



October 27, 2020

# RFID for Warehouse and Inventory Management 2020

# RFID and IoT for Inventory and Warehouse Management 2020

Building you business case

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# Objective of the presentation

How to develop an RFID business case and justify your investment  
(Qualitatively /Quantifiably)

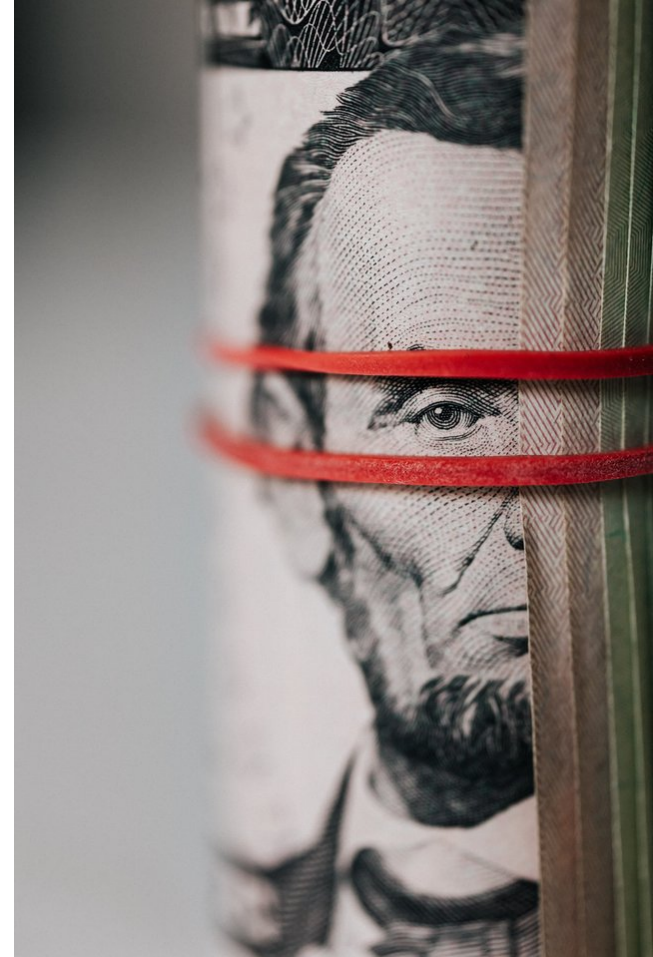
- **Assess the financial impact (costs & benefits) of your RFID/IoT project**
- Build an RFID/IoT “Business case” based on the selected technologies and solution design
- Assess & Monitor your performance

# Start Your Business case!

RFID/IoT

- (i) as a solution
- (ii) as a mean to resolve business problems
- (iii) or to leverage on new opportunities!

Not JUST a technology!



# and before counting the money...

## Consider:

- **The benefits:** How will your company benefit from RFID-IoT driven visibility across the supply chain?

But also

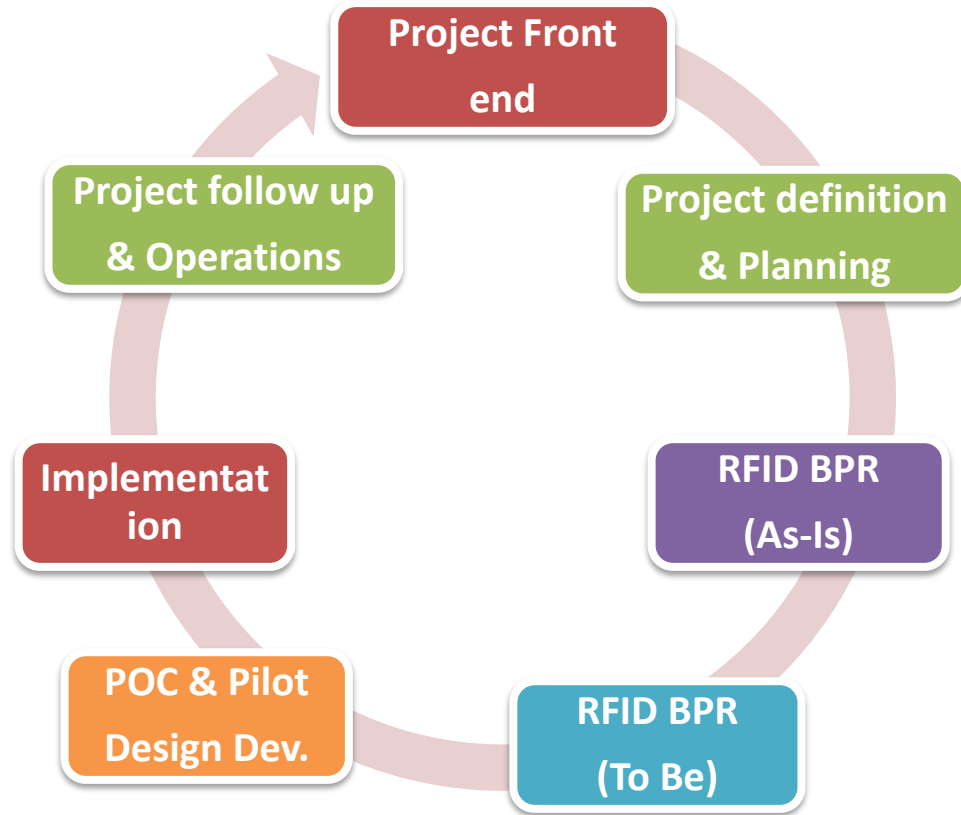
- **The Costs:** How will your company pay, both in hard costs and resources, for RFID-IoT driven visibility?

