Opportunities and Challenges for RFID-Integration in the automotive industry

RFID Seminar Odette, Lindholmen Science Center, Gothenburg

BIBA-IPS at the University of Bremen
Intelligent Production and Logistics Systems

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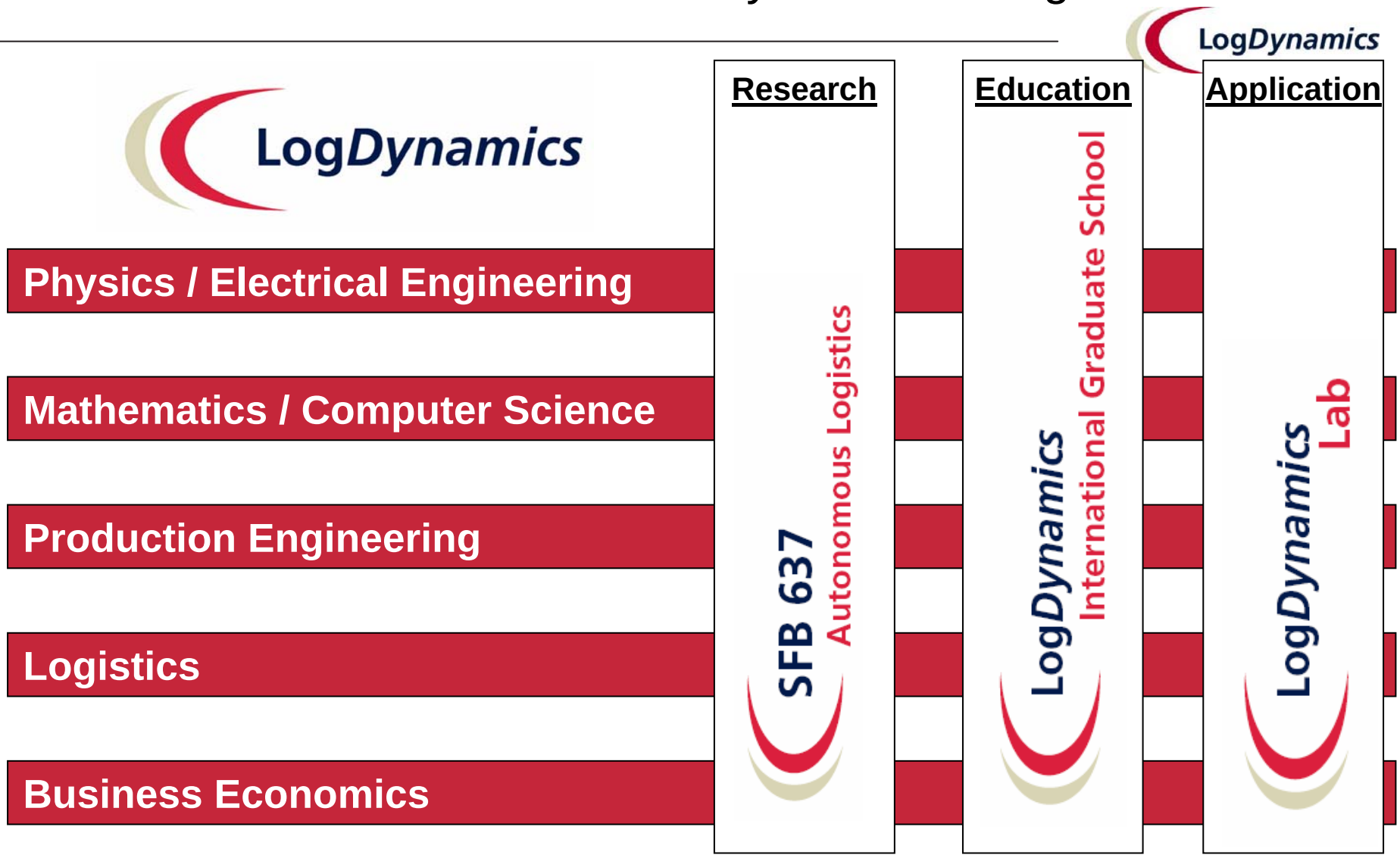
University of Bremen

- The University of Bremen was founded in 1971.
- Research and teaching are characterised by interdisciplinary as well as practice-oriented project studies - known as the „Bremen Model“ - which enjoys a high degree of acceptance in the academic world as well as in business and industry.
- As the centre of science for North West Germany, Bremen University is a place of research for 1,700 scientists, a place of study for nearly 22,000 students, a place of work for more than 1,100 employees.
- The University has 12 Faculties representing various sciences, among them the Faculty for Production Engineering

Bremen Research Cluster for Dynamics in Logistics



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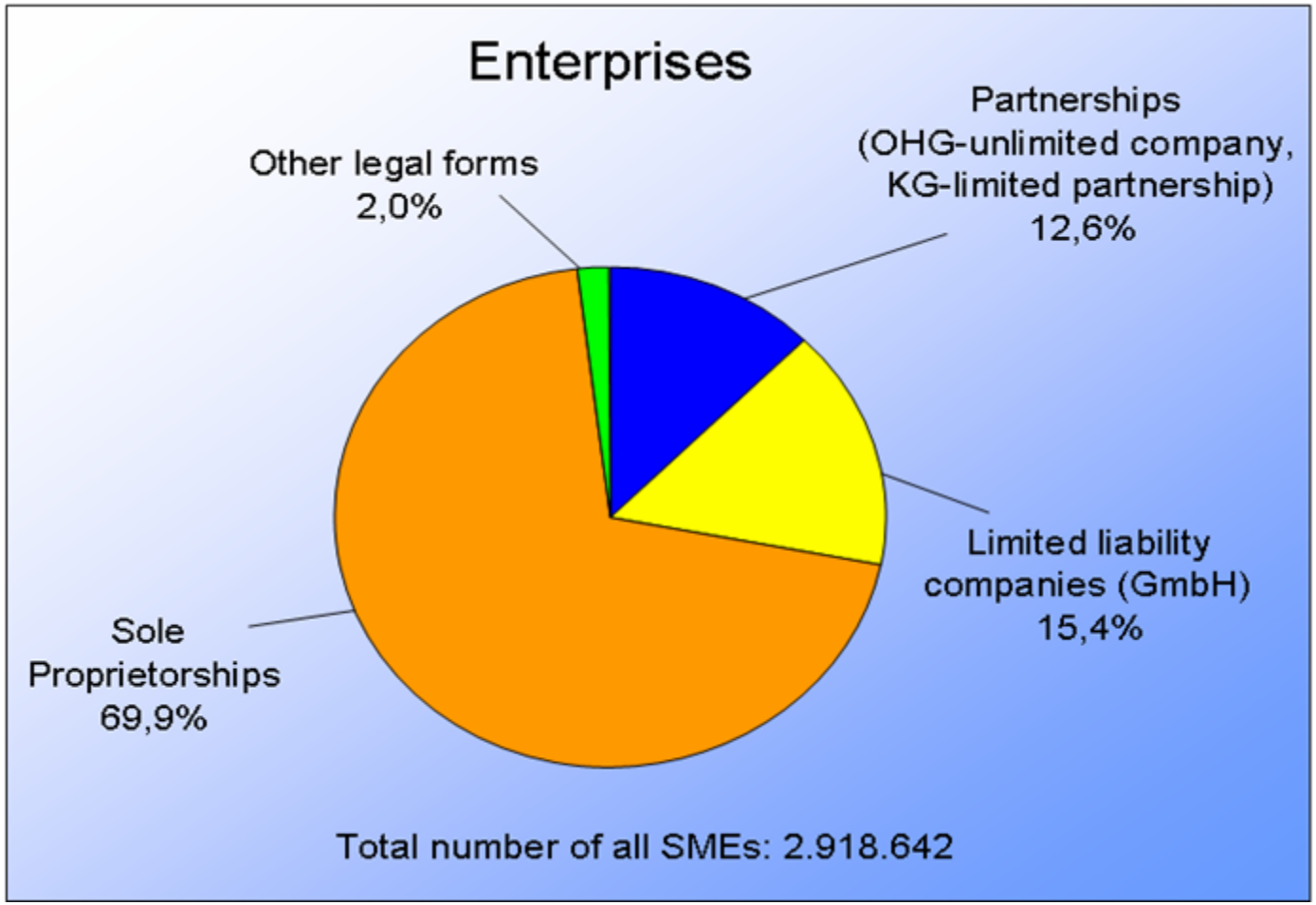
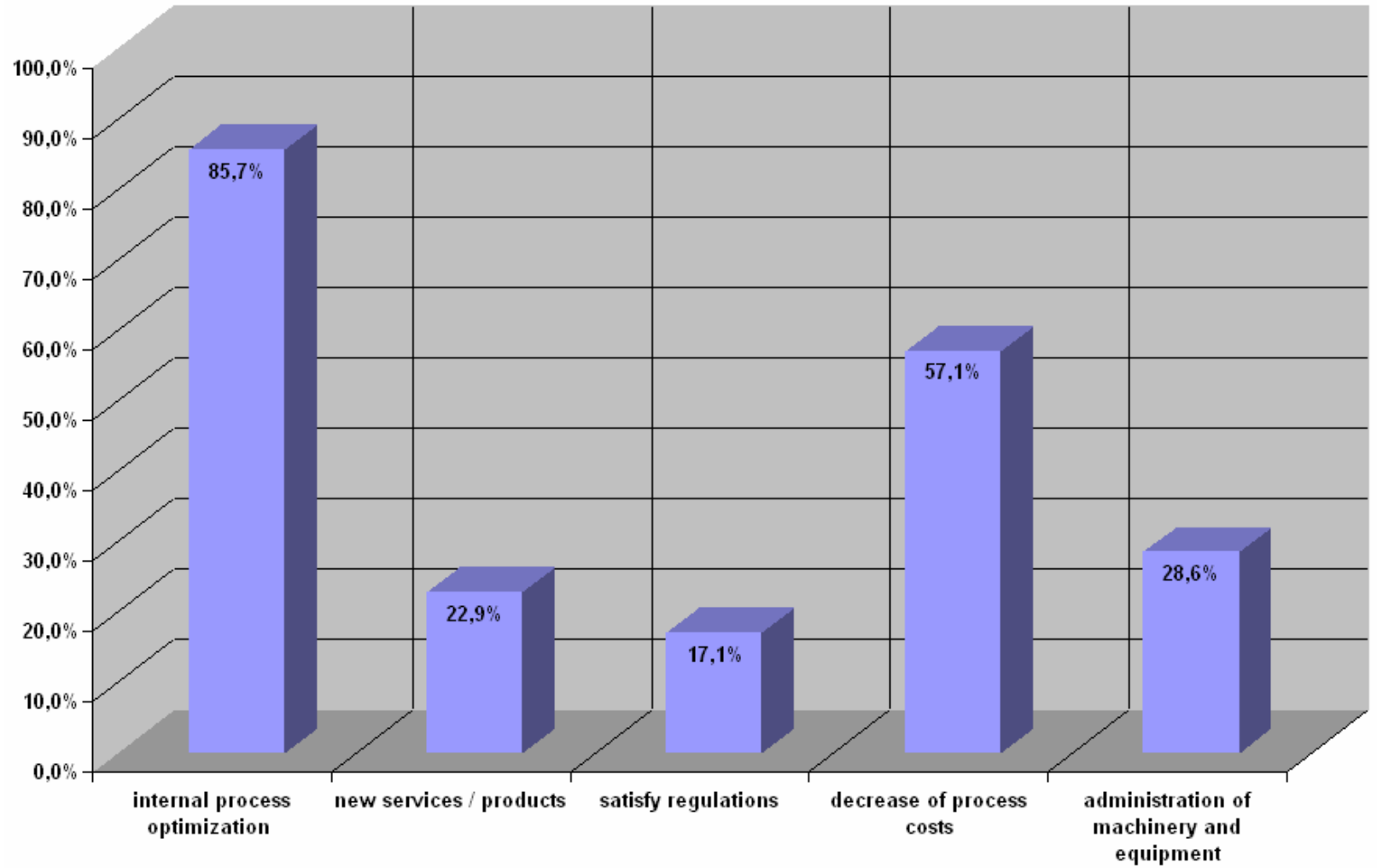
SMEs


