RFID: Anwendungen, Chancen und Risiken

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Münchner Kreis
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Agenda

- Technology Trends
- Business Drivers
- The Internet of Things
- Management Agenda
Recent advances in miniaturization, …
... sensor & communication technology, and new materials drive for a new computing paradigm.

- Communication protocols
  - Wi-Fi
  - Bluetooth
  - RFID
  - ZigBee

- Sensors

- Polymer-based electronics
  - Organic light emitting diodes
  - RFID
  - Sensors
  - Actuators

Quelle: Henkel
Low cost minicomputers ...
... with mobile communication capabilities ...
… finally help to implement the vision of ubiquitous computing.

Virtual world

Real world
Agenda

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But what is it good for? No technology for technologies sake.
The lack of integration ...

- **Out-of-stock**
  - Average OOS level in retail industry: 8.3%
  - Average OOS level in direct store delivery product categories in US: 7.4%

- **Shrinkage**
  - Average shrinkage rate for supermarkets/grocery in US: 1.5% of sales

- **Invoice inaccuracy**
  - Average deduction level: 9.9% of annual invoiced sales in US

- **Unsaleable products**
  - Cost of unsaleable food and grocery products in US: 1% of sales

- **Inventory data inaccuracy**
  - Mean difference between physical and book inventory in a single case study: 6.8 units per SKU or on average 35% of target inventory

Source: C. Tellkamp, E. Fleisch, Auto-ID Lab St. Gallen
... between the real and the virtual world ...

Source: Koblishke, Lüpke, MBA Thesis, HSG
… causes many tough business problems …

- Counterfeiting
  - Product counterfeiting is estimated to account for between 5 and 7% of world trade, with a value of 280 billion USD.
  - 30% of pharmaceuticals in the developing world and 6-10% in the developed world are counterfeits.

- Medication errors
  - Non-compliance with medication in the US causes 125,000 deaths yearly, 11% of hospital admissions and 23% of nursing home admissions.
  - Preventable medication errors in the US cause between 44,000 and 98,000 deaths yearly.

- Handling cost
  - Up to 25% of a physician’s time is spent for filling in forms, computer entry and data searching.

- Recall
  - In the automotive industry in Germany, there were 113 official recalls in 2001.
  - In 2000, Firestone had to recall 14.4 million tires of which 6.5 million were still in use.

... some of which also have become a target for legislation.

- **The guidance of the FDA**
  - 2004, Performance of Mass Serialization/RFID feasibility studies
  - 2005, Mass Serialization of some packages, cases & pallets likely to be counterfeited
  - Use of RFID by some manufacturers, large wholesalers and some chain drug stores and hospitals
  - 2006, Mass serialization of most packages, cases & pallets likely to be counterfeited
  - 2007, Mass Serialization of all pallets & cases and most packages
  - Use of RFID by all manufacturers, wholesalers, chain drug stores, hospitals and most small retailers

- **EU Laws**
  - Food traceability
  - Electronic waste recycling
  - Product liability

- **Portugal**
  - 2D Code on drug packages starting since January, 2004

- **Italy**
  - Recommendation for Patient Safety in the Medical Practice

- **CEN TC 251 Health Informatics**
  - Tech Report SAFE ID N00-049 – Safety Procedures for Identification of Patient and Related Objects

- **Florida**
  - July 2003, pedigree for Top 30 drugs
  - July 2006, pedigree for all drugs

- **Department of Defense**
  - June 2004, detailed Implementation & Roll out RFID Plan.

- **Wal-Mart**
  - June 2004, all CII drugs into Bentonville

Source: Auto-ID Lab Health Care Initiative, M-Lab
Information system integration did not stop here …

Phase 1: Computerization of individual functions
(support of isolated functions such as invoicing)
... because interfaces were still bio-mechanic.
Information system integration did not stop here …

Phase 2: Computerization of functional areas
(integrated functional areas such as financial accounting)
Phase 3: Design of integrated processes
(internally between departments such as order processing)
However, ...
… information systems integration will not stop here either.

Phases 4 & 5: Individual 1:1-integration and consistent m:n-integration of cross-enterprise processes based on web services and a networking infrastructure.
So what comes next?
The information system integration of the real world.

- Manual data entry
- Smart Cards
- Bar code scanning
- Embedded Systems

Virtual World

Cost of data entry

Real World

Manual intervention required | No human intervention required
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Automatically connecting objects around the world is a vision of many powerful players.