Adapted from Forrester Research



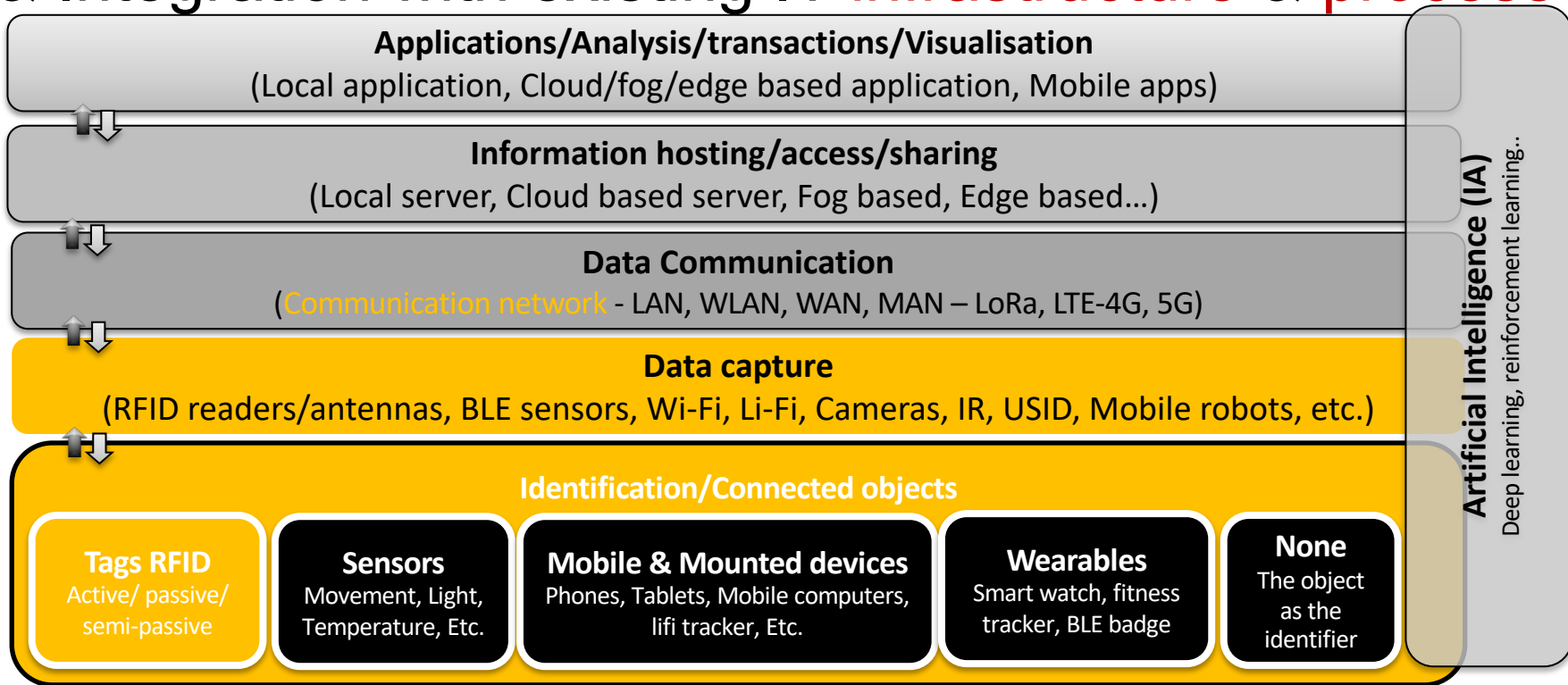
Pics: <https://www.pexels.com/>

# Building on existing Infrastructure



# IoT Infrastructure

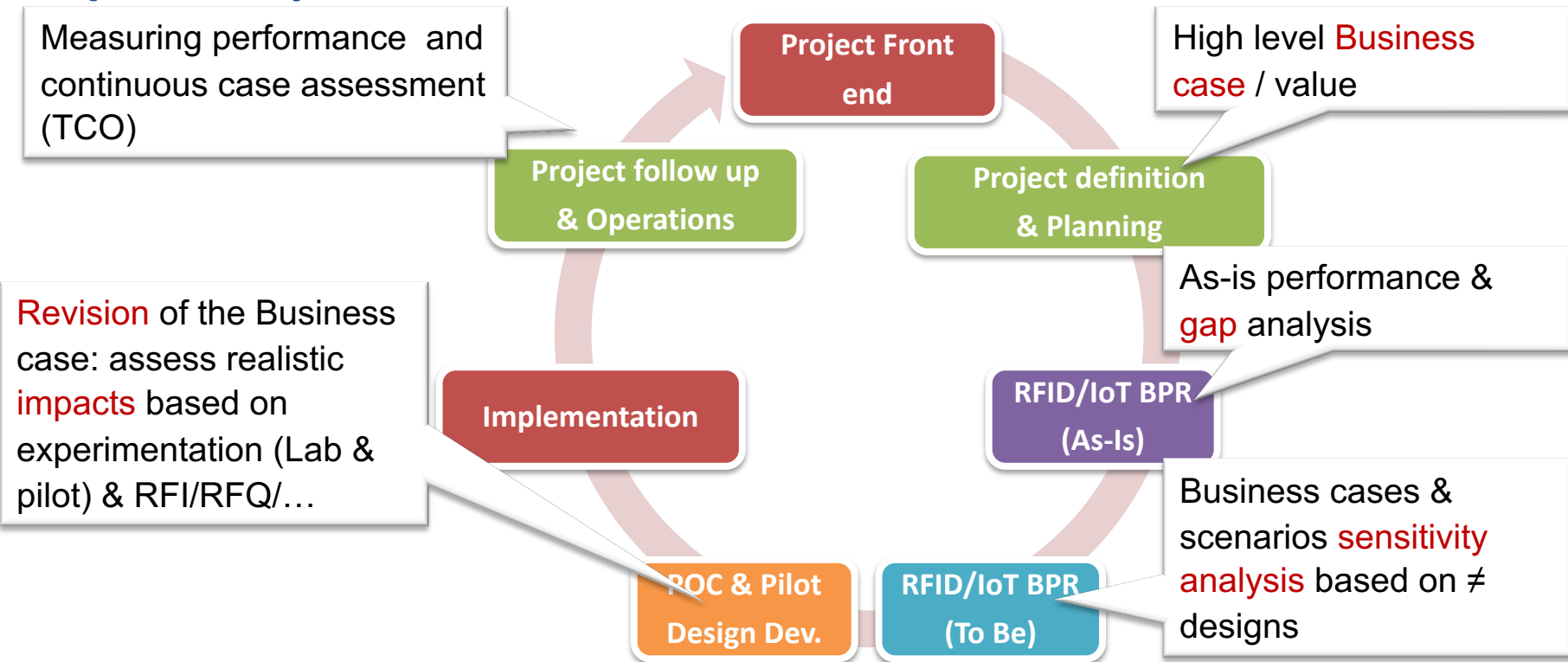
## & Integration with existing IT infrastructure & processes





# RFID/IoT Business Case in the

## *Project life cycle*





# RFID/IoT Business Case

*Different type of experiences*



# RFID/IoT Business Case in the *Project life cycle*



Needs-requirements

Project Planning

Procurement Process

RFID /IoT Prototyping

Physical infrastructure

Software infrastructure

Configuration - integration

Deployment

Maintenance (TCO)

...

