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BEYOND INVENTORY MANAGEMENT: RFID IN VISUAL MERCHANDISING

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RFID lab

BACKGROUND

Background

2008

April– **Board of Advisors fashion** was set
Charter members: 13 major brands in fashion industry

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2008 - 2011

Research Projects:

- ✓ The impact of RFID in the fashion supply chain
  - ✓ Business case
  - ✓ Technology Tests
- ✓ RFID for anti counterfeiting
- ✓ RFID for Electronic Article Surveillance

2009 - 2013

Pilot activities:

- ✓ RFID fashion store (http://www.rfidlab.unipr.it/eventi/fashion/2009/)
- ✓ RFID fashion pilot (www.rfp.unipr.it)

Research - projects

RFid FASHION PILOT

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RFID Boosts Store Turnover by Nearly 10 Percent in Italian Pilot

A study conducted by the University of Parma's RFID Lab, working with a retailer, apparel suppliers and logistics providers in Italy, reveals significant benefits throughout the supply chain.

By Mark Roberti

Tags: Apparel, Inventory / Warehouse Management, Labeling, Logistics, Manufacturing, Packaging, Retail, Supply Chain, Transport

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The software provides employees with a dashboard showing, in real time, which styles, colors and sizes need to be replenished when some of those items are stocked in the back room but there are none on the sales floor. The system determined what needed to be replenished, by combining RFID data from the inventory counts with sales data acquired from the RFID reader at the checkout counter. Store associates were trained to print a list of items to be replenished each morning. The system then tracked when the list was printed, along with the time that those items were moved from the back room to the sale floor.

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2013 - now

RFID deployments
consultancy and support, PM, KPIs, BI & data analysis

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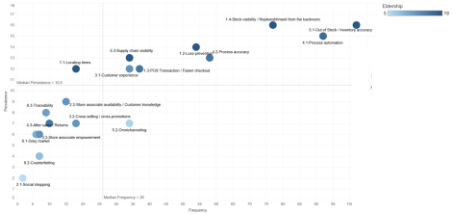
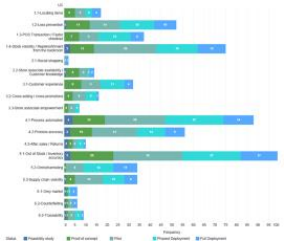
RFID barometer in retail

RFID barometer in apparel retail

- RFID adoption in fashion and apparel retail
- Who is adopting, when, how, why?

- 100+ companies; 18 use cases
- 24k+ stores; 1B+ tags





- Use cases framework
- Evolving use cases

Rizzi, A., Romagnoli, G., & Thiesse, F., 2016. A new framework for RFID use cases in fashion and apparel retailing, *International Journal of RF Technologies: Research and Applications*, 7(2-3), 105-129. DOI: 10.3233/RFT-150075

Cilloni, G., Leporati, R., Rizzi, A., Romagnoli, G., 2019. State of t*International Journal of RF Technologies: Research and Applications*he art of item-level RFID deployments in fashion and apparel retail., paper in press

RFID in the store

DIFFERENT LEVELS OF VISIBILITY

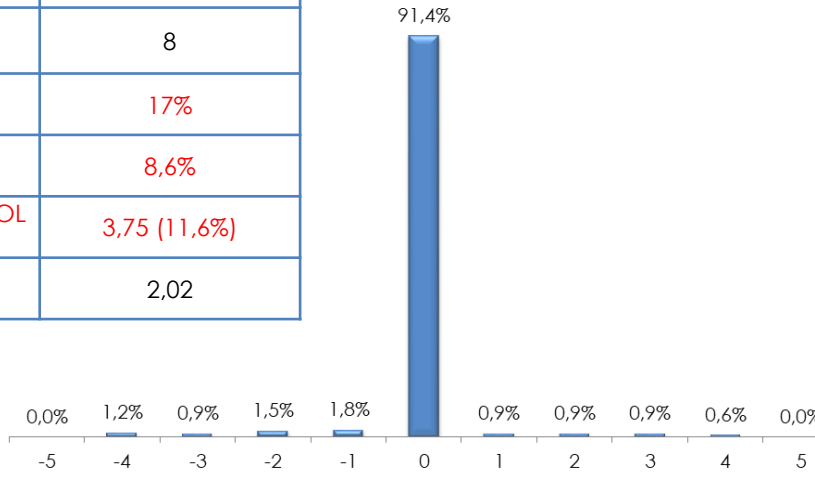
Traditional retail stores – lack of visibility

