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RFID for Warehouse and Inventory Management 2020

RFID and IoT for Inventory and Warehouse Management 2020

Targeting the Correct RFID/IoT Technology for the Right Project

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CRI²GS Centre sur l'intelligence² en gestion de systèmes complexes

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Objective of the presentation

Understand how RFID/IoT can be used to gain visibility over your inventory?

- **Define the RFID/IoT strategy & select the right project**
- Use a Methodological approach to solve problems & identify opportunities
- Target the appropriate RFID/IoT technology for your specific case

Main Idea of the presentation

Image par MasterTux de Pixabay

But there is more than one way…

Image par Gerd Altmann de Pixabay

Image par Arek Socha de Pixabay

& more than one right solution for the right RFID/IoT project…

RFIDJOURNAL VIRTUAL EVENTS

Image par Arek Socha de Pixabay

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1-Define the RFID/IoT strategy

Vision & orientation

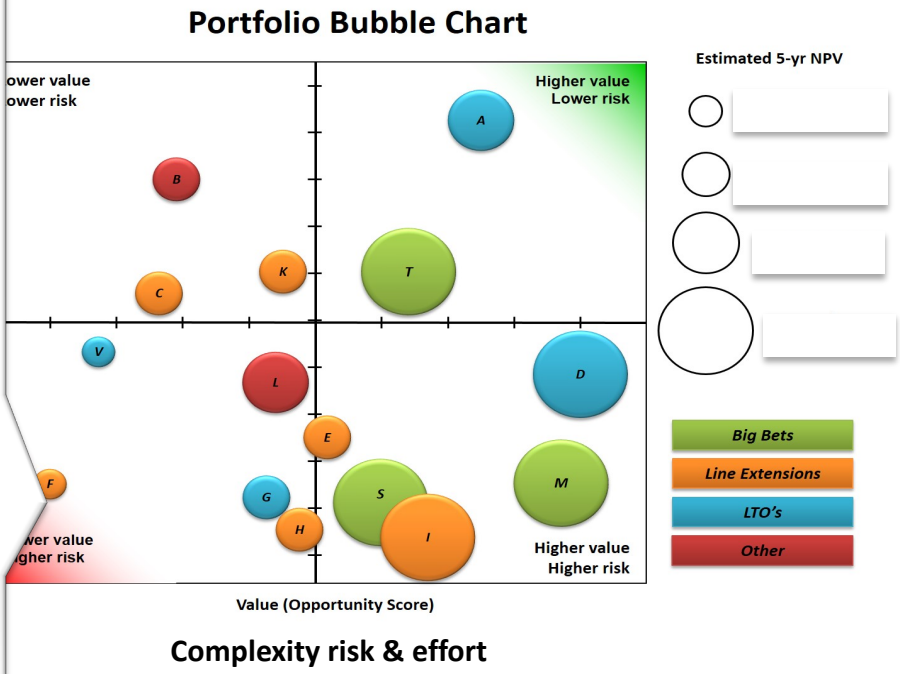
- How **effective** and **efficient** are the existing operations & business processes?
- What are the Strategic-Tactical-Operational **goals** of my warehouse/inventory project?
- How can RFID **help me** reach these goals?

"A vision without a plan is an hallucination"

Select the right RFID project

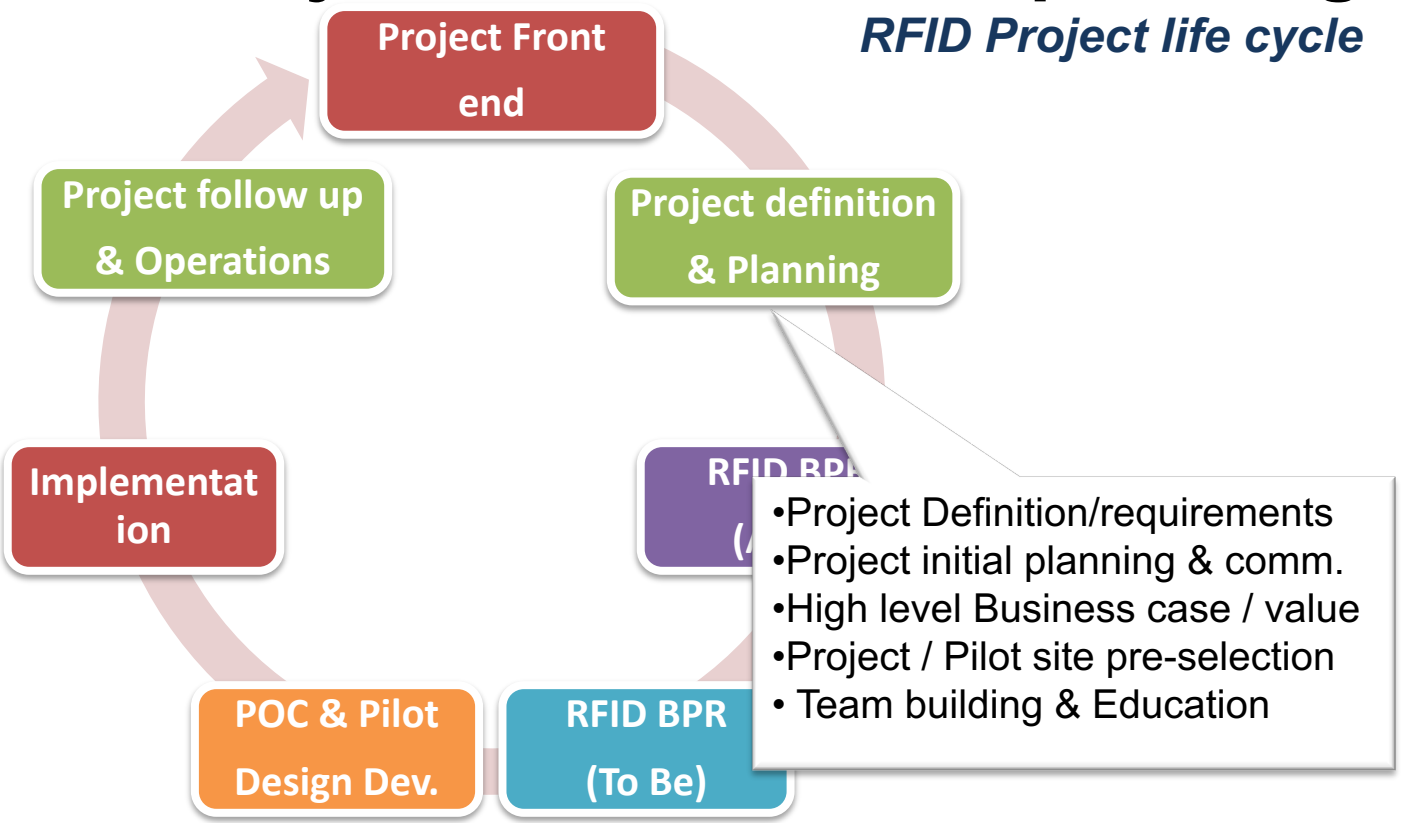
Project Portfolio Management

- Strategies
- Resource allocation (based on priorities)
- Financials Methods (yes but….)
- Bubble diagrams or portfolio maps
  - Classification XY, E.g. P(technical success) and benefits (NPV))
- Scoring Models
  - Selected criteria's
- Check-lists
  - Yes-No; Go-Kill points (Stage gate)