Enterprises
Partnerships (OHG-unlimited company, KG-limited partnership) 12,6%
Other legal forms 2,0%
Limited liability companies (GmbH) 15,4%
Sole Proprietorships 69,9%
Total number of all SMEs: 2.918.642

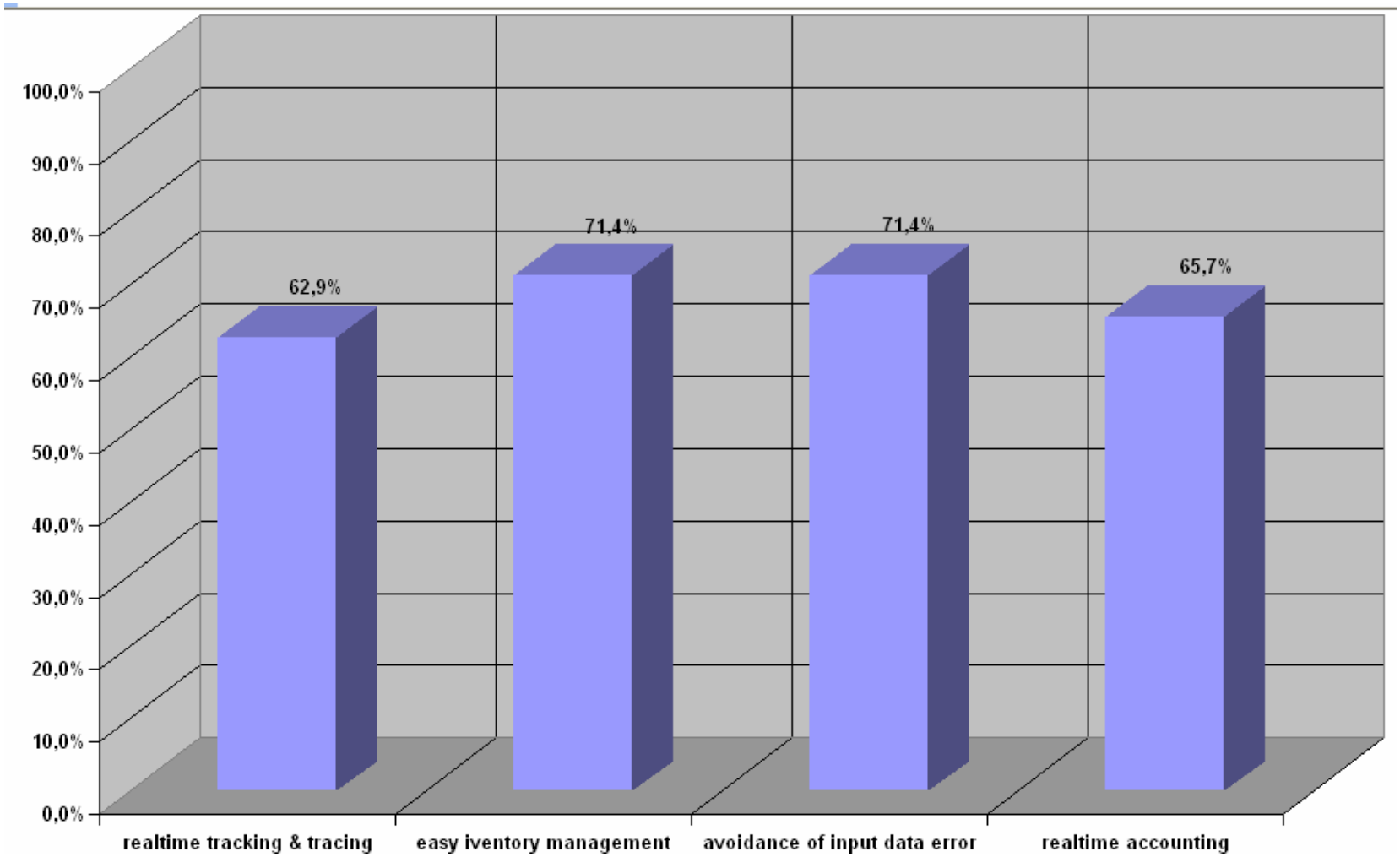
Survey about RFID Implementation in SME

- Scope
  - Interview with 150 SME
  - Replies from 35 Enterprises (online questionnaire)
  - Return rate 23%
- Branch overview
  - 43% logistics
  - 29% manufactoring
  - 11% retail
  - 3% package delivery service
  - 14% others
- Opportunities
  - 82% of the interviewed enterprises could imagine to implement RFID
- Obstacles
  - High costs
  - Lack of information

