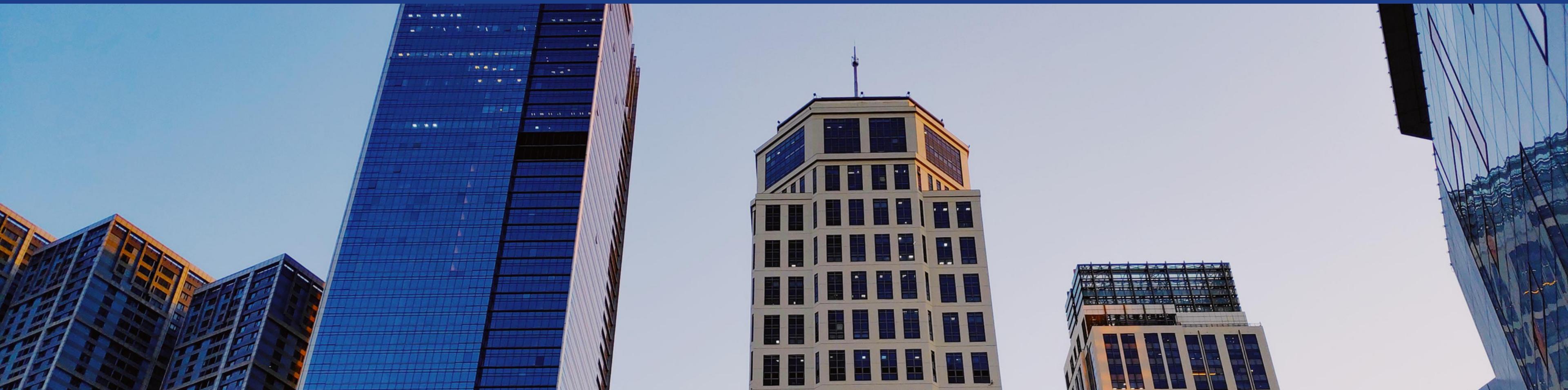




RFID

METRO return on investments



Meet the Team



Sophia Falco



Arun Jonnalagadda



Stuti Khanna



Garrett Wadley



Danqing Wang



Our Proposal

We recommend that the METRO group should move forward with solution #2, i.e. Move to case-level RFID with the manufacturers currently engaged in the pallet-level rollout.

- The financial impact of using case-level tagging trumps pallet-level tagging –
 - For the retailer- Estimated benefits of €0.09 per case, with each pallet consisting of 70 cases on average, as compared to benefits of €0.15 per pallet.
- Suppliers would make better decisions based on inventory data, by having information on point-of-sale, knowing how many units sold and in how much time.

Solution #2

- Improve store's accuracy in terms of inventory data collection and utilizing it for merchandising decisions.
- Improved shelf re-stocking, on-shelf availability and reducing out of stock, as employees would no longer rely on memory to replenish on-shelf commodities.
 - Estimated increase of in-stock rate from 96% to 98%
 - An estimated 17% labor reduction, 11-18% theft reduction, and 9-14% reduction in stockouts
- Strengthen relationships with existing suppliers.



Strategic & Operational Benefits

RFID Rollout

Strategic Benefits

01

Monitor METRO's supply chain efficiencies

- Investigate problem areas



02

Relay data to enterprise application

- Uniform data



03

Receive point of sale and inventory data

- Improved market, store, and produce demand predictions
- Eliminate underselling products
- Increase supply of popular products

RFID Rollout

Operational Benefits

Ability to identify individual products, cases, & pallets

01

Ensure manufacturer agreements

- More accurate planograms
 - Easier for layout planning
- Verify promotion compliance
 - 3rd party is no longer required

02

Accurate inventory count

- Reduce out of stock rate
- Leads to increase in sales, brand loyalty, and consumer satisfaction
- Provide stock visibility for stores and warehouses

03

Improved product availability on floor

- Increase store execution
- Monitor backroom products
- Ensure all products are available to customers
- Increase efficiency of store replenishment process

04

Reduce shrinkage

- Decrease inventory theft from employees/customer with product tracking

RFID Rollout

Operational Benefits

05

Accurate data entry

- Automatic
- No human error

07

Employees

- No need for cashiers - easy and accurate checkout
- No need for warehouse personnel to supervise orders