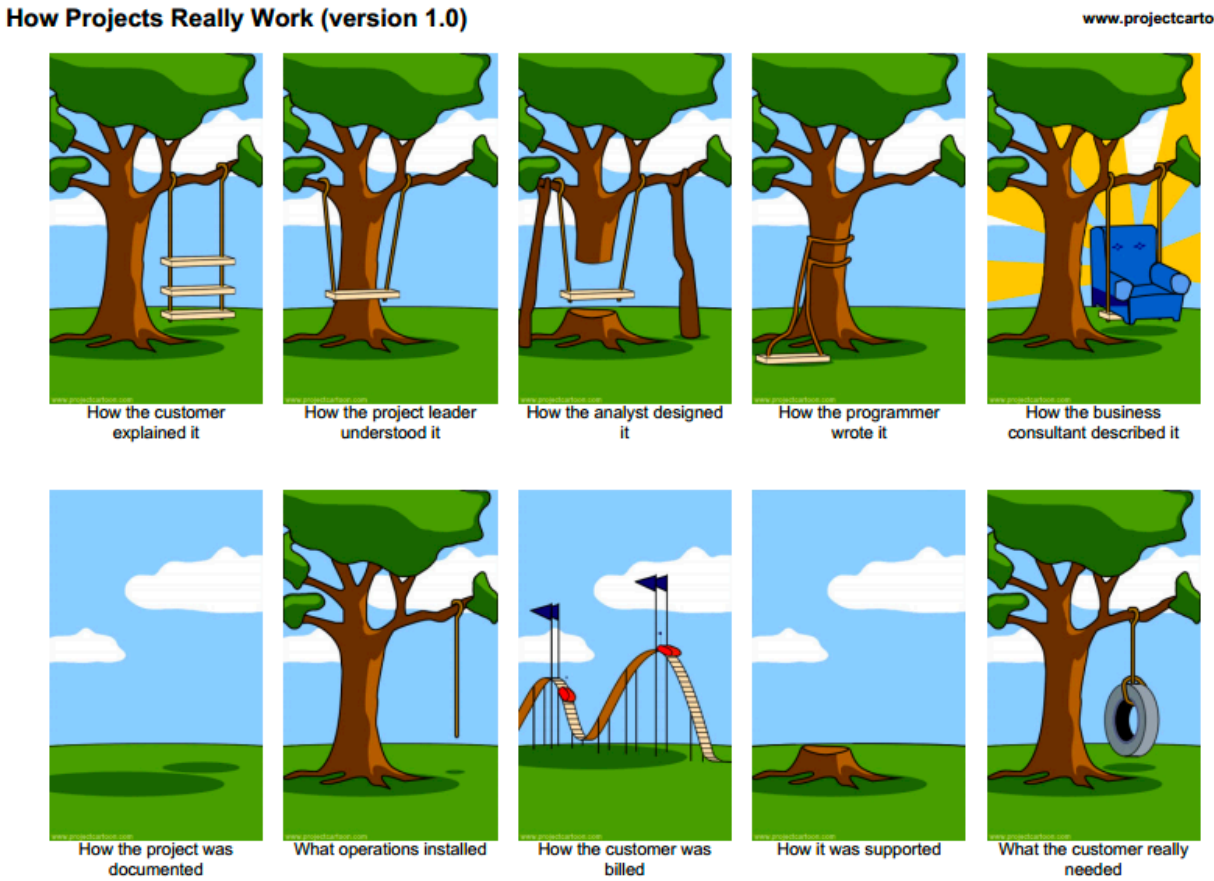


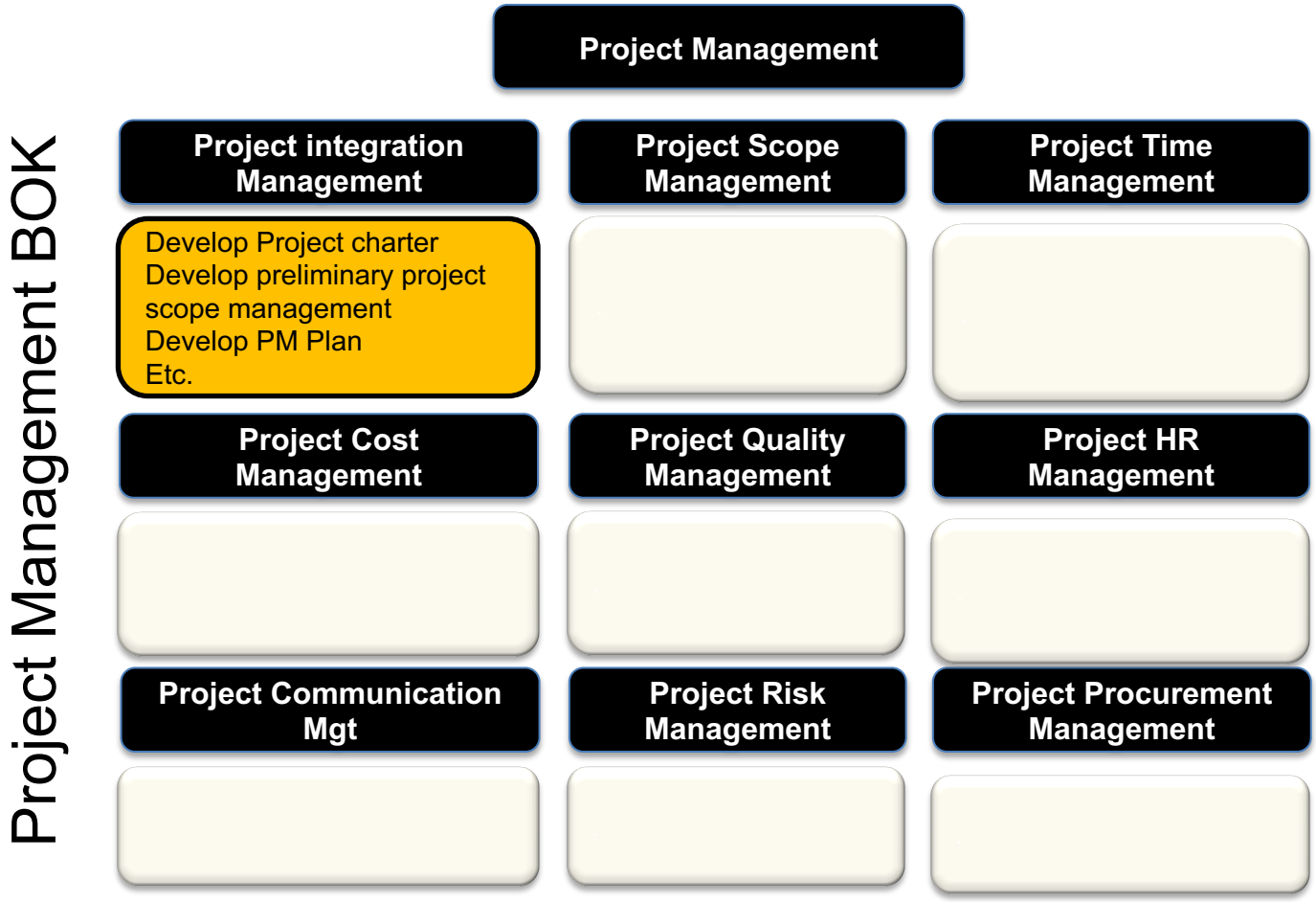
Project Definition and planning

RFID Project life cycle



It all starts with requirement management





Source: Adapté du PMBOK

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  - Define the RFID/IoT strategy & select the right project
  - **Use a Methodological approach to solve problems & identify opportunities**
  - Target the appropriate RFID/IoT technology for your specific case

2-Use a Methodological approach

To solve problems & identify opportunities

- Set of **practices, procedures & rules** used in the inquiry/investigation of RFID potential
- With the **goal to understand** different situations & **acquiring new knowledge**
- Based on gathering observable, empirical & **measurable evidence** in your warehouse!
- It is not a formula!

