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The Challenge of Food Waste

Retailers step up to the next level of inventory management

3 Marketing Tools

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Contents

3 Marketing Tools

Executive summary

Food shrinkage and waste can cost retailers up to 4% of revenue. Given the need to continually drive out costs in the highly competitive grocery sector, this fact cannot continue to be ignored. To offset food wastage retailers discount items and sell them to shoppers before they go out of date and become waste. However, this discounting recoups just 0.75% of the 4% revenue loss. Taking into account the razor thin margins in the grocery industry, unsold items can be one of the major challenges for food retailers.

Although retailers are already taking some measures to reduce food waste, they do not take full advantage of the technology that can help tackle the issue. Instead, they focus on initiatives such as food donation programmes, organic composting and recycling initiatives. However, the most obvious approach to reduce food waste is to optimise order forecasts in such a way that the gap between predicted and actual sales is reduced to a minimum. With this, retailers can avoid food waste at the earliest possible stage.

This immense food waste problem in the highly developed markets is rapidly increasing in public awareness, especially as a good proportion of wastage occurs in households. Governments, campaigners and multinational organisations stress the fact that food wasted in the US and Europe could feed the world three times over.

Of course, food waste does not only occur in households. In the UK alone, retailers and wholesalers produce around 1.7 million tonnes of food waste each year. Some retailers react to the situation by donating surplus food - US grocery retailer SuperValu, for example, donated 22,000 tonnes of food to the Feeding America organisation in 2010. Food that cannot be donated is converted into energy by some retailers instead of sending it to landfills. For instance, Sainsbury's, the UK-based supermarket retailer, generates power for 500 homes in a biomass power plant in Scotland. Aside from the obvious financial benefits, reducing food waste can therefore also play a part in helping retailers to achieve their own sustainability targets.

For both financial and environmental reasons, reducing food wastage is therefore an area that needs to be targeted by retailers. In this report, we will examine the ways some retailers are tackling the problem. We will focus on the technologies that enable retailers to optimise their inventory as well as generate pricing more dynamically.

Food shrinkage and waste can cost retailers up to 4% of sales revenue.

3 Marketing Tools

Over the last ten years, major retailers achieved significant improvements in terms of inventory optimisation with the implementation of automated replenishment based on forecasting software. But those initiatives are often limited to the ambient range and processed chilled food. Implementing sophisticated technologies which enable the optimisation of inventory in produce and instore-produced food is now also on the agenda for retailers' project plans.

These include:

- Automated replenishment systems based on sophisticated forecast, in order to avoid overstocks.

- Utilising real-time inventory management systems to help maintain accurate stock levels at all times.

- Using dynamic pricing to enable price changes according to current stock and sales forecasts. This helps retailers to effectively sell excess supply rather than risk it going to waste and generating no return.

- Effective communication with shoppers through their mobiles provides upselling and cross-selling opportunities for retailers.

- Deployment of the new barcode GS1 Databar enables retailers to offer automated mark

1. Introduction: The problem of high food waste

1.1 Food waste in retail stores

1.1.1 Dimension of the problem

With between 50-60% of sales in a supermarket being derived from the perishable category, it is estimated that between 5-7% of perishables are lost to poor management. This means that food shrinkage and waste can cost retailers up to 4% of their overall revenue. To offset food wastage retailers discount items and sell them to consumers before they go out of date and need to be disposed of. However the discounting of food recoups just 0.75% of the 4% revenue loss.

Food waste at retail stores is a bigger problem in developed markets than in developing countries. Consumers demanding constant availability and full range of choice in retail outlets leads to excessive supply and therefore increased waste of food in mature markets. The moral and social argument between consumers demanding choice and retailers supplying it is complicated, while the environmental and economic impact is far more measurable.

1.1.2 Economical impact on retailers

In the UK, retailers and wholesalers produce about 1.7 million tonnes of food waste a year. The costs and complications of giving this food away means that over half of it is sent to landfills. In the US, supermarkets, restaurants and convenience stores throw away 27 million tonnes of food annually, representing wastage valued at €28.6 billion ($41.9 billion). On top of this, consumers waste an additional 25.9 million tonnes of food annually.

