FREIGHT TRANSPORT VISIBILITY PROVIDED BY RFID

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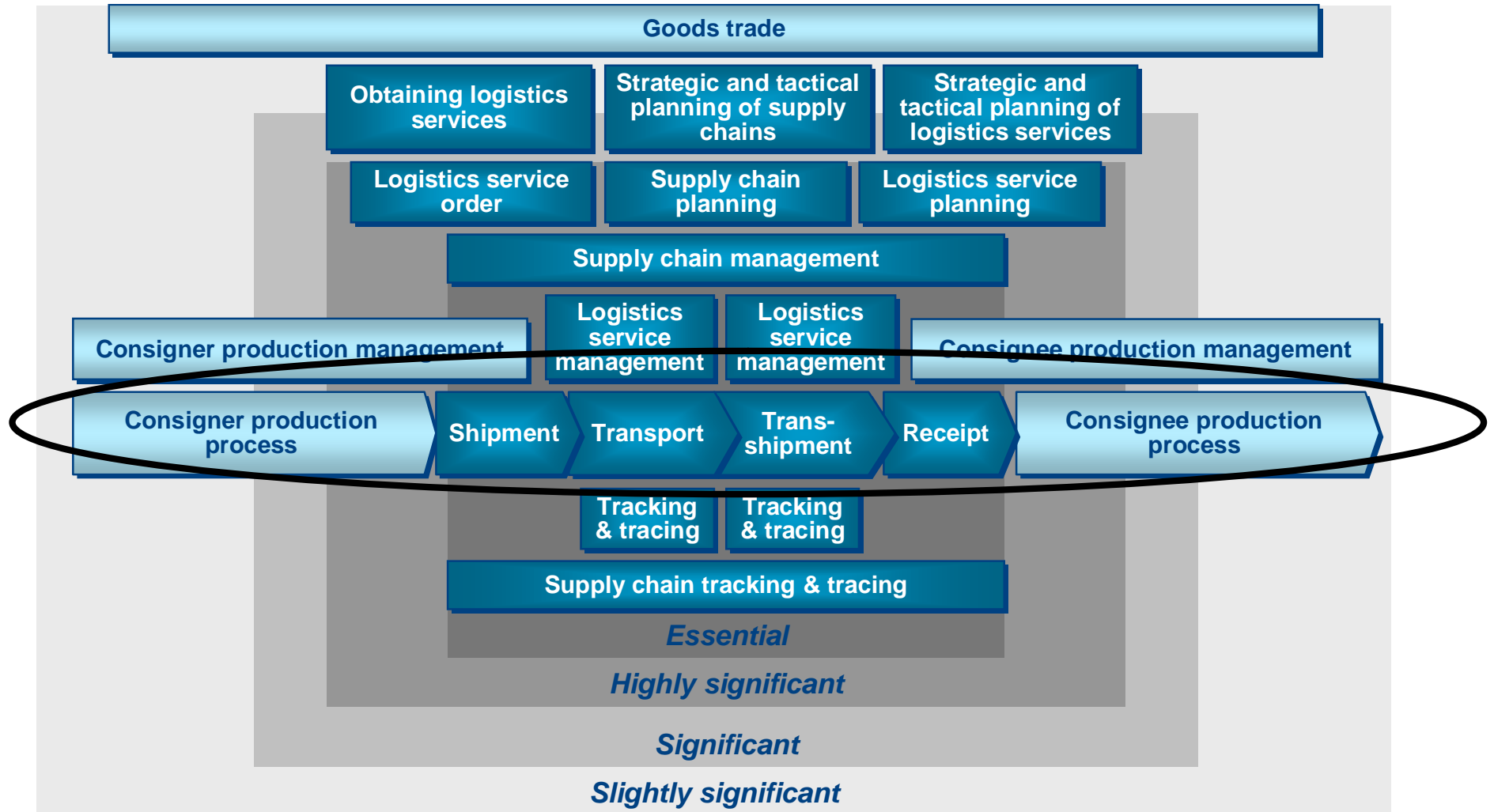TS028-3524

Business from technology

RFID and identification

- Automated identification is a basic function for implementing efficient tracking and tracing and status & authenticity systems in supply chains

- RFID allows to identify objects automatically without visual contact at several meters reading range

- By improving the visibility in the supply chain, the different actors involved can improve the efficiency of their processes and lower operational costs

- RFID is an enabling actor for visibility, but requires the involvement of all participants in the supply chain

RFID and identification

- There is a wide range of RFID techniques: from small inductive tags with a few cm reading range to active microwave or UHF active transponders with 100 meter
- Lack of widely industrially accepted standards and business models has delayed wide deployment of RFID techniques in supply chains between different actors
- The target in a supply chain can be the product, transport unit or item, freight container or vehicle
- Tracking levels can be linked hierarchically to each other so that by reading the "highest level" all other items should identified

Logistics processes

Goods trade

Obtaining logistics services | **Strategic and tactical planning of supply chains** | **Strategic and tactical planning of logistics services**