2-Use a Methodological approach

To solve problems & identify opportunities

Images par Gerd Altmann de Pixabay

2 Methodology

Different Methods & tools at different phases of the project

1. Problem definition
2. Data gathering and analysis
3. Selection/development of a solution
4. Cost Impacts and pay off Analysis
5. Implementation & follow up

Do not envision an RFID project as a technological project!

See : Bendavid Y. and Cassivi L (2010), Bridging the gap between RFID/EPC concepts, technological requirements and supply chain e-business processes, Journal of Theoretical and Applied Electronic Commerce Research, VOL 5 (3) pp. 1-16

2.1 Methodology

Defining the problem – the classics errors!

1. Our problem is that we want to improve ….
2. Our problem is that we want to implement RFID for…
3. Our problem is that … wants us t…

Its not about WHAT you want to do, but WHY you wan to do it

"So.... How can we blame procurement?'

2.1Methodology

Defining the problem – the classics errors!

Defining the problem/opportunities & envisioning solutions shouldn't be an endless process…

It has to be managed as a project! By **projects managers**! For/with **operations managers!**

"They've supposedly been close to a breakthrough on inventory optimization for 5 years now."

2.1 Methodology

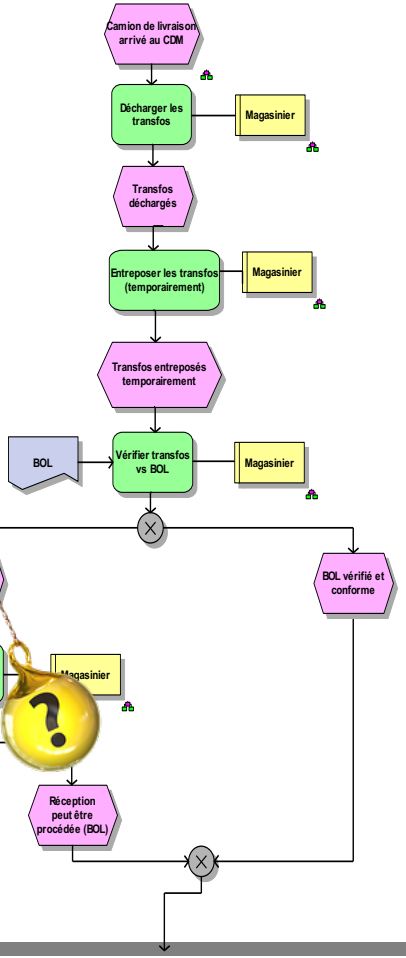
Defining the problem – key tools

1. **Problem definition**
2. Data gathering and analysis
3. Selection/development of a solution
4. Cost Impacts and pay off Analysis
5. Implementation & follow up

- Employee surveys
- Issues Trees
- Root cause analysis
- Cause & Effect Diagrams (Ishikawa)
- (ABC)Pareto analysis
- Impact analysis
- Gap Analysis
- Organization analysis
- Industry analysis

2.1Methodology

Defining the problem: Key tools



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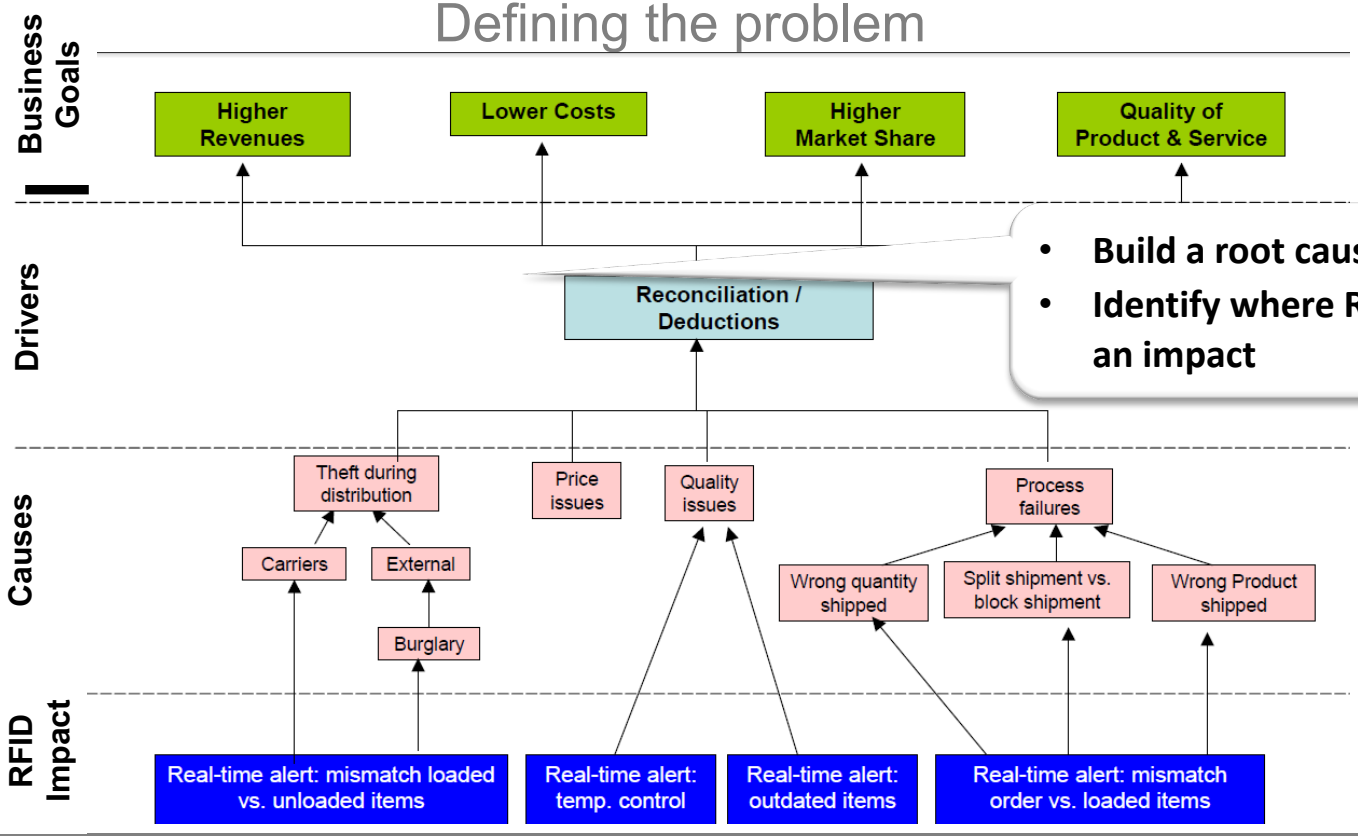
2.1Methodology & Tools