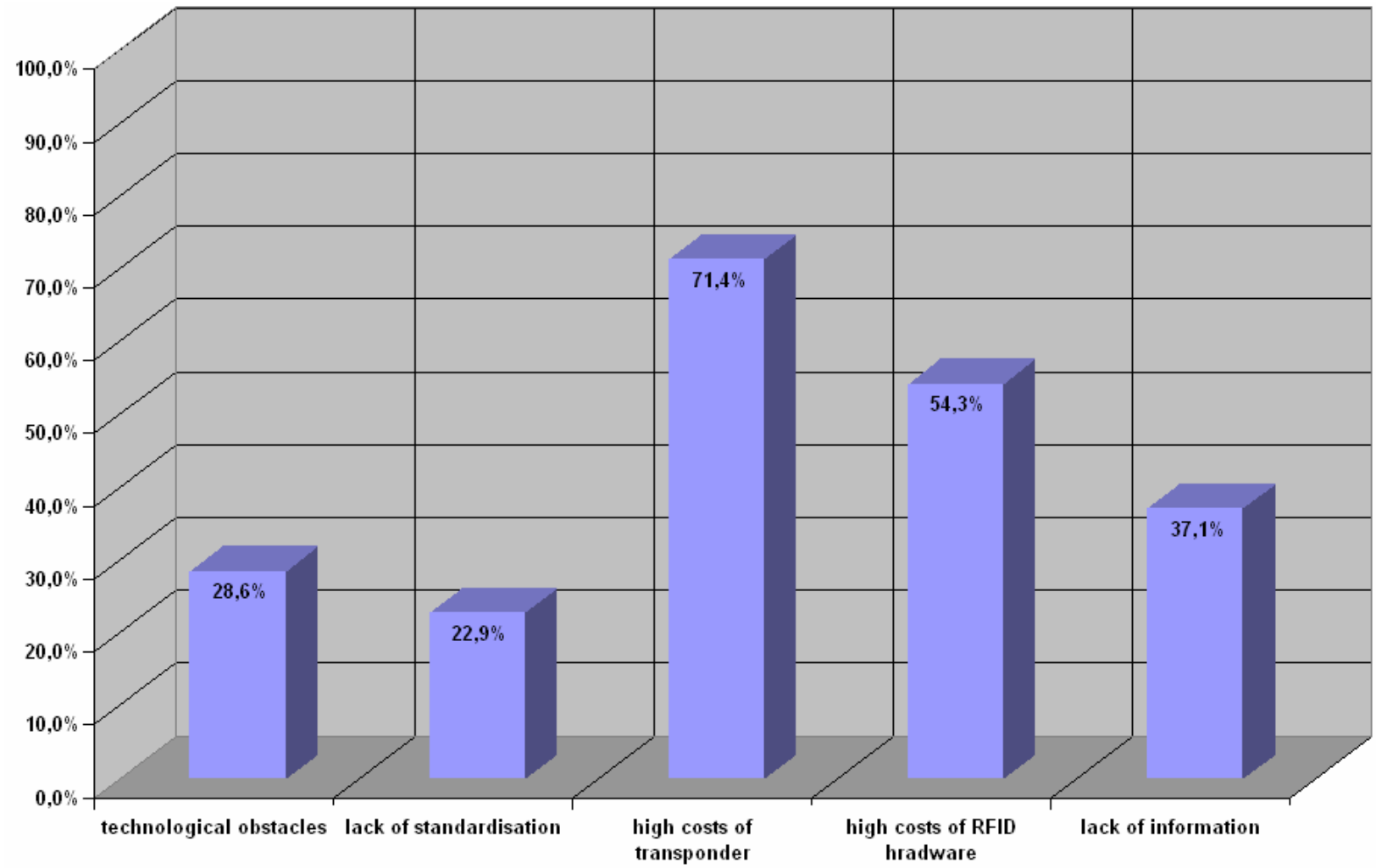
Expectations



Opportunities



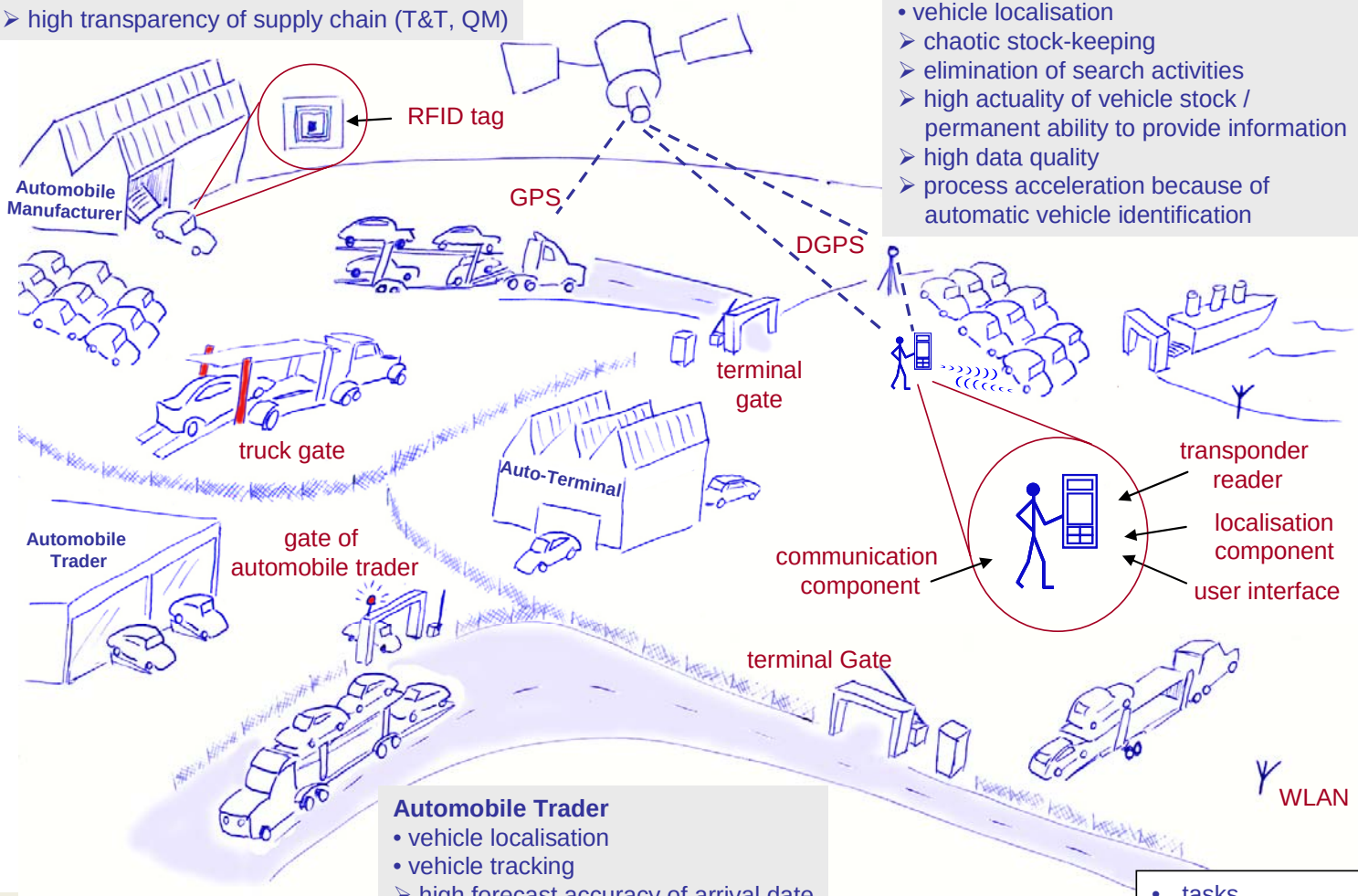
Obstacles


100,0%
90,0%
80,0%
70,0%
60,0%
50,0%
40,0%
30,0%
20,0%
10,0%
0,0%
28,6%
22,9%
71,4%
54,3%
37,1%
technological obstacles
lack of standardisation
high costs of transponder
high costs of RFID hradware
lack of information

Possible fields of ICT usage in automobile logistics

Automobile Manufacturer
- vehicle localisation within own compound
- vehicle localisation outside own compound
- ➢ elimination of search activities
- ➢ high transparency of supply chain (T&T, QM)

Automobile Logistics Provider
- vehicle identification
- control of vehicle orders
- vehicle localisation
- ➢ chaotic stock-keeping
- ➢ elimination of search activities
- ➢ high actuality of vehicle stock / permanent ability to provide information
- ➢ high data quality
- ➢ process acceleration because of automatic vehicle identification



Automobile Trader
- vehicle localisation
- vehicle tracking
- ➢ high forecast accuracy of arrival date
- ➢ high protection against theft

- tasks
- ➢ fields of application

The Goal of RFID-Integration in Logistic Processes

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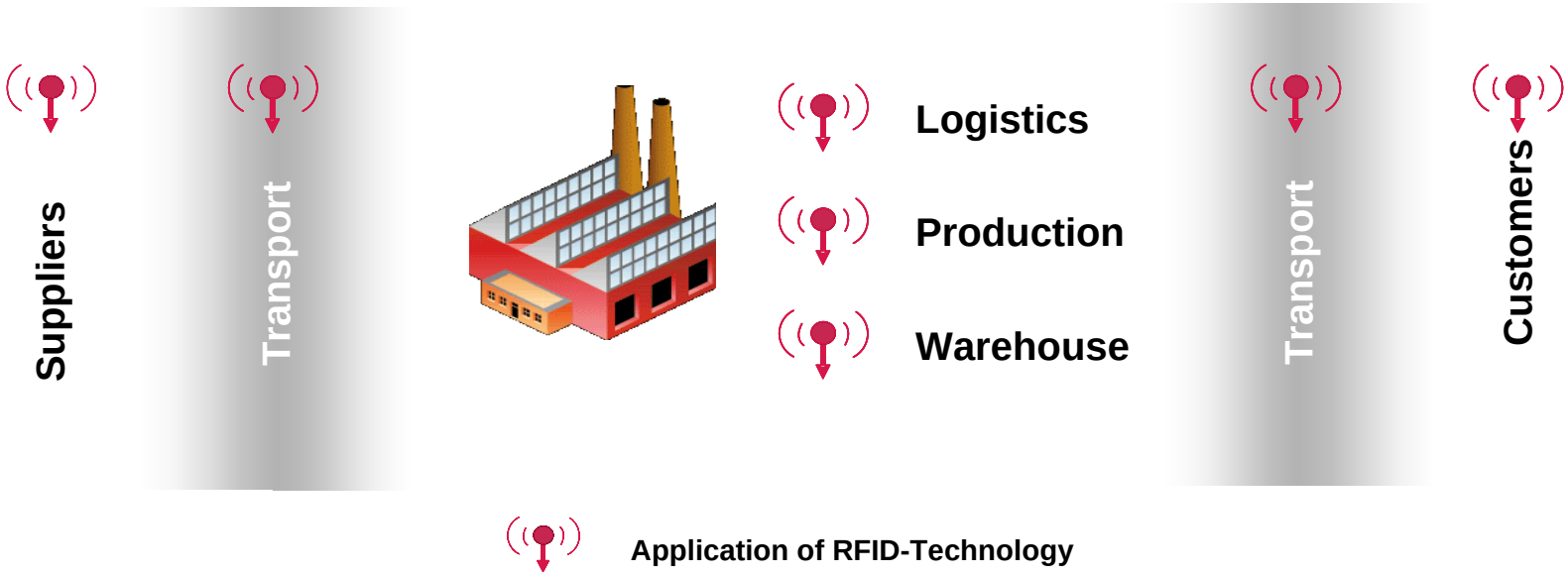
Improvement of flow of information by RFID in logistic processes



