Using a RFID-University-based laboratory for homeland security applications testing

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3rd RNSA Workshop on the Social Implications of National Security

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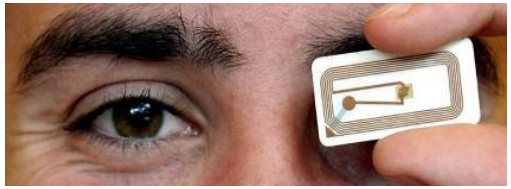
Presentation outline

- Objective of the presentation
- Technological, conceptual and contextual issues
- RFID University-based laboratory
- Discussion



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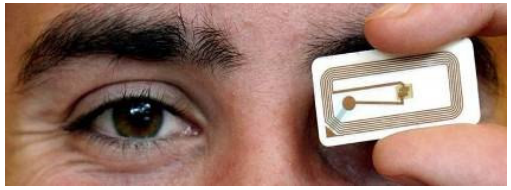

Objective of the presentation

- Insights into a RFID-University-based laboratory
  - Acts as a pole of innovation for homeland security applications testing
  - Shows through a case study how the laboratory helps Canadian SMEs to fulfil the C-TPAT

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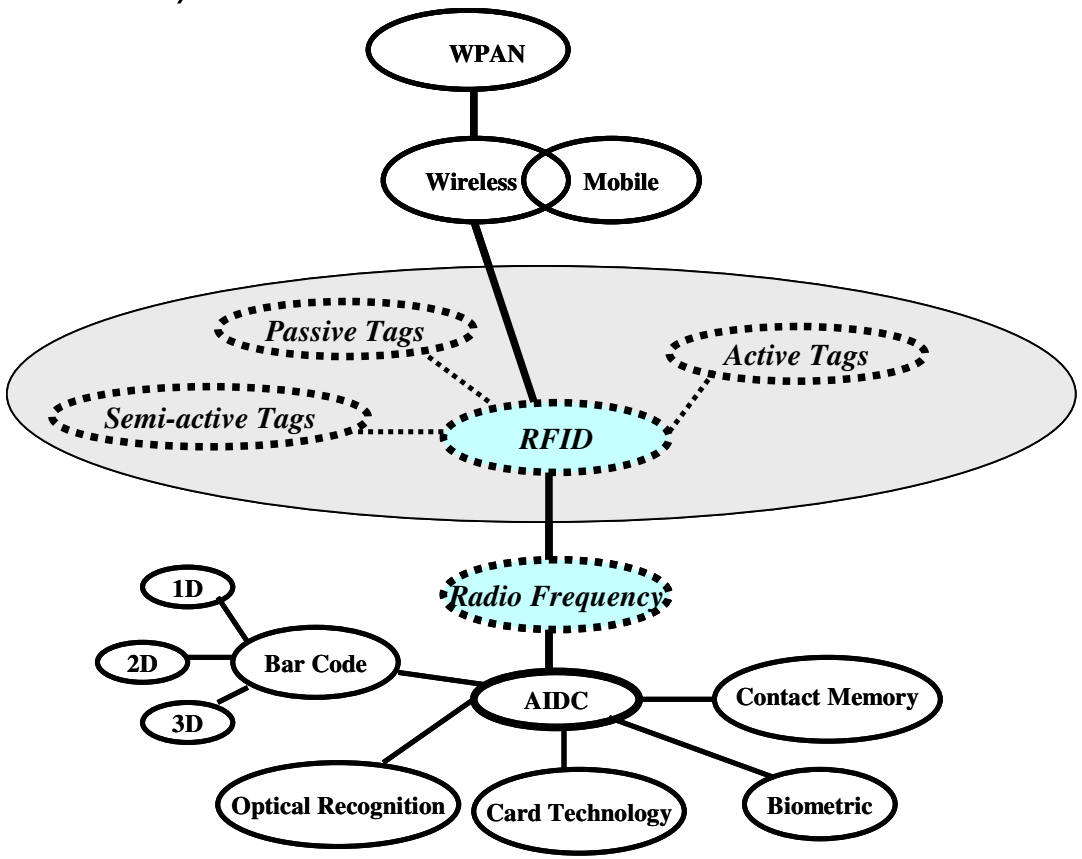
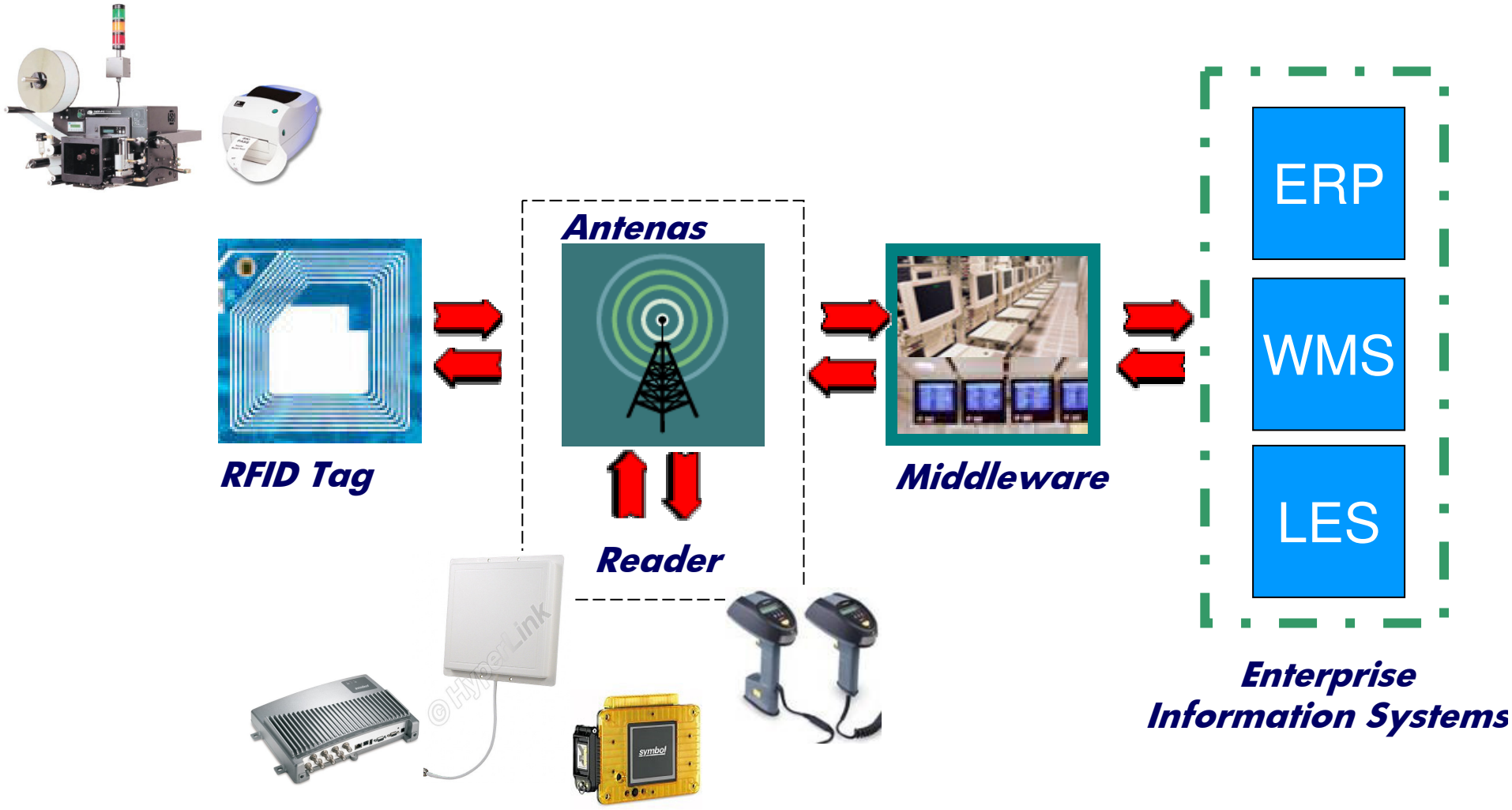
RFID technology as wireless AIDC