Defining the problem

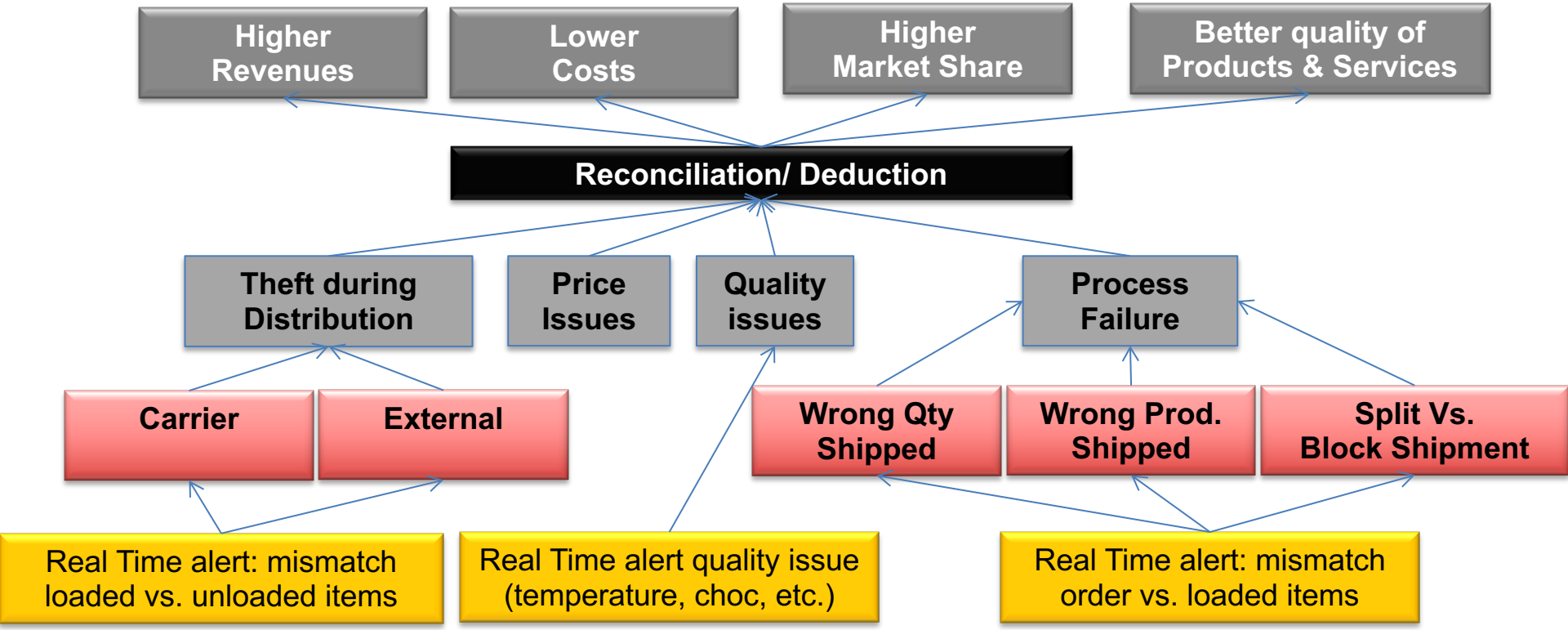


- **Build a root cause analysis**
- **Identify where RFID can have an impact**

Source: Adapted from EPC Global US, 2005 - EPC Value Model for Consumer products

2.1Methodology & Tools

Defining the problem

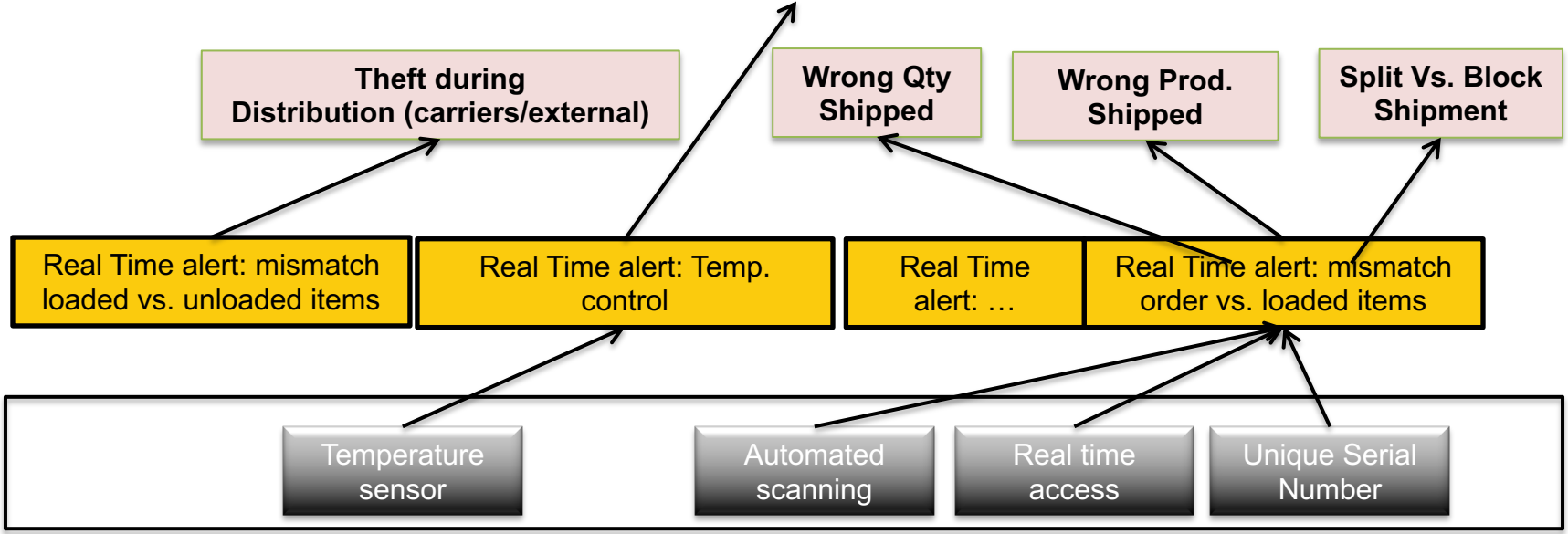


Source: Adapted from EPC Global US, 2005 - EPC Value Model for Consumer products

2.1Methodology & Tools

Defining the problem…and anticipating tec. requirements

As we define & analyse the problems, we already anticipate the requirements for selecting the technology….



Source: Adapted from EPC Global US, 2005 - EP[illegible]

2.2 Methodology

Data gathering to document the current situation

1. Problem definition
2. **Data gathering and analysis**
3. Selection/development of a solution
4. Cost Impacts and pay off Analysis
5. Implementation & follow up

Operations Management perspective

- Plant tour/audits
- Flow charts/Business Processes
- Pareto charts
- Org. Charts
- …

Technical perspective

- Site Survey
- IT Infrastructure/system maps
- IT portfolio assessment
- Wireless Network evaluation

See : Chase e

2.2 Methodology

Data gathering and ANALYSIS

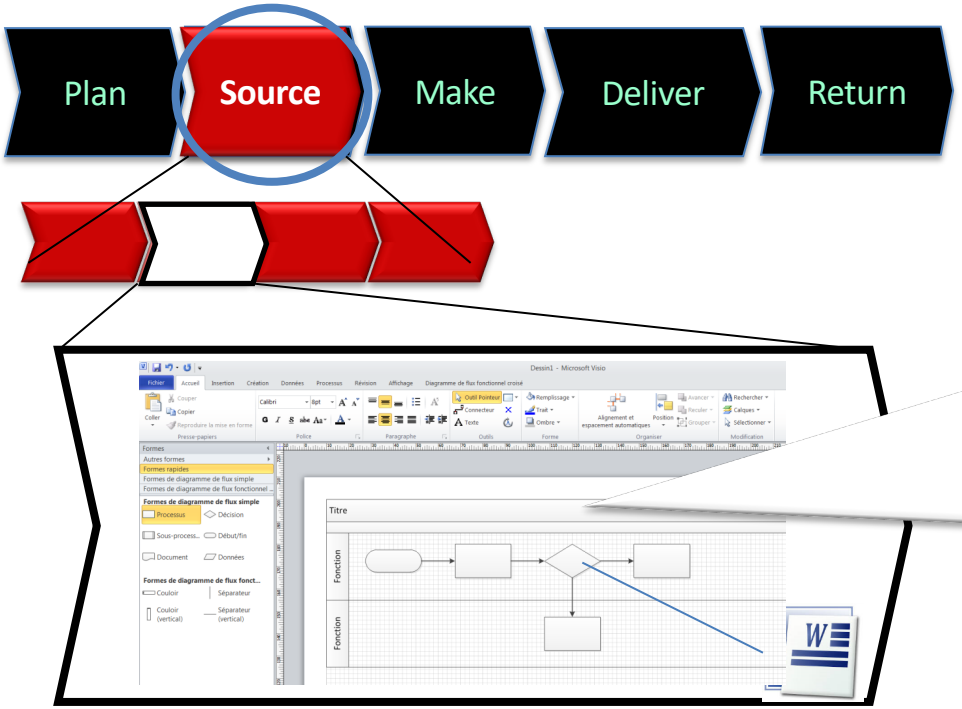
1. Problem definition
2. **Data gathering and analysis**
3. Selection/development of a solution
4. Cost Impacts and pay off Analysis
5. Implementation & follow up

- Value chain analysis
- Business process analysis (BPA) - value analysis
- Use case & requirements identification
- Problem Analysis (SPC Tools)
- Labor productivity
- Etc.