Logistics service order | **Supply chain planning** | **Logistics service planning**

Supply chain management

Consigner production management | **Logistics service management** | **Logistics service management** | **Consignee production management**

Consigner production process | **Shipment** | **Transport** | **Trans-shipment** | **Receipt** | **Consignee production process**

Tracking & tracing | **Tracking & tracing**

Supply chain tracking & tracing

Essential

Highly significant

Significant

Slightly significant

http://www.vtt.fi/rte/projects/fits/julkaisut/hanke1/fits25_2003.pdf

Drivers

- Efficiency of processes should be improved: This demands for new operating concepts, opening bottlenecks, efficiency goals, agreed information content and the sharing of technological compatibility between the different actors in the supply chain

- Cost-effectiveness and profit: Supply chain visibility should increase the predictability and reliability of supplies. Manual work should be reduced. Through deployment of RFID more accurate and faster information has to become available.

- Visibility which means information sharing can also theoretically be justified
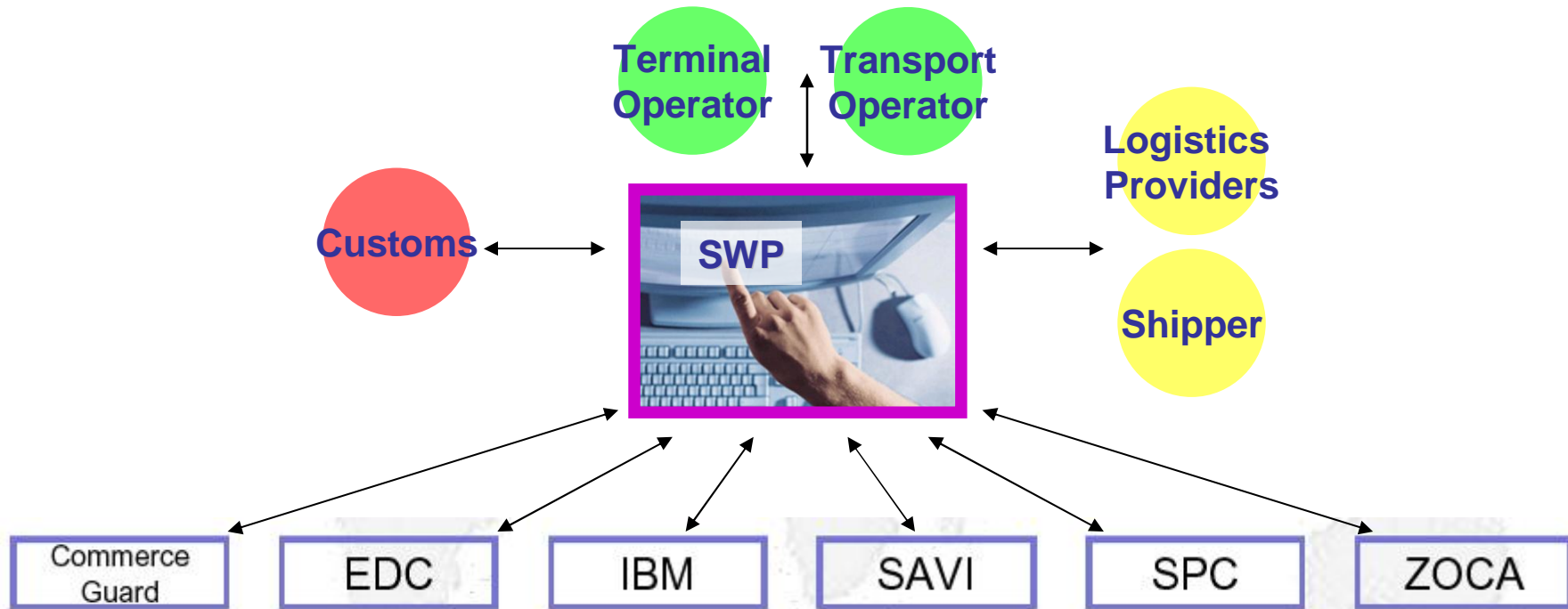
Vehicles and Transport Units

- TRACKIDEF project: Eight different active RFID systems were tested with a container. Two active railway RFID systems were piloted in harbour conditions. Both piloted systems functioned well

- DoD mandates that all containers, air pallets, and large airframe and vehicle component containers must be equipped with active RFID tags by the shipper. The shipper writes the data into the tag and servers.

