Munich, October 25, 2005

Convergence of Automobile and Media Industries in Telematics?

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Agenda
Münchener Kreis, October 25, 2005

- Study Approach
  - Use Scenarios
  - Key Questions and Core Problems
  - Outlook
**Initial Situation**

To some extent, the media and automotive industry share complementary goals in obtaining their individual strategic objectives.

### Telecommunication and media industries
- High investments in mobile broadband infrastructure
- Distribution of high-volume content through multiple distribution channels
- Eroding traditional revenue models through piracy and peer-to-peer
- Increasing importance of mobile media consumption
- Cooperation with non-media companies for generating additional data traffic (e.g. location-based services)

### Complementary goals
- Complementary incentives and assets
- Additional revenue potential
- Large customer base

### Automotive industry
- Price pressure and reduced margins in core business
- Declining opportunities for technological differentiation in core markets
  - Smaller time frames
  - Technological diffusion
- Strategic emphasis on downstream business\(^1\) as means of differentiation and sustainable revenue source

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1 Revenue generation after sale of new car; increasing customer loyalty through differentiating services
Study Structure and Expected Results
The study is set up to incorporate views and insights from different industries involved in telematics and is jointly executed by LMU and Mercer Management Consulting

Combination of different industry perspectives

<table>
<thead>
<tr>
<th>OEM perspective</th>
<th>Mercer Study</th>
<th>Expected results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premium segment</td>
<td></td>
<td>Overview and Classification of current telematic and infotainment service models</td>
</tr>
<tr>
<td>Mass market segment</td>
<td></td>
<td>Identification of strategic and organisational problems from the perspectives of different industries</td>
</tr>
</tbody>
</table>

| Device manufacturer perspective|              | Implications of new technologies |
| Navigation systems             |              | Options for future strategies and collaboration models |
| Mobile devices                 |              |                                |
| User interface / usability     |              |                                |

| Telecom perspective            |              |                                |
| Wireless broadband             |              |                                |
| WLAN operators                 |              |                                |
| Broadcasters                   |              |                                |

| Service / software provider perspective |              |                                |
| Telematic SP                    |              |                                |
| Online SP                       |              |                                |
| Integrated SP                   |              |                                |
| IBM                             |              |                                |

| Content industry perspective   |              |                                |
| Media conglomerates            |              |                                |
| Location based data & services |              |                                |
| Other Content Providers        |              |                                |
**Interviews**
In the study, 49 explorative expert interviews with 59 experts of 44 companies have been conducted.

**Interviews conducted according to main economic task**
(Total = 49)
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- Study Approach

Use Scenarios

- Key Questions and Core Problems
- Outlook
Imagine you buy a new car...
Buying process
If you have a limited budget and the choice between two alternatives...

VW Passat

- Trendline 2.0 FSI 110 kW 6-Gang base price: 25.450 €
- A/C automatic control: 390 €
- Park pilot: 495 €
- Retractable glass roof: 880 €
- Xenon lights with automatically controlled bend light: 1.210 €

| Subtotal | 28.425 € |

The decision

Budget: 30.000 €
Subtotal: 28.425 €
Rest: 1.575 €

1. Option:
- “Westwood" aluminium wheels, 235/45 R 17

2. Option:
- “Telematics package“: “…Automatic emergency call, if you can not ignite by yourself!“

Source: Interviews, Volkswagen AG
intermedia Projekt 2005
Service offering
...and one alternative is telematic services...

Example: GM Onstar

- Event Services:
  - Off-Board Navigation: 1,49 € /Route
  - On Star Assistant: 1,99 € /Call
  - Virtual Assistant: 0,29 € /Call

- Booking Services
  - eLogbook: 9,99 € /Month
  - Commuter: 4,99 € /Month
  - Organizer: 4,99 € /Month

- Emergency / breakdown call: 0 €

Device incl. fitment in new car: 1,500 €

Source: Interviews, General Motors Europe, Presentation of GM Representatives at Telematics Update 2004, Stuttgart
**Buying process**

...you are most likely not to choose it (congruent with the interests of the salesperson...!

