ob deine Freunde in der Nähe sind. Funktioniert mit jedem Handy, einfach per SMS. Du kannst einzelne Freunde sowie Gruppen mit bis zu vier Mitgliedern lokalisieren.

In der City beim Shoppen oder abends auf der Piste: Der Buddy Alert sagt dir, welche Freunde in deiner Nähe sind. Auch praktisch: zu wissen, wie weit die Freunde entfernt sind, während du an einem Treffpunkt wartest...

Der Buddy Alert funktioniert netzübergreifend, bei Vodafone D2 und o2. Als Vodafone-Kunde kannst du also auch Freunde bei o2 orten und umgekehrt. In Kürze werden auch die übrigen deutschen Netzbetreiber angeschlossen.

Den MOBILOCO Buddy Alert kannst du per Abo oder per Einzelkauf nutzen. Beim Abonnement zahlst du eine Gebühr von nur 2,99 €/Monat. Dafür hast du monatlich fünf Einzelabfragen und fünf Gruppenabfragen frei, um bis zu 25 Freunde zu lokalisieren. Weitere Abfragen kannst du jederzeit online erwerben. Wenn deine Freunde dich orten, informieren wir dich kostenlos. Das Abo hat keine Mindestlaufzeit, du kannst es jeweils zum Monatsende kündigen. **Jetzt anmelden!**