1.2 The environmental and social problems of discarded produce

Food waste is a global phenomenon that impacts the environment and society in four key areas: the energy used to produce food, the food disposed of by retailers, the food wasted in the household and the energy used to dispose of food waste.

1.2.1 Government campaigns and actions to raise public awareness of the issue

Consumers' understanding and awareness of food waste are key areas when looking to tackle this widespread issue. More than three-quarters of US consumers mistakenly believe certain foods are unsafe to eat after the expiration date has passed. In the UK, the confusion between 'best before' dates and 'use by' dates has created a political storm with lobby groups suggesting that packaging should display a 'use by' date only to avoid consumers from misunderstanding the two differently labelled expiration dates. The EU and UN have committed to reducing food waste by 50% by 2025 through the "Joint Declaration Against Food Waste".

In the UK the government-funded Waste and Resources Action Programme (WRAP) has tasked itself with halving the amount of waste that goes to landfills. WRAP launched the campaign "Love Food - Hate Waste" in 2007 which, by January 2009, had already saved €337 million ($493 million). The scheme persuaded two million UK households to take steps to reduce food waste and stopped 137,000 tonnes of food from being thrown away.

A third of the food
we buy in the UK
ends up being
thrown away

Sad, isn't it?
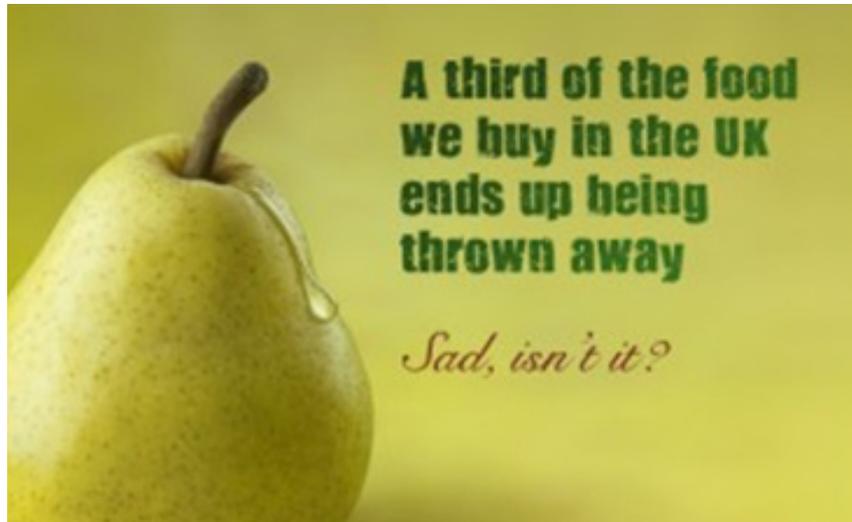
© WRAP

WRAP's "Love Food - Hate Waste" campaign was launched in 2007.

The success of WRAP's "Love Food - Hate Waste" campaign convinced Australia's Department of Environment, Climate Change and Water to adopt the concept. It focuses heavily on the emotional side of food waste, using subtle messaging and statistics to nudge consumers into changing their behaviour. It focuses on four key ways to prevent food waste:

- **Buy It** - for great ideas on food shopping.

- **Cook It** - to find out how much food you really need and for nutritious recipes that use up leftover ingredients.

- **Save It** - for information on keeping your food fresh and prevent it from ending up in the bin.

- **Love food** - to learn about the issues and how wasting less food helps our environment.

In the Netherlands, the government is committed to reducing food waste by 20% by 2015, with the country throwing away an estimated €2.4 billion ($3.5 billion) per year. The Dutch campaign was instrumental behind the creation of a global campaign called www.tastethewaste.com.

1.2.2 Retailers' current non-technology approaches (food donation programmes, organic composting and recycling initiatives)

Retailers are faced with a difficult dilemma - they do not want the costs and social stigma associated with food waste but they also want to maintain availability at their stores. A simple solution would be to enter into food donation programmes and simply give away the surplus food at the end of each day. Unfortunately the costs involved and the scrutiny that fresh in particular has to go under before it is re-sold or given away makes this virtually impossible for retailers. Such schemes also don't take into account the environmental impact of over producing food.

