AmI Technologies Based Business Improvement in Manufacturing SMEs

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- Objectives

- Ambient Intelligence (AmI) Reference Model for Industry

- Methodology Development Constraints

- The two Stage Optimisation Process

- Business Case Example

- Conclusion

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Methodology required enabling SMEs to make decisions on:

- – To what extent AmI technologies can create innovation potentials

- – In which of their business processes

Relationships

?

Business Processes

SP i **Sub-Process**   Ai.n **Activity**   • **Task**   ↗ **Interaction**
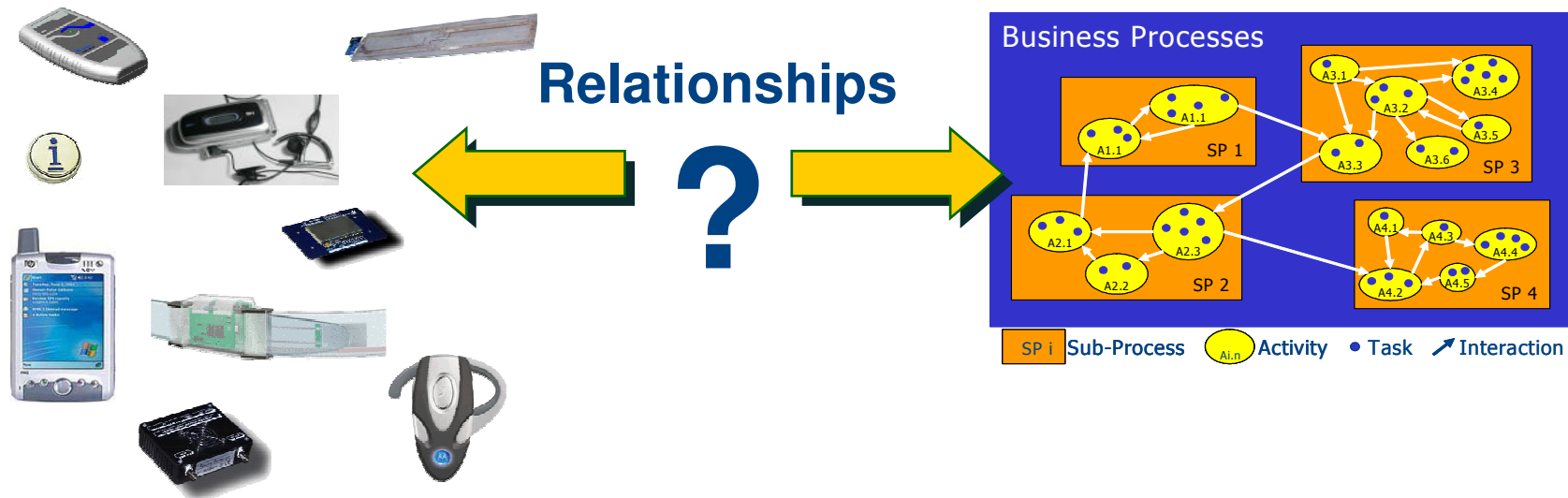
AmI Concept:

- Surrounding people with electronic environments, sensitive and responsive to their wishes.

