

Item-level RFID Tagging: Lessons Learnt and Future Challenges

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Overview

- MyGrocer project
- Developments since then
 - Standardisation of RFID for supply-chains
 - Item-level deployments
- Benefits of item-level tagging
- Trust and privacy issues
- Open questions
 - Technical
 - Sustainability
- Near term predictions

RFID in Retail

- What applications are feasible
 - Which are needed/wanted by consumers
 - Which applications can be supported by a business case
- Open vs. closed supply chains
 - Standardisation
 - Information sharing
- Dealing with consumer generated data streams

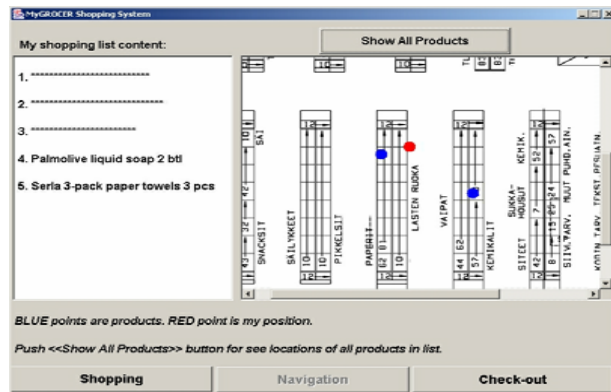
FMCG SC

- Fast Moving Consumer Goods
- Extend SC to the supermarket floor and the home
- JIT stock keeping
- Three scenarios
 - On the floor
 - On the move
 - At home
- First two scenarios implemented in MyGrocer

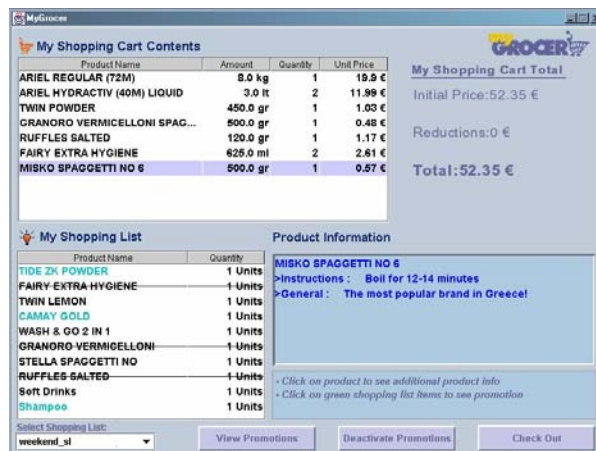
MyGrocer Studies

- Scenario development in multidisciplinary development team
- Focus on consumer value
- Exploratory research using qualitative methodologies and storyboarding
- Quantitative analysis of two-week trials in supermarket with loyalty club members
- Re-analysis of qualitative data with focus on privacy, security and trust

System features



- Track cart content
- Track price
- Display product info
- Compare products
- Update preset shopping list
- Display offers and promotions
- Display locations of products in shopping list and navigation info



IST project: MyGrocer



MyGrocer Trials



Evaluation - Functionality

System Functionality	Mean
Monitoring of the products in the shopping cart	4.72
Weekly / Regular Shopping List Reminder	4.60
Personalized Product Promotions	4.33
Appearance of Promotional Messages	4.30
Additional Product Information	4.47
Usability of “scanning” the products yourself	4.55
Continuous monitoring of the shopping cart’s total value	4.9
Ability of automated payment during check-out	4.93
Average	4.60

Evaluation - Acceptance

System Acceptance	Mean
Perceived Usefulness	4.50
Perceived Ease Of Use	4.80
Aesthetics of menus	4.40
Perceived Trust	4.52
Intention Of Use	4.74
Intention Of Service Loyalty	3.92
Overall Service Quality	4.69
Average	4.51

Positives

- Ubiquitous retail has considerable value:
 - Reduced stress levels associated with shopping
 - Cognitive and navigational support while shopping
 - Reduction in POS queuing
 - Continuous price tracking (cost control)
 - Offers and promotions
 - Detailed product information and price display
 - Ability to compare different similar products
- “Fun” element
 - Long term studies are required to overcome the possible effect of the novelty factor

Privacy

- Very strong objections to home scenario
- Consumption monitoring seen as invasive
- Commercial communications seen as undesirable
- Personalisation via profiling and data mining seen as intrusive
- Data mining potentially can be used to infer individual situation
- Balance between data collection and functionality
- Willing to discuss tradeoffs between value and personal data

System security

- Low confidence on system integrity
- Low confidence in electronic payment
- Non-electronic mechanisms to guarantee security of transactions
- Provision for transaction traceability
- No single interaction point is confusing
- From no-one knows your name on the Internet to everyone knows your location

Trust

- **Consumer control over the system is critical**
- Means of control should be visible and its results verifiable
- Data once collected can be reused outside the scope of the system
- Option to use the system anonymously
- Relationship with service is personal
 - The role of branding

Transparent operation

- Notify when the product contains an RFID tag
- Option to remove or destroy tags when product is purchased
- No penalty for opting out of RFID use
 - Price discrimination
- Access to information and mechanisms for modification of erroneous information
- Notification of RFID monitored areas

Logistics - DHL



- DHL automated warehouse for high end garments (fashion expo)

Item-level stock-keeping applications – M&S



- High value items, primarily suits
- Closed supply chain
- 64-bit UHF tags
- Stock keeping at the end of day to replenish sizes/colours
- Rolled out across all stores



Retail – Mitsukoshi department stores



- Service improvement
- Increased to 3 from 1.7 trials
- HF tags with EPC codes



The next 3 years, part 1

- RFID use in the supply chain will (slowly) become common at the SKU level
- Item level use of RFID will remain restricted to high value products
- RFID-based supply chains will put considerable stress to the back end infrastructure due to increased data requirements
 - The RFID stack
- Personalised consumer services will be using sensor data to improve their accuracy
 - RFID is just one of the sensors used to develop services
 - Cameras can potentially be more important

The next 3 years, part 2

- UHF will be the winner for item-level tagging
- EPC does not offer a clear competitive advantage
- Reward mechanisms for commercial use of private data will be introduced
 - Ownership will remain open for debate
 - Different views will proliferate
- The learnt behaviour of shopping will change and we will need to be educated in new practices
- Consumer activism will increase