**Selling process: VW Passat**

- Trendline 2.0 FSI 110 kW
  6-Gang base price: 25,450 €
- A/C automatic control: 390 €
- Park pilot 495 €
- Retractable glass roof 880 €
- Xenon lights with automatically controlled bend light 1,210 €

**Subtotal** 28,425 €

**The decision**

![Pie chart showing budget and subtotal]

- **Budget:** 30,000 €
- **Subtotal:** 28,425 €
- **Rest:** 1,575 €

1. **Option:**
   - „Westwood“ aluminium wheels, 235/45 R 17
   - 1,385 €

2. **Option:**
   - „Telematics package“
   - „...Automatic emergency call, if you can’t ignite yourself!“
   - 1,500 €

Source: Interviews, Volkswagen AG
Traffic Jam
Basic traffic services in Germany may lack performance, but are free of charge

Technology shortcomings before...
- Traffic jam announced too late
- Traffic jam information inaccurate
- No information for cities and smaller roads

..and after the traffic jam
- End of traffic jam not announced (correctly)
- Traffic jam information for most individuals useless

Status Quo Technology
- Standard: RDS/TMC-based message channel
- About 36,000 actively used control points across Germany
- Low bandwidth
- No signal for dissolved traffic jams
- DAB hardly disseminated
- No control points in city centres and smaller roads

But at least, it is free!

Source: Interviews

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**Line-fitted Devices and Substitutes**
There are several options for line-fitted devices available at comparatively low cost.

**Line Fitment**
- **Premium Models**
  - >1.000€ / pc as option

**Aftermarket**
- **Luxury class – upper middle class**
  - 400-1.000€ / pc

**PDA**
- **Middle class – Sub class**
  - 300-450€ / pc
- Navigation as supplementary functionality

**Price Correlation**

Source: Interviews, AutoConnect

**intermedia** Projekt 2005

Institut für Information, Organisation und Management
**Industry Status in Germany**

The industry players have not achieved in developing their services into a mass market.

**German Telematics and Infotainment Industry: Installed base (2003)**

- **Car park Germany**: ~ 40 Mio.
- **Onboard TV**: 5%
- **Rear Seat Entertainment**: ~ 2,0 Mio. Vehicles
- **E-Call**:

Source: Interviews, VDA, PriceWaterhouseCoopers, Just-Auto.com, Estimates

*intermedia Projekt 2005*

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Diffusion of Telematic Services
The first wave of telematics in Germany is over

Expected and Actual Diffusion of Telematic Services in Germany

Diffusion

Expected Diffusion

No Critical Mass

No Long-term Service Value

Slow Start

Actual Diffusion

Source: Interviews

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Institut für Information, Organisation und Management
### Service offering from 2000 to today

**Telematics: a success story?**

<table>
<thead>
<tr>
<th>OEM</th>
<th>Offering 2000¹</th>
<th>Current status¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audi / VW</td>
<td>E-Call, B-Call, Off board Navigation, Telephony</td>
<td>Abandoned 2003</td>
</tr>
<tr>
<td>BMW</td>
<td>E-Call, B-Call, Internet Access, E-Mail Access</td>
<td>Ongoing</td>
</tr>
<tr>
<td>DaimlerChrysler</td>
<td>E-Call, B-Call, Internet Access, E-Mail Access</td>
<td>Abandoned 2004</td>
</tr>
<tr>
<td>Ford Europe</td>
<td>E-Call, B-Call, Internet Access, E-Mail Access, Traffic Info, Driver’s Log</td>
<td>Abandoned 2001</td>
</tr>
<tr>
<td>Opel</td>
<td>Telephony, E-Call, B-Call, Traffic Information</td>
<td>Abandoned 2005</td>
</tr>
</tbody>
</table>

1. Does only include „premium“ services beyond on-board navigation

Only „traditional“ Onboard-Navigation successful to date

Source: Interviews, Company Information
Intermediate conclusion (1)

Client view

1. The term „Telematics“ is very vaguely defined and hard to explain to outsiders
2. The selling process of telematic services is subject to systematic biases
3. Telematic services are currently very expensive and generate only minor additional value from a client’s perspective
4. Substitutes exist for some qualitatively advanced service offerings free of charge (in Germany)
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Key Questions and Core Problems

