

# Consumers are wary of the privacy implications of smart new shopping technology. But when they try it, they find much to like about it – as a unique experiment in Greece shows

## Can technology make shopping fun?

STUDENT AWARD

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**Sally wants to go to the supermarket. She prepares her shopping list, including all the products she wants to buy. But instead of writing them down on a piece of paper, she uploads the list to the specific web page of her preferred supermarket.**

Later on, she arrives at the supermarket and picks up a specially modified trolley, equipped with display and scanning devices. She uses her loyalty card to log into the system, which welcomes her and presents her with the shopping list she uploaded earlier.

Sally starts to pick up products, placing them in the trolley, following her usual route. Each time she does this, the display device automatically presents the product's name, amount and item price, updates the total quantity and erases it from the remaining list.

During her trip, Sally decides to try a new product. The system knows she is on a diet, so she can trust it to provide her

with information regarding the nutritional value or even the ingredients of any of the products she places in her trolley.

Furthermore, she can get information about every promotional activity in the supermarket through a dedicated area in the trolley display device. Of course, since the system knows Sally's profile, all promotions are personalised. Moreover, if Sally selects a product that has a promotion attached, she is instantly informed about the promotional rule which should be satisfied in order to activate that promotion.

At the same time, Sally remembers to purchase the new razor blades her husband requested. She doesn't know the exact location of that particular product, but all she has to do is ask the system, which then displays a map of the supermarket and the best path for Sally to find the blades. In addition, she can

# There are many ways retailers can use information technology to help the shopper shop. They can all be brought together via an ‘intelligent trolley’

constantly monitor her location within the store.

When Sally has finally completed her shopping, she goes to the cashier to pay. She doesn't need to wait at queues since her trolley knows exactly what she has purchased and how much the trolley's contents cost.

At this point, it transmits the total amount to the cashier who issues a receipt. The only thing Sally needs to do is select her payment method – cash or credit card.

Is such a scenario feasible? The answer is Yes.

Recent developments in technology provide pervasive retail information systems designers with a variety of alternative technical solutions which can address each problem in the design and implementation phases.

So far, however, each piece of the jigsaw has been tackled separately. The MyGrocer experiment brings them all together via an intelligent trolley which supports the shopper throughout his or her entire supermarket visit.

It uses five distinct interface areas to help the shopper shop. They are:

- Shopping Cart Contents area, which presents the products (that is, name, amount, quantity and unit price) collected in the shopper's trolley
- A Shopping Cart Total area, providing the total price of products inside the

trolley and the total reductions deriving from a promotional activity

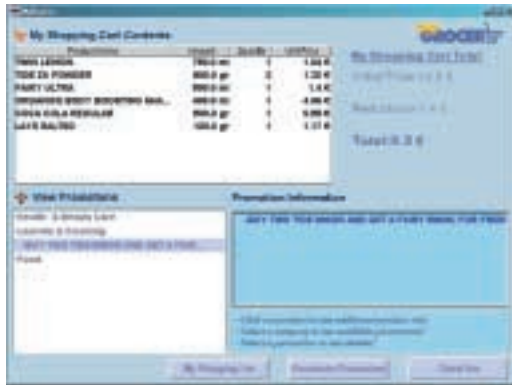
- A Reminder Shopping List area, highlighting the products (or product categories) the shopper has indicated he or she wants to purchase
- A Promotions area (activated when the View Promotions button is pressed) which presents available promotions for the particular shopper, based on his or her profile and past consumption behaviour
- A Product/Promotion Information area which displays either additional information on each product (such as nutritional value, recipes and so on) or on each promotion (conditions that should be satisfied for a promotion to be activated).

The intelligent trolley uses RFID technology for automatic scanning – the advantages being a) transparent data capturing for the shopper (no line-of-sight is required between the tag and the reader), b) efficient operation in hostile environments (excessive dust, moisture, dirt and so on), c) unique product identification, and d) provision of Electronic Article Surveillance (anti-theft) capabilities.

## The MyGrocer experiment

We conducted a two-phase evaluation of how MyGrocer affects the shopping experience.

**Exhibit 1: MyGrocer User Interface. Top left: Shopping Cart Contents area; Bottom left: Reminder Shopping List/Available Promotions area; Top right: Shopping Cart Total area; Bottom right: Product/Promotion Information area**



First, we tested the idea in focus groups with real supermarket shoppers. Second, we tested a pilot scheme when shoppers used it to carry out part of their shopping in Greek supermarket ATLANTIC. (For more information on the project, please refer to the acknowledgement at the end of this article.)