- Gillette
- Wal-Mart
- P&G
- Unilever
- Kraft
- Philip Morris
- Nestle
- Best Buy
- Target
- Tesco
- Home Depot
- CVS
- Sun
- Philips
- Intel
- ST Micro
- Canon
- Alien
- BT
- NTT
- Metro
- Mitsui
- Pfizer
- Sara Lee
- USPS
- UPS
- DoD
- UCC/EAN
- Accenture
- IBM
- Coca-Cola
- Pepsi
- Kodak
- NCR
- SAP
- Symbol

Over 100 in total!
So, we started to number the world …
… and built the infrastructure for the Internet of Things …
… to track every physical object in the world.
Because only what you can measure you can manage. RFID leads to better processes, new products and new services.
Better processes: Libraries around the world are tagging media.
Gerry Weber is tagging transport units …

Source: Uwe Quiede, "METRO Group Future Store Initiative: Projekt Kaufhof - Gerry Weber", Presentation, January 9, 2004
... and garments.

Source: Uwe Quiede, "METRO Group Future Store Initiative: Projekt Kaufhof - Gerry Weber", Presentation, January 9, 2004
Better security measurements: From ePassport to eTickets and secure banking applications
Smart Products: Guns and bikes link functionality to the proximity of jackets.
Pads check themselves and temperature plasters monitor patients.

Management of surgery tools

http://www.medicalindicators.com

http://www.powerpaper.com
Smart services: RFID enables many new services, from track & trace ...

Source: Auto-ID Lab Health Care Initiative
... to proof of origin, counterfeit protection, maintenance, fleet management, configuration, reordering ...

Sorry, I can’t prove I am no counterfeit

Send new drills

Source: http://www.norwichunion.com/pay_as_you_drive
... and life signal monitoring.

**Sensatex Smart Shirt**

The Wearable Motherboard™ Smart Shirt is a flexible, wearable open platform that can be customized to monitor vital signs, external impact, and other data through sensors woven into its fabric. Here's how the system works:

1. The Sensatex Smart Shirt is worn during any activity. Embedded sensors monitor heart rate, respiration, and other vital signs in a customizable fashion.

2. Data is sent via satellite or cellular tower from the Smart Shirt's processor to an information hub.

3. The information hub constantly monitors the Smart Shirt wearer's vital signs for specific health or job-related hazards.

4. If a problem arises, an emergency medical crew is immediately alerted. Paramedics can reach the Smart Shirt wearer quickly, already informed about his condition and able to attend to his needs.

5. Data continually travels to a secure Internet site where the wearer can log on anytime, anywhere to review.

**Other Applications**

As an highly versatile platform, the Wearable Motherboard™ Smart Shirt can be customized to meet different monitoring needs.

- Infants can be monitored for sleep apnea and other infant disorders.
- Geriatric and post-operative monitoring offers a greater sense of security and improves quality of life.
- Monitoring in police and military applications can enhance job safety and performance.
- The processor gathers and sends data via Bluetooth, WLAN, and/or cellular.

http://www.sensatex.com
RFID has the potential to change control tasks.

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<tr>
<th>Impact area of higher control quality</th>
<th>Benefit of higher control quality</th>
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<tr>
<td><strong>Automatic process control</strong></td>
<td>• Cost reduction (inventory, labor, process error)</td>
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<td>Supply Chain Management</td>
<td>• Speed (real time)</td>
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<td>• Goods issued / receipt</td>
<td>• Process quality and process reliability</td>
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<td>• Quality check</td>
<td>• Revenue increase (Quality, innovation, value adding service)</td>
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<td>• Track and trace</td>
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<td>• Production control</td>
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<td>• Shrinkage prevention</td>
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<td>• Goods damaged prev.</td>
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<td>• Counterfeit prevention</td>
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<td><strong>Product-Life-Cycle Management</strong></td>
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<td>• Product pedigree management</td>
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<td>• Call backs</td>
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<td>• Maintenance</td>
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<td>• Recycling</td>
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<td><strong>Customer Relationship Management</strong></td>
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<td>• Payment process</td>
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<td>• Market research</td>
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<td>• Usage behavior</td>
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<td>• Merchandising</td>
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<td><strong>Smart products</strong></td>
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<td>• Features based on product proximity</td>
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<td>• Features based on product affinity</td>
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<td>• Features based on product history</td>
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<td>• Emotional products</td>
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<tr>
<td>• Product-service-bundling</td>
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<td><strong>Smart services</strong></td>
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<tr>
<td>• Product-service-bundling</td>
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<td>• Control services</td>
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<td>• Use-based billing</td>
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<td>• Risk-based billing</td>
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<tr>
<td>• Instant information services</td>
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<tr>
<td>• Complex services</td>
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Guideline: Good products want to communicate.
Start in-house with assets.

- In-house production management
- Retail check-out
- In-house asset management
- Cross-enterprise asset management
- Closed Loop
- Open Loop
Manage the privilege of privacy.
Start with processes, then go to products and services.

- **RFID**
  - is a logical next step in enterprise computing
  - is not new
  - is not a plug&play-technology yet
  - standards are currently being established
  - is not primarily a replacement of the barcode
  - can create competitive advantage
  - asks for an infrastructure decision

- Don’t install complexity
- Still be careful when discussing time frames
- Start building RFID business intelligence
Progress has no alternative.

For questions please contact:

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