- Outlook
Classification of services
Telematic, Infotainment and base Services can be segmented in eight clusters

- **Telematic** (car / driving related)
  - Safety
    - Emergency Call
    - Breakdown call
  - Car Services
    - Remote Diagnostics
    - Software Updates
    - Fleet management
  - Navigation / Localization
    - Navigation
    - Traffic Information
    - Travel Guide / POI
    - Location-based services

- **Infotainment** (related to consumption of media content)
  - Video-Entertainment
    - Onboard TV
    - Movies (DVD, download)
    - Games
  - Audio-Entertainment
    - Radio (analog / digital)
    - Music consumption via CD, MP3

- **Insurance Services**
  - Driver Monitoring
  - Anti-Theft

- **Office + Information**
  - E-Mail
  - News feeds

- **Base Services**
  - Telephone
  - Internet Access
Telematic and infotainment value chain
Featuring an overwhelming complexity, the telematic and infotainment value chain comprises a wide number of heterogeneous companies in at least 13 industry clusters.
Proprietary interfaces and Conflict of Interest

The lack of standards and the Automotive OEMs’ aim to control the value chain led to significant conflicts of interest. The self-confidence of OEMs and NOs\(^1\) often posed a cultural burden on cooperation.

Telematic value chain

“OEMs wanted to control the value chain as they thought telematics would be differentiating. They know better today.”\(^2\)
– Service Provider –

“The OEM is our most important partner.”\(^2\)
– Supplier –

“Network operators are really arrogant!”\(^2\)
– OEM –

“Silo” No. 1

“Silo” No. 2

“Automotive OEMs are hard to work with.”\(^2\)
– Network Operator –

“Service Provider”

“Content Provider”

“Supplier”

“OEM”

“Network Operator”

Source: Interviews 1 Network Operators
2 COMMENT: Selected quotations from various interviews. Majority of quotations does not stem from companies whose labels are indicated on this page. Labels on this page have only an illustrative function.
Dependencies of players in the industry

Network operators and OEMs are dominant in the industry, with the OEM being more dependent on the operator than vice versa.

Independence of company clusters

Source: Interviews

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Causes Explaining Market Failure
Lack of standards is the single most important reason for the slow and stagnating diffusion of new services

Reasons mentioned for failure of Telematics

- “Clients were not willing to pay for the services offered”
- “Revenue models were flawed”
- “The services offered had no value.”
- “Would you pay for services you can get for free on your mobile?”
- “People were not used to Telematics and Infotainment in the car”
- “People had no idea about what they were about to buy”
- “At the POS, the sales person had no competence or willingness to explain and sell Telematic services”

Underlying Forces

- “Lack of standards”
- Other

In the following focus on the issue “standards”

Source: Interviews

1 Point of Sales

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Standard platforms
The key issue is generating an actual standard platform for in-car media content processing. There are a couple of options available

De-facto candidates

Siemens TLA
- Announced 2004
- Cooperation with BMW
- “Open platform”

Infineon
- Announced 2004
- Cooperation with VW

Microsoft
- Announced 2004
- Cooperation with Fiat

Delphi
- Announced 2004

Industry candidates

AUTOSAR
- Industry standard
- Worked on since 2002
- Supported by most OEMs

GST
- Industry standard
- Worked on since 2002
- “… lacks support …”

Commitment of more than one OEM needed! White label approach by VW, BMW, Audi and DaimlerChrysler abandoned

- “… overengineered …”
- “… not hardware – we need standardized services!”

- “… is slowly evolving … might come too late”
- “… lacks support …”

Source: Interviews
The prisoners dilemma in Telematics

Multi-Person Prisoners’ Dilemma (MPD)

- Automotive OEMs and Suppliers could solve the problem if they formed an alliance
- However, both parties profit from the current situation
  - OEMs earn tremendous profits on options (i.e. line-fitted navigation systems)
  - The suppliers’ business models are aligned to incompatibility (engineering effort)

...but:

- All interviewees agreed that everybody would probably be better off if a standard existed
- There is a second mover advantage – the pioneer bears the most cost
- No one wants to move first and risk a „second desaster“

This situation is a typical one for converging markets
Resolving the prisoners dilemma through external shocks
Handheld integration and the emergence of a new middleware entrant are two non-excluding scenarios which could lead to the dissolution of the prisoners dilemma.