We generated the following seven research hypotheses in order to evaluate the effects of pervasive retail information systems on the shopping experience (see Exhibit 2):

- provide an effective mechanism for consumers to monitor their budgeting
- streamline the check-out process, enabling consumers to wait less time at cashiers
- provide increased effectiveness on the overall shopping trip
- provide a more entertaining shopping experience compared with the traditional environment
- minimise information search costs for supermarket products
- increase promotions effectiveness during the supermarket visit
- reduce the sense of time pressure for supermarket shoppers.

The seven hypotheses in Exhibit 2 relate directly to the core elements of the ECR programme, as shown in Exhibit 3.

The first evaluation of MyGrocer ran over a one-week period during May 2001 in Athens, Greece. Our objective was to

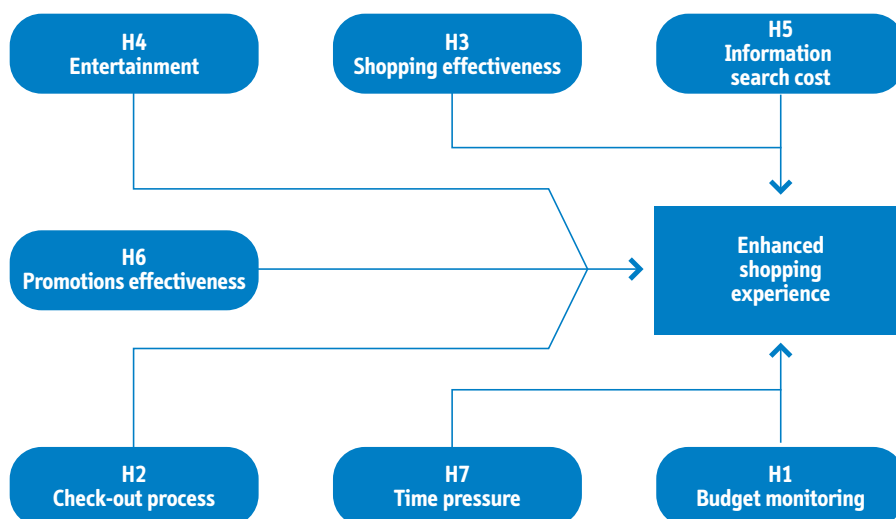
understand how shoppers perceived the new way of shopping and to identify potential barriers of acceptance at all levels (social, legal, family).

To this end, we constructed a paper mock-up of the system in the form of concept sketches which were shown to four focus groups comprising 48 shoppers.

Respondents were attracted to many aspects of MyGrocer, especially after they were reassured that traditional ways of shopping would initially co-exist with the “modern” one. The following features were particularly attractive:

- constant awareness of the total cost of the shopping cart contents, providing better control over total expenditure and also avoiding embarrassment on those occasions when shoppers run short of cash and have to deduct items at the checkout
- on-screen appearance of complete and accurate description of products, which helps deal with incorrect or non-existing information on product packaging or on supermarket shelves and provides access to extra information, such as the expiry date or nutritional value
- ability to compare the value of similar products simply by scanning them
- personalised, targeted promotions fitting the shoppers’ profile. This feature was highly appreciated – especially by promotions-sensitive shoppers
- the in-store navigation system which helped

Exhibit 2: Decomposition of the shopping experience into seven distinct elements



shoppers save time asking store employees to locate certain products

- the smart checkout and the ability to bypass queues and reduce waiting time which received most appreciation by respondents.

Exhibit 4 presents some key verbatims of the participants for each examined hypothesis.

However, several MyGrocer features were treated with considerable scepticism.

In particular, personalised provision of information and promotions raised a debate among participants. A significant proportion was particularly concerned about the collection of personal data.

This reaction was triggered mainly by customer identification during the log-in process and the provision of a shopping list based on past consumption patterns and of personalised promotions.

Another barrier to acceptance lay in the fact that the overall shopping experience seemed to point towards a hi-tech, fully standardised lifestyle. This form of personalisation appeared patronising, too rational, and perhaps even dehumanising.

Indeed, the majority of the participants rejected the idea that a computer system would be able to successfully predict their exact wishes – and some were offended by the suggestion.

