RFID for Warehouse and Inventory Management 2020
RFID and IoT for Inventory and Warehouse Management 2020

Building your 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

- Project Front end
- Project definition & Planning
- Project follow up & Operations
- Implementation
- RFID BPR (As-Is)
- RFID BPR (To Be)
- POC & Pilot Design Dev.
IoT Infrastructure & Integration with existing IT infrastructure & processes

Applications/Analysis/transactions/Visualisation
(Local application, Cloud/fog/edge based application, Mobile apps)

Information hosting/access/sharing
(Local server, Cloud based server, Fog based, Edge based...)

Data Communication
(Communication network - LAN, WLAN, WAN, MAN – LoRa, LTE-4G, 5G)

Data capture
(RFID readers/antennas, BLE sensors, Wi-Fi, Li-Fi, Cameras, IR, USID, Mobile robots, etc.)

Identification/Connected objects
Tags RFID: Active/ passive/ semi-passive
Sensors: Movement, Light, Temperature, Etc.
Mobile & Mounted devices: Phones, Tablets, Mobile computers, lifi tracker, Etc.
Wearables: Smart watch, fitness tracker, BLE badge
None: The object as the identifier

RFID/IoT Business Case in the Project life cycle

Project Front end

- Project definition & Planning
- RFID/IoT BPR (As-Is)
- RFID/IoT BPR (To Be)
- ROC & Pilot Design Dev.

Implementation

- Project follow up & Operations

Project Front end

- High level Business case / value
- As-is performance & gap analysis
- Business cases & scenarios sensitivity analysis based on ≠ designs

Revision of the Business case: assess realistic impacts based on experimentation (Lab & pilot) & RFI/RFQ/…

Measuring performance and continuous case assessment (TCO)
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 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

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

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

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

**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

Inventory carrying costs

- Capital costs
- Inventory Service costs
- Storage Space costs
- Inventory Risk costs

- Inventory investment
- Inventory insurances
- Taxes
- Company Owned warehouse
- Inventory obsolescence
- Inventory damage
- Inventory pilferage
- Inventory relocation costs

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

Source: Adapted from GS1 Canada, 2007 & IBM & EPC Global
Matching 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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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 and IoT for Inventory and Warehouse Management 2020

Targeting the Correct RFID/IoT Technology for the Right Project

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CRI²GS
Réseau Innovation 4.0
Network
OCCAH
HumanIA

ESG UQÀM
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
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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

Source: Adapted from Bragg S. (2004), Inventory best practices
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

Customer
- How should we appear to our customers?
  - Objectives
  - KPIS
  - Initiatives

Internal Business Processes
- What business processes must we excel at?
  - Objectives
  - KPIS
  - Initiatives

Financial
- How should we appear to our Shareholders?
  - Objectives
  - KPIS
  - Initiatives

Vision & Strategy

Learning and growth
- How will we sustain our ability to change and improve?
  - Objectives
  - KPIS
  - Initiatives
Assess & Monitor your performance

Supply chain frameworks to assess the performance

Frameworks

Transform Your Supply Chain

Our resources and frameworks, including the Supply Chain Operations Reference (SCOR) model, set the global standard for supply chain excellence and help organizations transform the way people do business, drive growth and reach global customers.

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.

ASCM members have access to all process frameworks. Visit My Account to learn more.
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
### Supply Chain Reliability

| RL.1.1 | Perfect Order Fulfillment |
| RL.2.1 | % of Orders Delivered In Full |
| RL.2.2 | Delivery Performance to Customer Commit Date |
| RL.2.3 | Documentation Accuracy |
| RL.2.4 | Perfect Condition |

*SCOR Metrics*

- RL.3.33 - Delivery Item Accuracy
- RL.3.35 - Delivery Quantity Accuracy
- RL.3.32 - Customer Commit Date Achievement Time
- RL.3.34 - Delivery Location 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

### Supply Chain Responsiveness

| RS.1.1 | Order Fulfillment Cycle Time |
| RS.2.3 | Deliver Cycle Time |
| RS.2.3 | Deliver Cycle Time |

*SCOR Metrics*

- RS.3.16 - Build Loads Cycle Time
- RS.3.18 - Consolidate Orders Cycle Time
- RS.3.34 - 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

**Assess & Monitor your performance**

# 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?

### Put Away

- What is the put-away accuracy (%)?
- What is the put-away cycle time?

### 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?

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- **Fixed RFID portal**
- **Integration with WMS**
- **Integration with supplier EDI**
- **Mobile RFID reader**
- **Integration with WMS**
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?

**Return management**
- What is the % of product returns (if any)?
- What is the average return management process time?
- What is the …

**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)?
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