RFID is a technology that uses radio waves to automatically identify individual items or products in real time in a given supply chain with a minimal (human) intervention (Poirier and McCollum, 2006)



Source: adapted from Fosso Wamba et al.(2008)

RFID technology, not only tags

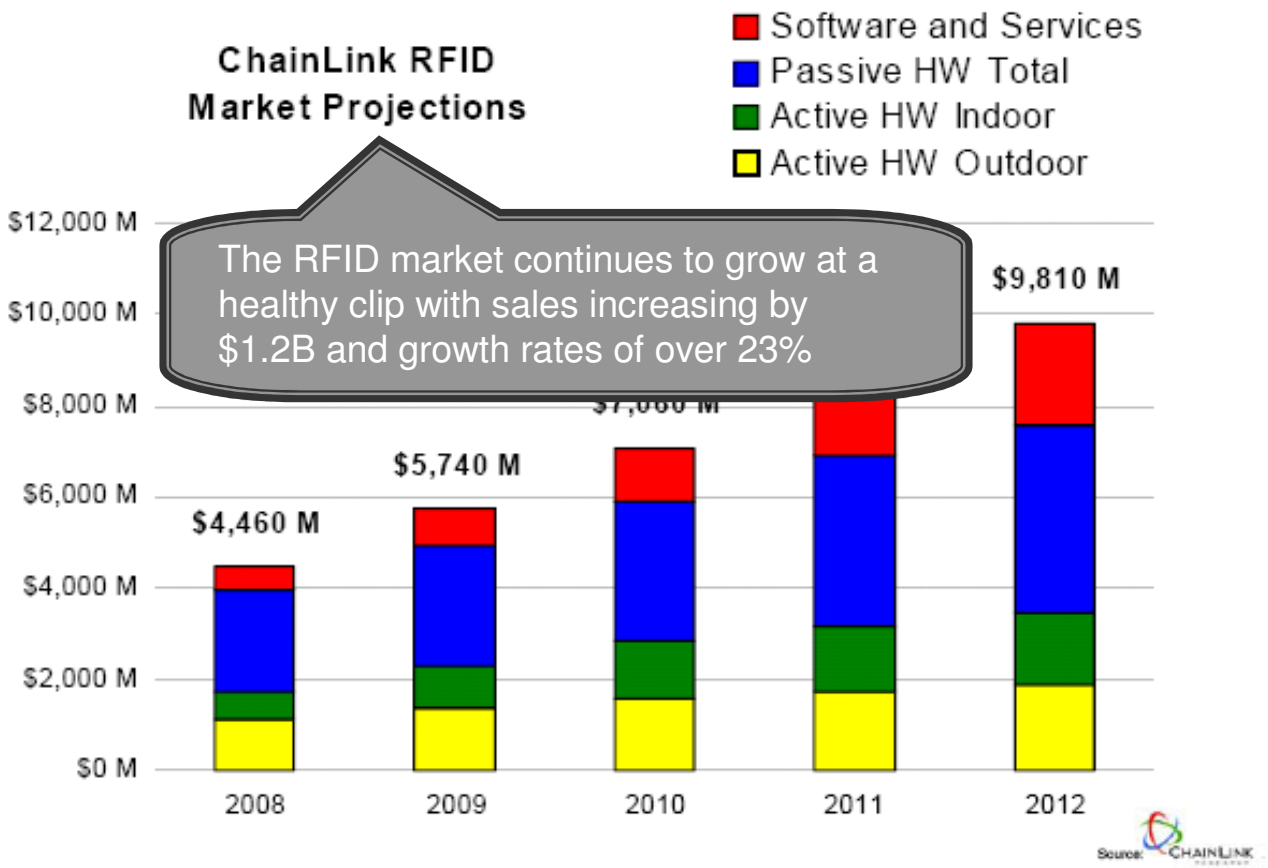


RFID technology vs. Barcode

	Barcode/ UPC	RFID Tag/EPC
Efficiency	Ability to read one tag at a time (line of sight required)	Ability to read multiple tags simultaneously (no line of sight required)
Dependability	Labels easily damaged	Tags less susceptible to damage Can be used in harsher environments
Data Capacity	Limited amount of data can be assigned	Significantly higher data capacity to capture detailed information about product Accuracy close to 100%
Flexibility	Static information	Potential for read/ write capability, making tags reusable

Source: IBM

RFID technology market



RFID technology in the border security market

- Border security is expected to be one of the top growth markets in the homeland security sector
- $13.98 billion by end of 2011
- A compound annual growth rate of 19.5%

Top 10 homeland security industry sectors are forecasted to grow by 60 percent to 400 percent during 2007-2011

RFID technology traditional applications

Supply Chain

Asset Tracking

Consumer Applications

Security & Access Control

Homeland security applications: Case of e-Passport

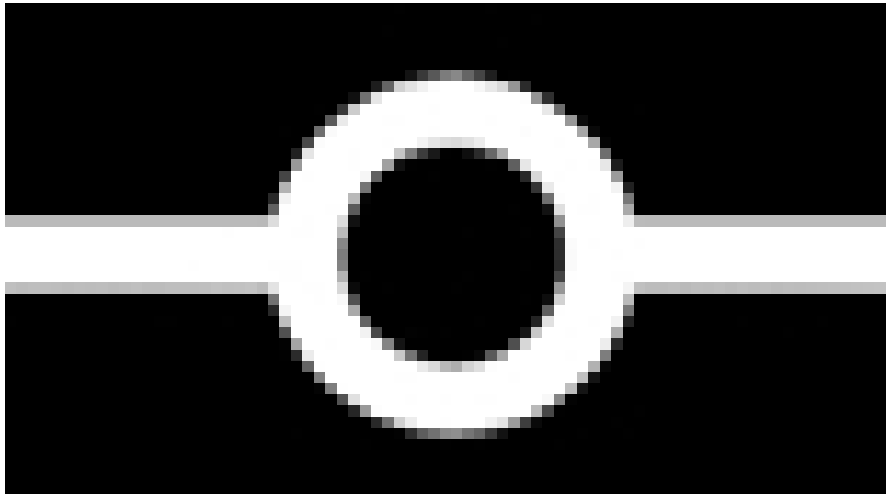
By October 2006:

Almost all U.S. passports will include an RFID-enabled chip containing about a unique identification number for the passport holder

Facilitating and Securing International Travel

e-Passport: Which information?

- An e-Passport contains an electronic chip
  - Holder's name
  - Date of birth
  - Biographic information



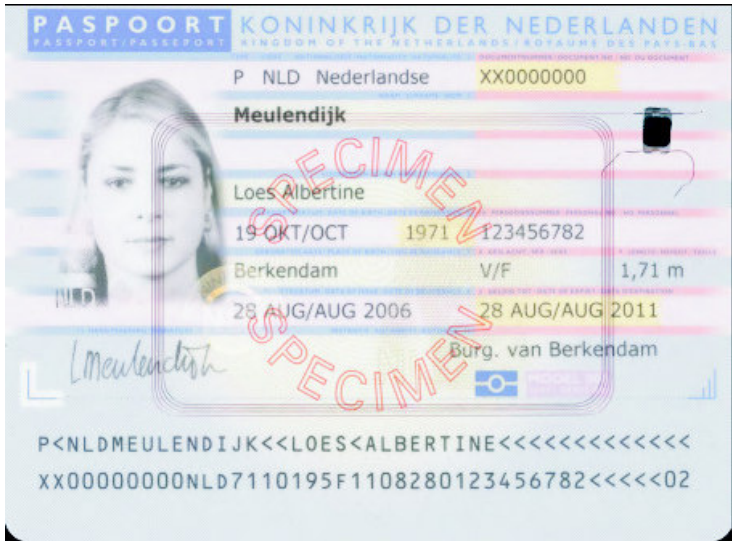
e-Passport logo

U.S.