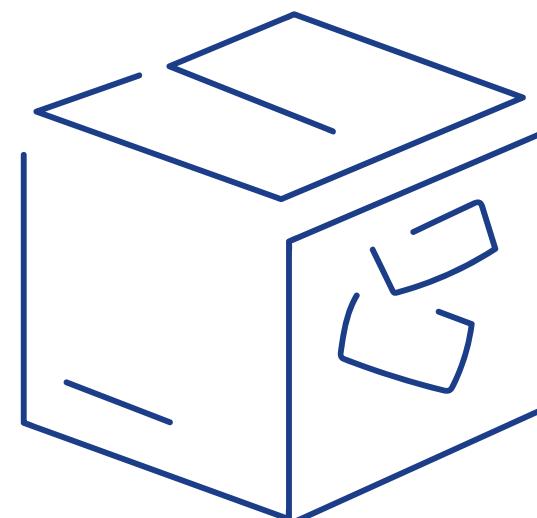
Labor



06

Case pickers

- Verify number of cases picked (correct and incorrect)
- Reduce picking error and improve accuracy of shipments
- Incomplete orders are known immediately
- Decrease the number of cases returned or thrown away
- Improve store inventory accuracy



IT Strategic Models

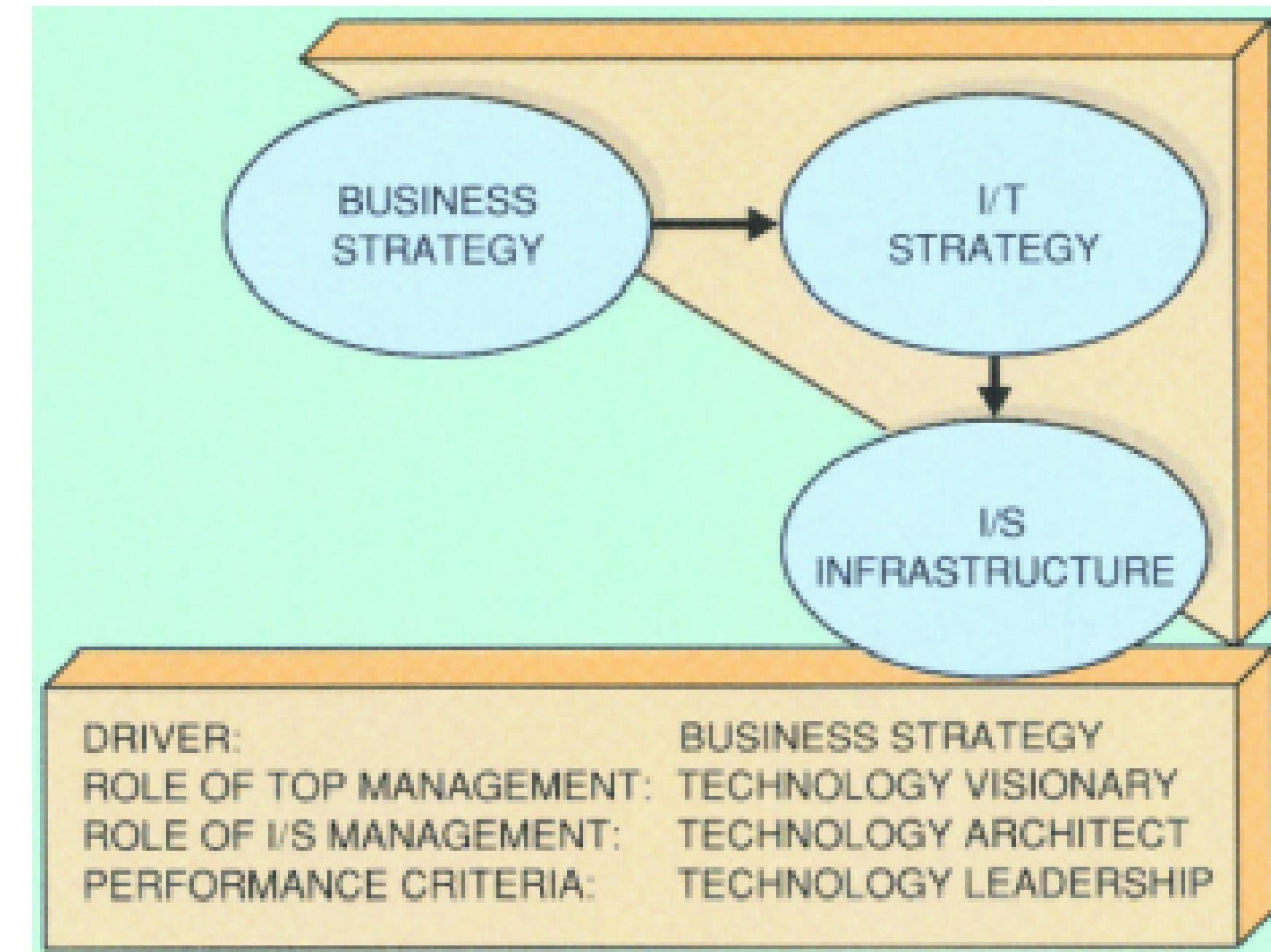


RFID Model

Henderson and Venkatraman



Technology Transformation



Technological advancements (RFID) are pursued by top management (CIO and managing director internal IT) to increase efficiencies in METRO's supply chain