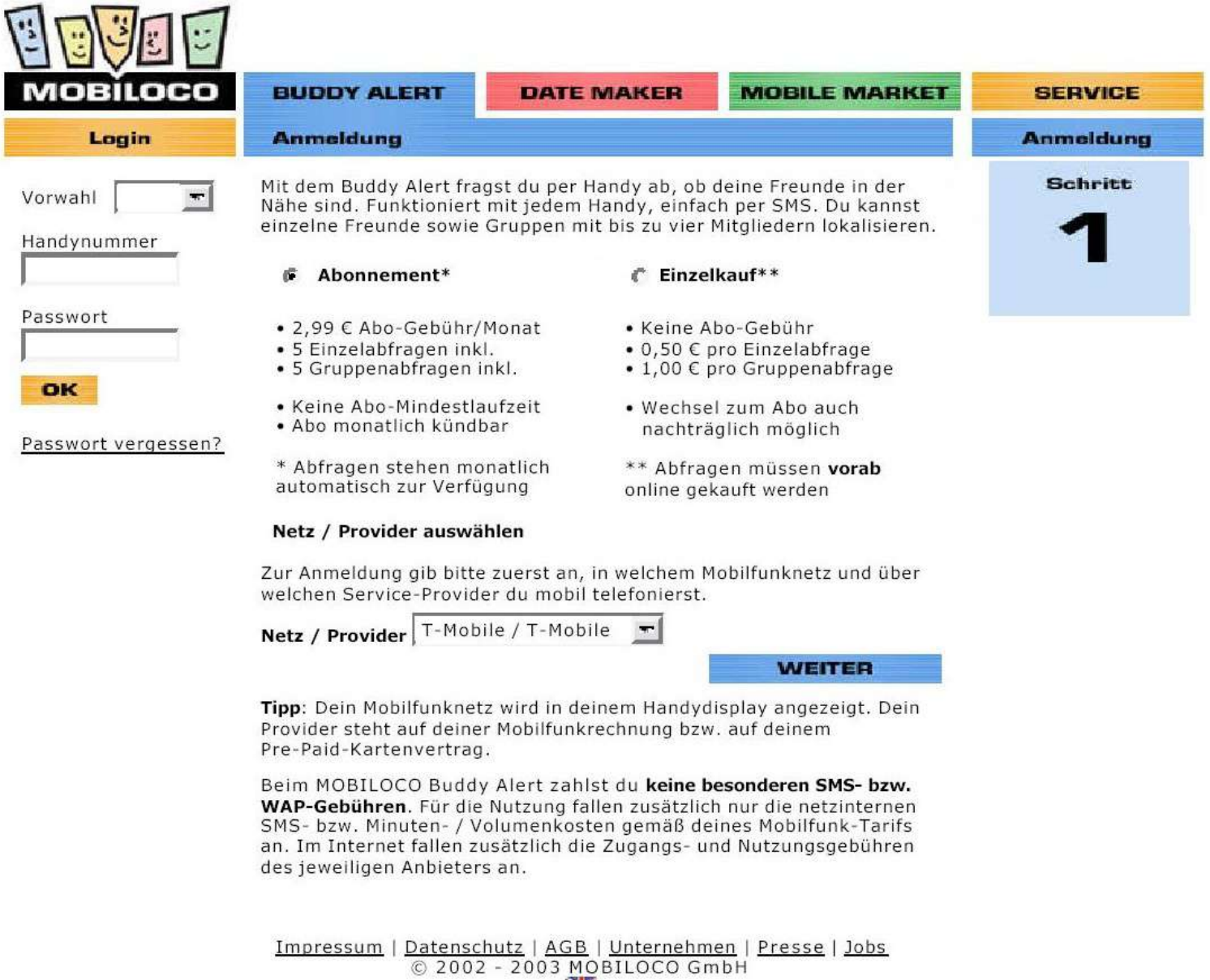
Aktuelles

Bonus-Programm: 10 Abfragen gratis!

Mobile E-Mail: Jetzt auch für dein Handy

DER FILM

Former Friend Locators
Mobiloco Buddy Alert

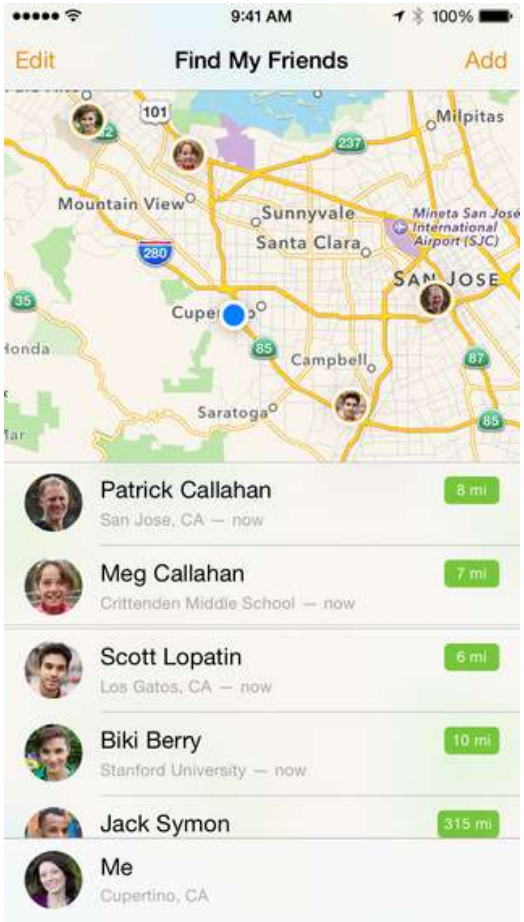


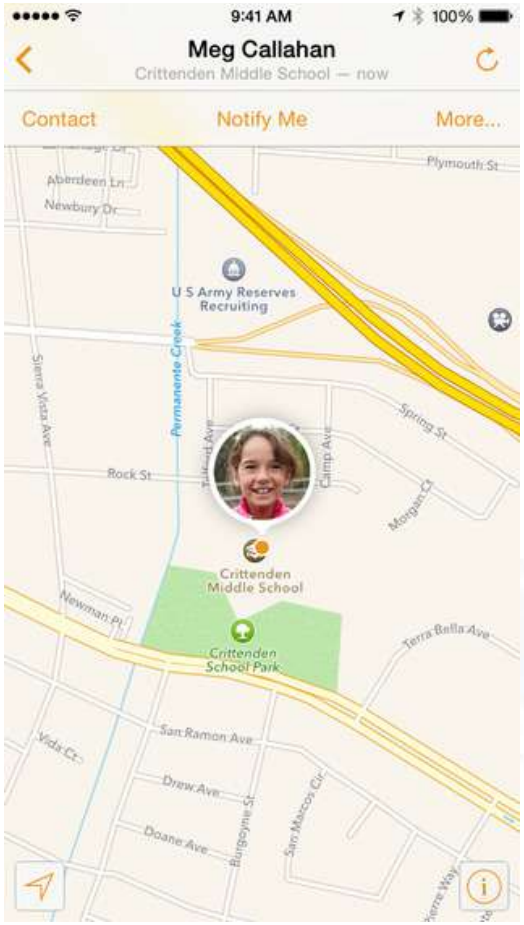
mobile business

More Recent Friend Locators
Apple Find My Friends

Find My Friends allows to locate, share and track locations of friends and family members

Business Model:
- Free app





[Sources: iTunes "Find my friends"]

More Recent Friend Locators
Life360

Life360 allows to locate, share and track locations of friends and family members with more functionalities

Business Model:

- Life360 operates as a freemium app
- Users can pay for extra features per month.