- Chip contains a digital photograph of the holder

e-Passport: In practice…

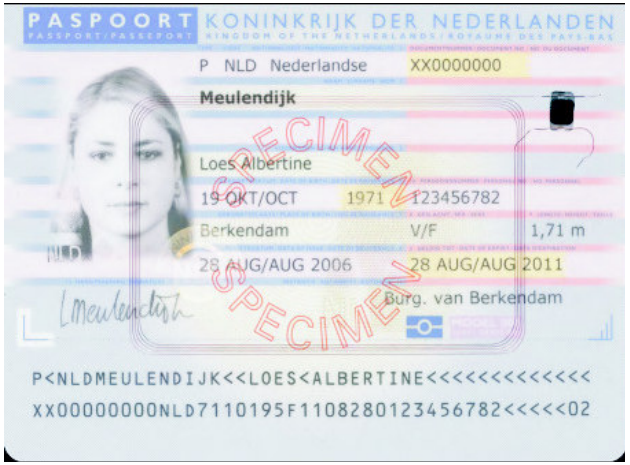
e-Passports contain sensitive personal information, security and integrity are critical



Source: Entrust

e-Passport: Cloning risks

"From my point of view all of these RFID passports are a huge waste of money. They're not increasing security at all."



"I'm not opposed to chips on ID cards, I am opposed to RFID chips. My fear is surreptitious access: someone could read the chip and learn your identity without your knowledge or consent"

Enabling the C-TPAT using RFID

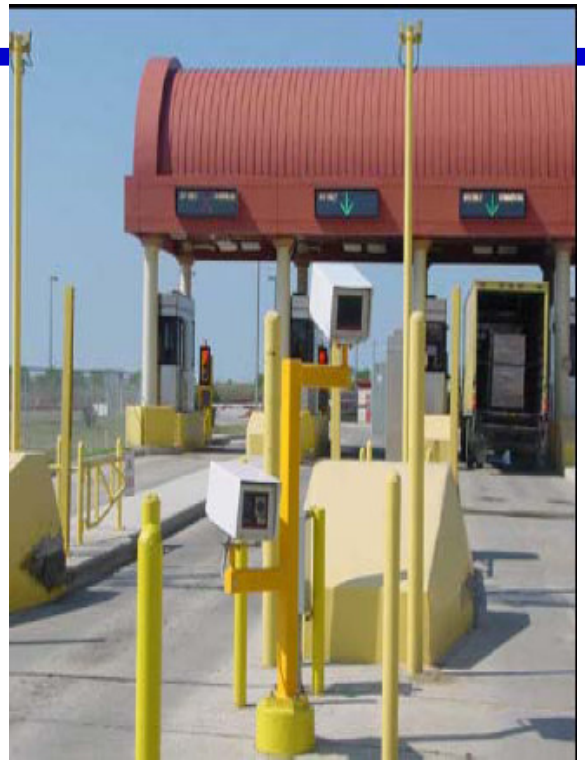
- Customs - Trade Partnership Against Terrorism (C-TPAT)
- Automated Cargo Environment
- Automated License Plate Reader
  - U.S. uses two types of RFID technology for border management
    - Vicinity RFID
      - Read by authorized readers from up to 20 to 30 feet
    - Proximity RFID
    - Must be scanned in close proximity

U.S. Customs and Border Protection

Technology at the border: The C-TPAT

- Ensure that C-TPAT partners improve the security of their supply chains pursuant to C-TPAT security criteria
- Provide incentives and benefits to include expedited processing of C-TPAT shipments to C-TPAT partners
- Internationalize the core principles of C-TPAT through cooperation and coordination with the international community
- Support other CBP security and facilitation initiatives
- Improve administration of the C-TPAT program

Technology at the border: Case of RFID



- License Plate Reader system automatically locates, reads, processes and communicates license plate information from passenger vehicles that are entering and exiting the U.S. borders

Technology at the border: RFID in action

- Mobile RFID reader to determine the exact source of a radiation alarm

Technology at the border: Case of a portal

- A portal provides
  - A passive
  - Non-intrusive means
- To screen cars, trucks and other conveyances for the presence of radioactive and nuclear materials