See : Chase et al, (2009). Operations Mgt for Competi

2.2 Methodology

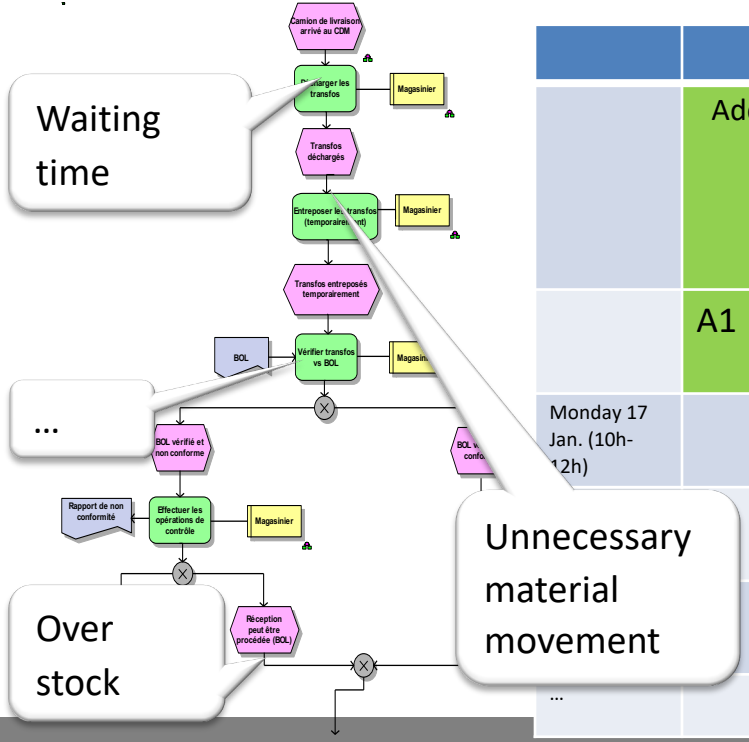
Data gathering : a process perspective



- Use Process Modeling Methods & standards
- Concentrate on core processes (Receive, put away, pick, …)
- Use KPIs to assess/ measure your processes

2.2 Methodology

Process Map & value analysis (and waste)



Waiting time

...

Over stock

Unnecessary material movement

	Reduce the amount of late orders delivery								
	Added value			Non added value (but necessary)			Non added value		
	A1	A2	An	A1	A2	An	A1	A2	An
Monday 17 Jan. (10h-12h)									
...									

See: James P. Womack & Daniel T. Jones **Lean Thinking: Ba**

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Corporation

2.3 Methodology

Selection/development of a solution

1. Problem definition
2. Data gathering and analysis
3. **Selection/ development of a solution**
4. Cost Impacts and pay off Analysis
5. Implementation & follow up

- Market browsing/ Identification of existing solutions/vendors
- **Conference/exhibition (RFID Journal Live ☺)**
- **RFID Journal awards**
- Benchmarking analysis
- RFI / RFQ/RFP/…
- Use case & requirements definition
- **Computer simulation**
- **Laboratory experiments/ Pilot**
- **…**

2.4 Methodology

Methods & tools for ROI analysis

1. Problem definition
2. Data gathering and analysis
3. Selection/development of a solution
4. **Cost Impacts and pay off Analysis**
5. Implementation & follow up

- Decision Tree
- BP Analysis
- Balance scorecards (BSCD)
- SCM frameworks (e.g. SCOR)
- Infrastructure cost analysis
- Lab. scenario design and testing
- Trade off analysis
- RFID system decision matrix
- etc

See : Chase et al, (2009). Operations Mgt for Competi

2.5 Methodology

Methods & tools for implementation

1. Problem definition
2. Data gathering and analysis
3. Selection/development of a solution
4. Cost Impacts and pay off Analysis
5. **Implementation & follow up**

- IT Project management guidelines & methodologies (e.g. PMBOK, APMBOK)
- New Product development (e.g. stage gate model)
- ERP/IOS implementation methodologies (BPR)
- Laboratory experiments
- Pilot project

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3 Select the appropriate RFID tech. for your specific case?

Image par Gerd Altmann de Pixabay

The IoT & RFID within the IoT

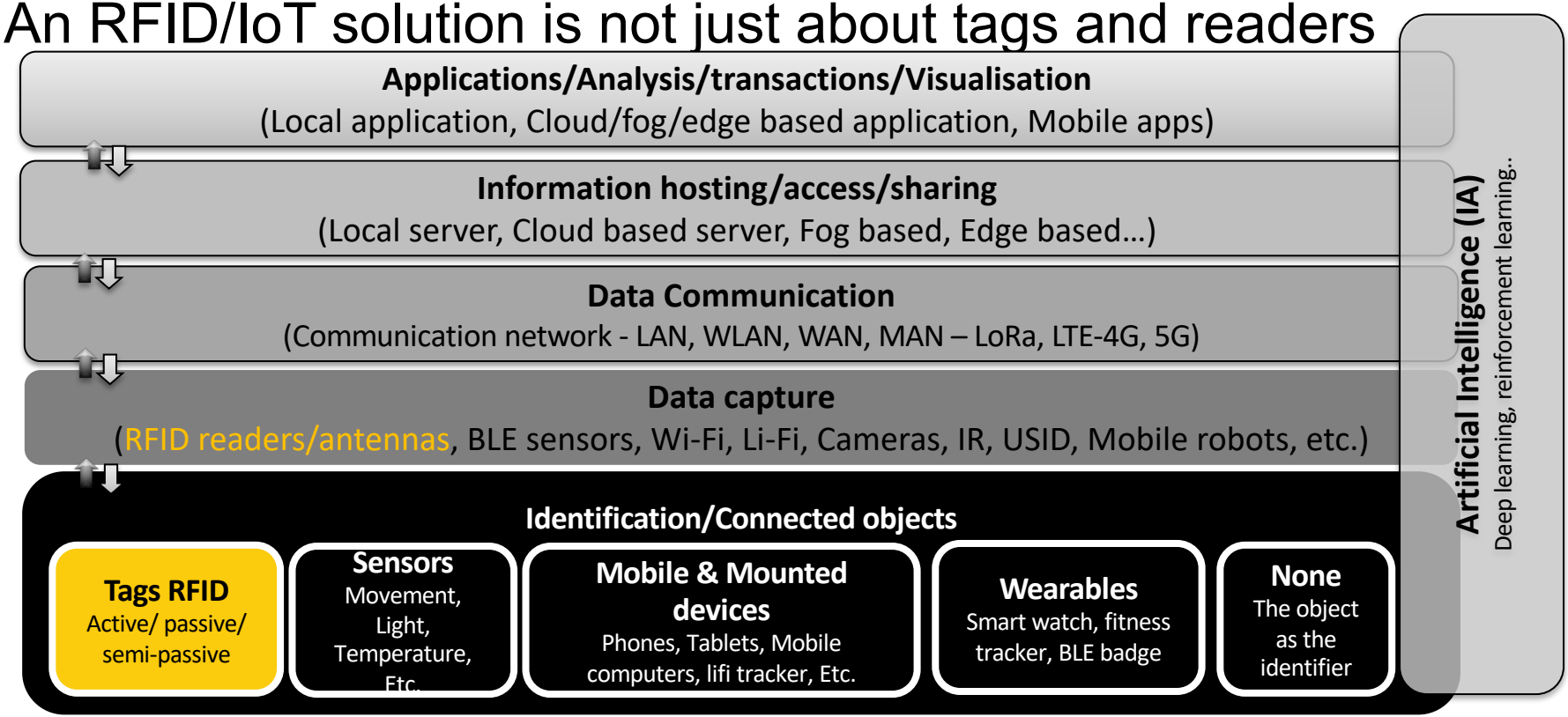
Vision in which objects (living or not) are equipped with **unique IDs,** as with the capacity to **communicate automatically** and in **real time** with their environment