Nevertheless, the majority thought the

service would empower shoppers to select the level of personalisation the system offered. In particular, some shoppers suggested that the system should include an option of anonymous usage in order to provide just an enhanced in-store shopping facility.

Overall, protection of their privacy and personal data was of paramount importance to survey respondents.

These observations led us to redefine the original concept of MyGrocer. First, we included an option for the shopper to deactivate personalisation in promotions – should he or she desire. Second, we revised the suggested shopping list to include only those products the shopper provides the system with over the Internet. Still, we decided to keep the log-in feature in order to enable tracking of each user's session.

The second evaluation of MyGrocer spanned a two-week in-field trial, using a selected group of appropriate products in a specially modified corridor inside the participating supermarket (an ATLANTIC outlet in Athens) during September and October 2002. Sixty 25 to 65-year-old loyalty club members of ATLANTIC participated in the trial.

The trial was organised in three steps. Initially, trial participants were shown the system by an assigned facilitator (ten minutes).

Shoppers were then asked to use the system on their own (ten to 15 minutes),

Exhibit 3: **Impact of pervasive retail information systems on ECR initiatives**

<b>ECR initiatives</b>	<b>Value-adding elements of pervasive retail information systems</b>
<b>Efficient assortment</b>	<ul style="list-style-type: none"> <li>• Real-time information provision regarding the products' lifecycle within the retail outlet (placement on the shelf, number of removals /replacements by each shopper, actual purchase)</li> <li>• Real-time information provision regarding each shopper's shopping trip (and correspondent patterns) within the retail outlet</li> <li>• The aforementioned information can lead to the generation of the optimal store layout based on the actual preferences of the supermarket shoppers</li> </ul>
<b>Efficient promotion</b>	<ul style="list-style-type: none"> <li>• <b>Personalised promotions</b> based on past consumer behaviour and in-store navigation patterns</li> <li>• Real-time monitoring of promotions effectiveness (impressions, actual purchases)</li> <li>• Collaborative placement of promotional strategies within the retail outlet taking into account retailers' POS data</li> </ul>
<b>Efficient product introduction</b>	<ul style="list-style-type: none"> <li>• <b>Identification of shoppers' emerging needs through the continuous monitoring of their behaviour within the retail outlet</b></li> <li>• <b>Continuous monitoring of shoppers, perceptions on new product introductions (eg number of times a shopper – or a cluster of shoppers – has removed the product from the shelf or placed it in his/her trolley)</b></li> </ul>
<b>Efficient product replenishment</b>	<ul style="list-style-type: none"> <li>• <b>Elimination of out-of-shelf/out-of-stock conditions (real-time monitoring of remaining product quantity on-shelf, efficient inventory management within the store)</b></li> <li>• <b>Efficient forecasting of future demand taking into account the actual product lifecycle within the retail outlet</b></li> </ul>

Exhibit 4: **Focus groups participants' opinions**

<b>Examined construct</b>	<b>Participants' verbatims</b>
<b>H1: Budget monitoring</b>	<ul style="list-style-type: none"> <li>• "Protects from overspending"</li> <li>• "You avoid getting off budget"</li> </ul>
<b>H2: Check-out process</b>	<ul style="list-style-type: none"> <li>• "Very convenient"</li> <li>• "Saves time"</li> <li>• "Less frustrating"</li> </ul>
<b>H3: Shopping effectiveness</b>	<ul style="list-style-type: none"> <li>• "Very convenient"</li> <li>• "Can't miss usual needs"</li> <li>• "Even when there is no employee to assist you, you can find what you are looking for. It guides you!"</li> </ul>
<b>H4: entertainment</b>	<ul style="list-style-type: none"> <li>• "Has fun"</li> <li>• "Really advanced"</li> <li>• "Great! It's like a game"</li> </ul>
<b>H5: Information search cost</b>	<ul style="list-style-type: none"> <li>• "No need to write a shopping list"</li> <li>• "You can't forget. The list is programming, reminding"</li> <li>• "Gives information needed to select brands, ie price, ingredients, expiration date, sub-totals"</li> </ul>
<b>H6: Promotions effectiveness</b>	<ul style="list-style-type: none"> <li>• "Won't miss interesting offers"</li> <li>• "Allows to select better value"</li> <li>• "This is very good, because you do not have to search for promotions on supermarket shelves for hours"</li> </ul>
<b>H7: Time pressure</b>	<ul style="list-style-type: none"> <li>• "Saves time and effort from searching"</li> <li>• "You never get lost in the supermarket and you do not waste time searching especially when you are in a rush"</li> </ul>

## Consumers will accept pervasive retail information systems – but only if they believe the improved experience justifies letting go of some privacy

purchasing products which were displayed in the MyGrocer corridor (including promotions that were displayed by the system).

