



storaenso

# Learnings from developing a RAIN RFID based NEW RETAIL solution

Stora Enso Intelligent Packaging  
Lauri Huhtasalo  
Director, Product Management, Innovation  
and Product Development

THE RENEWABLE MATERIALS COMPANY

# Agenda

- Stora Enso
- New Retail
- Learnings
  - Business Case
  - Solution Design
  - Intelligent Fridge
  - Application Performance
- Technology Comparison
- Conclusions



# Stora Enso

## In brief



- A leading global provider of sustainable solutions in packaging and retail space
- 26 000 employees in 35 countries
- Sales in 2017: EUR 10 billion
- Listed in Nasdaq OMX, HQ in Helsinki, Finland
- RAIN RFID end-user (pulp bales, paper rolls, biocomposites, packaging pallets, consumables)

### Stora Enso Intelligent Packaging

- Digitalization of packaging and product flows using RAIN RFID technology
- Geographical focus Europe, Asia and the US
- Product and solution offering provided in three focus areas

## Intelligent Packaging RAIN RFID Verticals

### ECO tag products



### New Retail solutions



### Industrial solutions



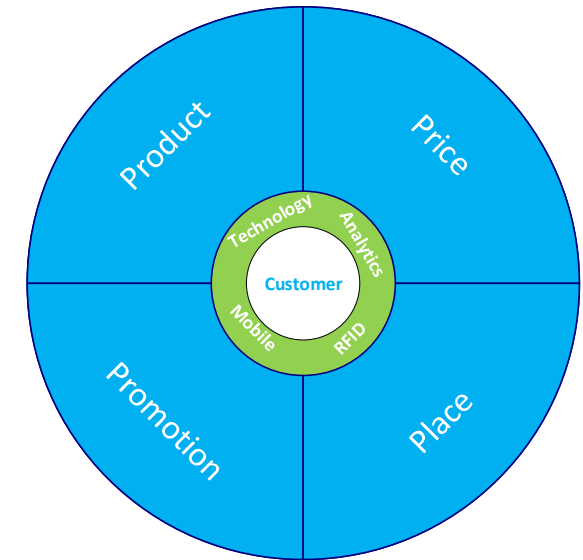


# New Retail



- “New retail” term by Jack Ma (Alibaba) in 2016
- “Pure e-commerce will be reduced to a traditional business and replaced by the concept of New Retail—the **integration of online, offline, logistics and data** across a single value chain.”

- Impacting the whole marketing mix, enabled by modern technologies
  - Mobile devices & apps => payment, authentication, data
  - Cloud computing => analytics, optimization
  - RAIN RFID => unmanned operations, logistics



- Consumer centric, increased availability & customization

- Video: New Retail by Stora Enso



# It isn't just the intelligent fridge



## Complete solution for New Retail



# Learnings – Business Case

- Driver is **increased revenue** – maximize it (location, outlook, payment solution, offering)
- **Advertising** is one revenue stream – display & software to support this
- Very **different customers** – internet giants and corner stores – choose your target customers & biz model
- Include **entire customer journey** from product catalogue management to product tagging and encoding, replenishment, payment, sales reporting, pricing updates
- **Payment solution** selection is critical
- **Remote provisioning and management** as each visit to cabinet is expensive
- **Replenishment** cost important – existing staff or own last mile service



# Learnings - Solution Design

- Design for **scalability**: efficient pre-integration, cabinet test mode for automated diagnostics for isolation and factory acceptance
- Design for **customisations**: centralised services (payments, products and pricing, advertisements)
- Optimise **data usage** between Cloud and Cabinets, to match with limited mobile data subscriptions.
- **Test automation** software helps during development
- Challenge to find truly global payment service fitting to cabinet payment use case. Create **easy integration to local payment solutions**.
- **Modular software and hardware architecture** to support changing requirements

The image displays four overlapping screenshots of the SMART CABINET web application interface. The top screenshot shows the 'Reports' section, featuring a 'Sales Report' for 1.12.2018 in Tampere, Naulakatu, and a 'Temperature report' with a line graph showing temperature fluctuations between 10:00 and 17:00. The middle-left screenshot shows the 'Cabinet inventory' page, which includes a table with columns for Quantity, Name, and Price, listing items like Coca Cola and Mars Chocolate Bar. The middle-right screenshot shows the 'Advertisement' page, which has a form for adding a new advertisement with fields for 'Advertisement title', 'Notes and description', 'Deactivation date', and 'Area'. The bottom screenshot shows a product detail for 'Mars chocolate bar', including an image of the product, its name, a placeholder description, and a 'Pirkanmaa' logo.