This opens the door to new business models

Sources: Bendavid Y. (2019). Laboratoire IoT https://labiot.uqam.ca/

IoT Infrastructure

An RFID/IoT solution is not just about tags and readers



Sources: Bendavid Y. (2019). Laboratoire IoT https://labiot.uqam.ca/

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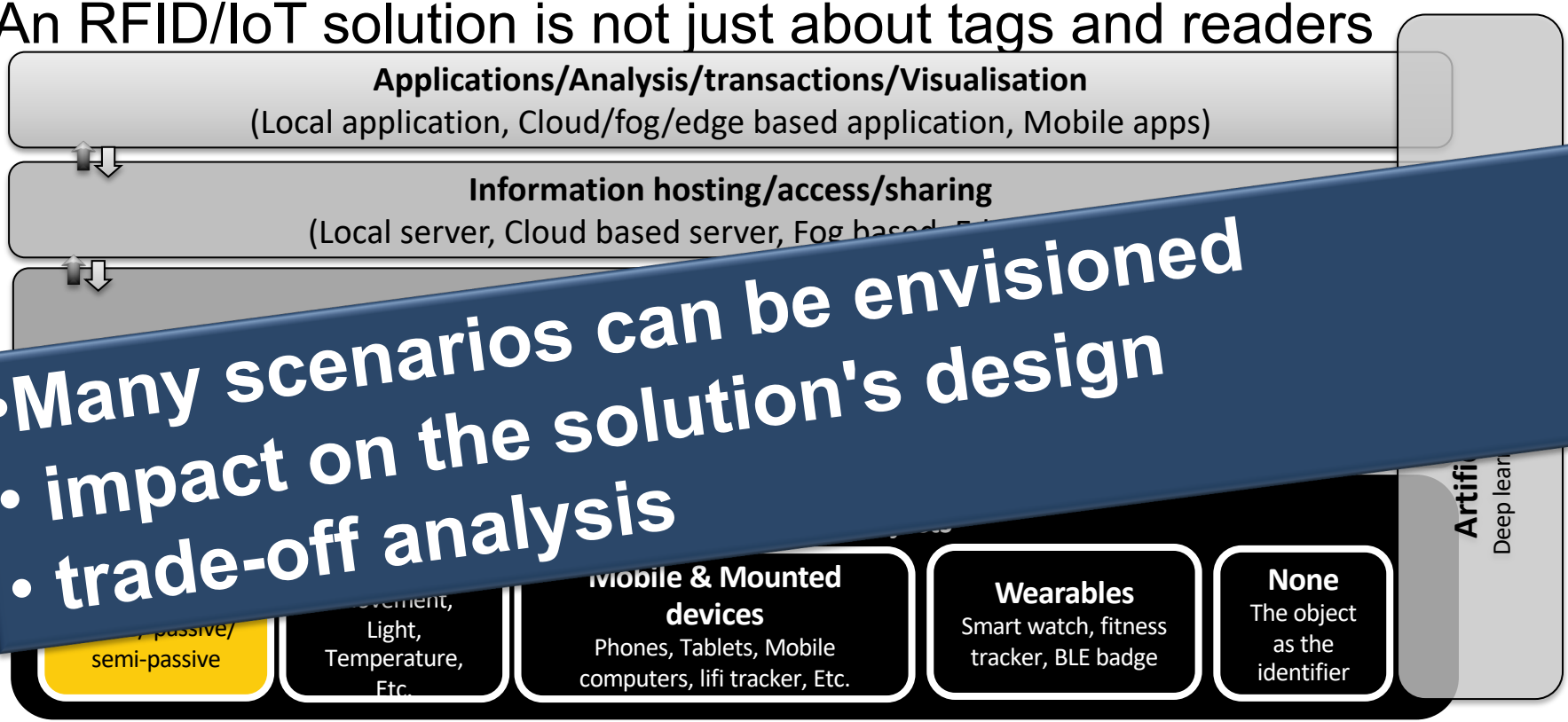


- Many scenarios can be envisioned
- impact on the solution's design
- trade-off analysis

Sources: Bendavid Y. (2019). Laboratoire IoT https://labiot.uqam.ca/

Visibility

- Capture data (events)
- Translate data into information's
- Access this information, accurate, precise, updated
- Take event based decisions based on this information
- To improve business process performance

Sources: Bendavid Y. (2019). Laboratoire IoT https://labiot.uqam.ca/

3 Select the appropriate RFID tech. for your specific case?

The technology will support your case –
Requirement management

- Passive RFID (LF, HF, UHF)
- Semi Passive RFID (BAP)
- Active RFID (proprietary 433Mhz, UWB, RFID/IR, RFID/WIFI)
- Hybrid solutions
- BLE devices
- LiFi
- Robots
- Drones

3 Select the appropriate RFID tech.

Some questions for the design of the "to Be" business & technological Scenarios

- **Which application / business process(es)?**
  - **Which** products? **What** level of tagging?
  - **What** functionalities are required for the tags/readers?
  - **What** is the level of process automation? **Automated? Semi-automated?**
  - **Where** will items need to be identified?
  - **How Many** products (tags) at a time?
  - **What** is the speed (reading, commissioning tags, etc.)?
  - **What** is the reading/writing distance? **Where?**
  - **What** is the required level of Security ?
  - **With** who to share the info? **Why?**
  - etc

3 Select the appropriate RFID tech.

AVERY DENNISON smartrac an Avery Dennison company

Selection tools on vendor websites

English [Change]

Explore RFID | Industry Segments | Products and Solutions | News and Insights | About Us | Contact

Product Finder

128 products found

Contact Us

Clear filters

- Product Name
- Product Type
- Industry Segments
- Applications
- Frequency
- Frequency Band
- Chip
- Antenna Dimensions in mm
- Die-Cut Dimensions in mm
- Hard Tag Dimensions in mm

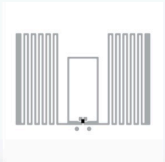
Show Details | 1 - 10 of 128 | Page 1 2 3 4 5 ... 13