# RFID/IoT costs in the Project life cycle

## *Project/Infrastructure Cost Analysis(1 of 2)*

### Project Preparation

- Opportunity Assessment
- Business Case Development
- RFID Strategy Development
- Use Case Generation
- Procurement Management (plan-source)
- Solution Architecture Development
- System Integration Assessment
- Business Process Assessment
- Experimentation/Testing (**validation of the business case**)

### RFID hardware

- RFID Tags (logistic units -Pallet, case, item, mobile asset, ...)
- Readers and Antennas
- Mounting Accessories
- RFID printers and label Applicators
- Ancillary devices (motions sensors, horns, lights, ...)
- Other Infrastructure Costs (new servers & computers, infrastructure upgrade,
- Etc.

# RFID/IoT costs in the Project life cycle

## *Project/Infrastructure Cost Analysis(1 of 2)*

### Installation Costs

- Initial Site Survey
- Design selection
- Hardware installation
- Testing and trouble shoot...

### Ongoing System admin.

- Network Management System
- Reader Firmware Upgrades
- Damaged Readers/Antennas
- Performance Monitoring
- Maintenance...

### RFID Software Costs

- RFID Middleware Solution
- Middleware System Integration (with WMS, ERP, Track& trace sol.)
- Interface Customization
- Engineering/Business Process Change

### Other expenses

- Physical warehouse modification
- New resources (business analysts)
- Training

# Methods & tools for ROI analysis

*How to quantify & justify your RFID investment? Qualitatively & quantifiably?*

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
- Business Process Performance Analysis (BPA)
- **Balance scorecards (BSCD)**
- **SCM frameworks (e.g. SCOR)**
- Infrastructure cost analysis
- Lab. scenario design and testing
- Trade off analysis
- RFID system decision matrix
- etc

Introduced in: "Targeting the Correct IoT/RFID Technology for the Right Project"

# ROI analysis – a look @ the costs

## *Classic - Costs of inventory*

### Carrying Costs

#### Facility storage

rent, depreciation, power, heat, cooling, lighting, security, taxes, insurances, etc.

#### Material handling

### Ordering costs

Replenishment (\$/order)  
Requisition, PO, transportation, shipping, receiving, handling, accounting, auditing, etc.

### Equipment

Labor  
Record Keeping  
Borrowing to purchase inventory

### Shortage costs

Stock outs costs – loss of sales & relative loss of profits  
Customer dissatisfaction  
Reputations...

### Product deterioration

Spoilage, breakage, obsolescence, ...