Lack of visibility – rooth causes

Inbound inaccuracy

- from the DC
- from other stores
- From third parties

n° BOLs checked	46
n° order lines checked	1480
Average n° OL per BOL	32,2
n° BOLs with errors	8
% BOLs with errors	17%
% OL with errors	8,6%
Average number of wrong OL per BOL	3,75 (11,6%)
Average error (items)	2,02



Bertolini, M., Bottani, E., Ferretti, G., Rizzi, A., & Volpi, A., 2012. Experimental evaluation of business impacts of RFID in apparel and retail supply chain, *International Journal of RF Technologies: Research and Applications*, 3(4), 257-282

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Outbound inaccuracy

- End of season returns management
- Ship from store

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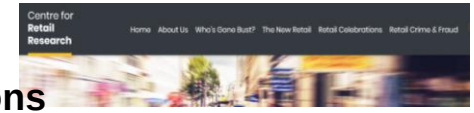
Internal and external shrinkage

Lack of visibility – rooth causes



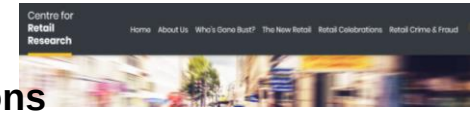
Crime Comparisons
Retail Crime in the U.S., UK and Europe 2019
Three hundred and twenty-eight retailers; eight countries;combined total of 48,000 stores, crime events during 2018-19

- 1.44% of sales is lost for shrinkage

Table 1
Shrinkage and retail crime costs in U.S. & Europe

	shrink as percentage of sales	total shrinkage $billions	costs of crime $bn (shrink-minus-error)
U.S.	1.48%	$43.316	$34.783
UK	1.42%	$6.770	$5.267
Germany	1.12%	$6.579	$5.066
France	1.47%	$6.769	$5.117
Netherlands	1.40%	$1.535	$1.131
Spain	1.51%	$5.380	$3.707
Italy	1.67%	$6.335	$4.954
Sweden	1.44%	$0.934	$0.648
Average/Total	**1.44%**	**$77.618**	**$60.673**

Lack of visibility – rooth causes



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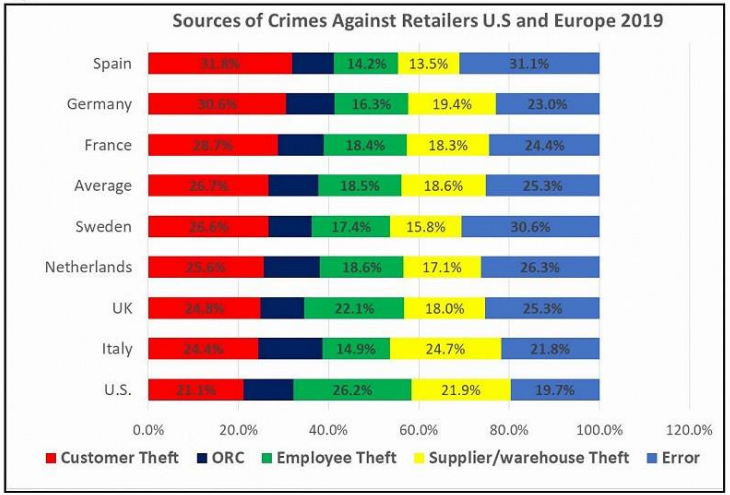
- 1.44% of sales is lost for shrinkage/crime
- 1/3 external, 1/3 internal, 1/3 errors

Figure 2



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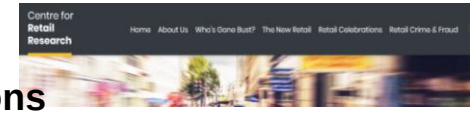

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- 1.44% of sales is lost for shrinkage/crime
- 1/3 external, 1/3 internal, 1/3 errors
- Apparel is in the hit parade!