Retailers of course want to remove the economic burden of food waste but also want to make the right social decisions around their business. Walmart has a global goal of creating zero waste. Even if it just achieved an 80% reduction in waste in the US alone it would prevent more than 11.8 million tonnes of carbon dioxide emissions annually - equivalent to taking more than two million cars off the road for a year. To achieve this, the retailer looks to convert food to energy and enters into food donation programmes. This is something that is mirrored around the globe.

Sainsbury's, the UK-based retailer, runs a scheme that converts food waste into electricity. Almost 42 tonnes of waste food from 28 Sainsbury's locations in Scotland are delivered weekly to a biomass power plant for processing and generates enough electricity to power around 500 homes. Sainsbury's has a long-term plan to send zero waste to landfill and will roll out the scheme across the UK.

In the US grocery retailer SuperValu donated 22,000 tonnes of food (37.5 million meals) to Feeding America in 2010. Feeding America has more than 200 food banks across the country designed to aid the distribution of food waste. 72% of the food donated by SuperValu was fresh food.

The company is in the process of expanding the scheme across its retail estate and has already managed to achieve zero waste classification at two of its Albertson stores in Santa Barbara, California. The two stores are successfully diverting 95% of their waste through recycling, food donation, organic composting and other means.

The onus should not solely rest with retailers to reduce food waste. Instead there should be more of a co-operation between retailers and consumers in doing so. A new tactic retailers such as Tesco and Sainsbury's in the UK are pursuing is the 'buy one get one later' promotion. Sainsbury's calls the marketing promotion 'Buy Now, Free Next Time'. Customers receive a coupon at the checkout offering the chance to claim a second item during their next shop, rather than pick it out immediately. Consumers have two weeks to redeem the vouchers and only four items involved in the scheme can be used per transaction.

Traditional 'buy one, get one free' offers have long been criticised for wastage. While many people buy items – particularly food – when it is on special offer, they are unable to use the quantity provided. This contributes to additional household waste. The UK government's Food 2030 report in August 2009 was especially critical of retailers encouraging people to buy goods they don't need through marketing initiatives. With the new 'buy one get one later' approaches, retailers allow customers to defer food purchases, helping to drive loyalty to their stores and reduce food waste at the same time.

Often subtle and simple solutions are the most effective ways of tackling major problems, by educating or nudging consumers, retailers can work with them to prevent food waste. In conjunction with UK grocer Waitrose celebrity chef, Delia Smith, created the ultimate Christmas cake kit for €11.50 ($16.10) that came with ready weighed ingredients. To buy the ingredients in individual packets would have cost consumers €27 ($37.81), so not only did it reduce food waste but saved customers money.

Managing consumption or preventing customers from buying unwanted or unneeded goods is possible through loyalty card information. For example, a simple reminder when shopping online that you may already have a certain product could go a long way in preventing food waste.
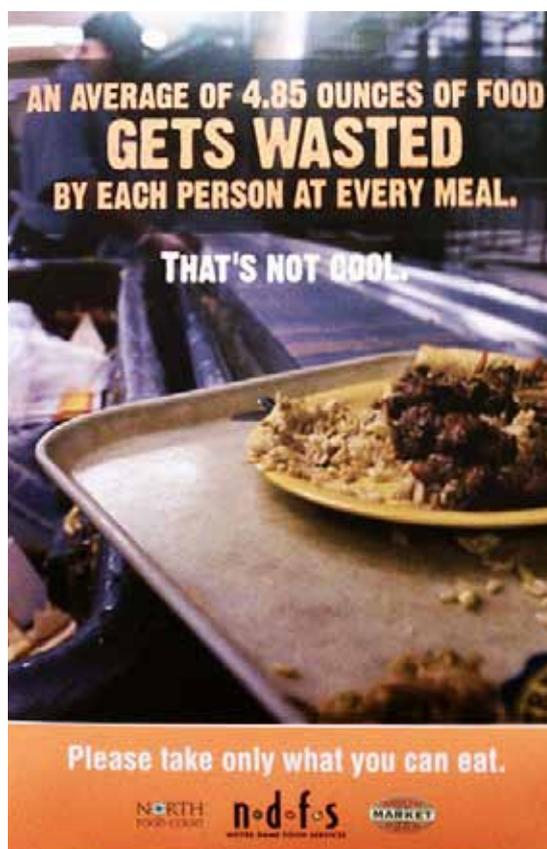
Awareness campaigns increase the public's attention to the problem of food waste.