[Sources: iTunes "Life360"]

Taxi apps

FREENOW

- Several apps for calling taxis
- FREE NOW (previously mytaxi) – available in several countries
  - Search taxis nearby
  - Estimate the price for the route
  - “Slide-to-pay” mobile payment also possible
  - Bill sent to customer’s email
  - Customer pays nothing extra
- Development of the business/price model:
  - Fixed fee: driver pays 0.79 € per fare.
  - Possible to leave tip for the driver (5%, 10%, or 15% – Driver pays an additional 0.21 € + 3.9% of the tip for the service.)
  - Expanded to offering rental cars with drivers in addition to taxis
  - Changed twice after an auction model had led to highly negative responses and false incentives
  - Then fee equal to 7% of the price of the fare
  - …

Uber

Uber is a car pick-up service that allows consumers to submit a trip request, which is routed to third parties that fulfil this request

- **Advantages:**
  - Hiring and payment is handled through Uber and not personally
  - Usually cheaper than competitors in the passenger transport sector
- **Disadvantages:**
  - In times of soaring demand, prices may rise above the level of competitors (surge pricing)
  - Privacy: Uber extensively collects data on its drivers and customers
- **Business Model:**
  - Dynamic pricing based on real-time demand and traffic
- **Current Status:**
  - Originally relied on private drivers that often drove without official authorization. This model was banned in Germany in March 2015
  - The new business model focuses on linking customers with professionally licensed drivers and fixed up-front pricing

[Source: https://de.wikipedia.org/wiki/Uber_(Unternehmen)]

Future of the Mobility Age II

After going public in May 2019, Uber has a total market capitalization of $50 billion as of April 2020

- Why is this company worth so much? (Valuation higher than national product of 60% of all nations worldwide, ranked before Croatia or Luxembourg)

  “When there’s no other dude in the car, the cost of taking an Uber anywhere becomes cheaper than owning a vehicle. So the magic there is, you basically bring the cost below the cost of ownership for everybody, and then car ownership goes away.” (Travis Kalanick, CEO Uber)

Future of the Mobility Age |II

This quote highlights the most important ideas:

1. Highest share of costs is for the drivers ("the other dude in the car")

2. Autonomously driving cars create the possibility to cut this cost

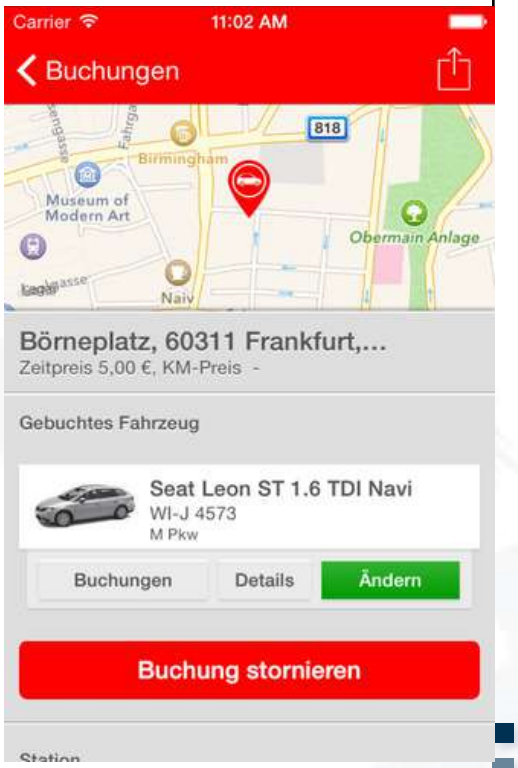
3. "Taking an Uber" (using the service) would be so cheap that it would not be beneficial to own a car on your own anymore (think about the devastating consequences on the German car manufacturers)

→ Uber's valuation is based on their knowledge about the driving behavior of millions of customers and their position in developing autonomous cars