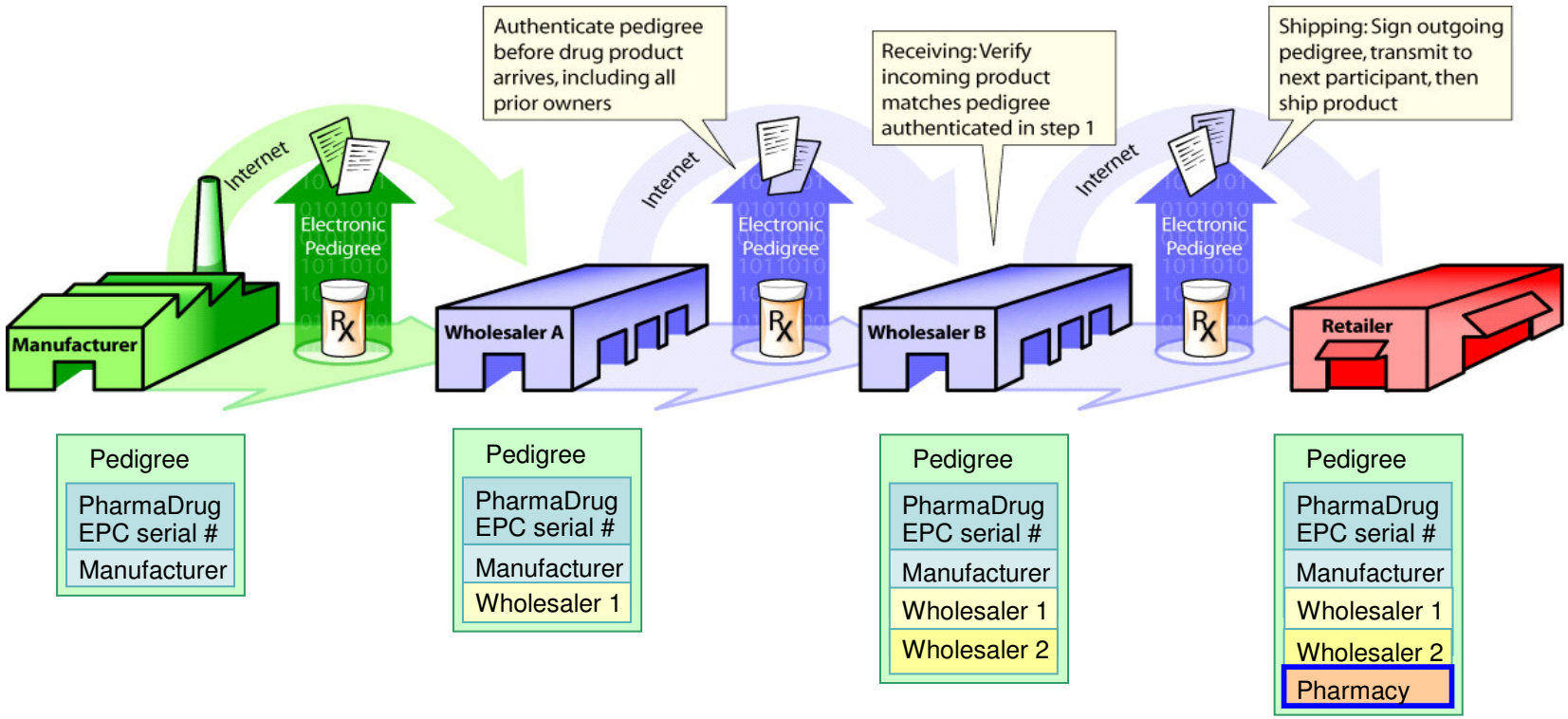
John Leyden: http://www.theregister.co.uk/2006/08/04/e-passport_hack_

The Safety chain: What's the problem?

- The growing and imminent threat of counterfeit medicines
- Significant threats to
  - Patient safety
  - Trust in safety of medicines
- FDA – increasing desire for electronic pedigree systems
  - Federal Laws have moved faster
  - Nevada, California, Florida …… now require electronic pedigree showing chain of custody for certain drugs

Supply chain security: Case of e-Pedigree

Pedigree tracks product flow throughout supply chain

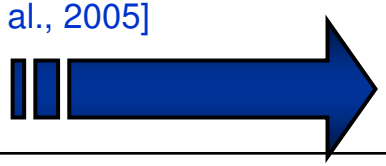


Source: ePedigree Pilot

Evaluating the business value of RFID applications: Focal firm perspective

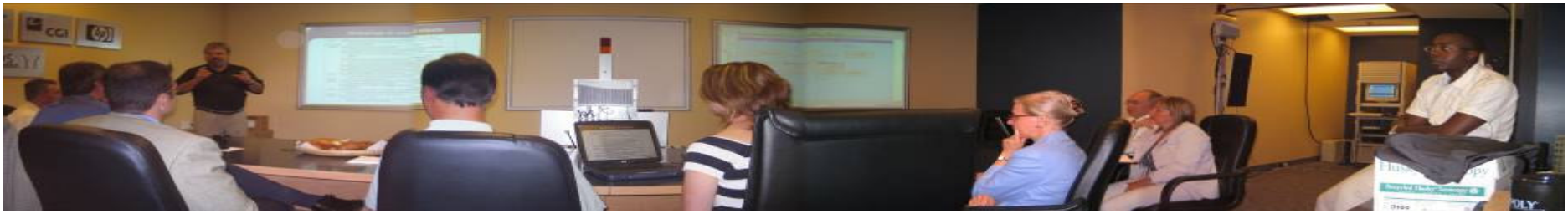
"More than ever IT executives encounter the justification issue due to senior management's insistence that the investment be properly utilized" [Devaraj and Kohli, 2003 p. 273]