2. Technology-based approaches bring new dimension to store pricing

Even though retailers are already taking some measures to reduce food waste, they do not take full advantage of technology that can help to tackle the problem. Technology can help them to reduce food waste by optimising order forecasts in such a way that the gap between predicted and actual sales is reduced to a minimum. With this, retailers can avoid food waste at the earliest possible stage.

2.1 Automated replenishment based on sophisticated forecast avoids overstocks

Over the last few years, major retail groups have managed to significantly reduce overstocks by implementing automated replenishment based on software that is able to predict sales at item level. However, this technology, which is highly successful for ambient ranges, is hard to deploy in product categories that have a short shelf life such as fresh produce. Nonetheless, retailers are constantly working on this topic and are continuously looking to improve their forecasting solutions for fresh items.

Coop expands automated ordering to fresh produce

Swiss grocery retailer Coop began automating the ordering of its fresh produce range in April 2011. Already in 2005, Coop started using forecasting software to automate the ordering process for its ambient range. With this, the Swiss retailer was able to reduce inventory in its stores by 8% and at the same time managed to increase on-shelf availability. Due to this success, Coop decided to use automated forecasting for its fresh produce category too. Following a pilot with 30 dairy products, the retailer started to roll out the solution to the rest of the dairy category, as well as meat, convenience products, fruit and vegetables, fresh bakery products and plants in April 2010. Coop plans to have automated the ordering for around 230,000 stock keeping units across its various channels in 2012. Additionally, the retailer plans to implement automated replenishment in its distribution centres by 2012.

In order to secure the supply of necessary amounts and to prolong the response time for suppliers, Coop plans to establish pre-ordering for fresh produce 72 hours before the anticipated delivery to the store. 48 hours before the products are supposed to be delivered to the store, a mandatory order will be sent to the supplier. There will also be the opportunity to manually override automated orders in stores. This could be important if, for example, the store managers know that there will be a street festival close to the outlet, something of which the centralised forecasting solution could not be aware of. In this case, the store manager could increase the order amount for items such as beer, soft drinks or barbecue meat. Overall, though, this override functionality is very rarely used, especially in ambient categories. In fact, Coop employees only alter 0.7% of automated orders.

3 Marketing Tools

For replenishment automation, it is crucial that a retailer has accurate inventory data. Due to this, Coop abolished the multiplication key at its checkouts. This is to avoid, for example, different flavours of chocolate being booked under the same GTIN (Global Trade Identification Number, formerly known as an EAN code). Today, Coop's scanning accuracy stands at 99.85%.

Since 2005, Coop has been gradually rolling out its order forecast solution. By the end of 2006, some 7,000 SKUs including spirits, soft drinks, wines and textile products were ordered automatically. This figure went up to over 30% of the store's item orders by 2008. Since 2010, the retailer's entire ambient range, frozen food and most of the non-food products are ordered automatically. Per week, the solution now generates around five million automated orders. Additionally, around 90,000 products for Coop's DIY stores and 60,000 textiles will be switched to automated ordering soon.

Automated replenishment also affected Coop's entire supply chain. The system enabled the retailer to plan deliveries at a much earlier stage, which also improved staff scheduling and route planning. Consequently, Coop was able to reduce its truck fleet from 485 to 450 vehicles.

Coop started automated replenishment for fresh produce in the dairy department.