Scenario 1: Handhelds entering the market
- PDA navigation system sales have doubled in the last 12 months
- Good functionality of offboard solutions at affordable prices
- Handheld navigation meets demands of drivers of cars in the A – D segments
- Further diffusion of handheld navigation expected through smart phones
- Non-premium OEMs will offer seamless functional integration in the future

Interview Quotes
- “In the future, these mobile devices will be seamlessly integrated. Functionality will reside on the device, using the car’s MMI.”
  – OEM, supplier
- “The car industry can not ignore the dynamics of the consumer devices.”
  – Supplier

Scenario 2: New entrant with interoperable platform
- Microsoft and Fiat have agreed upon introduction of standardized platform telematics and infotainment applications (based upon Windows CE)
- Comparatively low cost
- Starting in 2008
- Capitalizes on existing PC industry “ecosystem”

Interview Quotes
- “It depends upon if Microsoft can match automotive quality standards. If they do, they have very good chances.”
  – OEM
- “If Microsoft wants, they just do it. And they want.”
  – Supplier
- “If Microsoft and Fiat succeed, this will increase the pressure on other OEMs to adapt similar solutions.”
  – Supplier, OEM

“External shocks” as means leading out of MPD

Source: Interviews
intermedia Projekt 2005
Intermediate conclusion (2)

**Client view**

1. The term „Telematics“ is very vaguely defined and hard to explain to outsiders
2. The selling process of telematic services is subject to systematic biases
3. Telematic services are currently very expensive and generate only minor additional value from a client’s perspective
4. For qualitatively advanced service offerings exist substitutes free of charge (in Germany)

**Firm view**

5. Although differently anticipated a couple of years ago, telematics is neither a differentiating force nor a „cash cow“ for Automotive OEMs
6. Proprietary interfaces along the value chain prevent the evolution of standards and, thus, drastic reduction of cost structures
7. The „Clash of Cultures“ prevents a frictionless convergence of the Telecommunication-, Media- and Automotive industry
8. The key players so far had no real incentive to promote the development of one single industrywide standard
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- Key Questions and Core Problems

Outlook
Scenario „Handheld invasion“
The invasion of handhelds in the mass market poses a major threat for Automotive OEMs

Scenario: Expanding market for handhelds
- PDA navigation system sales have doubled in the last 12 months
- Good functionality of offboard solutions at affordable prices
- Further diffusion of handheld navigation expected through smartphones
- Non-premium OEMs will offer seamless functional integration in the future

Price Correlation & Car Park Germany
(% of car park, total=45mio cars)

Source: Autofahren in Deutschland 2004, Motor Presse Stuttgart
**In-car Platform: Microsoft**
Handheld integration and the emergence of a new middleware entrant are two non-excluding scenarios which could lead to the dissolution of the prisoners dilemma.

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**Scenario: New entrant with interoperable platform**
- Microsoft and Fiat have agreed upon introduction of standardized platform telematics and infotainment applications (based upon Windows CE)
- Comparatively low cost
- Starting in 2008
- Capitalizes on existing PC industry “ecosystem”

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**The influence of network effects on OEM behavior**

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“External shocks” as means leading out of MPD

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Source: Interviews

*intermedia* Projekt 2005

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Service Environment
The service environment will be subject to a paradigm shift

Telematics is a part of the car

The car is a part of telematics

Traditional

Future

Personal media and information services
Driving-related services
Car-related services

Office
Home
Hypotheses

1. Handheld devices will increasingly include telematic and infotainment functionalities. This will force Automotive incumbents to rethink their strategic approach to Telematics.

2. If Microsoft (or any other player) achieves success, or the established automotive industry expects them to succeed, the pressure for introducing standardized platforms will increase.

3. Standards would dramatically decrease price levels, leading to faster diffusion of solutions.

4. Open standards would reduce entry barriers regarding content and service. This will accelerate convergence between the industries.

5. Telematics used to be a part of the car. In the future, the car will be a part of telematics.