Most Stolen Merchandise Hit Parade 2019	
FOOD & GENERALE MERCHANDISE	Packed meat, such as steak, lamb and bacon Cheese Razor blades alcoholic products Coffee Cosmetics, makeup and lipsticks, Branded under-arm deodorants Perfume and fragrance
APPAREL	Sport fashion Clothing accessories Baby clothes Jeans and casual apparel
ELECTRONICS	Small electrical goods and accessories Batteries Boxed sets DVD and games.

Lack of visibility – rooth causes

Inbound inaccuracy
- from the DC
- from other stores
- From third parties

Outbound inaccuracy
- End of season returns management
- Ship from store

Internal and external shrinkage

Returns management from customers

Manual adjustments

Checkout errors

Damaged spoiled

RFID - turn the light on!

RFID in the store - three levels of visibility

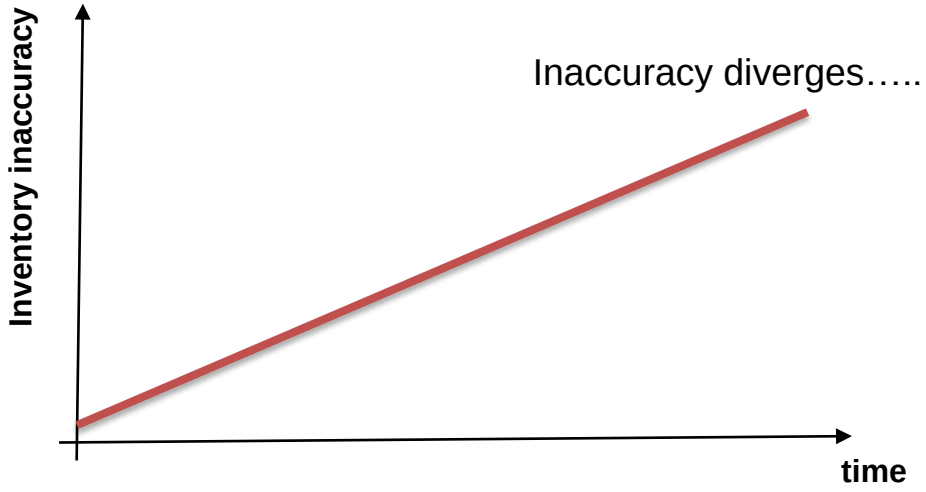
what is in the store?

- Inventory accuracy

Hardgrave, B., 2009, “ITEM-LEVEL RFID FOR APPAREL FOOTWEAR: THE JCPENNEY RFID INITIATIVE”, University of Arkansas White Paper

Waller, M.A., Nachtmann, H., and Hunter, J., 2006,“Measuring the Impact of Inaccurate Inventory Information on a Retail Outlet,” The International Journal of Logistics Management, 17 (3),, 355-376