Replenishment automation for fresh produce in order to avoid food waste should be a topic for every grocery retailer. Recent examples of retailers investing into this technology include UK-based Marks & Spencer, which chose a new software solution to manage its inventory forecasting, replenishment and order planning needs for its food division in early 2010.

The new technology forecasts demand at item level for every store. Buying decisions are made based on current stock levels, as well as daily selling patterns, product life-cycle, seasonality, projected waste, target service levels and inventory availability.

Sainsbury's in the UK aims to improve its replenishment automation with weather forecasts. In summer 2010, the retailer announced its investment in a new technology that should help it reduce by around 15% the amount of food that went unsold due to periods of unexpected weather. The real-time supply chain technology will enable Sainsbury's to monitor exactly what food is selling on a minute-by-minute basis, allowing the company to know exactly what goods to send to individual stores each day. With this system, Sainsbury's will be able to react to changes in buying patterns on the same day. This will reduce the risk of shelves being full with barbecue meat for the weekend when unexpected rain occurs.

2.2 Accurate stock levels at all times

Retailers have done a lot over the last ten years to improve their order quantities with the help of software that is able to forecast sales by item. One necessary condition for the success of replenishment automation is the accuracy of stock levels in the systems. Now, some retailer are going one step further by also monitoring the stock level of parts of their assortment during the course of the day, ideally in real-time.

One area which could certainly benefit from real-time inventory management is the instore production of pastries, grilled chicken or any other delicatessen sold at a service counter. If a retailer knows that certain kinds of muffins or breads aren't selling as expected, then there is no need to produce additional ones in the backroom.

Another field where real-time inventory management can help retailers is shelf-replenishment with products from the store's backroom. It can be the case, especially in larger stores, that a certain product is out-of-stock on the shelf but is still available in the store's stockroom. With real-time inventory management, the store manager can identify such a situation and replenish the shelf accordingly, thus generating turnover, which might have otherwise been lost. Real-time inventory management can also avoid perishable products being brought from the stockroom to the shopfloor too early if they do not sell as predicted. Furthermore, in combination with a forecasting and replenishment tool, real-time inventory management could also be used to optimise orders to the retailer's distribution centres for the next store deliveries.

Real-time inventory management not only helps retailers to optimise the amount of instore-produced pastries in line with the current demand, but also enables them to change prices of products according to how they sell. This dynamic pricing is especially useful for perishables such as fruit and vegetables where retailers try to minimise their losses from write-offs.

2.3 Dynamic pricing enables price changes according to current stock and sales forecasts

When it comes to reducing food waste and losses from unsold perishables, automated replenishment can help retailers only up to a certain point. Even though this technology enables them to optimise their inventory so that it best matches their sales forecasts, there will always be some excess supply in the fresh produce department. Strawberries, for example, are very difficult to handle from a retailer's perspective as it is very hard to forecast how they will sell. If they arrive at the store and are too green, they will not sell very well. The same would be the case if they are too ripe. Apples as well can be tricky from a forecasting perspective. Even though they have a long shelf life, it is difficult to know the exact time when they have to be marked down.

This is where real-time inventory management and dynamic pricing come into play and help retailers to further reduce write-offs in the fresh food department. If the products are already on the shelves and are in danger of expiring, retailers can at least secure a proportion of their originally expected sales by marking down prices. This is what Albert Heijn has tested in the Netherlands.

3 Marketing Tools

Albert Heijn

Albert Heijn marks down prices for fruit and vegetables

Dutch grocery retailer Albert Heijn tested mark down optimisation to reduce losses from spoiled fruit and vegetables in one of its stores in Amersfoort. The project was launched in early 2010 with mark downs communicated to shoppers via large electronic displays in the store.

In order to reduce food waste in the store to a minimum, Albert Heijn continuously compared predicted and actual sales of fruit and vegetables and analysed expected deliveries and current stock levels to avoid overstock or out-of-stock situations. Prices were marked down according to the calculations of a price optimisation engine and were communicated via Wi-Fi to 92 full colour 15-inch displays, which either reflected the company's standard design for pricing or for promotions. However, local management in the stores were also able to override price changes with a custom-made mobile solution within a predefined time-frame, in case they did not agree with the suggested price changes.