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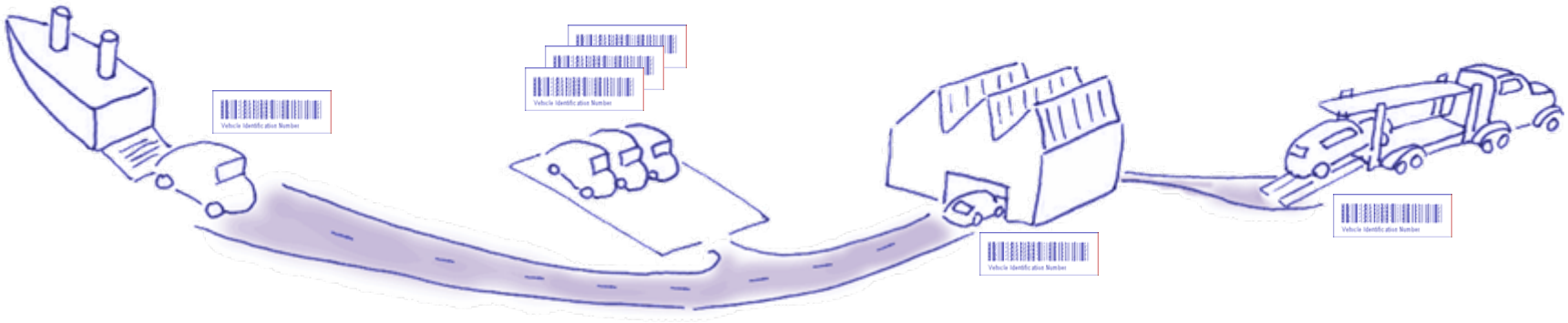
Case study 1 – FasTer **E. H. Harms Automobile-Logistics**

- Cooperation project “Autonomous Control in Automobile Logistics” between E.H.Harms Automobile-Logistics and the University of Bremen.
- Automobile logistics service provider for new and used vehicles
- in the range of transport, technical treatment, storage and handling of vehicles.
- Consisting of E.H.H. Auto-Terminals, E.H.H. Automobil-Transporte und E.H.H. Car Shipping.
- Europe-wide network with auto-terminals at strategically important traffic junctions.
- Transport of vehicles between automobile manufacturer, auto-terminals and automobile dealer via vessel, rail and truck.

Investigation of several possible fields of application of RFID-Systems based on the processes of an idealised automobile terminal.

Current state – auto-terminal processes and weaknesses



Transport → Identification → Storage → Delivery request → Technical treatment → Delivery

- Every vehicle is fitted with a barcode label, that contains the Vehicle Identification No.
- Documentation of vehicle movements via bar code scanner or keyboard.
- Several weaknesses of manual data entry in the field of automobile logistics:
  - Rain drops, condensate and snow on the windscreen makes scanning unreliable to impossible.
  - Bar code labels bleach when exposed to direct sunlight.
  - Incorrect or incomplete data acquisition and as a result high consequential costs.

↳ Manual data entry via bar code scanner or keyboard is error-prone, time-consuming and concerning its quality dependent on the competence of the responsible employee.

Opportunities for improvement

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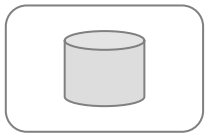
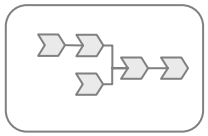
Adoption of transponders provides many opportunities for improvement, for example:



Improvement of data quality (complete and faultless date entry) -> automatically by transponder



Process acceleration (immediate vehicle identification and passage documentation, bulk identification of entire truck loads)

Enhancement of process transparency (correct vehicle identification, complete documentation of vehicle movements, up-to-date vehicle stock)

Cost savings (decrease of costs resulting from faulty data entries, reduction of equipment cost through recycling of transponders)

Improvement of working conditions (simplification of date entry tasks through more comprehensive and improved computer-aided support.

Protection and improvement of the market position (development of competitive advantages due to early adoption of innovative ICT)

E.H. Harms

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- Simplify inventory
- Locate cars
- Track treatment processes

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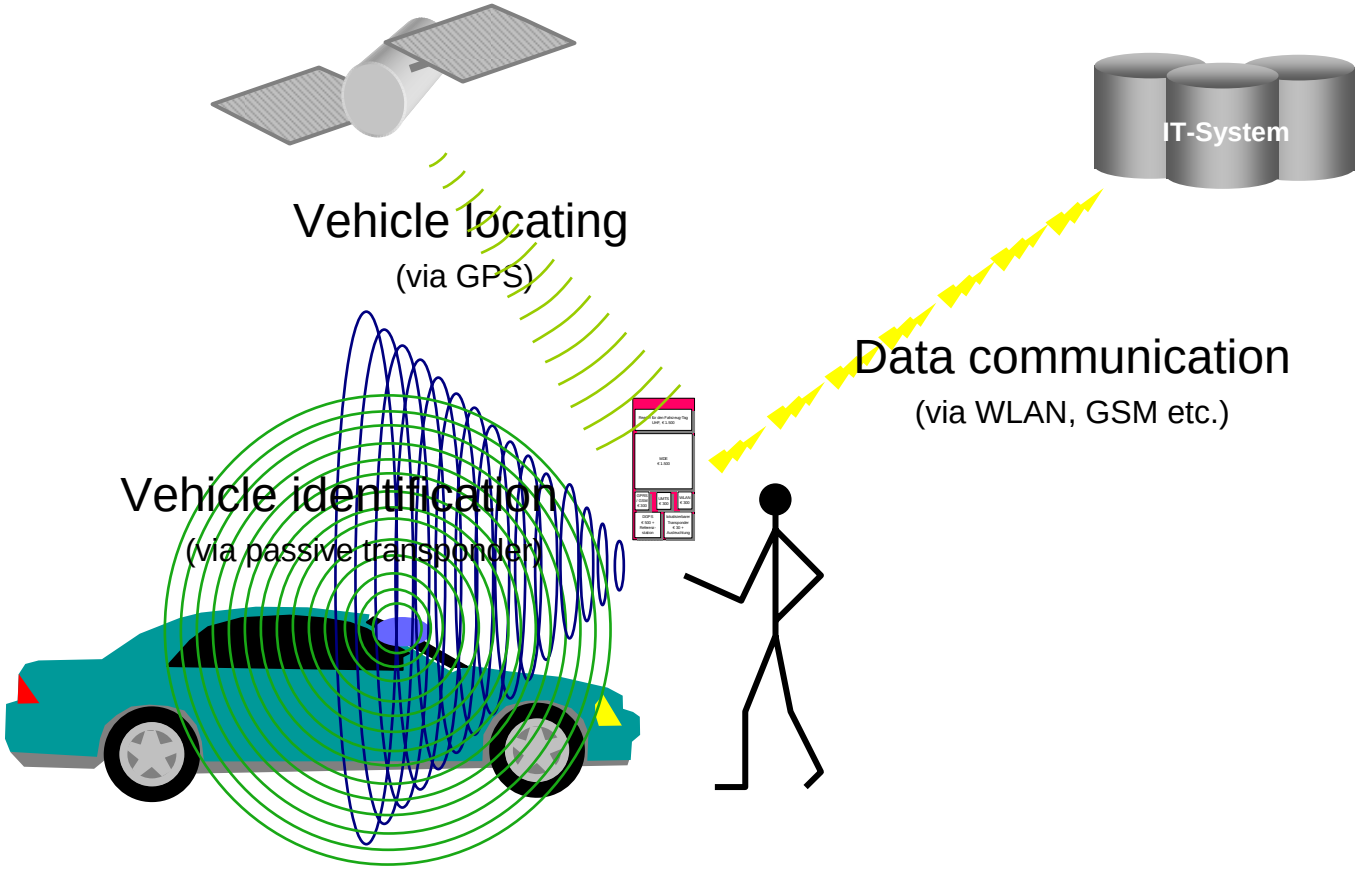
Operation mode of the Hybrid-Solution



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Tracking & Tracing of Returnable Transport Items (RTI)