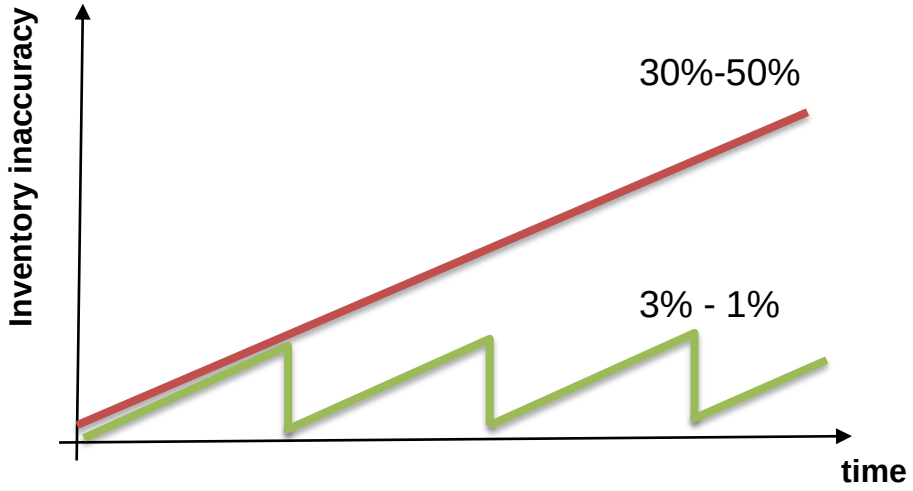
Inventory inaccuracy



	Accurate PI=OH	Overstated PI>OH	*OOS PI<>0;OH=0*	Understated PI<OH
Time 0	90,87%	7,25%	*1,14%*	1,88%
1 week later	89,61%	8,26%	*1,27%*	2,13%
1 month later	76,06%	10,76%	*1,76%*	13,18%

3.100 SKUs; 18.000 Items
10 RFID counts; 20 min each (3h20min) on average

Inventory inaccuracy



R5 - Inventory acccuracy	% projects
Yes	43.53%
30.0%	1.18%
95.0%	3.53%
96.0%	1.18%
97.0%	5.88%
98.0%	7.06%
98.5%	3.53%
98.6%	2.35%
98.7%	1.18%
99.0%	10.59%
99.8%	2.35%
99.9%	5.88%
100.0%	2.35%
baseline + 10%	2.35%
baseline + 17%	1.18%
baseline + 27%	2.35%
baseline + 50%	2.35%
baseline + 7%	1.18%
Total	**100.00%**

Cilloni, G., Leporati, R., Rizzi, A., Romagnoli, G., 2019. State of the art of item-level RFID deployments in fashion and apparel retail. *International Journal of RF Technologies: Research and Applications, paper in press*

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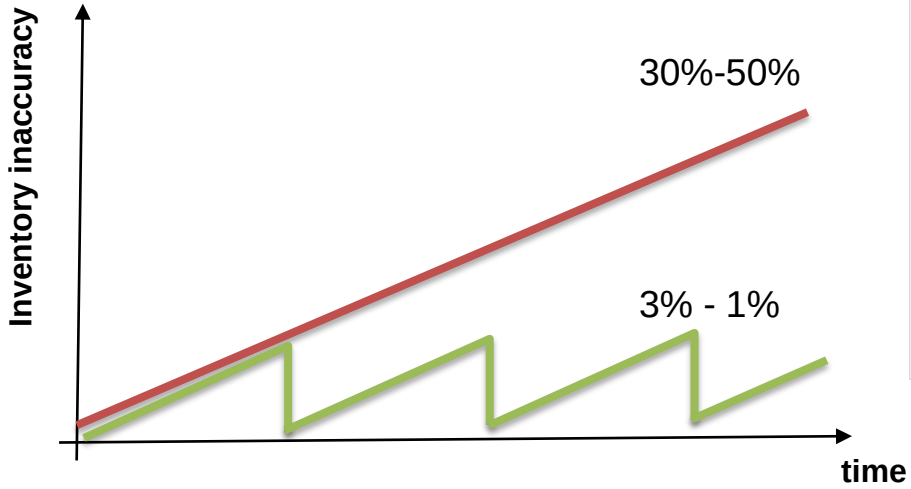