Accessory

Ideal for small item-level tagging

Details

Download Data sheet



AD-151g2iM

Exceptional performance across a wide range of dielectrics

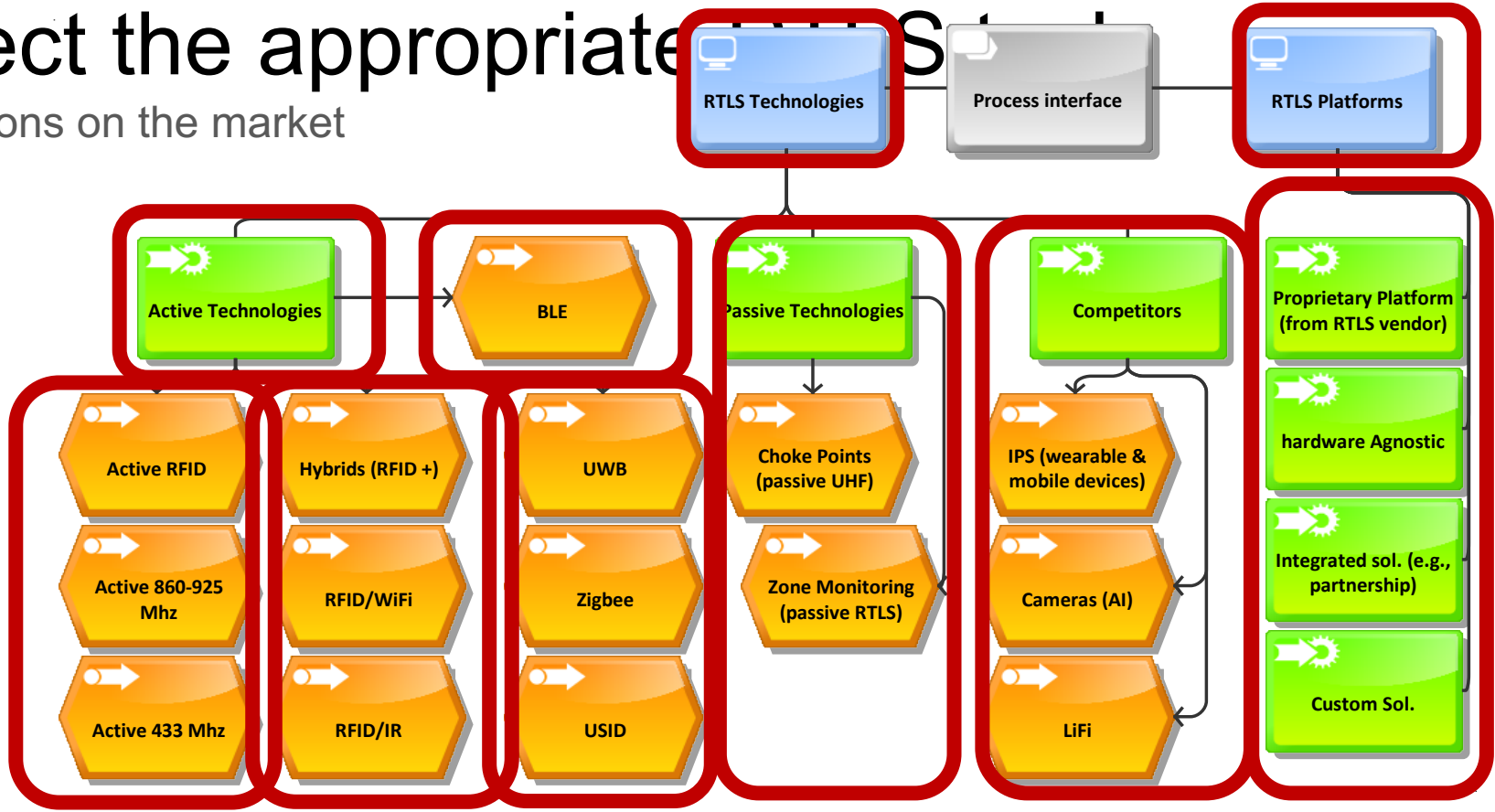
Details

Download Data sheet

https://rfid.averydennison.com/content/rfid/na/en/home/product-finder/ad-151g2iM.html

3 Select the appropriate RTLS t

various options on the market



Adapté de Bendavid Y. (2016), Selecting the Right RTLS in Hospitals. The Encyclopedia of E-Commerce Development, Implementation, and Management, IGI Global, Volume III – Category: RFID Technologies and E-Commerce Process Improvement, Chapter 133, pages 1884-1899, IGI Global, In Lee ed., IGI Global, Hershey PA, USA.
https://labiot.uqam.ca/

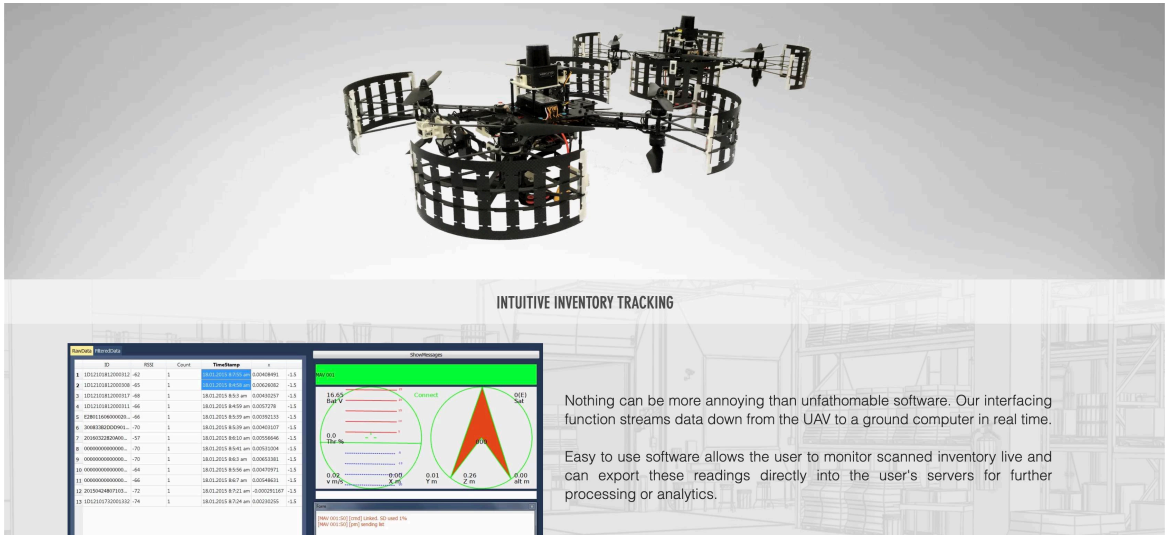
Looking at (relatively) emerging solutions…

CC BY-4.0. Credit: MIT Media Lab/Fadel Adib and Jimmy Day

https://www.media.mit.edu/posts/rfly-in-the-news/

http://www.rfidjournal.com/articles/view?16560

RFID Reading Drone Tested in Asia Warehouses



https://www.aerolion.com/warehouse-management

https://www.rfidjournal.com/rfid-reading-drone-tested-in-asia-warehouses

Look at (relatively) new solutions…

News | Editor's Notes | Expert View | Industries/Topics | Tools & Resources | Premium

RFID JOURNAL

NEWS

Robot Employs RFID to Manage Warehouse Inventory

BY CLAIRE SWEDBERG

Fetch Robotics has built Sick RFID technology into its TagSurveyor robot, with which logistics providers and retailers can gain data about tagged inventory without requiring handheld or fixed readers.

May 09, 2018 Several logistics companies and retailers are either piloting or deploying an RFID-enabled versi
counts inventory—in some cases 24 hours a day, seven days a week—in and among personnel and moving eq
TagSurveyor robot, from California automation technology company Fetch Robotics, leverages UHF RFID reade
as the Freight100 robot base from sensor company Sick. The two firms demonstrated their technology atRFID J
last month in Orlando, Fla.