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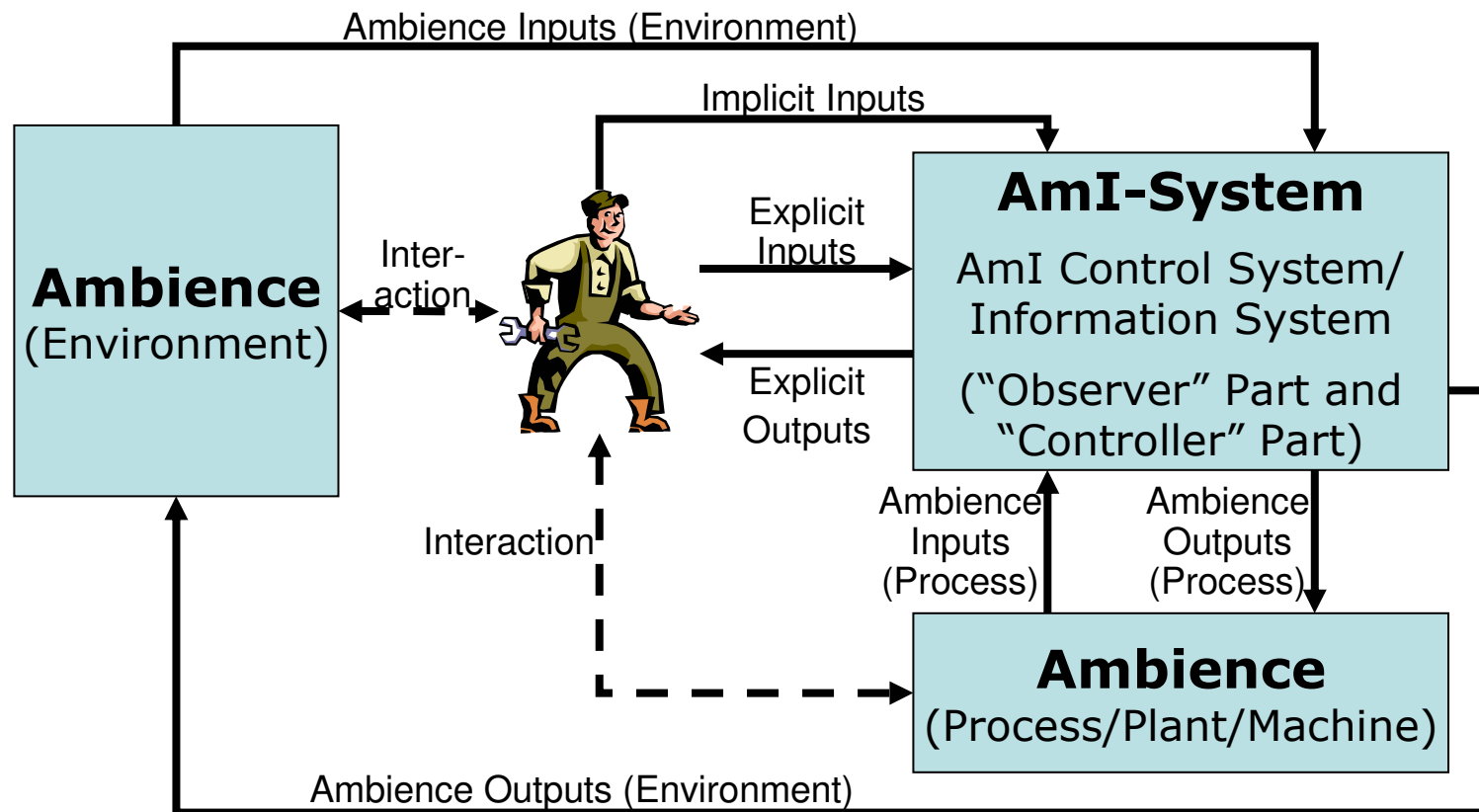
SME Constraints - Initial Situation

- Limited investment scope: Focus on measures creating most benefits at minimal risk.

- Business processes executions in SMEs often individually and experience driven.

- Insufficient integrated ICT infrastructure.

- SME position not going for AmI technology experiments.

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The two Stage Optimisation Process:

- ## Process Dimension
  Targeting QCS-optimisation of the business process execution, supported by an advanced & integrated companywide ICT system, open for the integration in an EE ICT environment

- ## Human Centric Dimension
  Targeting the creation of a context sensitive intelligent ICT environment for the human operators involved in the different business processes based on AmI technologies potentials