RFID Model

Henderson and Venkatraman



Technology Transformation

- Seeks improvement of IT competencies
 - Product, case, and pallet tracking to prevent backroom pileup, out of stock, and shipping/warehouse errors
 - Reduces customers buying substitutes or from another store
 - A 3rd party vendor is no longer required to ensure promotion contracts
 - Reduces supervision at warehouses
 - Case level benefits:
 - 17% labor reduction
 - 11-18% theft reduction
 - 9-14% reduction in stock outs
 - 98% in stock rate from improved replenishment and reduction picking errors

RFID Model

Henderson and Venkatraman

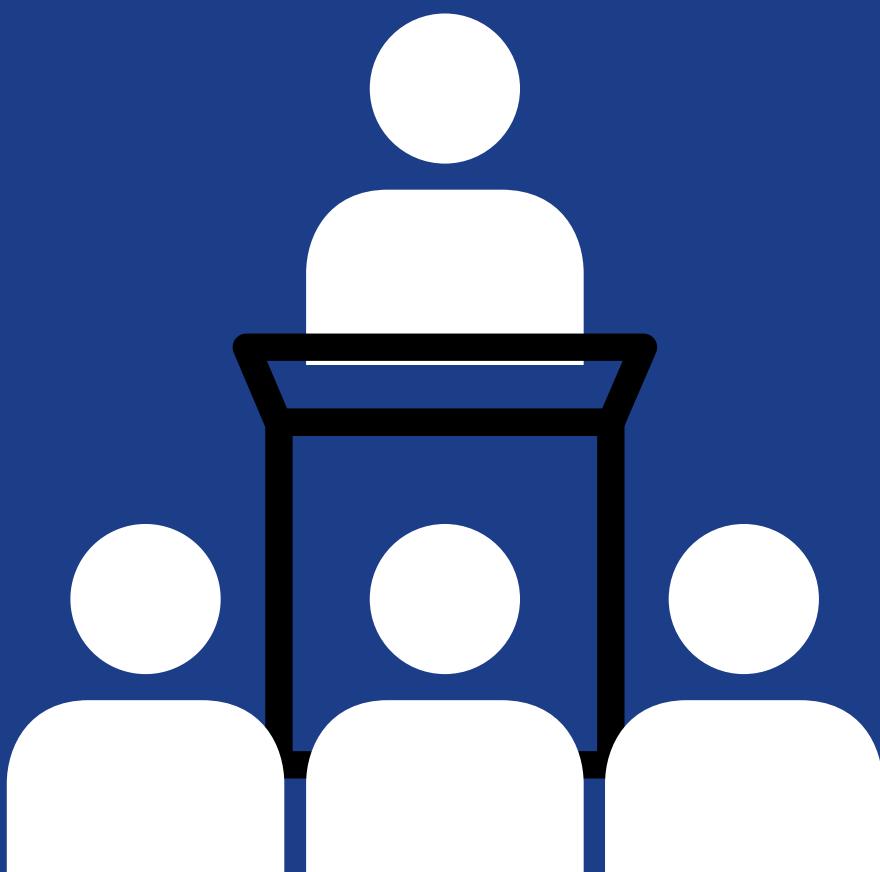


Technology Transformation

- Aware of migrating and funding issues
 - Long term investment - will take years
 - METRO and its suppliers would have to invest in RFID infrastructure
 - Process changes at manufacturing plants
 - Significant upfront costs
 - Tags - €0.17
 - Printers - €1,270 - 3,400
 - Portals - €8,500

RFID Model

Henderson and Venkatraman



Technology Transformation

- Research development
 - Founding member of Global Commerce Initiative
 - MGI METRO Group Information Technology
 - Launched Future Store Initiative
- I/S reconstruction
 - RFID tags, transponder, and reader, middleware