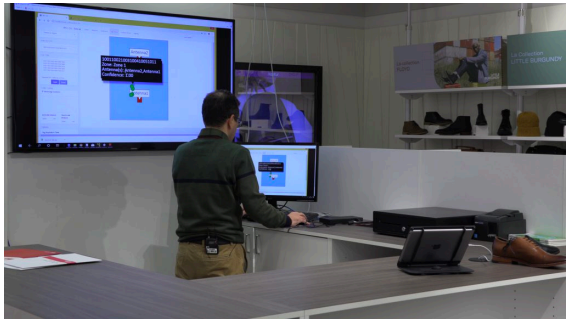
Fetch Robotics, founded in 2014, released its first robot a year later. These autonomous machines deliver freig

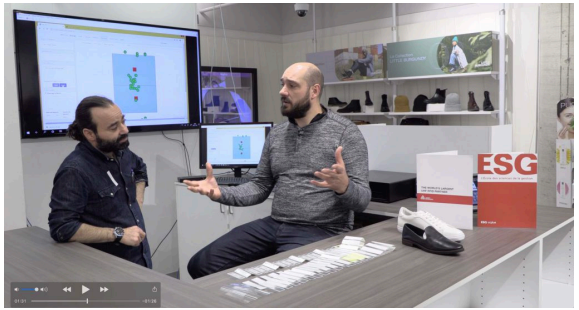
https://www.rfidjournal.com/view-from-the-top-5-cios-speak-out-on-rfid?17527%2F2

https://www.usine-digitale.fr/article/deja-plus-de-3000-km-de-parcouru-pour-les-robots-de-walmart.N665809

(relativelly) new ones?

Passive RTLS (RF Controls)





Passive RTLS @ the IoT lab. using **RF Controls** antennas and **Avery Dennison** Tags https://labiot.uqam.ca/projets/

More simple W&IM solutions?

An Excel based example

RFID Explorer
RFID Scan Scan Write
RFID Tag Finder
RFID Web Wedge
Third-Party Apps

Third-Party Apps

The following apps have been developed by external companies and are compatible with TSL's 1128 *Bluetooth*® UHF RFID Reader.

Wynne RentalResult
A full Equipment Management solution for Rental & Construction Companies. Track assets as they are deployed to and from the job site, for inventory counts and availability checks.
Website

Tagit Ice
Tagit Ice is a an inventory app geared towards the Diamond and Jewellery Industry, enabling stock checks, searches and batch scans at the click of a button.
Website

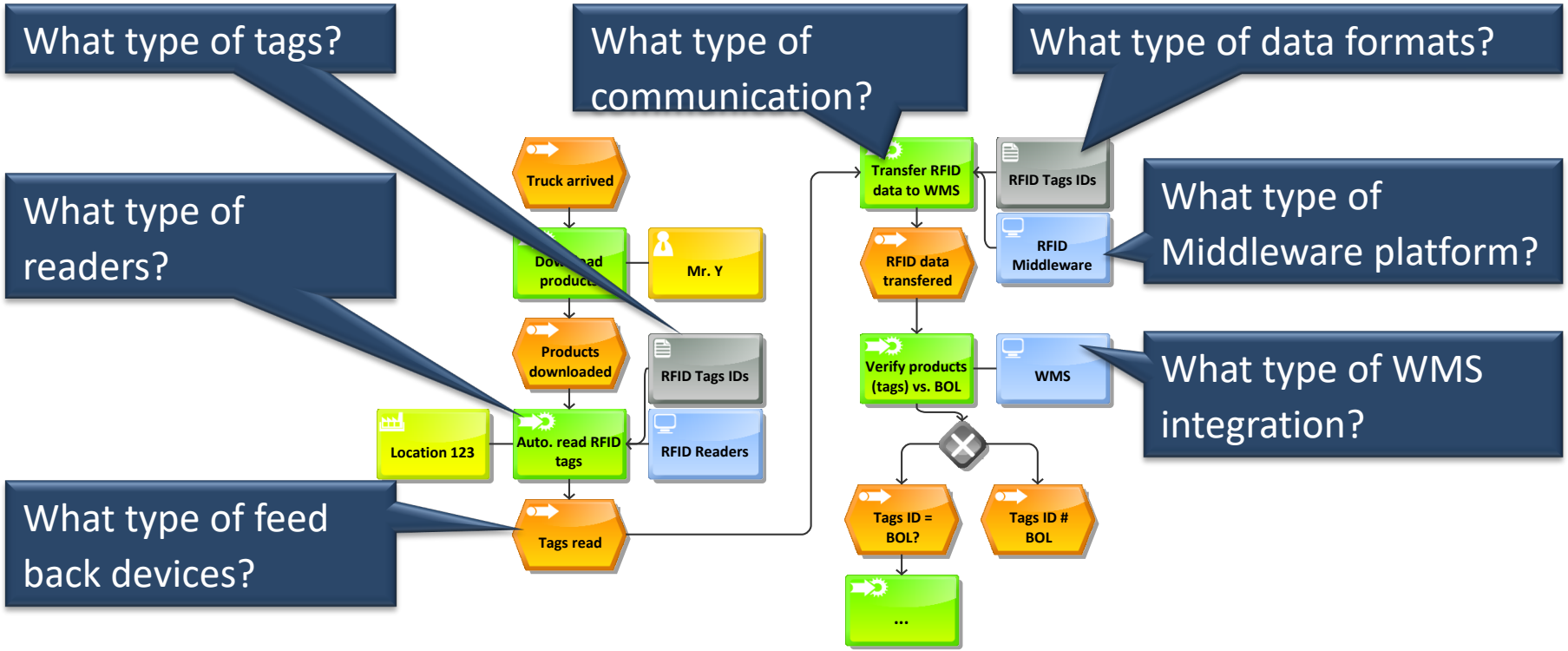
Tagit Operator
Tagit Operator is a suite of applications for performing encoding, validation and inventory operations on RFID tags. The suite is highly customizable and extensible to specific client needs.
Website

TagVUE MX
TagVUE MX is a mobile application for performing various RFID tag operations

AdvanScan
AdvanScan is an RFID inventory system based on an Android-based handheld

RFID Asset
This app enables users to perform all of the functions of a traditional RFID handheld

Evaluating different options & Selecting the right technologies - *Build your scenarios (an example for receiving)*



Selecting the right technology

*Build & assess your scenarios - **Using simulation tools***

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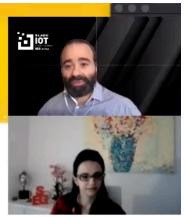

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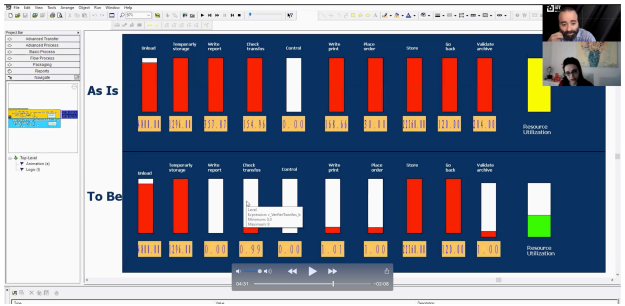

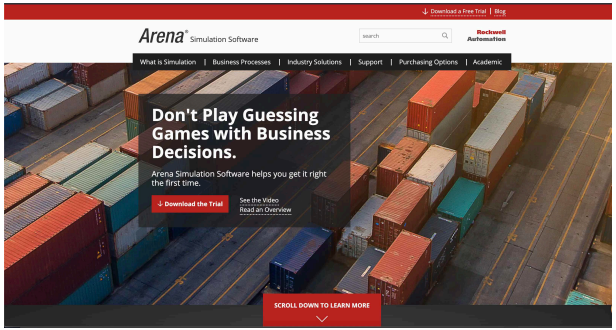

https://www.arenasimulation.com/

THANK YOU