(See also: http://zackkanter.com/2015/01/23/how-ubers-autonomous-cars-will-destroy-10-million-jobs-by-2025/)

Short-term rental of vehicles

- Car-sharing is a model of car rental where people rent cars for short periods of time.
- Example 1: ShareNow
  - A German car rental company, servicing > 15 European cities
  - Created from the merger of BMW-owned DriveNow and Daimler-owned car2go
  - Business model: charges per minute rate
  - A location-based system accessible form a smartphone app
  - Users can locate and reserve a car using the app.
- Example 2: Book-n-drive
  - Accessible through their location-based apps
  - Business model: charges per hour

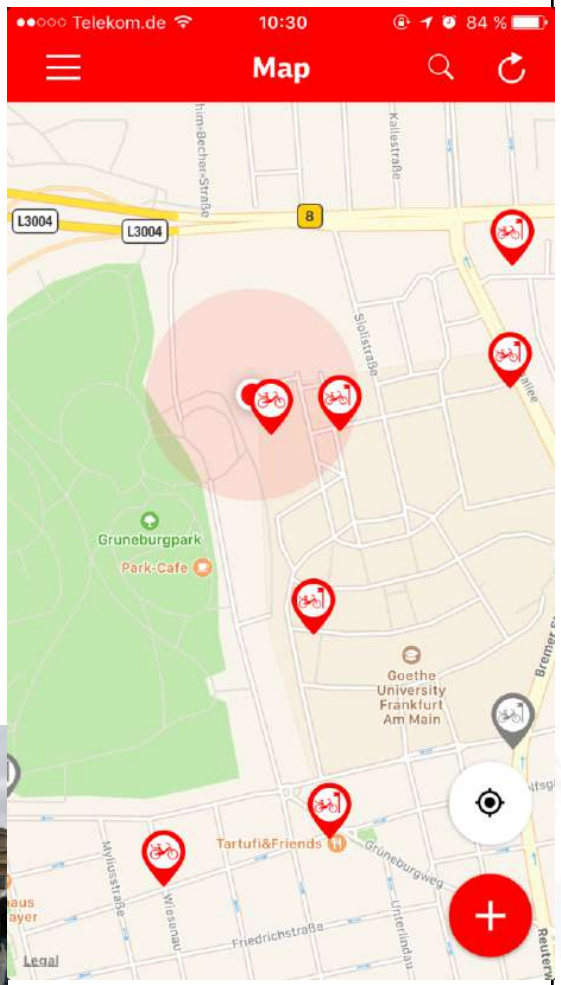


book-n-drive®
Carsharing

https://www.car2go.com/DE/en/
https://www.book-n-drive.de/unternehmen

Short-term bikes

- To rent bikes for a short period of time
- Example: Call a Bike from Deutsche Bahn (DB)
  - Accessible from the official app – called Call a Bike
  - The app locates the available bikes in the nearby based on GPS information.
  - Two available plans, with or without subscription:
    - No subscription: No flat fee, 1€ every 15 minutes (max. 9€/day)
    - Subsciption: 5.90€/month, 30 min/day free, then 1€ every 30 minutes
  - Three stages involved: hiring, locking temporarily and returning
- Other examples include
  - nextbike (1€ for 15 minutes)
  - Byke.de (defunct)
  - oBike (defunct)



Price Comparison Communities

clever-tanken.de

- Find the nearest gas station
- Based on community effort

Further (possible) services |1

- Payment via mobile phone
  - Ticketing for events
  - Location dependent payment
  - Mobile office with instruments for travel payment via mobile
- Information
  - Announcements on events
    - Promotions
    - Sales
    - Pollen warning
  - Catalogues at trade fairs
- Access control
  - Netflix policies based on location