# Structuring the costs

*Using - Normative model of inventory carrying cost method*

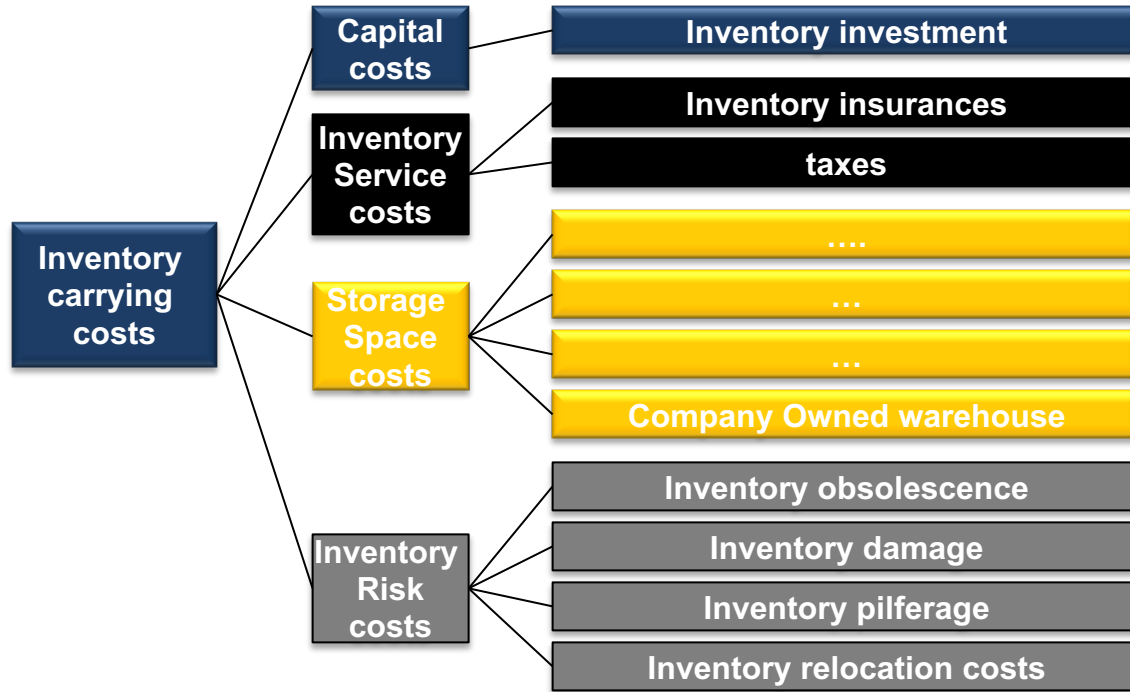


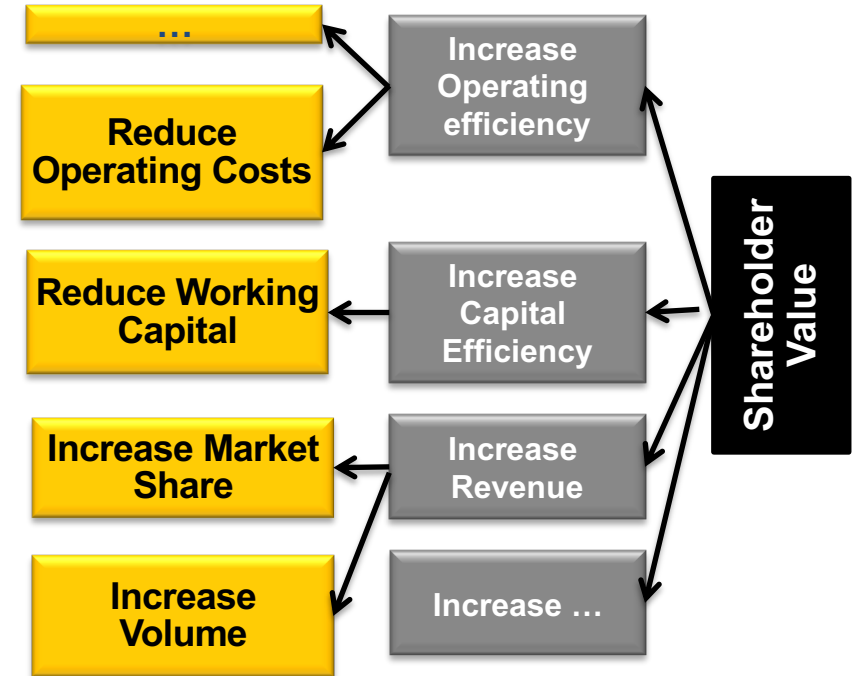
Photo de [Tiger Lily](#) provenant de [Pexels](#)



# Matching the problems and the solution

## *Linking goals & actions*

- **Reduced claims (overages/ shortages)**
- **Reduced labor costs** (e.g. receiving, put away, picking, shipping, assembling, reworking...)
- **Reduced inventory**
- **Reduced returns/ unsalable**
- **Increased asset utilization**
- **Improved on-shelf availability**
- **Reduced counterfeiting**
- **Improved customization options...**
- **Improved promotional planning and execution**
- **Improved shrink management**

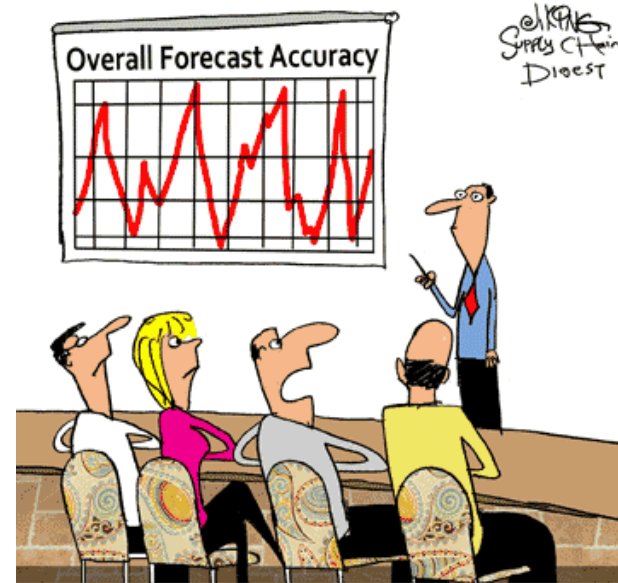


# Matching the the solution and the technology

*...ensuring the fit between the selected solution and the desired performance*



**"It was someone from corporate's idea to improve our inventory turns."**



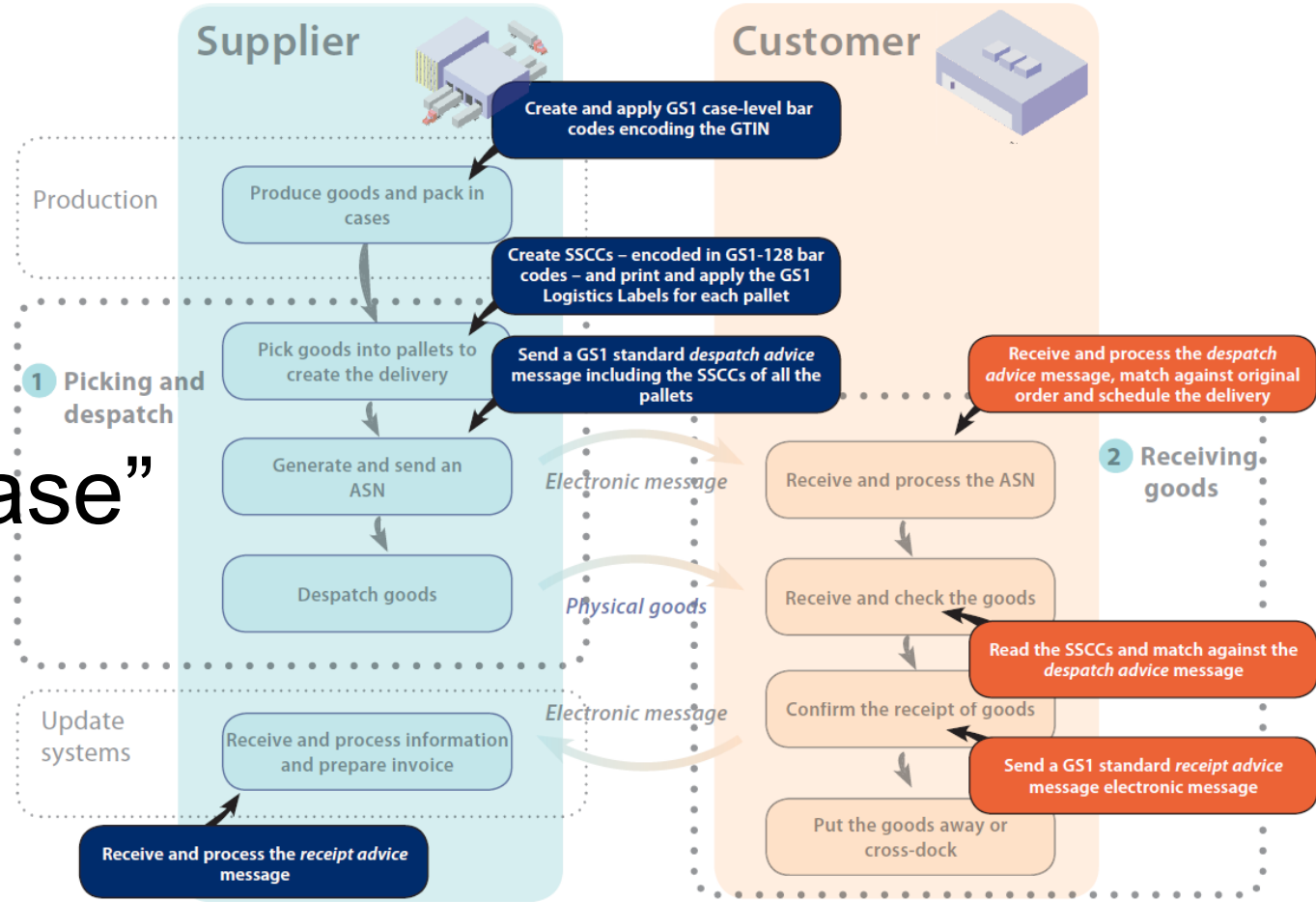
**"We're actually good except for the volumes and dates"**