Cost-Benefit Analysis



Assumptions

- Hardware costs are set at €8,500 per RFID portal, per the case, but vary widely from €700 to €6000 per reader. Given a conservative estimation, we're calculating based on the low end of this (€700).
 - Note that these are the initial costs, which are increased by 30% given the assumption presented in the project guidelines
 - 10 yr evaluation period
-

- Only calculating for **Extra stores and DCs**
- Assuming that all pallets and cases sent to the **Extra stores** are routed through the DCs (no external throughput)
- 1 portal and 2 readers per store; 2 portals and 5 readers per DC
- Software cost is a function of hardware cost. When hardware cost changes, software proportionally adjusts
- Straight-line depreciation for both hardware and software over 5 years
- Annual maintenance cost is 20% of initial software cost

- Savings and Shrink savings increase by 5% year over year for 5 years
- Shrink costs are calculated as 2% of sales - Extra stores amount to €2.5 billion
- DC shrink savings are not assumed (no information in case given)
- Discount rate of 15% and income tax at 30%.
- Savings/pallet is €0.157, savings/case is €0.089
- 30 pallets per store per week; 70 cases per pallet (case gives a range, we use the average)



Some quick napkin math...

0.16 savings per pallet

0.08 savings per case

60-80 cases on a pallet

Which will come out on top?

Pallet Level Analysis

YEAR	0	1
REVENUE	€ 2,500,000,000.00	€ 106,785.12
SHRINK SAVINGS		€ 2,500,000.00
MAINTENANCE COST	€ -	€ 2,351,128.00
DEPRECIATION COST	€ -	€ 3,526,692.00
PROFIT		€ (3,271,034.88)
NET PROFIT		€ (2,289,724.42)
Net + Dep		€ 1,236,967.58
NPV	€ (11,981,376.52)	

LEVEL LEVEL SENSITIVITY ANALYSIS						
(€ 11,981,376.52)	10%	12%	15%	20%	25%	
0.075	(€ 11,214,724.01)	(€ 11,643,152.03)	(€ 12,203,146.23)	(€ 12,961,927.80)	(€ 13,557,229.25)	
0.1	(€ 11,131,266.03)	(€ 11,566,661.02)	(€ 12,135,533.51)	(€ 12,905,887.72)	(€ 13,509,855.24)	
0.12	(€ 11,064,499.65)	(€ 11,505,468.20)	(€ 12,081,443.34)	(€ 12,861,055.67)	(€ 13,471,956.04)	
0.157	(€ 10,940,981.83)	(€ 11,392,261.50)	(€ 11,981,376.52)	(€ 12,778,116.36)	(€ 13,401,842.50)	
0.18	(€ 10,864,200.49)	(€ 11,321,889.77)	(€ 11,919,172.83)	(€ 12,726,559.49)	(€ 13,358,258.41)	
0.2	(€ 10,797,434.10)	(€ 11,260,696.96)	(€ 11,865,082.65)	(€ 12,681,727.43)	(€ 13,320,359.21)	
0.25	(€ 10,630,518.14)	(€ 11,107,714.92)	(€ 11,729,857.22)	(€ 12,569,647.29)	(€ 13,225,611.19)	

- First find the Revenue from Savings: savings per pallet * number of pallets
- Add Shrink Savings: from 2.5 billion initial sales, multiply by shrink rate and again by the 5% savings; for 5 years, this 5% increases multiplicatively
- Account for Maintenance Cost: simply 20% of software cost (2x hardware cost) per year
- Account for Depreciation Cost: Straight-line over 5 years for both hardware and software
- Add the above savings, subtract the costs to get EBIT
- Net Profit is simply the above minus the 30% tax rate
- Again, to calculate NPV we have to add back in depreciation, as this isn't a cash expense

Case Level Analysis

CASE LEVEL SENSITIVITY ANALYSIS						
	€ 4,443,104.10	10%	12%	15%	20%	25%
0.05	€ 219,019.49	(€ 1,163,882.93)	(€ 2,940,204.33)	(€ 5,284,437.79)	(€ 7,066,990.00)	
0.07	€ 4,892,666.46	€ 3,119,613.93	€ 846,107.68	(€ 2,146,193.70)	(€ 4,414,045.49)	
0.089	€ 9,332,631.09	€ 7,188,935.95	€ 4,443,104.10	€ 835,138.19	(€ 1,893,748.21)	
0.12	€ 16,576,783.91	€ 13,828,356.08	€ 10,311,887.72	€ 5,699,416.53	€ 2,218,315.78	
0.14	€ 21,250,430.88	€ 18,111,852.94	€ 14,098,199.74	€ 8,837,660.62	€ 4,871,260.29	
0.16	€ 25,924,077.86	€ 22,395,349.80	€ 17,884,511.75	€ 11,975,904.71	€ 7,524,204.80	