- Partners involved:
  - 3 project partners: Siemens Business Services, RedArts, BIBA IPS
  - 2 pilot installations: DaimlerChrysler Bremen, Lear Corporation Bremen.
- Scope:
  - 75 man-month,
  - Volume ca. 550.000 Euro.
- Public funding:
  - BIA – Bremer Innovations-Agentur

bremen in time

Task: Integration of RTI‘s and flow of material

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Existing software for planning and

Transport

Loaded RTI‘S

Supplier

- Component production
- Loading of RTI‘s

Dispatching loaded RTI‘s

Supplier Logistics Center

- Repair/ Scrap
- Cleaning

Production Supply OEM

- Delivery
- Buffer

Transport

Dispatching Empty RTI‘s

Carrier External storage area

Empty RTI‘s

Assembly OEM

- Component dispatching
- Withdrawal
- Assembly

Transport Of RTI‘s

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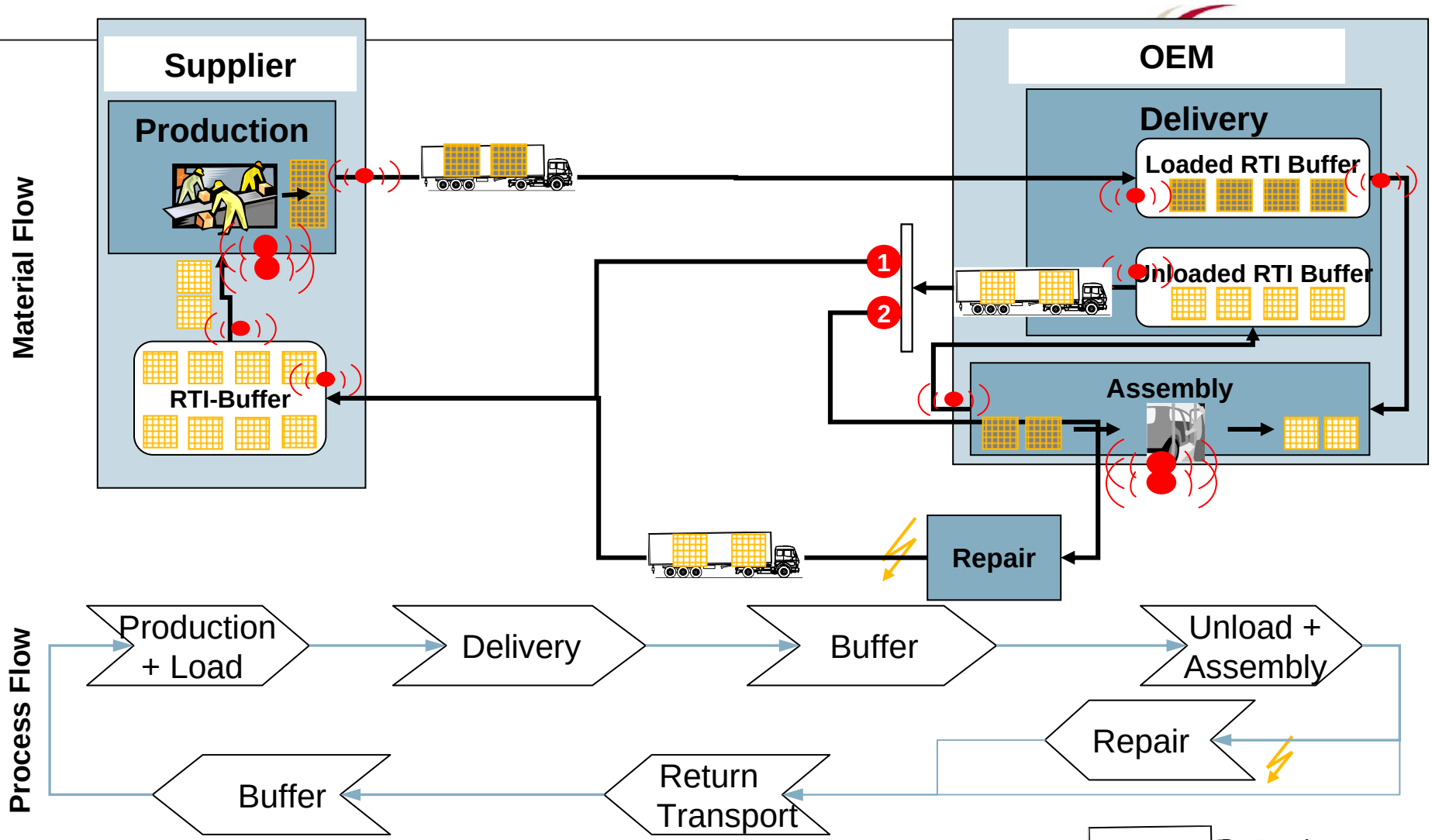
Seat supply cycle - schematic representation



Project goals

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Improvement of process reliability

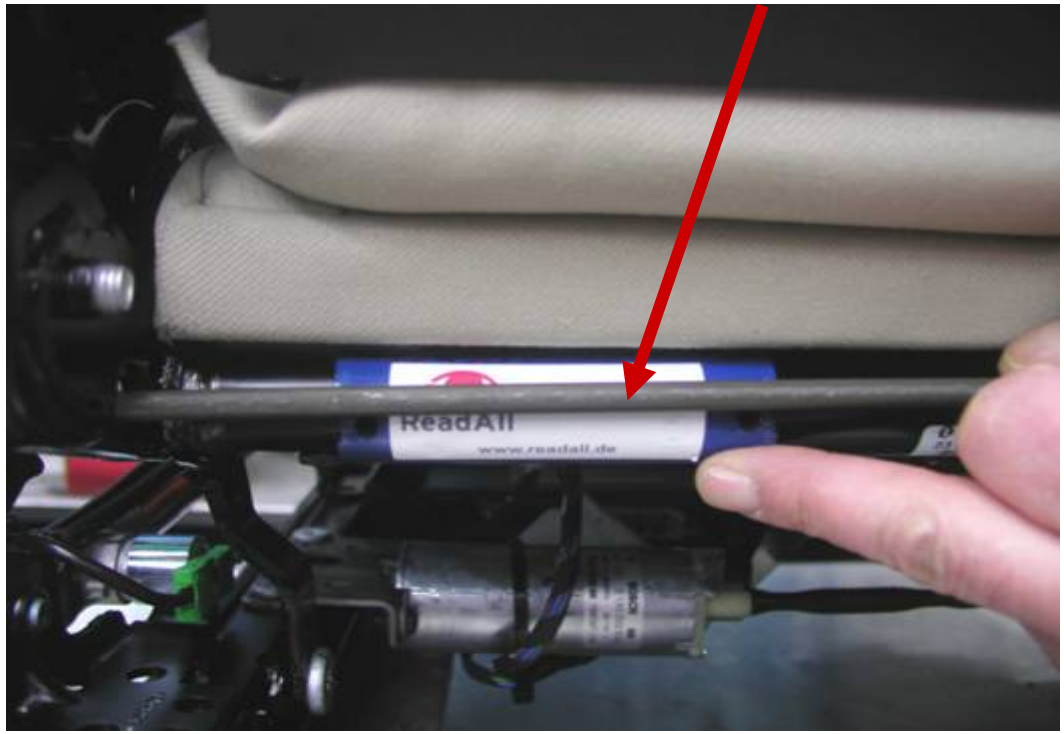
- Delivery of seats in sequence
- Loading of RTI‘s in sequence
- Delivery of RTI‘s to the right OEM
- Assembly of seats in correct order
- Reduction of costs and complexity

- Real time accurate asset data (quantity, location, load) for RTI‘s
- Reduction of circulating assets