New prices were automatically transferred to the merchandise management system. Shoppers using mobile self-scanning devices received updated price information as well as cross-selling offers directly onto their handhelds.

The food waste reduction programme received many positive reactions and won the EHI Retail Institute's Retail Technology Award for 'Best Instore Solution' in 2010. Even though original plans foresaw the expansion of the solution to other perishable products beyond fruit and vegetables, the project was discontinued after almost 14 months in January 2011.

With screens in the fruit and vegetables department, Albert Heijn's customers in Amersfoort were informed about marked down prices.

The reason for this was that Albert Heijn considered the price for the colour displays - approximately €300 ($439) per item - as being too high. With up to three products promoted on one screen, this amounted to around €100 ($146) per price shown. In order to reduce the costs, the retailer considered 32-inch displays which would have been able to show more prices on one display. Nevertheless, a planned extension to three more trial stores was shelved and Albert Heijn has decided to discontinue the project for the time being. However, the Dutch grocery retailer has changed its IT provider and is currently working on a new solution.

The approach currently pursued by two technology providers could remove the need to invest in relatively expensive colour displays. The concept study that was presented at computer expo CeBIT for the first time in 2010 has already attracted the interest of German retailer Metro Group. However, contrary to Albert Heijn, the concept study has selected Electronic Shelf Labels (ESL) and shopper's smartphones as the means of communication for marked down prices. This promises to be a more cost-effective solution.

2.4 ESLs and smartphones communicate price changes

In the concept study from SAP and SAF, several instore technologies enable the retailer to monitor sales of fresh produce throughout the day and mark down prices accordingly if products do not vend as well as anticipated. The solution is currently being tested at SAP's Future Retail Center in Regensdorf, close to Zürich.

Using an automated forecasting and ordering system, it compares actual sales during the course of the day at product level with a continuously updated forecast, and identifies significant deviations. The system alerts the retailer to products that will be overstocked or out of stock at the end of the day. Staff on the shop floor can then carry out appropriate measures such as applying price reductions or automated discounts at the checkout.

Store managers are equipped with tablet PCs which show a dashboard with a list of alerts sorted by urgency. Messages such as 'the private label strawberry yoghurt does not sell as expected today' are sent to the dashboard. Together with the alert, the store manager receives recommendations on what measures he could take such as marking down the price for the strawberry yoghurt and communicating the new price to the store's ESLs or to shoppers' smartphones. For the latter, shoppers have to be holders of a loyalty card and download a special app. Alternatively, the store manager could also select a promotion which could be sent to customers' mobiles. Contrary to the Albert Heijn approach which marks down prices automatically, this solution addresses the store manager who then triggers the necessary actions on the shopfloor.

Similar to the alert for underperforming products, the store manager is also warned of overperforming products which vend better than anticipated. While the latter is certainly good for the retailer in terms of sales, it can turn into a problem when it results in out-of-stock situations.

In addition to communicating prices to ESLs and shoppers' smartphones, the technology providers are also considering digital signage as a means of communication. Additionally, they are currently in talks with providers of scales that could also be used to inform customers about mark downs and promotions. This could be especially helpful at manned counters for meat, cheese or fish, where an employee can verbally alert shoppers to the latest price changes or promotions.

This approach goes beyond store level and also includes the supply chain. The solution foresees that additional technologies such as RFID tags and temperature sensors on pallets deliver additional data which is then shown within the dashboard on the shop manager's tablet PC. If the temperature for a certain batch of yoghurt has, for example, fallen below the mandatory temperature during transportation, an alert would be sent to the store manager. He could then either decide not to sell the yoghurt at all or to mark down the price if it is still saleable.

In addition to data from the supply chain, historical data such as how certain promotions have done over the course of time are visualised on this dashboard. This facilitates decision making for the shop manager and enables him to carry out the appropriate measures.