YEAR	0	1
REVENUE	€ 2,500,000,000.00	€ 4,237,396.80
SHRINK SAVINGS		€ 2,500,000.00
MAINTENANCE COST	€ 0.00	€ 2,351,128.00
DEPRECIATION COST	€ 0.00	€ 3,526,692.00
PROFIT		€ 859,576.80
NET PROFIT		€ 601,703.76
Net + Dep		€ 4,128,395.76
NPV	€ 4,443,104.10	

Revenue from RFID Saving way up!



- Positive NPV in all but the most risky hurdle rates
- 16MM higher NPV than Pallet
- Just 1 pallet increase per week raises NPV by over 500k, compared to ~11k on pallet-based

Retail Enterprise

400+ stores, only 10 DCs

Most savings proportionally found on store level for case-tagging

METRO stands to benefit most from case-tagging

Manufacturers

Pallet tagging significantly more valuable

Potential to negotiate with Metro's suppliers

Opportunity to incorporate data streams from up the supply chain



OPEN

Future Store Initiative

Economic disadvantage to pursue RFID:



Training

training all the related staff



Infrastructure costs

(equipements and update)—
each METRO store around the
world would have purchased
and updated these RFID
infrastructure



Third party purchasing costs

venders would purchase
pallets with RFID
compatibility



Third party purchasing costs

venders might forget to affix
tags on pallets or place them
at the wrong place which
results in difficulty or miss
reading which increase the
cost

Future change in store

Introduce smart cart:



**Special promotions
Guidance customer**

the easier the customers can access the information, the more items they are likely to buy than they normally do

**Low cost (compare to RFID)
No extra labor training**

It's a more aggressive sale approach with a lower cost



Risks of RFID Adoption

potential risks

placement tag issue

Data risk
Highly centralized database

minimize risks

- strengthen employee training
 - invest automatic tagging machine line
-
- Backup solution
 - Cyber risk management
 - Investment stable infrastructure to secure daily operations

potential risks

Suppliers' production costs increase

Assumption: company sells 200,000 units of product to METRO per year, if the company applies RFID the additional costs will be €364,500 (assume the printers and reader portals can functionally work for 10 years)

minimize risks

benefits for suppliers to implement RFID

RFID at case level would result in 17% labor reduction, 11%-18% theft reduction and 9%-14% reduction in stock outs. All the benefits will help the sales grow to METRO and will back to benefits suppliers

cost calculations for suppliers

It will cost the company €0.182 more to produce a single unit of their products

	Item	Price
Fixed Costs	3 x RFID Printers	€7,500
	2 x (RFID Reader + Portals) €8,500	€17,000
Subtotal		€24,500
Variable Costs	200,000 x RFID Tags (€0.17 each) x 10 years	€340,000
Total		€364,500

Benefit Analysis for Suppliers

Overall increase in sales will have a positive impact on the suppliers as well , with increases in sales, profit margin and demand.

The benefits for suppliers will cover the extra costs for them to implement RFID, and create more value.

In store rate	98%
Increase Sales	0.5%
labor reduction	17%
theft reduction	11%-18%
reduction in stock outs	9%-14%



Finding Minimum Required Savings

Goal Seek

- Excel tool used to solve for a desired output by changing an assumption that drives it
- Want to find least savings per pallet/case that still gives a positive NPV (break-even point)
- Set NPV cell as target equal to 0, with savings/pallet cell as the variable

Pallet Result

Required Savings per Pallet = €4.59

Excessively high for Metro's use
case

Pallet-level adoption not
recommended exploring

Case Result

Required Savings per Case = €0.065

Even lower than initial baseline

Case-level adoption is viable; even
has cushion from negative impacts



Two Year Postponement

ROI Analysis of Postponing

	Before Postponing	After Postponing
NPV (Pallet Level)	- € 11,981,376	- € 3,313,951
NPV (Case Level)	€ 4,443,104	€ 7,989,776

Benefits of Postponing

Given hardware costs will drop by 50% in two years

01

Value generation

Considering the expected drop in hardware expenditure for implementing the project, the value generation is better if the project is taken up after two years for both pallet level and case level implementation.

02

Opportunity to improve other processes

Postponing the implementation of project will help Metro to utilize the current capital expenditure on improving efficiency of other processes involved in the supply chain like training employees.

Thank You!

Questions?