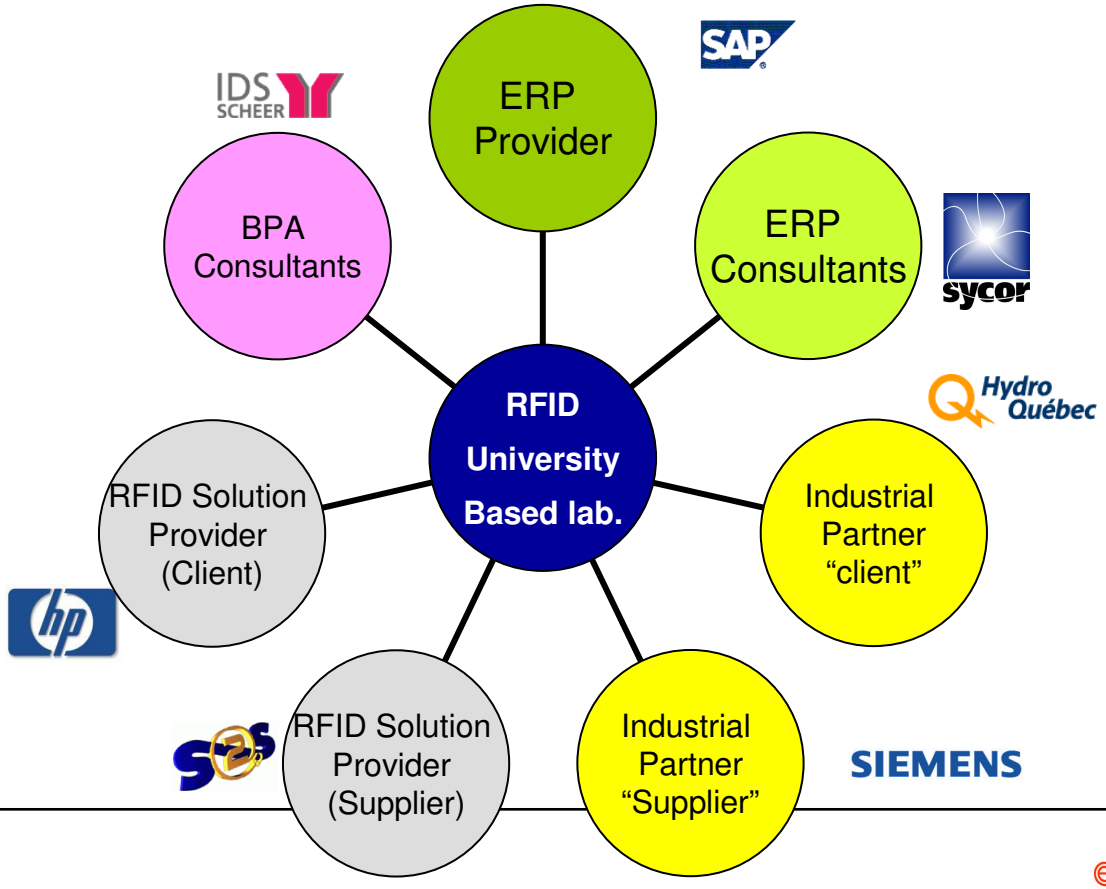
- Production-economics approach
  - Study the relationship between IT investments and productivity
  - ROI: cost savings, quality of service improvement and better customer service [Brynjolfsson and Hitt, 1996]
- Process-oriented approach
  - Assess the impact of IT investments on specific processes[Pavlou et al., 2005]



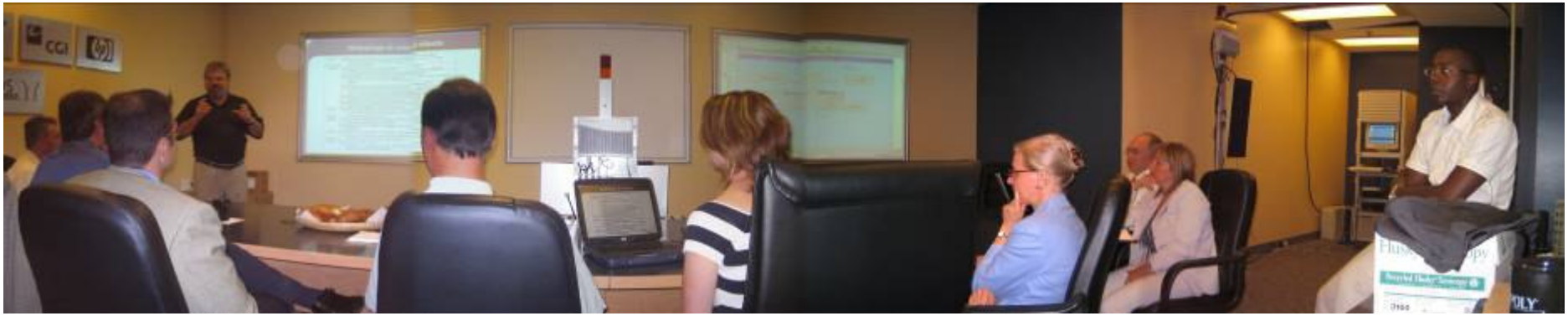
- "Impacts of IT investments are "perhaps better observed at the process level (versus the firm level)" [Pavlou et al., 2005 p. 200]
- Best approach to study the impact of IT at the locus of it impact [Byrd et al., 2003]
- RFID University-based lab.