Process Dimension

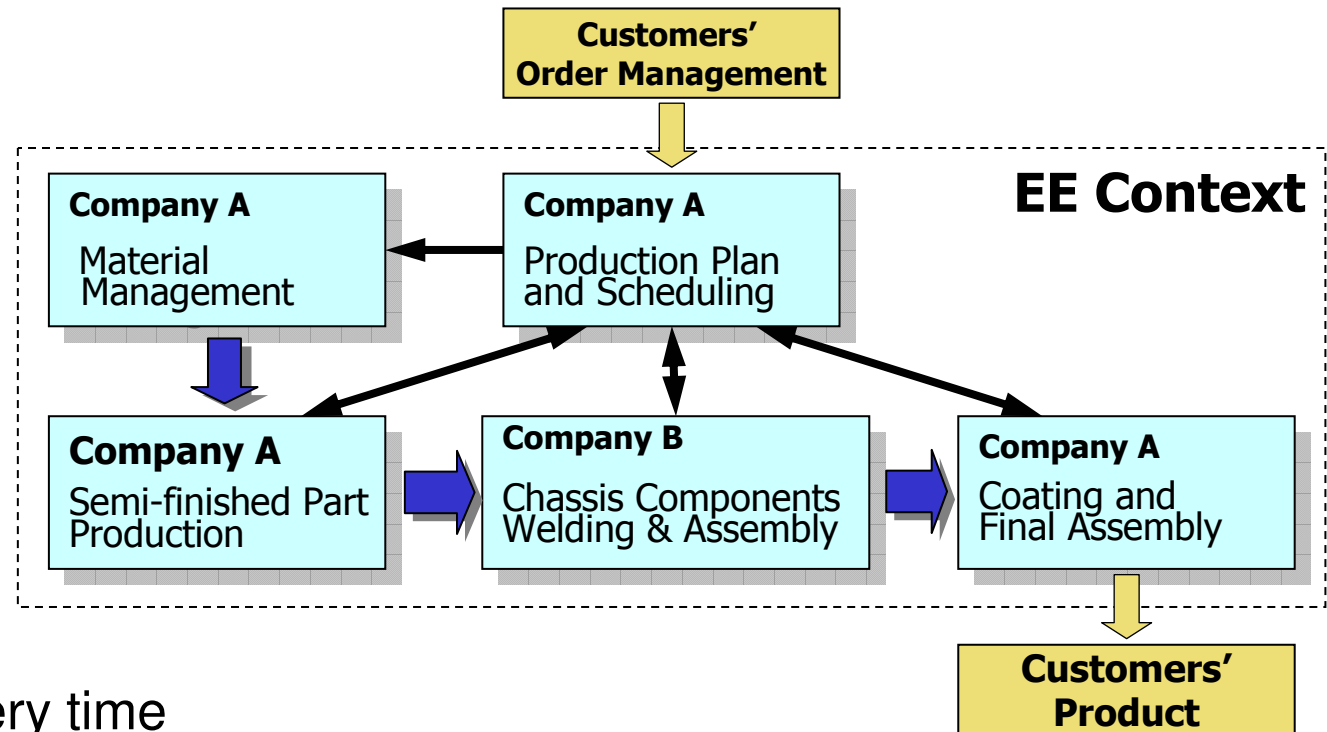ICT supported QCS optimisation of business processes

Human Centric Dimension AmI Technology Potentials

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Company A

Company B

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Customers' Order Management

EE Context

Company A Material Management	Company A Production Plan and Scheduling

Company A Semi-finished Part Production	Company B Chassis Components Welding & Assembly	Company A Coating and Final Assembly

Customers' Product

QCS-Objectives

- Decreasing delivery time
- Increased flexibility w.r.t. order changes
- Faster reconfiguration of the production
- Decreasing lead time
- Increasing productivity
- Decreasing wasted material

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- **Production Operations Management:**

  - **Weak Point 1:**
    Delayed update of the production progress information by foremen and missing actual status information along the entire assembly line.

  - **Weak Point 2:**
    Delays sometimes detected too late, reducing the reaction time for problem elimination

  - **Weak Point 3:**
    Rescheduling of the production order sequence is too slow.

- **Materials Management:**

  - **Weak Point 4:**
    Semi-finished products are not delivered order related to the frame welding areas, causing sometimes missing material or waste of material.

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Sub-process	New Method of Work	Classical ICT Activity Support
Production Operations Management	• Immediate update of production progress information • Immediate notification of critical delays • Provision of PM with rescheduling relevant information • Immediate rescheduling of the production order w.r.t rescheduling and product constraints	• Installed PC based production status control software to be extended for the support of rescheduling and reconfiguration activities • Installation of new production status control terminals in the welding shop floor area
Materials Management	• Customer order related delivery of semi-finished products • Delivery event to be recorded to the production status control	• Software support for order related commissioning of semi-finished materials • Extension of the installed PC based production status control software to manage delivery events

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Sub-process	New Method of Work	AmI Based Solution
Production Operations Management	• Immediate update of production progress information • Immediate notification of critical delays • Provision of rescheduling relevant information • Immediate rescheduling of the production order w.r.t rescheduling and product constraints	• RFID technologies for automatic recording of the truck chassis leaving production area. • Automatic warning of PM in case of production delays visual and via voice information • Commanding of rescheduling needs by PM via touch screen or speech commands and feedback of planning results via PDA • Mobile access to ERP system via PDA by PM and Foreman
Materials Management	• Delivery event to be recorded to the production status control	• RFID technologies for recording of commissioned transport units. • Automatic recording of delivery event to status control SW

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- Methodology test indicates that SMEs achieve a good understanding on AmI potentials.

- AmI technology vendors develop sets of AmI technology Building Blocks (BB), enabling a fast and cost efficient realisation of AmI solutions in SMEs.

- Key BB domains address mobile multimodal services (wireless, multimedia), RFID-solutions and speech recognition systems.

- Innovative BB approach represents a promising exploitation strategy for vendors to open up the SME market.

- Further RTD activities required to push AmI technology:
  - Further validation on methodology and BB-concept for other manufacturing processes in different industrial sectors,
  - Validation in other collaborative working environments (i.e. government und health care domain).

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