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  - Assess & Monitor your performance

# Build an RFID/IoT “Business case”

*Set the base line*

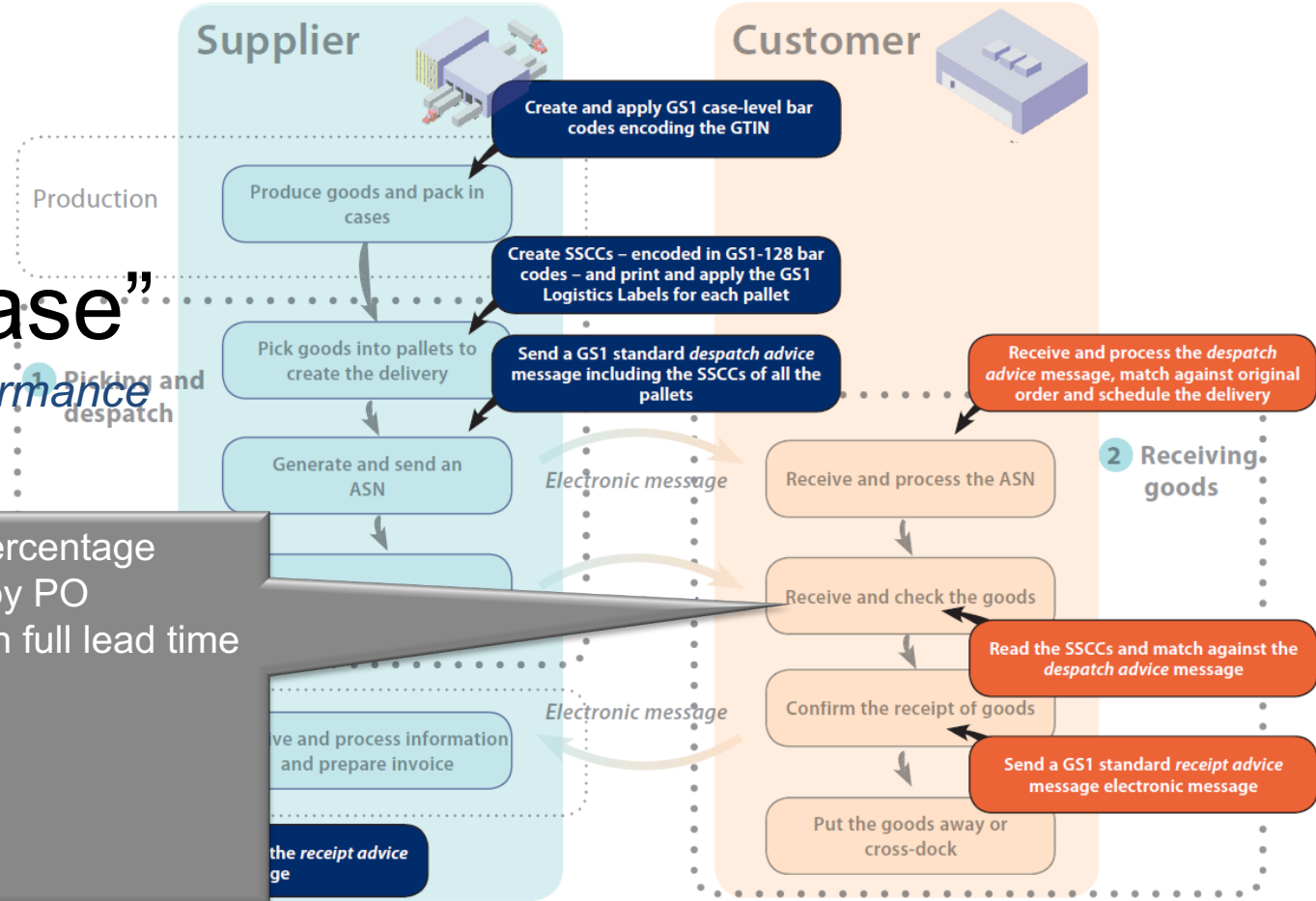


# Build an RFID/IoT

## “Business case”

*Evaluate the As is performance*

- On time parts delivery percentage
- % of receipt authorized by PO
- % of orders released with full lead time
- Put away accuracy
- Put away cycle time
- Average picking time
- Etc.



# Building your case – according to the selected solution

**RFID JOURNAL LIVE! 2020**

## RFID and IoT for Inventory and Warehouse Management 2020

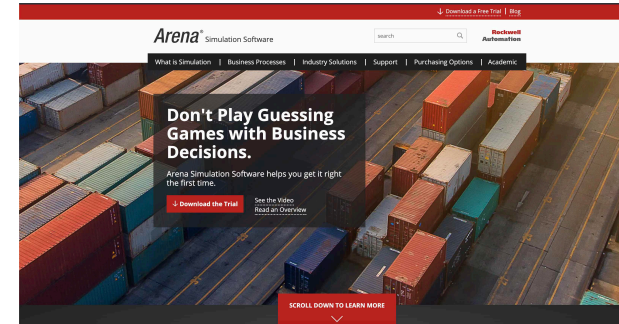
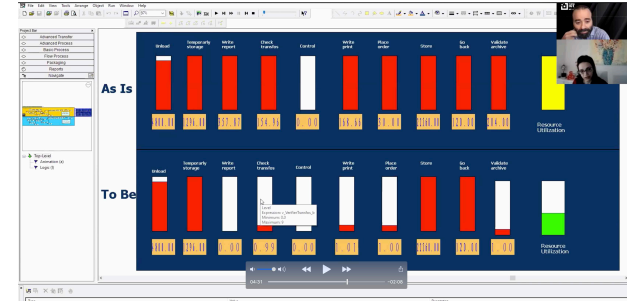
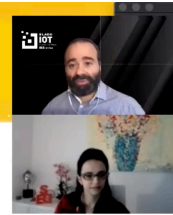
### Targeting the Correct RFID/IoT Technology for the Right Project