RFID University-based laboratory: Multiple players





RFID University-based laboratory: Case of Liaisoncanus and Galderma



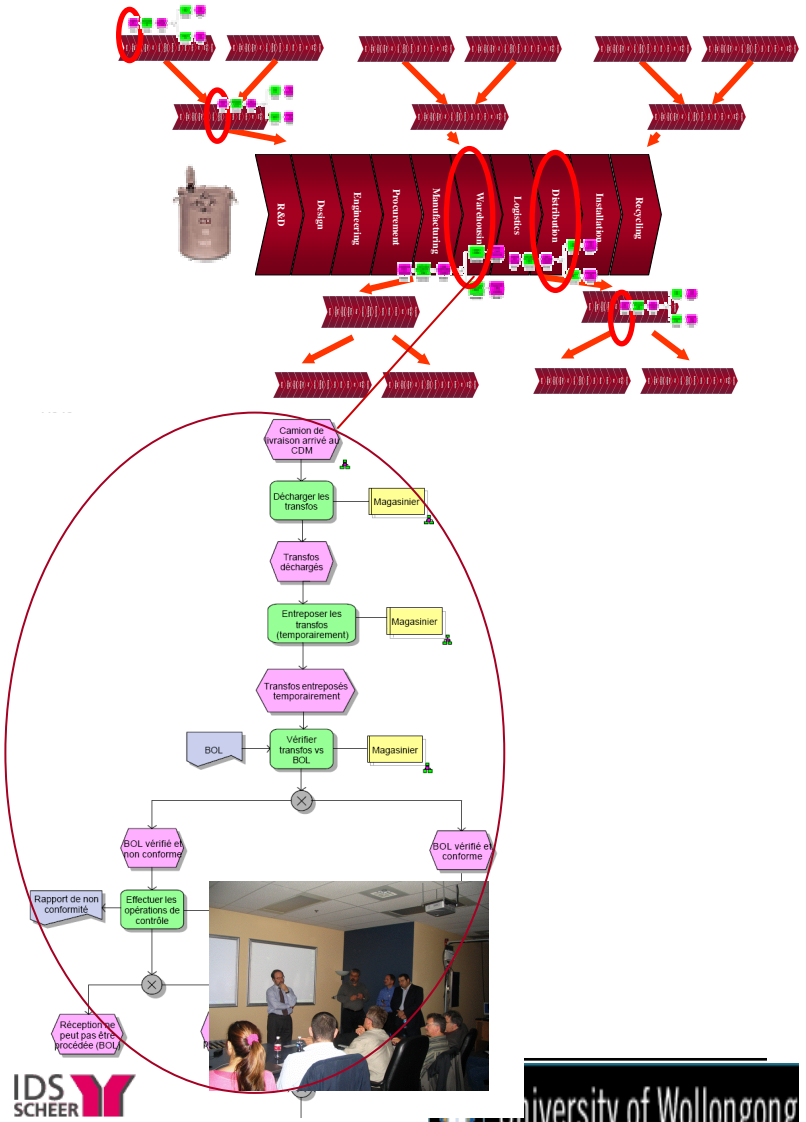
- Liaisoncanus
  - Logistics
  - C-TPAT
- Galderma
  - e-Pedigree

LIAISON CAN/US INC. COURIER 1986 INC

GALDERMA
Committed to the future of dermatology

RFID University-based laboratory: Implementation

- RFID – Why?
- RFID - For Which critical activities and Why?
- RFID - With Whom in the network?
- Mapping of («As is») intra- and inter-business processes (How?)
  - (i) on-site observations,
  - (ii) interviews
  - (iii) joint working session with industrial partners in laboratory settings