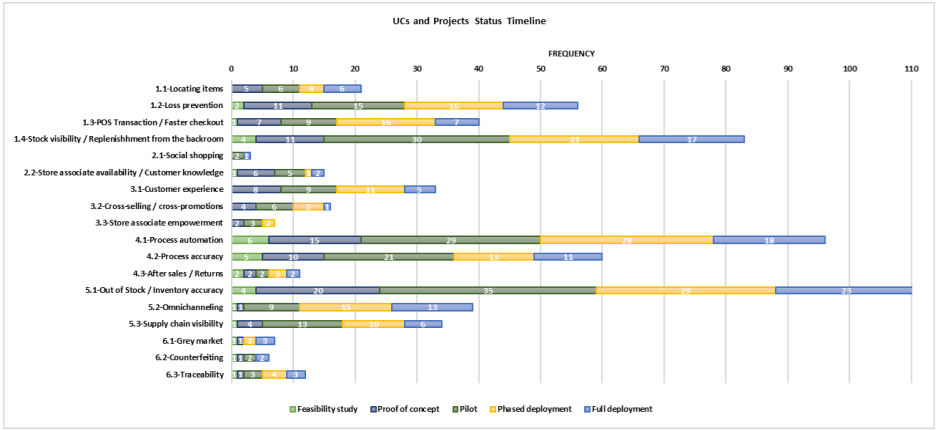

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RFID in the store - three levels of visibility

what is in the store?

- Inventory accuracy

What is the backroom or in the store area?

- Replenishment from the backroom

Bottani, E., Ferretti, G., Montanari, R., & Rizzi, A., 2009. The impact of RFID technology and EPC system on logistics processes of the fashion industry supply chain. *International Journal of RF Technologies: Research and Applications*, 1(4), 225-252.

Bertolini, M., Bottani, E., Ferretti, G., Rizzi, A., & Volpi, A., 2012. Experimental evaluation of business impacts of RFID in apparel and retail supply chain, *International Journal of RF Technologies: Research and Applications*, 3(4), 257-282

Replenishment from the backroom

Customers buy what they see

- Fashion outlets: Up to 96%
- High luxury retail: 84% sales are triggered by model/colour displayed in the store; only 16% from the backroom

Replenishment from the backroom

3% - 10% SALES INCREASE

The combined effect of inventory accuracy and replenishment from the backroom

R3 - Increased turnover/sales	% projects
Yes	61.90%
1%	3.17%
2%	1.59%
3%	6.35%
4%	4.76%
5%	3.17%
10%	4.76%
11%	1.59%
12%	1.59%
13%	1.59%
14%	1.59%
21%	1.59%
baseline + 11%	1.59%
baseline + 15%	1.59%
baseline + 5%	1.59%
baseline + 8%	1.59%
Total	**100.00%**

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What is in which area

- RFID visual merchandising

Rizzi, A., Volpi, A., 2018. RFID-enabled visual merchandising in apparel retail. *International Journal of RF Technologies: Research and Applications*, 8(4), 213-231

Visual merchandising – what it is and why it is important?

- purchase decision making is impulsive, often created by strategic visual presentations and merchandise assortments on the store area
- retailers strive for presenting an attractive sales environment that on the one hand, impacts emotions and keeps customers in the store as much as possible and foster impulse buying
- Displaying the right product in the right area is the key to attract customer, keep them in the store, and increase conversion

Visual merchandising – issues at stake

- only SKUs that positively generate margins are worth displaying
  - Store Net revenue = sales revenues (margins) - total costs of the space (CAPEX+OPEX)
  - Costs allocation to SKUs - space costs x days of display
    - Hotel approach

Visual merchandising – issues at stake

	% SPACE – COST TO DISPLAY	
% SALES	Money makers MANTAIN	The indifferent OPTIMIZE
	The indifferent EXPLORE OPPORTUNITIES	Money loosers REPLACE

Visual merchandising – issues at stake

- only SKUs that positively generate margins are worth displaying
  - Store Net revenue = sales revenues (margins) - total costs of the space (CAPEX+OPEX)
  - Costs allocation to SKUs - space costs x days of display
    - Hotel approach
- Not all store areas are equal
  - the higher the area value, the higher its costs and thus the expected sales

Visual merchandising – why RFID?