Following their interaction with the system, participating shoppers completed a questionnaire, evaluating the effects of the system on their traditional shopping experience.

Here are some of the headline results:

- more than 70 per cent of Greek shoppers evaluated their shopping experience using MyGrocer as “exciting”
- 78 per cent said MyGrocer helped them monitor effectively the products in their shopping cart, while at the same time organise their supermarket purchases better
- 85 per cent claimed MyGrocer saved time, allowing them to search for additional information or promotional offers regarding the products they wanted to purchase
- 89 per cent thought waiting less time with cashiers using MyGrocer would influence their decision to shop at a certain supermarket
- at least 80 per cent said MyGrocer gave them more time to conduct their shopping, while reducing the sense of time pressure
- 93 per cent stated that MyGrocer helped them monitor their budgeting more effectively during supermarket

purchases, noting that such a system allowed them not to spend more than they had planned

- 87 per cent claimed MyGrocer presented promotions of the products that interested them in a clear way.

Bearing in mind the limitations of this research – MyGrocer was not used in a completely real environment for a substantial time period – the results still suggest that pervasive retail information systems could provide a more entertaining and efficient shopping trip compared with conventional shopping methods.

There are still several challenges to the wider commercial deployment of pervasive retail. These relate to standardisation and engineering but especially to issues of personal identity, security and privacy.

Overall, our research suggests consumers will accept pervasive retail information systems when they become financially viable – but only if they believe the improved shopping experience justifies letting go some of their privacy.

Of course, several questions have still to be answered before retailers can identify a viable economic and business model for pervasive retail information systems.

These include – Who will be the owner of the application? What will be the role of the product supplier? What are the indirect benefits of pervasive retail information systems to the FMCG value

# Pervasive retail information systems empower retailers to work with consumers, making them an indistinguishable part of their operations

chain? How can these systems be integrated with retailers' legacy systems? What about RFID costs and who will pay for the tags? What about standardisation issues? Is it possible for such applications to generate revenue? Will consumers use them? Will consumers pay for them?

To this end, extensive and continuous research is needed in order to identify a) appropriate target groups and b) the most feasible revenue models that will ensure break-even for potential investors.

Drawing on the results of our research, we feel the early adopters of such innovative solutions will appeal to time-starved shoppers who are relatively familiar with technology, purchase a large shopping list, and have planned their shopping trip in advance.

Retailers most likely to become early adopters are large supermarkets and hypermarkets, which need to monitor on a real-time basis their POS data, including out-of-stock and out-of-shelf conditions, and to reduce thefts in their stores.

Pervasive retail information systems could be used as an extension to retailers' existing loyalty programmes due to the fact that, one, supermarkets are expected to initially invite their loyalty customers to use the system since they represent a controlled group which can provide feedback regarding the actual system use; and, two, supermarkets already possess the initial set of data (demographics and

past consumption behaviour) required by such systems in order to provide their full set of services to the consumers.

Finally, pervasive retail information systems can provide significant benefits to the FMCG value chain. Although ECR has always tried to embrace consumers, its initiatives have never actually reached them in a way that they become a real stakeholder – part of an optimised value chain.

Pervasive retail information systems empower retailers to “work with consumers”, making them an indistinguishable part of their operations.

Fully extending ECR to the consumer will emerge as one of the most fruitful ways for retailers and their suppliers to cut costs, open up new revenue streams, and build closer, more trusting relationships with their customers. Pervasive retail information systems will help them do this by evolving traditional loyalty programmes to become relationship-based solutions where retailers and consumers work on the shop floor together to solve common problems and co-create value.

## Acknowledgment

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# Eighty-nine per cent of respondents said that waiting less time at cashiers would influence their decision to shop at a certain supermarket

Associates Corporation, Nokia Corporation, Atmel Hellas, Unisys Belgium, Helsinki University of Technology, Atlantic SA, Procter & Gamble Hellas SA, and Eltrun-Athens University of Economics and Business.

This is an edited version of the winning paper in ECR Europe's 2003 Student Awards. A full copy is available from the web site of the ECR Europe Academic Partnership (<http://www.ecr-academics.org>)

## Further reading

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