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Professor, AOTI  
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<https://www.arenasimulation.com/>

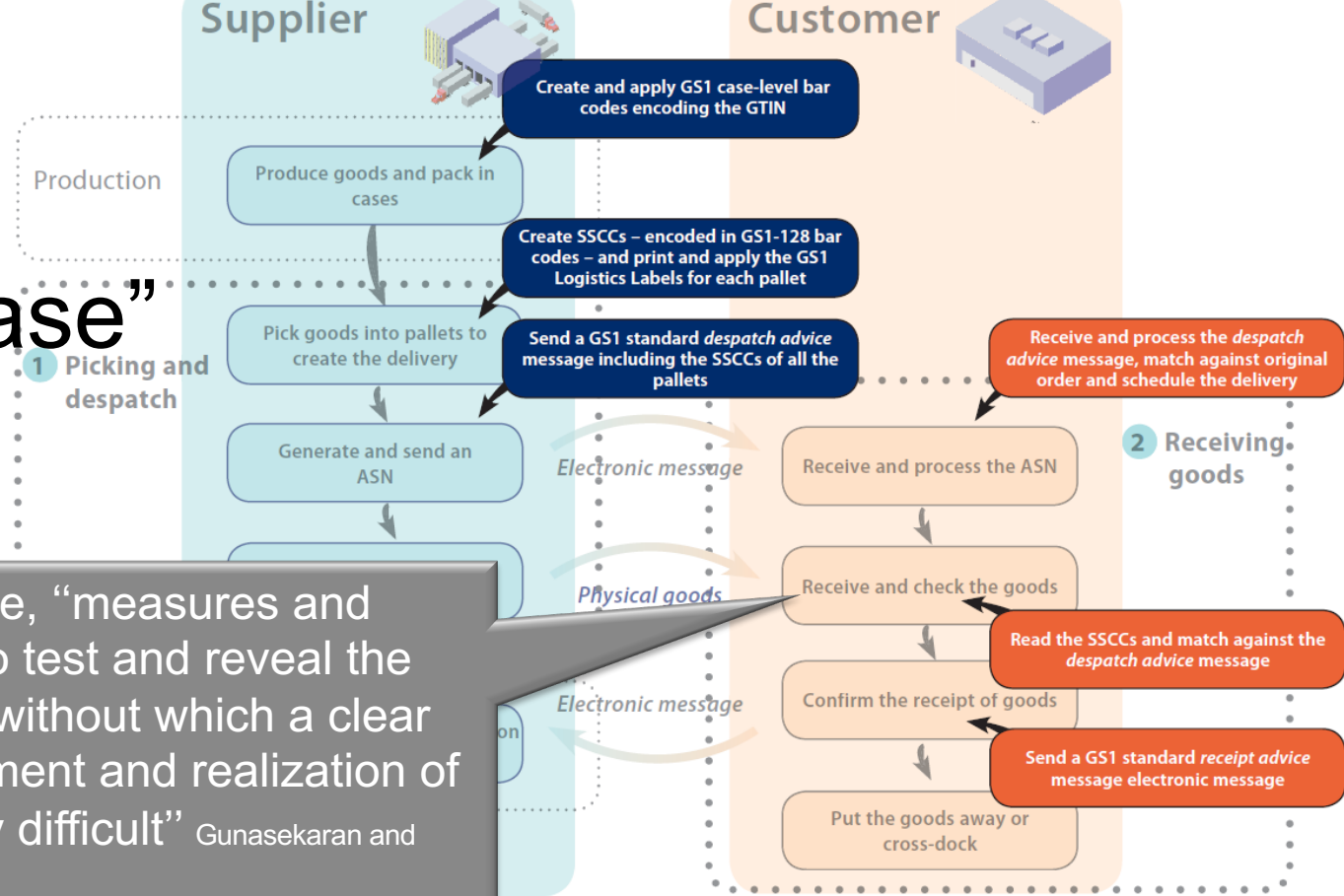
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# Build an RFID/IoT “Business case”

*Evaluate the To Be  
performance*

For any business case, “measures and metrics are needed to test and reveal the viability of strategies without which a clear direction for improvement and realization of goals would be highly difficult” Gunasekaran and Ngai (2005), JOM 23(5):423–451





# Objective of the presentation

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  - **Assess & Monitor your performance**

# Assess & Monitor your performance

## *KPIs and RFID impact assessment*

- ***With respect to previous experience on the impact of RFID in Warehouse contexts, multiple KPIs are used:***

- Level of inventory (reduction),
- Service level (improvement),
- (out-of) stock level,
- Storage space (minimum),
- Handling costs,
- Process improvement (automation, cancellation),
- etc.



# Assess & Monitor your performance

*KPIs for RFID impact assessment*

- On time parts delivery percentage
- Percentage of receipt authorized by PO
- Percentage of orders released with full lead time
- Put away accuracy
- Put away cycle time
- Average picking time
- Shipping accuracy
- Inventory availability
- Average back order length
- Inventory accuracy
- Inventory turnover
- Obsolete inventory percentage

- **What are your Priorities?**
- **How can RFID help you in addressing these challenges and opportunities**