- RFID makes it possible to get consistent information on product displays to correlate to sales
- The key point for VM is visibility; RFID is just an enabler

Evidence from the field

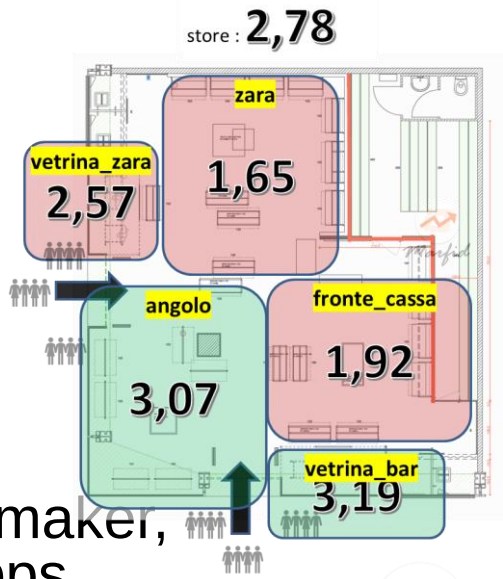
- Woman apparel, footware and accessories retail brand
- member of a luxury Italian fashion group

- 3.2 M items/year;
- retail wholesale and online worldwide

- RFID retail deployment
  - 25 stores in Italy, 4 EU
  - Full deployment in Italy - 2017-2018

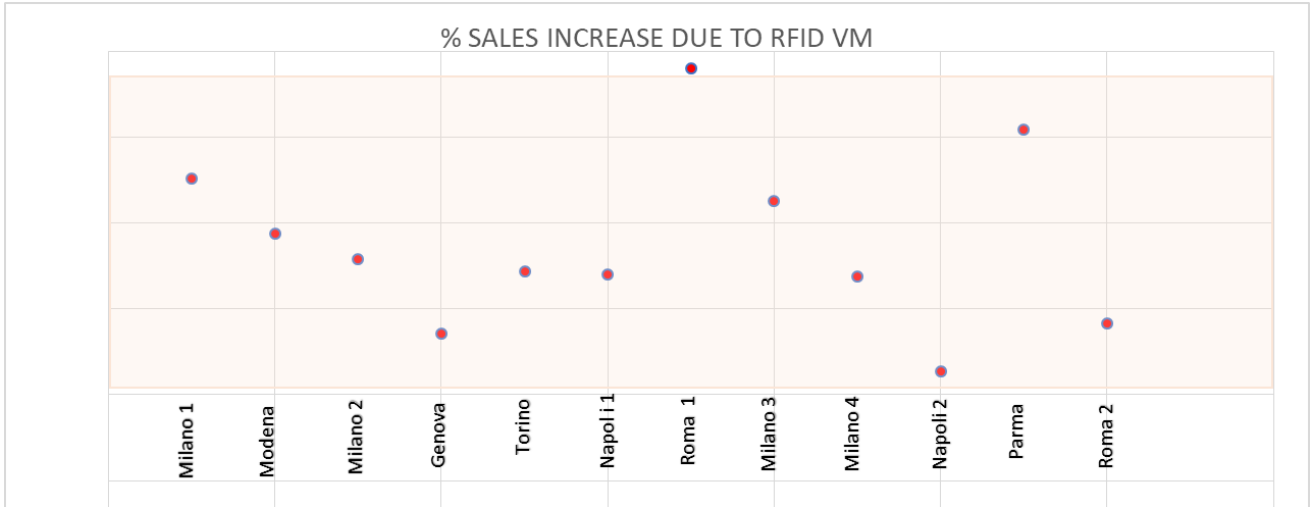
Evidence from the field

- 12 stores
- 10 mounths: Sept 2018 → Jun 2019
- Performace of stores areas
  - sales vs cost to display with RFID
- Performances of single SKUs (money maker, money looser, indifferent) with store apps
- Decide what's worth keeping, moving, replacing
- 500+ actions



Evidence from the field

- Monitor outcomes in terms of sales increase



Conclusions

- It is not RFID, its visibility!
- RFID is the visibility enabler that drives sales and reduces costs

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