Seat and RTI tagging

RTI‘s are equipped with two transponders

Removable transponder for seat frame



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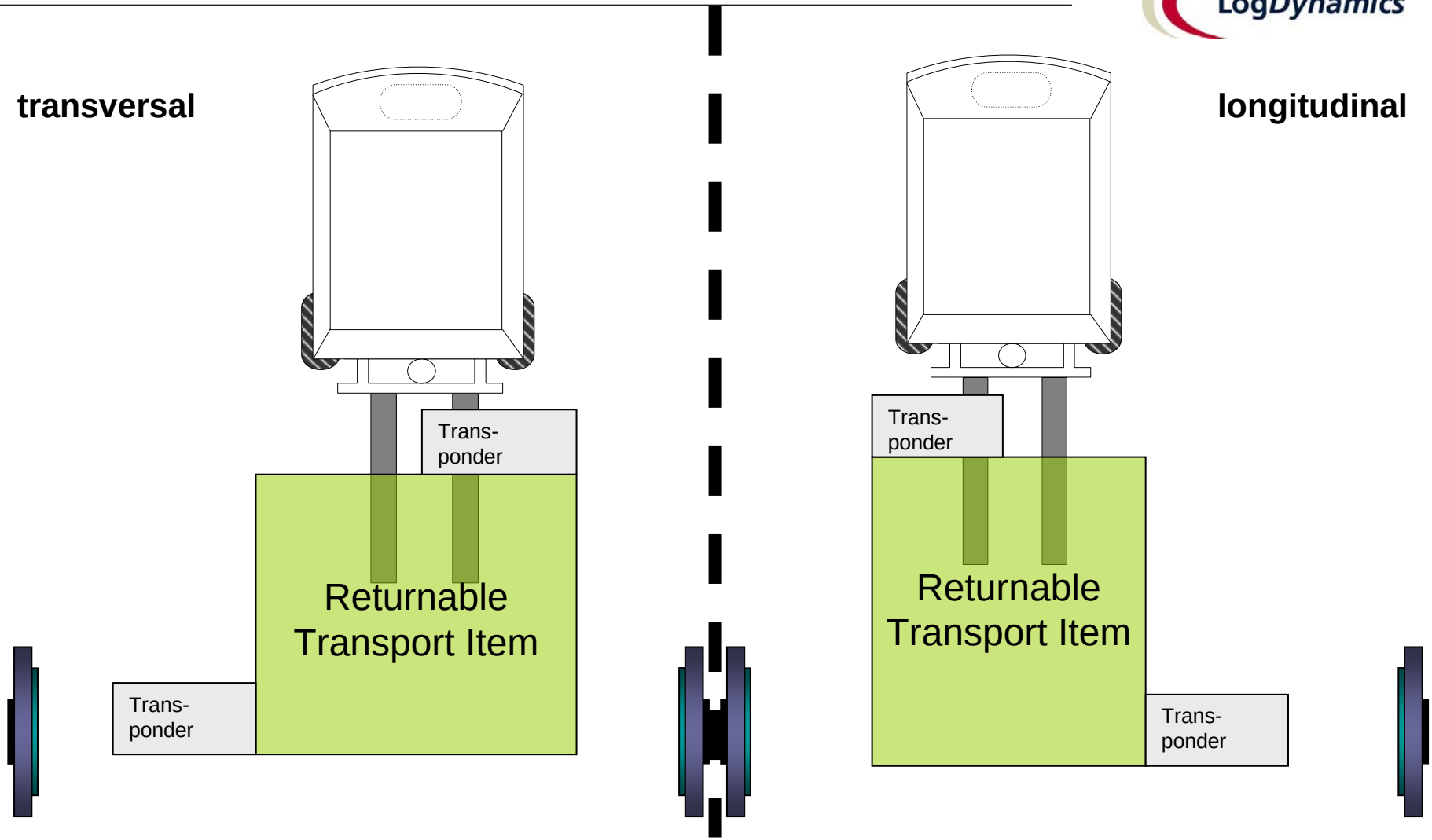
Metal filled plastic boxes

Redundant layout



Metal filled plastic boxes

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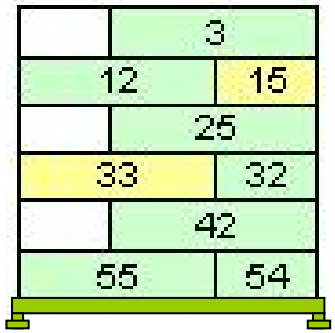
Seite 1 (links):



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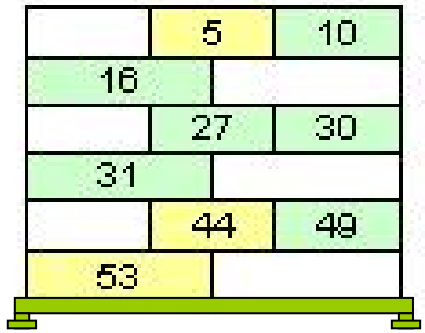

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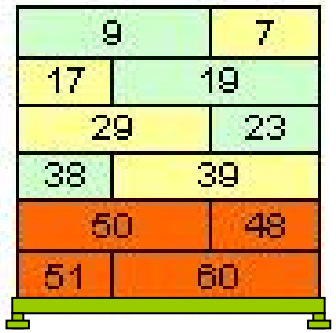

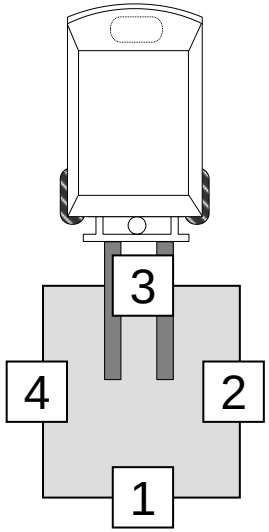

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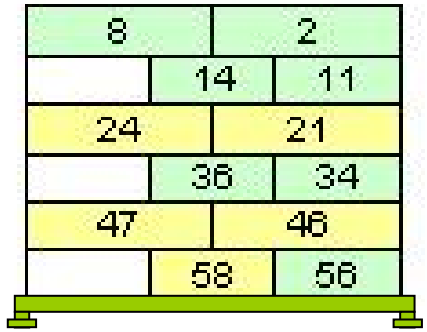

caption

10 reads

4-9 reads

0-3 reads

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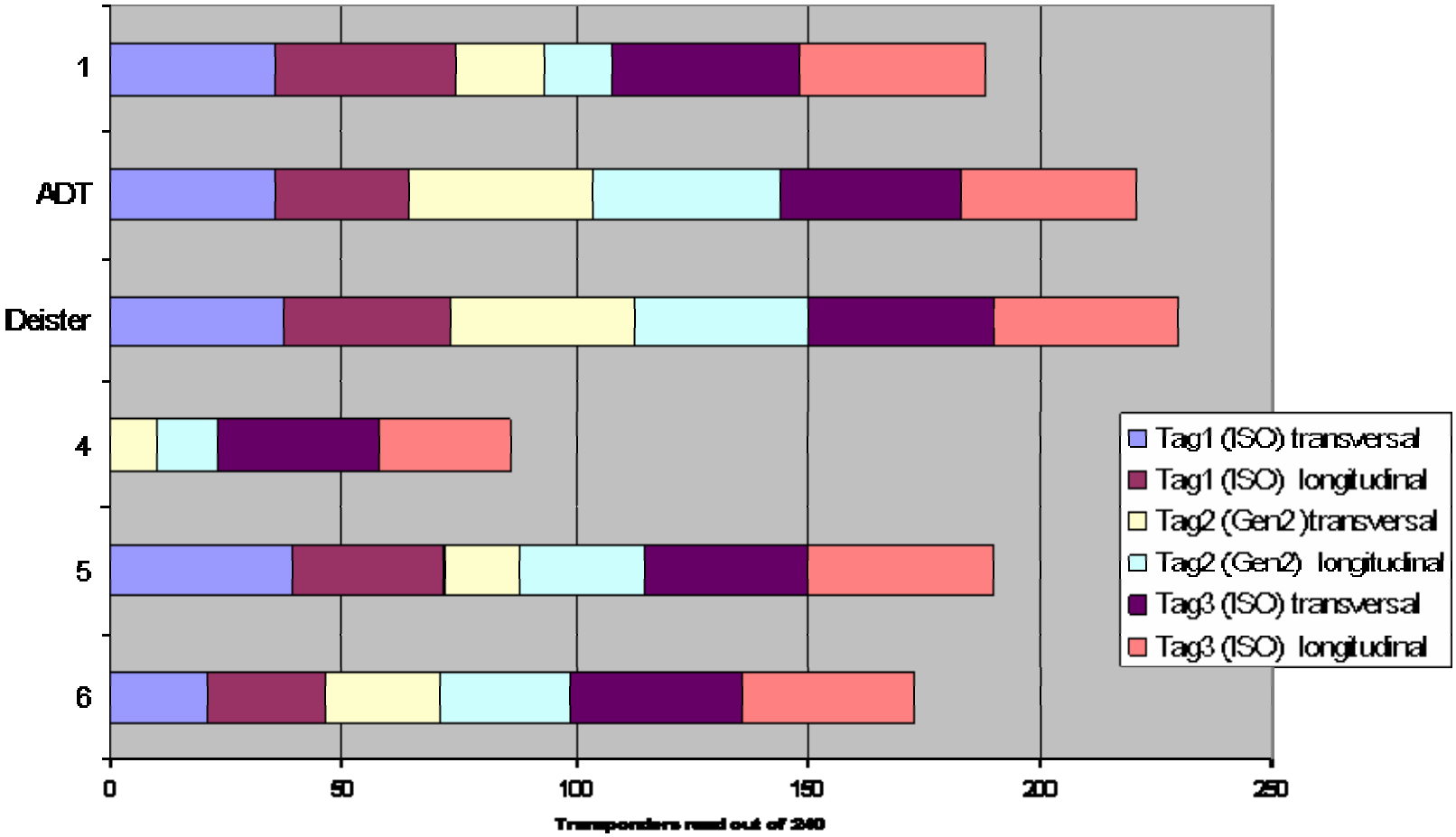
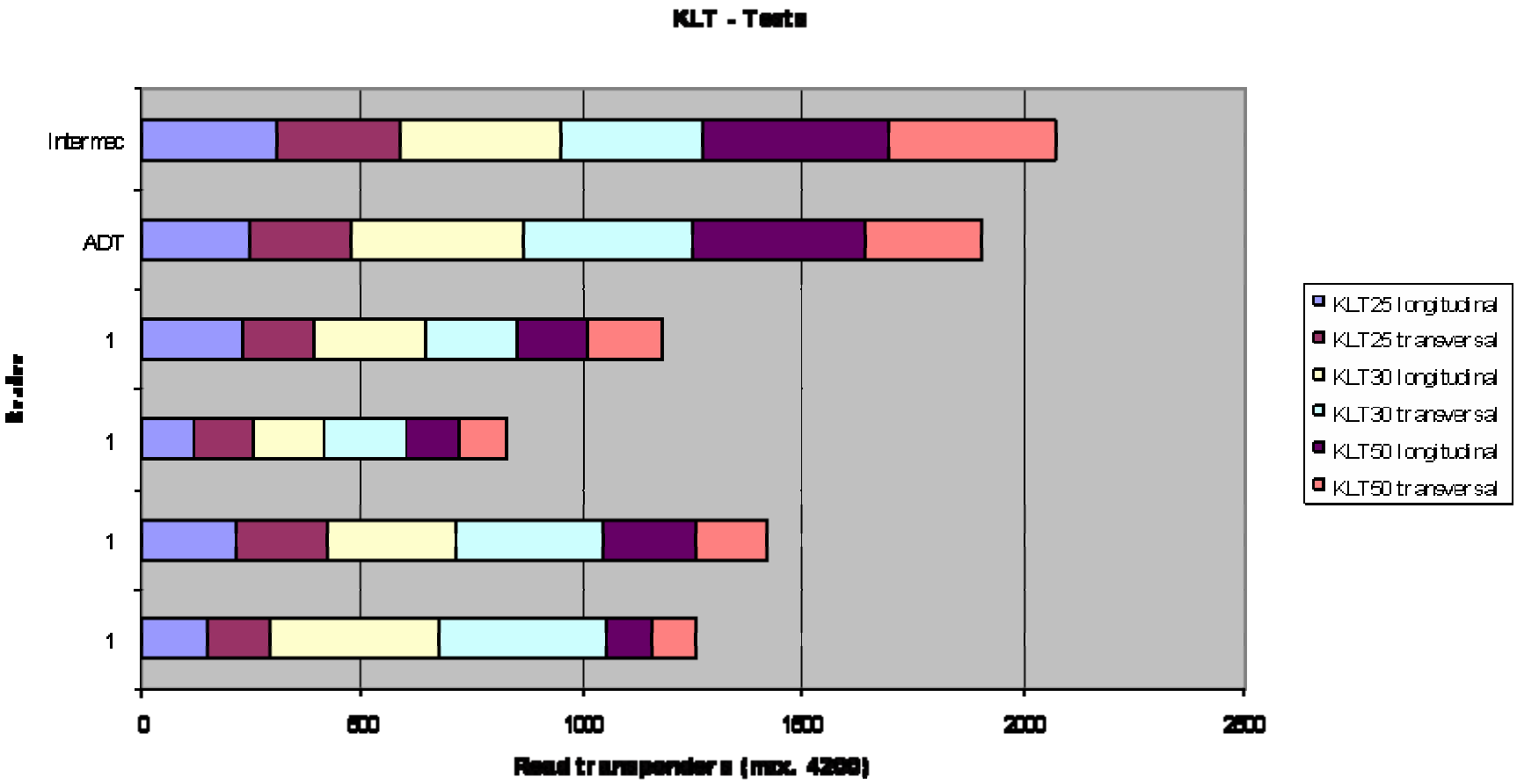
Reader comparison RTI-tracking on a forklift