Further (possible) services |2

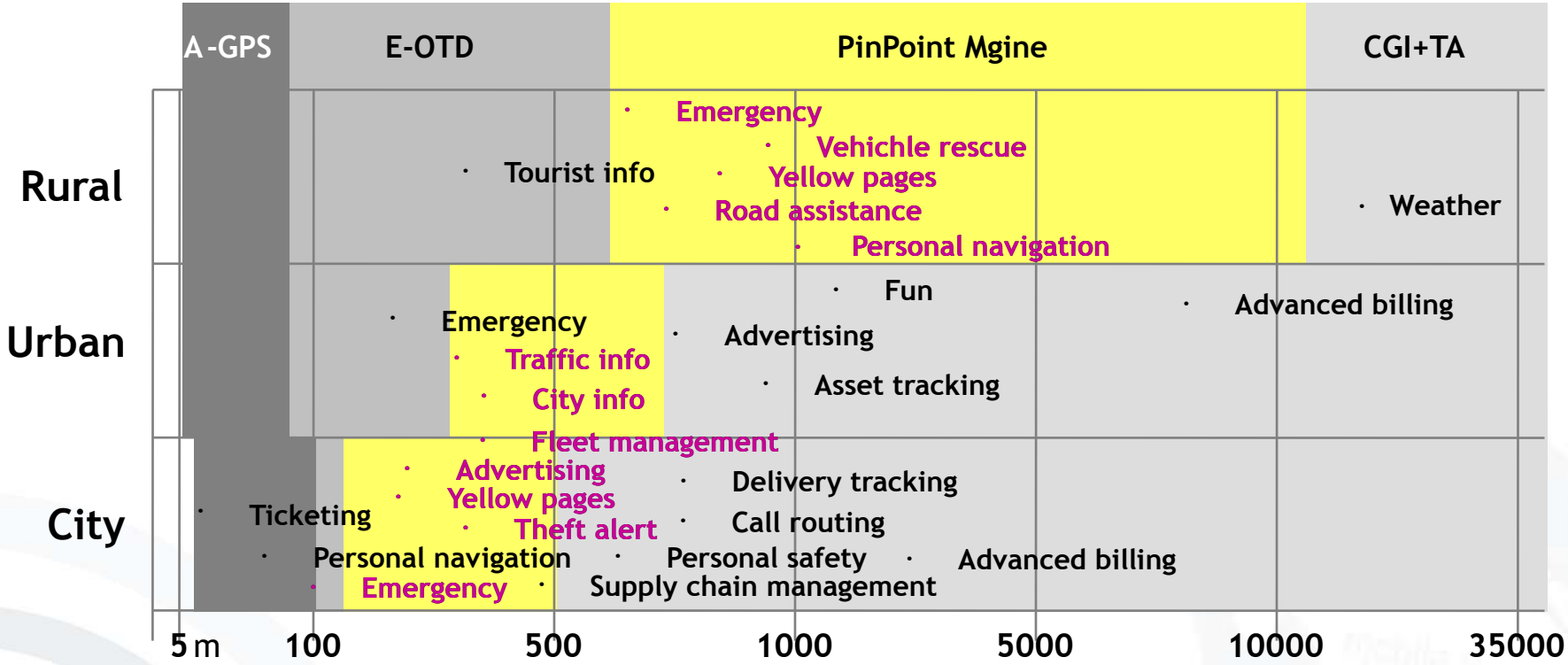
- Positioning
  - Naval management
  - Parcel tracing
  - Personal tracing
    - Child-Watch (e.g. integrated in toys)
    - Friend-Finder (Community)
    - Games (e.g. Gotcha)
    - Breakdown service
    - Prohibited areas

mobile business

Services and Precision

Application	Entry level accuracy requirements	Mass acceptance accuracy requirements	Customised device required?	Objective	Location frequency
Location Sensitive Billing	Cell/Sector	250m	No	Competitive Pricing	Originated calls, received calls, mid-call
Roadside Assistance	500m	125m	No	Send help	Originated calls
Mobile Yellow Pages	Cell/Sector	250m	No	What's near me?	Originated calls
Traffic information	Cell/Sector	Cell/Sector	No	What's traffic like?	Originated calls or every 5 min.
Location based messages	Cell/Sector	125m	Short message or data capable	Advertise, alert, inform	Originated calls or every 5 min.
Fleet tracking	Cell/Sector	30 - 125m	No	Resource management	Every 5 min. or on demand
Track packages	Cell/Sector	Cell/Sector	Yes	Locate and direct	On demand
Driving directions	125m	30m	No	Guidance	Every 5 sec.

Services and Precision



[Source: EMT]

Push vs. Pull

- Each service can be ordered both automatically and on demand.
- When and in which way do I want to get informed when I visit a certain location?
- Profiles vs. privacy

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