# Methods & tools for ROI analysis

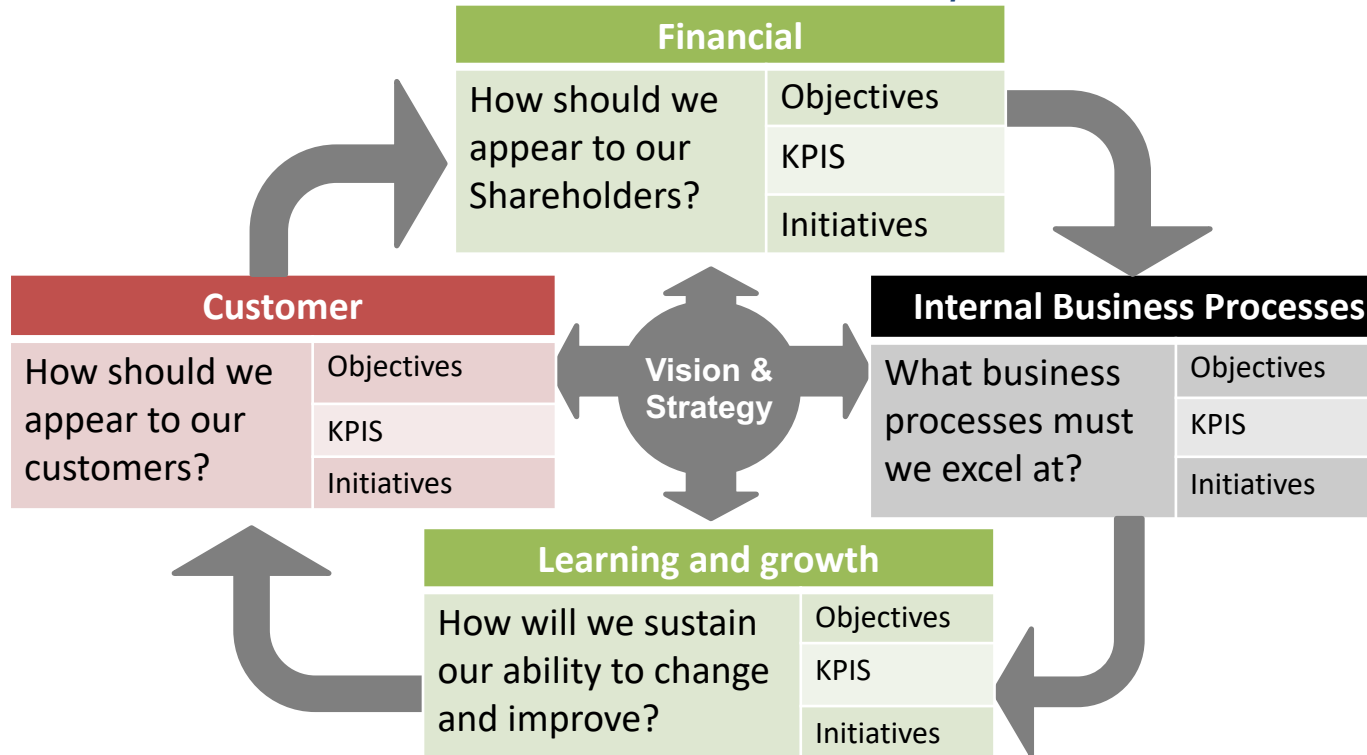
*Scorecards/ Performance framework*

1. ABC: Activity-Based Costing
2. FLR: Framework for Logistics Research
3. BSC: Balanced ScoreCard
- 4. SCOR: Supply Chain Operation Reference Model**
5. GSCF framework
6. ASLOG audit
7. SASC: Strategic Audit Supply Chain
8. -Global EVALOG (Global MMOG/LE
9. EFQM: Excellence Model
10. SCALE: Supply Chain Advisor Level Evaluation
11. SPM: Strategic Profit Model



# Assess & Monitor your performance

*Classics frameworks to assess the performance*



# Assess & Monitor your performance

*Supply chain frameworks to assess the performance*



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The Supply Chain Operations Reference (SCOR) model framework provides organizations with a world-class standard for defining process and measuring performance.

- [Supply Chain Operations Reference \(SCOR\) model](#)

### Learn more

If your organization is ready to implement a global process framework to standardize operations and improve performance, contact us at [CorporateDevelopment@ascm.org](mailto:CorporateDevelopment@ascm.org).

ASCM members have access to all process frameworks. Visit [My Account](#) to learn more.

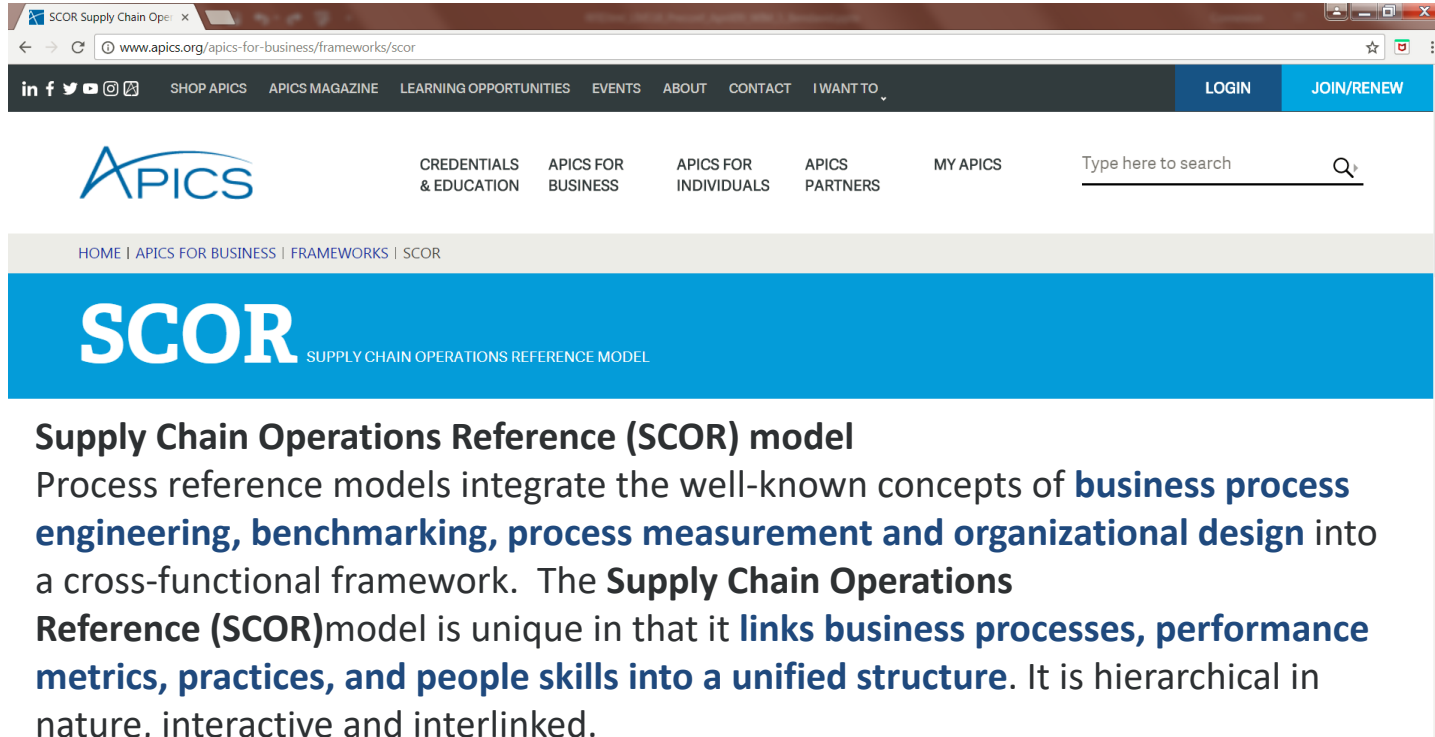
**RFID JOURNAL** VIRTUAL EVENTS

<http://www.apics.org/apics-for-business/frameworks>

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# Assess & Monitor your performance