# Learnings – Intelligent Fridge

- Cost of fridge plays major part in ROI calculation – components and supply chain must be **cost down engineered**
- Fridge inner surfaces may need to be engineered – non-metallic inner walls and shelves
- If shelf antennas are used, make sure shelf complies with load bearing and food grade requirements
- Performance and reliability of industrial PC module
- **Competition is with alternative technologies** (camera, scale)





# Intelligent Cabinet – Technology comparison



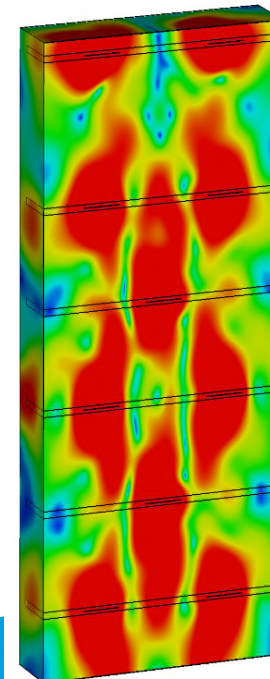
Area	RAIN RFID	Camera	Scale	Dummy	Mechanical
Consumer experience	Fast, easy to take multiple items	Fast, easy to take multiple items. Camera recognition still unreliable*	Fast, easy to take multiple items	Fast, easy to take multiple items	Slow, one-by-one
Support for variety of products	Works for all kinds of items	Difficult to segregate SKU's with similar or changing looks	Problem with objects with varying weight (fruit, sandwich etc).	Works for all kinds of items	Lot of restrictions due to mechanical function
Replenishment	Requires tagging & encoding. RFID can be utilized in sorting, packing, shipping.	Easy replenishment	Easy replenishment	Inventory information unreliable	Easy but slow process
Expiry date management	Item level identification (good for high margin items like fresh food, milk etc)	SKU level identification	SKU level identification	SKU level identification	SKU level identification
Adding new SKU's	Easy to add new SKU's	Slow, thousands of images per SKU	Easy to add new SKU's	Easy to add new SKU's	Easy to add new SKU's
Cabinet cost	RFID HW, isolation required	Simple cabinet structure but powerful PC and cameras needed	Large amount of scales & wiring needed	Simple cabinet	Expensive mechanics
Per item cost	Requires tagging & encoding	No per item costs	No per item costs	No per item costs	No per item costs
Shrinkage	Good theft prevention, expiry date mngt	Moderate theft prevention. No expiry date mngt.	Good theft prevention. No expiry date mngt.	Difficult to prevent theft. No expiry date mngt.	Good theft prevention. No expiry date mngt.
Basket size	High, easy to take multiple items, all kinds of items in one cabinet	High, easy to take multiple items, all kinds of items in one cabinet	High, easy to take multiple items, limited product offering	High, easy to take multiple items, all kinds of items in one cabinet	Small, slow process, limited product offering

*Subjective views of the presenter, situation also depends on exact business case, location and offering. Sometimes camera+scale is combined to improve reliability. RFID functions on its own.*

\*Camera detection impacted by: lens covered by anything, lens dirty, lens foggy, lighting conditions, product covered by other product, SKU size small, too similar SKU's,

# Learnings – Application Performance

- Intelligent Cabinet is a **demanding application**
  - Hundreds of items to be inventoried within few sec
  - Challenging products and packaging (metals, liquid)
  - Confined isolated space with reflections and nulls
  - Orientation, stacking difficult to control
  - High humidity
- **Consumer facing** application
  - System needs to resist misuse
  - All steps need to happen very fast
  - Errors immediately destroy customer experience
- **Tailored solutions are needed**
  - Reader antennas, middleware
  - Anti-tamper tags fit for metal, liquid packages
  - EMI Shielding



# Conclusions



- New retail is a whole new business model and business case success depends on multiple factors like consumers' payment habits in selected region, capabilities in cabinet replenishment and so on
- Customer's need a full solution which covers the entire customer journey
- From RFID perspective it is a demanding application but if implemented well it can outperform alternative technologies





**Thank you!**

**Any questions?**

Feel free to contact:  
Lauri Huhtasalo, Stora Enso Oyj  
[lauri.Huhtasalo@storaenso.com](mailto:lauri.Huhtasalo@storaenso.com)