- METRO tracks the boxes at loading in Hong Kong, in ports, and at arriving at the Port of Duisburg. The driver is visibility, including improved management, locationing, and security as well as reduced lead times and inventory

Vehicles and Transport Units
Smart Container Chain Management project
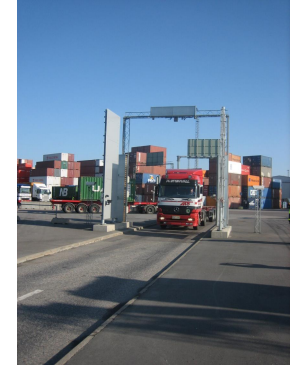
- Two demonstrators will validate all processes and technologies, using on board container technologies and dedicated management platforms in a door-to-door chain between Europe -Middle East / Asia/Pacific
- Customs' requirements to be supported; Green Lanes implementation for Ocean Freight
    - Data transfer including optional scanner results to customs for advance risk based assessment of inbound containers
- Through the RFID, handling companies can be provided with necessary data when a container enters the platform
- The Container Security Devices (CSD) with satellite network are used to communicate the status information

Vehicles and Transport Units
Smart Container Chain Management project

Terminal Operator

Transport Operator

Logistics Providers

Customs

SWP

Shipper

Commerce Guard | EDC | IBM | SAVI | SPC | ZOCA

Container Security Technology (CST): active RFID / satellite comms / multi-sensoric units

Pallets and General Cargo Factory

- ABB implemented RFID solution in its order-supply chain
- Empty material containers trigger an automatic materials order, which shows up on the supplier's extranet. Correspondingly, the supplier executing the order inputs an electronic shipping document into the RFID tag of full pallets
- At ABB's end the goods are automatically entered and registered in the ERP, via a drive-through RFID portal
- The system increases productivity and efficiency
- It increases the transparency by reducing the time it takes to initiate orders, receive goods and rectify errors

Pallets and General Cargo
# Bakery and Retail

- The pilot at Moilanen bakery consisted of identification of frozen bakery products pallet loads. Cold storage conditions did not affect the operation of tags. Each identification saved about 2.5 min working time.

- Metro has implemented the EPC Gen2 standard system in pallet identification in 2006, and has reported on good results. After the first year it was estimated that the efficiency of processes had increased, losses declined, the availability of stocks rose and work in storage decreased

Pallets and General Cargo
Paper reel

- Paper industry has developed a globally operable RFID tag. Tag bases on omnidirectional C-tag tag antenna, located on the core
- Omnidirectional reading means that there is no need to turn the reel for desired identification orientation
- There are two options for using RFID tags: either to choose the EPCglobal approach or use the ISO approach
- At the moment, European mills are using different codes (CEPI, IFRA and US NARI code. These codes have similarities but also differences

Vertically orientated reel

Reel core

Omnidirectional reading horizontally 360° around the reel

Tag
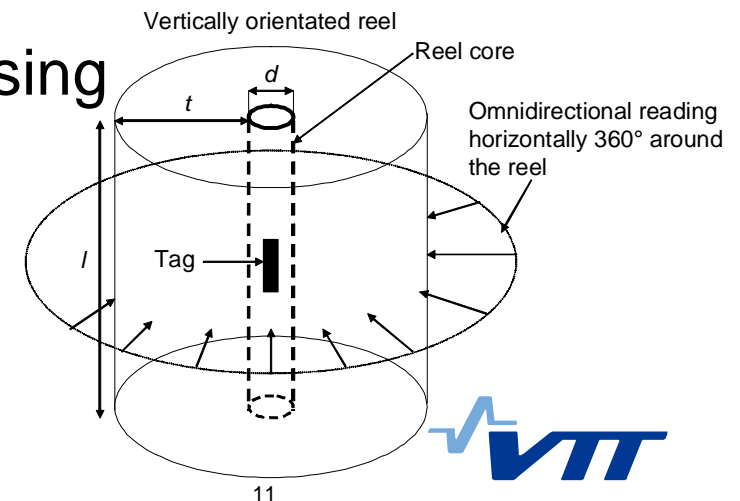
Discussion

- Different parties may have very different interests in identification
- Consignor/consignee point of view is the management and control of the shipment along the supply chain. Logistics service providers have different aims, e.g. optimisation of vehicle fleet.
- Both transport unit and pallet cases shows clearly that RFID technology is a solution for supply chain visibility.
- Metro and DoD cases base on public material from these organisations and certain degree of criticalness must be in the interpretation of the results.

New Network Processes and IT Architecture

- Most enterprises desire to implement RFID without making many changes to existing processes. Changes in processes are often justified through improvement of operation efficiency, improved cooperation with the partner network, added value for the customer, improvement of the position on the market or with cost savings.

- Solution for IT-architecture is needed when implementing RFID. There are several reference architectures like MOSES, FREIGHTWISE, RoSETTANET and TARKKI which can be applied.

- Middleware software, which processes the information from the RFID readers and passes the results to the ERP system, offers the flexibility demanded by the companies.

Costs and Benefits

- Distribution of costs and benefits in a network has a big impact on RFID investment decisions.
- There are simple tools in Internet for the cost-benefit analysis, which calculate e.g. the pay back time for the investment. As all RFID cases are different, the calculation models can not be detailed.
- Experiences from different pilots and implementations give good basis for start-up: Start the planning early, understand the scale, choose the right partners, do not perform IT integration if you are not the expert, make pilots and test different types of exception situations. Take the risks into account.

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