For the time being, this approach exists only in SAP Research's laboratory in Switzerland and has not been tested at a retailer's store. However, there have already been several meetings with Metro Group which is very interested in the solution and was, according to the technology providers, very enthusiastic about it at CeBIT.

3 Marketing Tools

## 2.5 Shoppers' mobiles offer upselling opportunities

The solution showcased in Regensdorf, Switzerland already incorporates shoppers' smartphones to which price alerts and special discounts are sent. Retailers can also go one step further and use customers' mobiles for cross-selling promotions. With the latter, retailers can increase sales of full-priced items to counterbalance lower sales from marked down products.

However, this level of interaction requires that retailers also offer self-scanning with mobile devices or shoppers' smartphones. If this is the case, retailers can send messages such as 'Would you like to buy some spaghetti as well?' to any customer who decides to buy a discounted tomatoes and self-scans them.

For mobile self-scanning, customers usually have to sign up for a retailer's loyalty card programme. Retailers can take advantage of this and use information about shoppers and their past purchases to further increase sales and compensate for losses from marked down products. They can provide customers with tailor-made discounts, coupons and promotions for products they might not have on their current shopping list, but which they have bought previously.

For example, if a customer has logged a special diet in their profile such as vegetarian or vegan or a preference for certain products, they will be immediately alerted once his favourite veggie burger or vegetable is being discounted.

With the help of this dashboard, store managers can immediately see how their store is currently performing.   © SAP
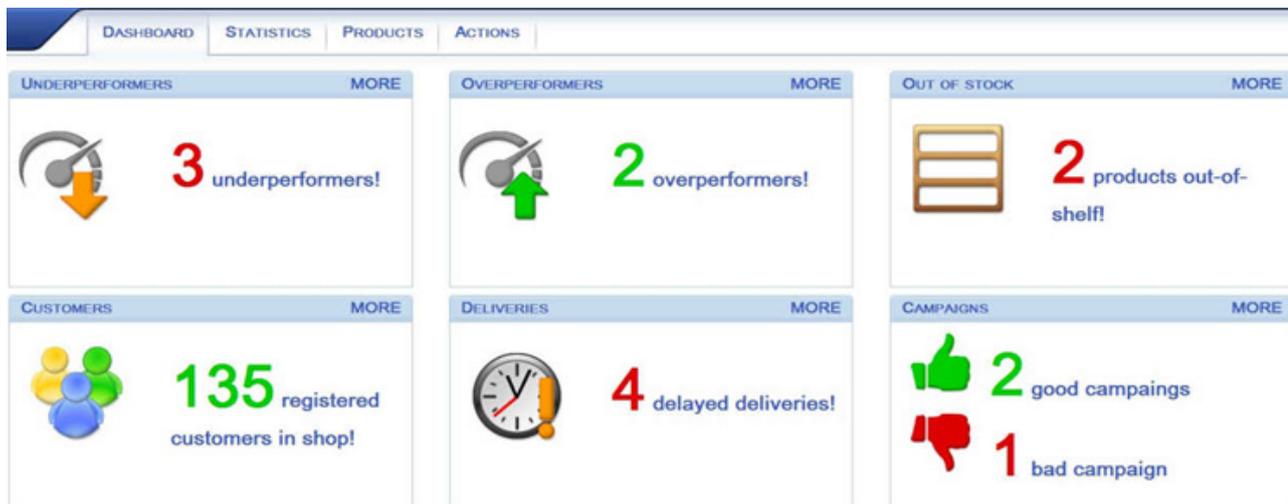
Rather than custom-made promotions for individual shoppers, a retailer can also segment customers into different groups according to their demographics and previous shopping baskets and send out price alerts, coupons and promotions to a group of shoppers.

Finally, retailers can also use information about a customer's past purchases to alert them if they want to buy a product they already acquired during a previous shopping trip. For example, if a customer wants to purchase tomato ketchup, the retailer could send a reminder such as 'Are you sure that you want to buy a bottle of ketchup? You already purchased one yesterday.' These alerts may reduce food waste generated at shoppers' homes and may improve the retailers' image as being sustainable and socially responsible. However, this kind of reminder can be counterproductive when it comes to every retailer's objective of selling as much as possible. Therefore, retailers have to think twice if they want to potentially sacrifice sales for the sake of preventing food waste outside their stores.