## *The SCOR Framework*



The screenshot shows the APICS SCOR Framework website. The browser address bar displays 'www.apics.org/apics-for-business/frameworks/scor'. The navigation bar includes links for 'SHOP APICS', 'APICS MAGAZINE', 'LEARNING OPPORTUNITIES', 'EVENTS', 'ABOUT', 'CONTACT', and 'I WANT TO'. There are also 'LOGIN' and 'JOIN/RENEW' buttons. The main content area features the APICS logo, a search bar, and a list of links: 'CREDENTIALS & EDUCATION', 'APICS FOR BUSINESS', 'APICS FOR INDIVIDUALS', 'APICS PARTNERS', and 'MY APICS'. Below this is a breadcrumb trail: 'HOME | APICS FOR BUSINESS | FRAMEWORKS | SCOR'. The SCOR logo is prominently displayed in a blue box, with the text 'SUPPLY CHAIN OPERATIONS REFERENCE MODEL' underneath. The main heading is 'Supply Chain Operations Reference (SCOR) model'. The text below explains that process reference models integrate business process engineering, benchmarking, process measurement, and organizational design into a cross-functional framework. It states that the SCOR model is unique in that it links business processes, performance metrics, practices, and people skills into a unified structure, which is hierarchical in nature, interactive, and interlinked.

Supply Chain Operations Reference (SCOR) model

Process reference models integrate the well-known concepts of **business process engineering, benchmarking, process measurement and organizational design** into a cross-functional framework. The **Supply Chain Operations Reference (SCOR)** model is unique in that it **links business processes, performance metrics, practices, and people skills into a unified structure**. It is hierarchical in nature, interactive and interlinked.

<http://www.apics.org/apics-for-business/frameworks/scor>



# Assess & Monitor your performance *SCOR Metrics*

## Supply Chain Reliability

**RL.1.1 - Perfect Order Fulfillment**

**RL.2.1 - % of Orders Delivered In Full**

RL.3.33 - Delivery Item Accuracy

RL.3.35 - Delivery Quantity Accuracy

**RL.2.2 - Delivery Performance to  
Customer Commit Date**

RL.3.32 - Customer Commit Date Achievement Time  
Customer Receiving

RL.3.34 - Delivery Location Accuracy

**RL.2.3 - Documentation Accuracy**

RL.3.31 - Compliance Documentation Accuracy

RL.3.43 - Other Required Documentation Accuracy

RL.3.45 - Payment Documentation Accuracy

RL.3.50 - Shipping Documentation Accuracy

**RL.2.4 - Perfect Condition**

## Supply Chain Responsiveness

**RS.1.1 - Order Fulfillment Cycle Time**

**RS.2.3 - Deliver Cycle Time**

RS.3.16 - Build Loads Cycle Time

RS.3.18 - Consolidate Orders Cycle Time

RS.3.46 - Install Product Cycle Time

RS.3.51 - Load Product & Generate Shipping  
Documentation Cycle Time

RS.3.95 - Pack Product Cycle Time

RS.3.96 - Pick Product Cycle Time

RS.3.102 - Receive & Verify Product by Customer Cycle Time

RS.3.110 - Receive Product from Source or Make Cycle Time

RS.3.111 - Receive, Configure, Enter, & Validate Order  
Cycle Time

RS.3.116 - Reserve Resources and Determine Delivery  
Date Cycle Time

RS.3.117 - Route Shipments Cycle Time

# Methods & tools for ROI analysis

## *Inventory control questions & related KPIs*

### Receiving

What is the % of orders accurately received complete and on time?

What is the percentage of orders accurately received against the ASN?

- Fixed RFID portal
- Integration with WMS
- Integration with supplier EDI

### Put Away

What is the put-away accuracy (%)?

What is the put-away cycle time?

- Mobile RFID reader
- Integration with WMS

### Picking

What is the picking accuracy (% orders picked accurately)?

What is the average picking time? Average picking cost?

What is the number of pull-lists processed per day?

# Methods & tools for ROI analysis

## *Inventory control questions & related KPIs*

### Shipping

What is the average order turnaround time?  
What is the Order Lines Shipped /Labor Hr?  
What is the average back order length?  
What is the average lead time for an order?

### Inventory Control (Inbound)

What is the Inventory Availability?  
What are the inventory carrying costs?  
What is the inventory turnover?  
What is the accuracy of inventory?  
Is there an inventory obsolescence costs?  
What is the shrinkage % (as a % of sales)?

### Return management

What is the % of product returns (if any)?  
What is the average return management process time?  
What is the ...

# Quantifying opportunities/ problems

*Consider the full scope of benefits- Automated receiving benefits*

- **More efficient processes**

- Faster data acquisition
- Faster verification
- Reduced paperwork
- Reduced errors
- Reduced bottlenecks
- Improved asset utilization
  - Improved Human Resource utilization
  - Dock doors used by trailers – quicker turnover
  - Free up coveted real estate : receiving dock and staging area
  - Fewer forklifts

# Quantifying opportunities/ problems

*Consider the full scope of benefits- Automated receiving benefits*

- **Improve the quality of information**
  - Paperwork gets (correctly) filled out
  - Fewer claims (relationship, time, \$)
  - Better informed management decisions
    - Inventory
      - Cash flow
      - Level of inventory (floor space, variable costs, insurance costs, depreciation, ...)

# Quantifying opportunities/ problems

*Consider the full scope of benefits- Automated receiving benefits*

- **Improve the quality of process execution**
  - Better management and control on operations
  - Better Just-in-Time
- **Business Process Re-engineering**
  - Cross-dock possibility (if not in FIFO)
  - Manage « Hot items »
- **Externalities**
  - Use the same pallet tag for put-away, picking and shipping, client receiving

# Conclusion

- An RFID business case should be a *living, breathing* document
- Continuous RFID/IoT developments (↓price, ↑performance)

***“ Implementing RFID is just the start... ”***



**THANK YOU**