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IDS SCHEER

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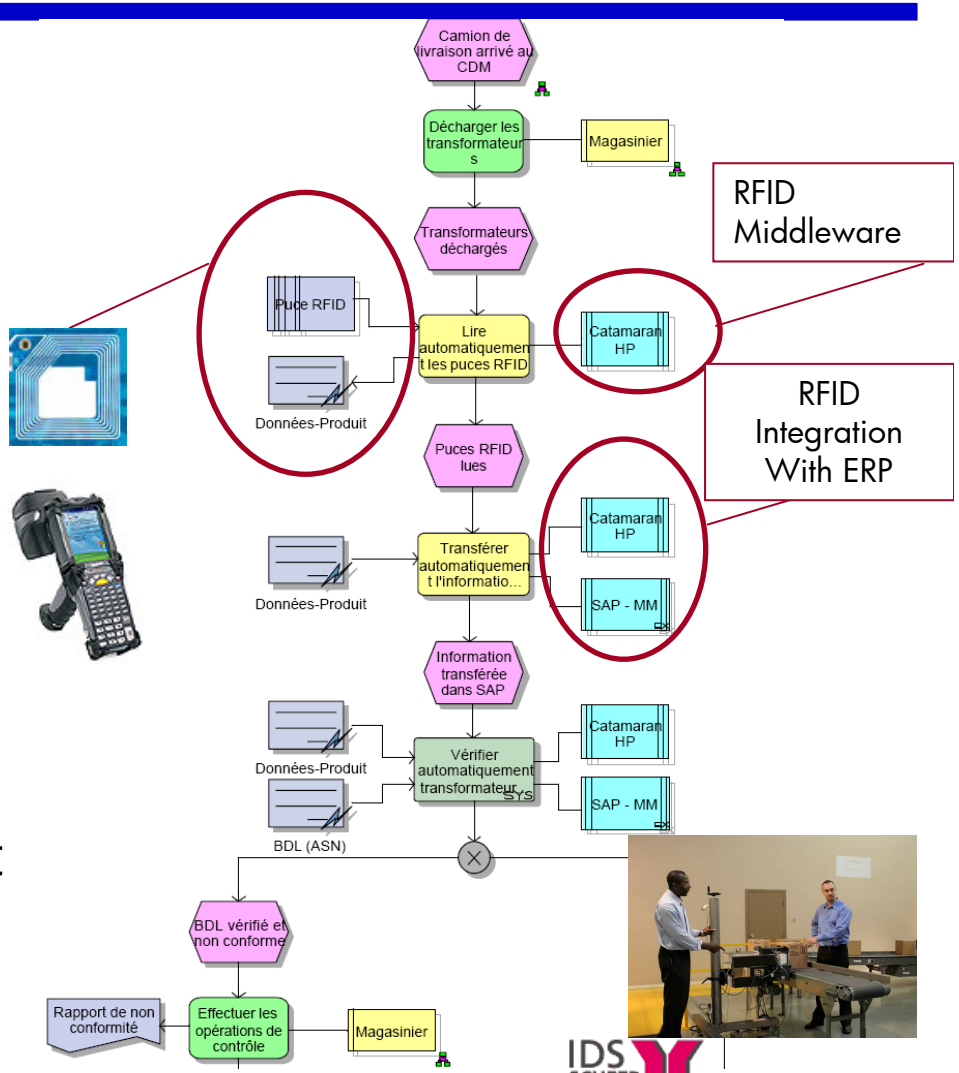
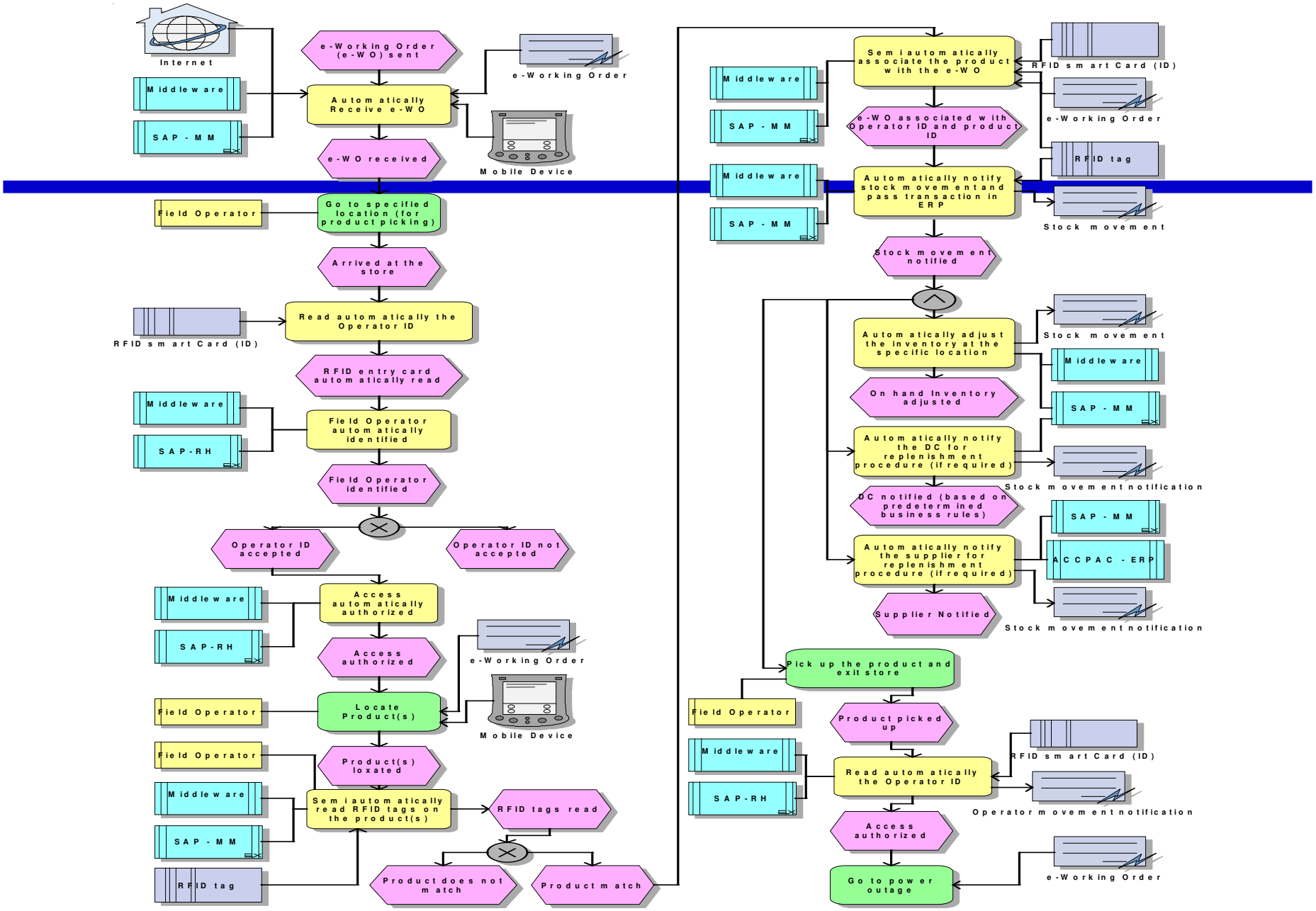
RFID University-based laboratory: Scenario building

- Evaluation of RFID opportunities
  - Level of granularity
- Evaluation of RFID potential applications
  - Scenario Building
- Validating RFID scenarios
  - Business processes
  - Technological solutions
- Simulating several scenarios
  - Final choice for proof of concept





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RFID University-based laboratory : Simulation environment

Simulation Lab

ERP

Real time transactions

- Proof of concept in controlled environment (i.e. laboratory)
  - simulating physical environment
  - Simulating technological environments
  - Simulating interfaces between SC players

Discussion

- **Practical implications**
  - In line with recent questions raised [Ngai et al., 2008; Curtin et al., 2007]
    - Need of models, theories, concepts, frameworks, methods, techniques, and tools
    - Meet the needs of practitioners and managers
    - The concept of a living laboratory as an insightful approach for exploring issues related to (RIFD enabled) homeland security applications

Discussion

- **RFID impacts**
  - Increase responsivess of organization managing emergency situations
  - RFID Can Reduce Delay at Entrances and Checkpoints
  - Still requires some human intervention
  - Challenges tasks
  - Privacy issues
    - Greater surveillance in RFID identification
    - What information is transferred during identification
  - Costs consideration
  - High level of collaboration
  - Engage in periodic risk assessments
  - Encryption should include the data in the tags

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