In addition to the GTIN, the GS1 Databar can also store serial or lot numbers and expiry dates.

2.6 The GS1 Databar facilitates automated mark-downs at the checkout

Since October 2010, and following on from its discontinued project with price displays (see above), Albert Heijn is testing another way to tackle the problem of food waste. The retailer automatically reduces the prices of game and poultry products in one store in Zaandam with the help of the GS1 Databar. On the day of expiration, checkouts at the store automatically apply a 35% discount to the normal price of these products. This works because the GS1 Databar does not only carry the Global Trade Item Number (GTIN) but can also store information such as serial numbers, lot numbers and expiry dates. Products from the game and poultry range are promoted instore with their normal prices, with mark down prices also promoted on the day of expiration.

While this seems to be quite a simple approach to automatically carry out discounts in order to avoid food waste, there is also a drawback. Not all retailers are ready to scan the GS1 Databar at the checkout. The global retail standards-setting organisation GS1 originally set a date of 1 January 2010 for the global adoption of this new barcode type. However, due to not all retailers being prepared, the date was pushed back to 1 January 2014. So, as of 2014, all manufacturers worldwide will be able to label their packages with the GS1 Databar as an alternative to the GTIN used today.

However, even when all retailers can read the GS1 Databar, there will still be the question of how to communicate price changes in the store. Customers will want to know which products are discounted before they head to the checkout. Overall, the GS1 Databar approach to mark down perishables is certainly a more cost-effective solution. Nonetheless, it marks down prices only at the day of expiry and therefore does not offer the same possibilities as more comprehensive approaches such as the one communicated to shoppers' smartphones.

3 Marketing Tools

3. Conclusion and outlook

Looking ahead, technology solutions that help to avoid food waste will become increasingly important for retailers. Quite simply, any opportunity to reduce waste will have financial benefits for retailers at a time when already razor thin margins are coming under growing pressure.

The most obvious approach to reduce food waste is to optimise order forecasts through automated replenishment systems in such a way that the gap between predicted and actual sales is reduced to a minimum. The past decade has seen leading grocery retailers achieve significant improvements in terms of inventory optimisation through investment in these systems. However, their impact has typically been limited to the ambient and processed chilled food ranges. The adoption of new technologies to help the optimisation of inventory in the key fresh produce category is now firmly on the agenda for retailers.

Although automatic replenishment can help close the gap, there will always be some excess supply in the fresh produce department. Other technologies where investment will help limit the impact of wastage where it occurs include real-time inventory management systems, which can be used to enable dynamic pricing according to current stock and sales forecasts. Affected products can quickly be identified and the price changed accordingly. Increasingly, such changes will be communicated to shoppers through relatively cost-effective methods such as ESLs and smartphones. Going forward, deployment of the new barcode GS1 Databar will enable retailers to offer automated mark downs on products reaching their expiry date.

Aside from the pure financial benefits, there are other clear reasons why retailers should invest in tackling the issue. Firstly, retailers are emphasising their credentials through their fresh produce offer. Customers expect an extensive and lush product offer of fruit and vegetables, meat, fish and dairy products at all times. Having a well-stocked fresh produce department will give a retailer a key advantage over less efficient rivals.

Secondly, food waste reduction measures improve the retailer's public image when it comes to sustainability and social responsibility. Most retailers already take some measures in this area, including donating food to good causes and recycling. However, these initiatives typically occur after wastage occurs and the retailer is still impacted by the financial costs of wastage. Adopting the new technologies identified above can help retailers avoid and limit food before it gets to this stage.

With between 50-60% of sales in a supermarket being derived from the perishable category, it is estimated that between 5-7% of perishables are lost to poor management. This wastage could impact up to 4% of overall sales, with only a small proportion being recouped through mark downs. As consolidation and competition within the grocery industry intensifies, and margins facing constant downwards pressure, the issue of wastage should be addressed as a priority by grocery retailers.