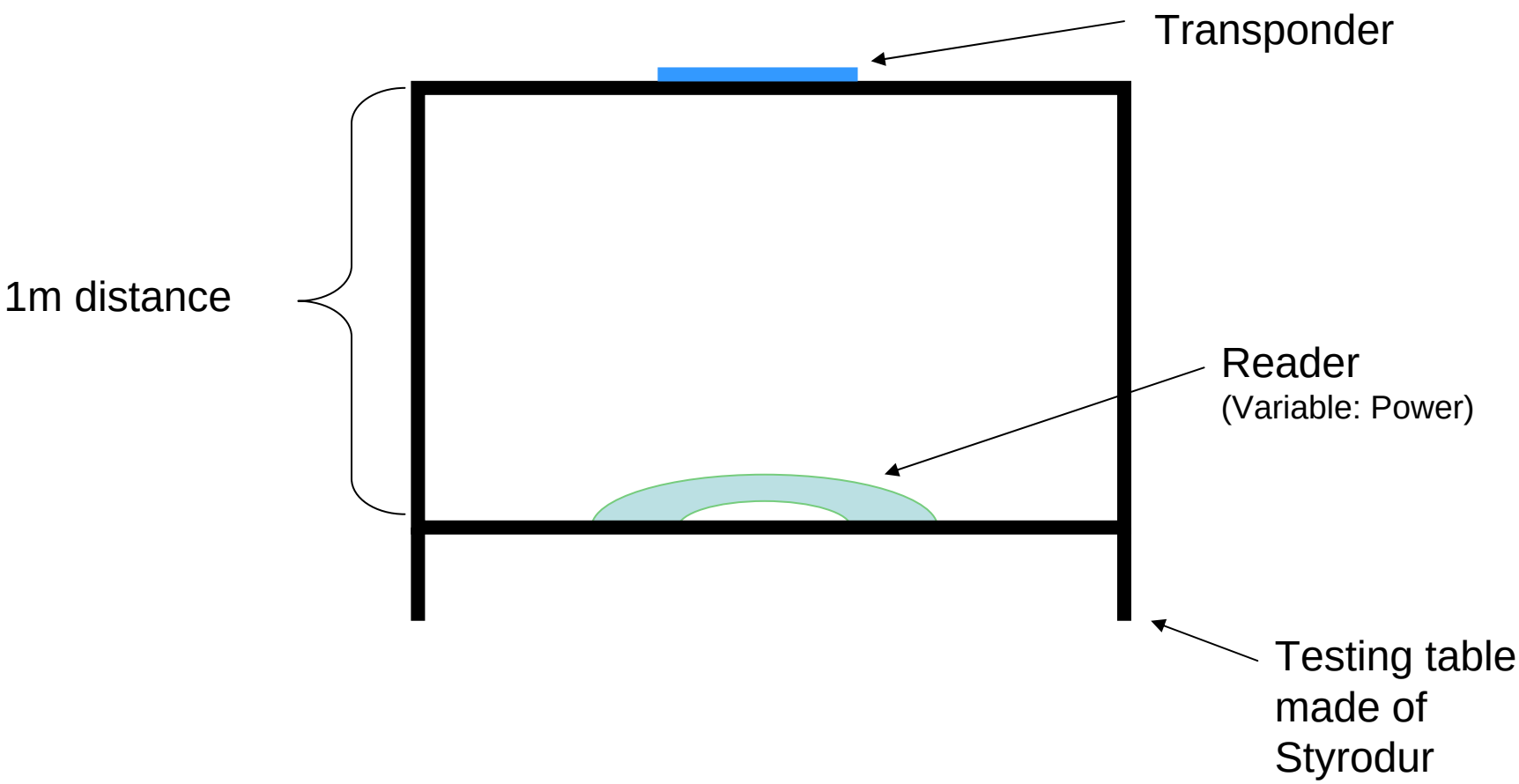
Reader comparison boxes on a forklift



Summary

- Avoid metal
- Keep your distance to metal
- Use air gaps
- Choose the right tags
- Choose the right reader
- Use onMetal tags
  (or active tags)

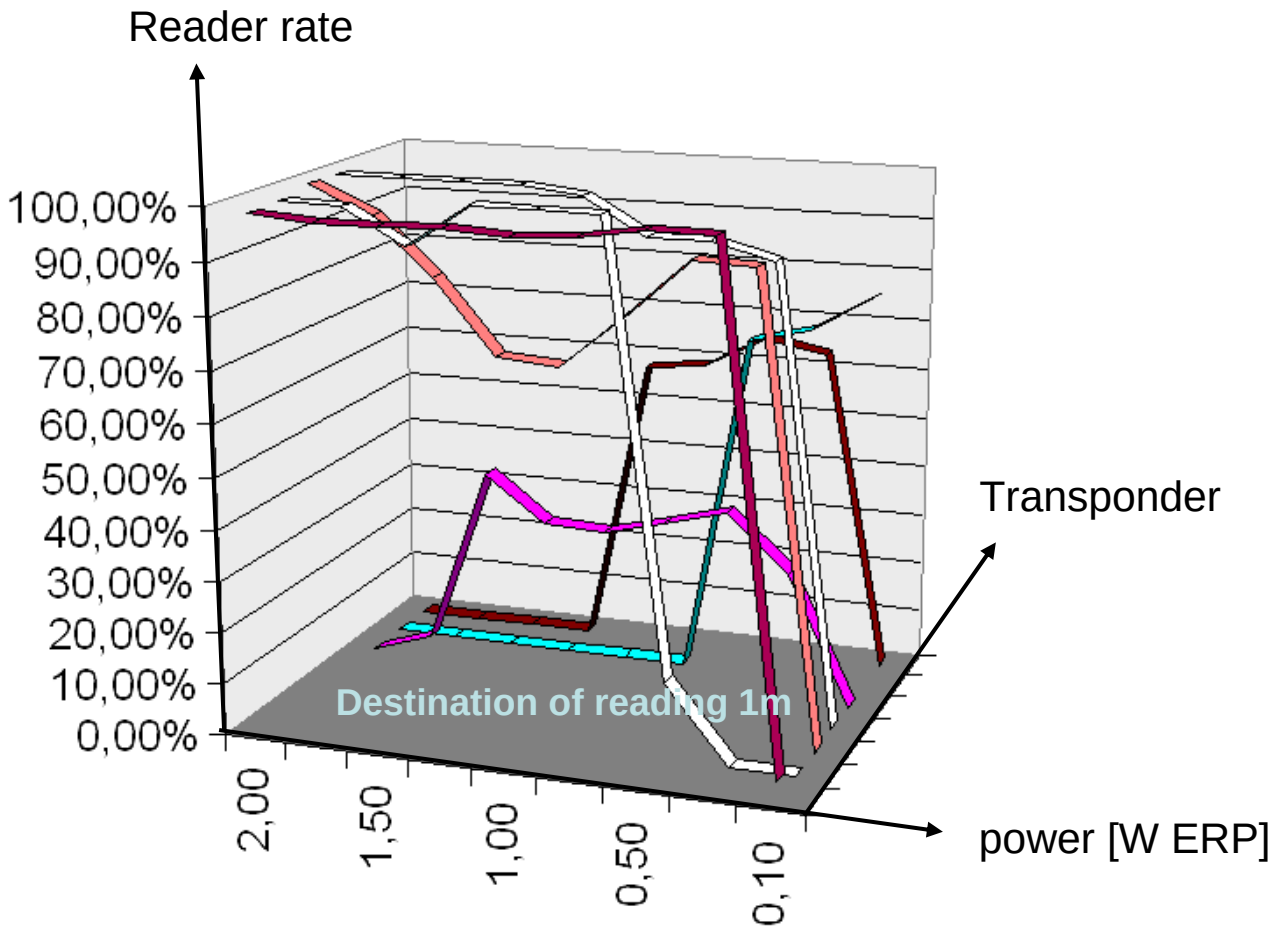
Static transponder tests



Overview of different on metal tags

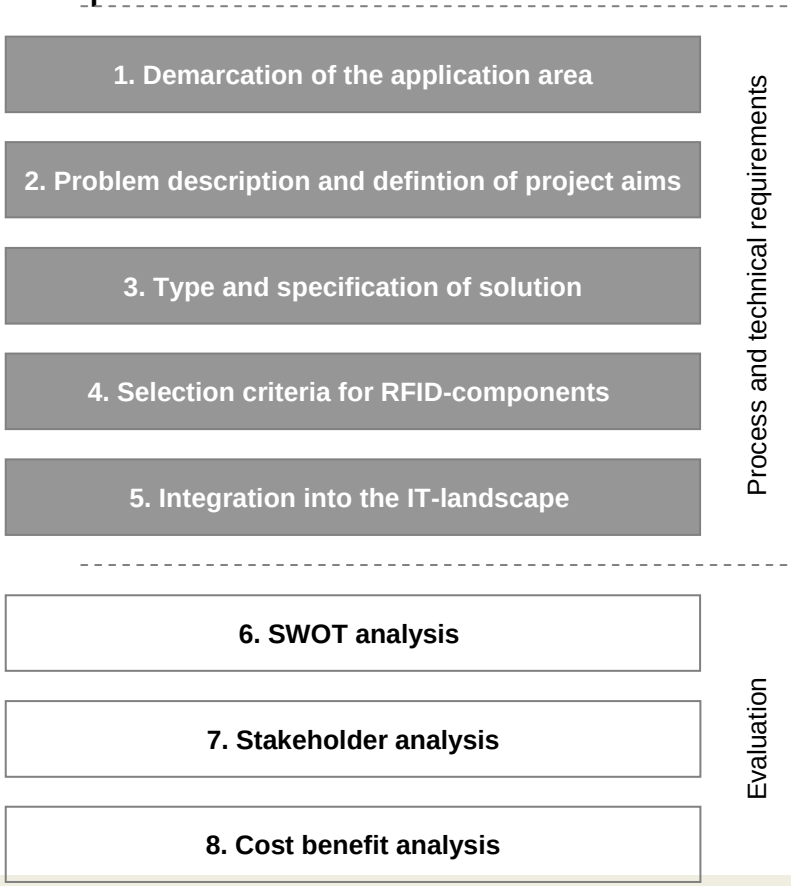
- EPC Gen2
  - Confidex
  - Deister
  - Hitachi
  - Sokymat
- ISO 18000-6B
  - Caen
  - Deister
  - Sokymat
- Atmel Tagidu
  - Idesco
  - Harting
  - Stielow

Static transponder test results



Planning Handbook

- Deduction of universal criterias which are relevant for the implementation of RFID in small and medium-sized enterprises



→ realization:

HTML/ web based planning handbook

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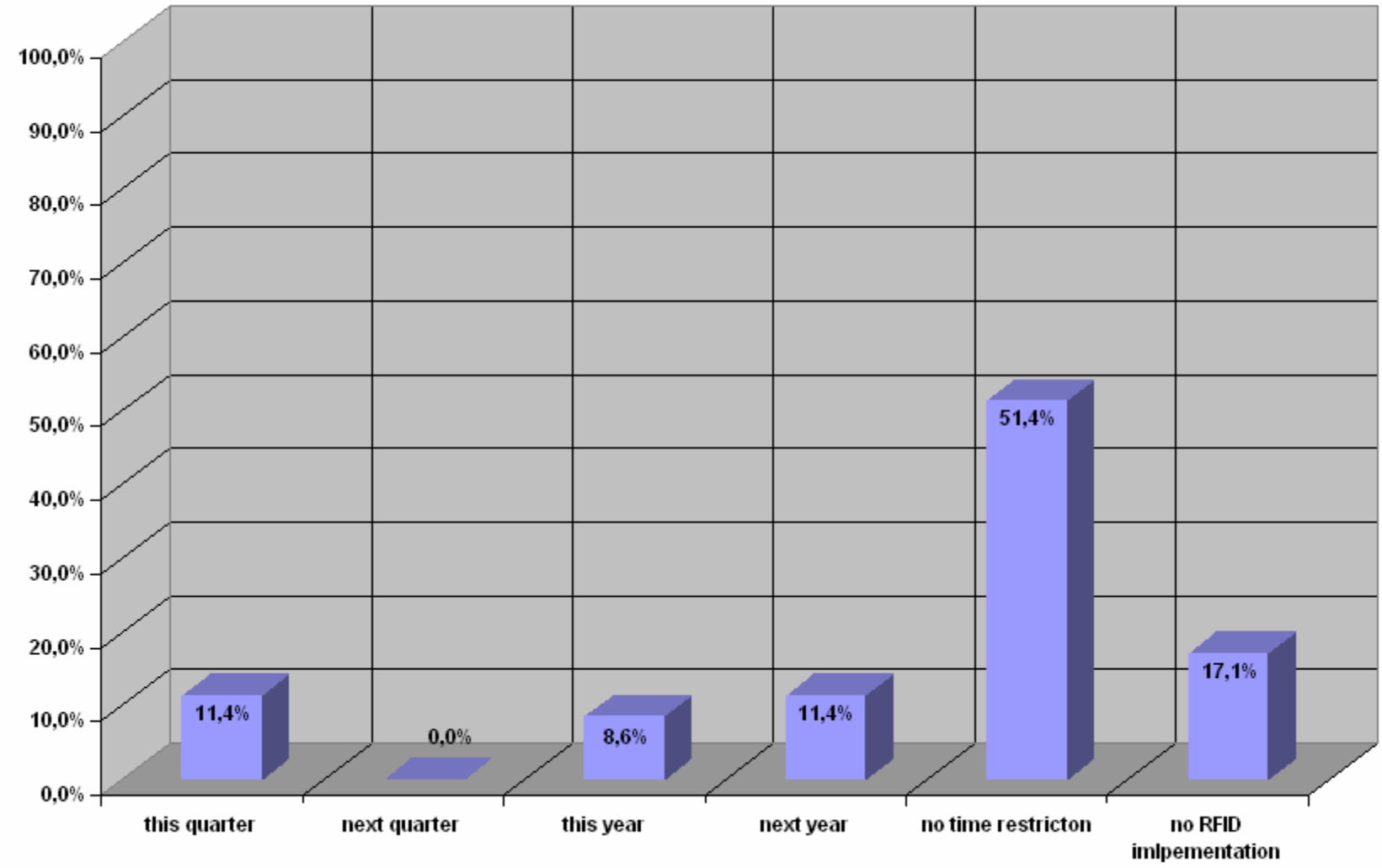
Back to the survey – RFID implementation by when?



RFID Projects in Co-operation with Industries (SME)

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non-standard processes

- choose the **right** transponder
- every RFID project is **special**
- RFID is **complex**, that's natural
- no **plug `n` ident**
- elaboration of **case studies** or **realization of pilot projects** meaningful
- **knowledge** and **method competence** as a result of complex planning and problems are necessary

Thank you for your attention!

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