

# **Pervasive Information System Devices Enhancement of the Shopping Experience: Enablers and Barriers to its Adoption**

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## **Abstract**

*This research article explores the issues of subjectivity of in-store Pervasive Information Systems (PIS) in turning browsers into buyers and enhancing the overall shopping experience. This article presents secondary research findings that suggest that existing perceptions of the barriers to these PIS devices may not be solely associated with the consumer, but also exist within the retailers. A research study exploring the retailers' perspective of PIS Kiosk devices was conducted and the secondary research findings supported the general perception that information access, interactivity, transactional and relational exchange are recognised as important to enhancing the consumer shopping experience, and purchasing conversion rate. The research findings associated with the retailers' operational, implementation and metric perspectives identified potential barriers to the wholesale deployment of these technologies. Further research is needed on the perceived and expected benefits of using these PIS Kiosk devices from the consumers' and retailers' perspective, and potential impact on future retailer strategy.*

## **Keywords**

Pervasive Information System Devices, Retailers, Consumers, Enhanced Shopping Experience, Implementation and Operational Issues.

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## **Introduction**

The retail industry is driven by the single most important goal, to bring together supply and demand (Burke and Payton, 2006). These two sides to customer satisfaction present quite unique problems and issues. On the supply side, manufacturers and retailers have taken tremendous leaps in adopting sophisticated logistical systems and other technologies associated with delivering enhancements to in-store products and services. On the demand side, the retailers are still encountering difficulties in creating shopping environments that sufficiently engage the consumers' needs and match their aspirations, and therefore increase overall purchasing conversion rates. In 2005, US retailers spent over \$113 billion on developing advertising, marketing and promotion

materials to increase overall store traffic (AMR, 2005). But in-store research suggests over 70% of customers make their buying decisions in-store, within the traditional bricks and mortar of the store environment. It is therefore more appropriate that retailers need to move beyond their traditional investment in these in-direct marketing channels and instead focus on the real challenge, turning browsers into buyers within the confines of the store. A significant factor influencing shoppers' awareness, selection and eventual choice of product or service is their search for additional information.

Information technology is already embedded into so much of what we do in our work, leisure and domestic activities. These IT systems provide us with up-to-date information on news, weather, sport and entertainment. This information is piped into our desktop computers and other information channels at our work and homes. These information systems (IS) have information technology in the foreground, where it is us humans, who trigger and manipulate information for our own purposes. But there is a new breed of information device that is, or shortly will, pervade our working, social and home environment. These new IT systems provide innovative services, services that provide superior interaction qualities above those achieved through the desktop paradigm, they can monitor our behaviours, processing and communicating with us and intervening where required. We have entered a new age, the 'Pervasive Information Systems' (PIS) age, one where the sensing and recognition technologies provide more human-like communication interactions and interactivity. These PIS devices can directly impact on the shopping experience by positively affecting our shopping efficiency, information searches, reducing promotions overload, alleviating checkout problems, and be at the same time entertaining (Chang and Burke, 2007).

This research study explores the issues of Pervasive Information Systems (PIS) adoption by the retailing sector, the overall potential benefits of this technology, and the perceived costs of its implementation. The authors conducted a series of interviews with UK grocery retailer staff to initially understand the operational issues of adopting and implementing PIS, with a particular focus on Kiosk devices. The expected findings would be used initially to guide further research studies into the quantifiable benefits, retailers and consumers, to overall shopping experience and more importantly the direct link to purchasing conversion rates, and the inherent barriers from retailers in adopting and rationalizing these PIS devices.

### **Retail Drivers for In-store Innovation**

The rationale for retail innovation is marked by three key drivers: the current dissatisfaction expressed by consumers with regard to their shopping experiences (Heckel, 2004), the need for retailers to evaluate the benefits from adopting a positivist customer interaction perspective, and finally, the opportunities presented by new in-store self-service technologies.

### **Customer driven**

In assessing the customer-driven innovations it is useful to look at the underlying reasons why casual browsers, and those who have salient needs, find dissatisfaction with the current retail environment. Some consumers defer their purchases because: the desired product is not-in-stock, or there is insufficient product information, they are dissatisfied with the product selection, or have difficulty in evaluating the alternatives

(Huffman and Kahn, 1998), or are just put off by the retail environment. Consumer surveys have identified “shopping avoidance” as high on the list of consumer wishes, that is, any alternative to the tedious activities involved in shopping. Mintel (2007) tells us that a higher percentage of women are shopping from home in United Kingdom (UK) than in any other industrial country. The key channel that can support this is that of the ‘online shopping’ proposition, although there are still a number of women in the UK who use mail order catalogues to make purchases. This shopping avoidance is primarily marked by the consumers frustration in their information searches and shopping enjoyment of the current shopping environment (Mattila and Wirtz, 2004). Purchasing behaviour research shows that consumers are more willing to seek information, try new brands, are less cautious with their purchases and importantly willing to try new shopping modes (e.g. on-line, mail-order) to experience personalised shopping (Birtwistle and Tsim, 2005). It is for this reason that Pervasive Information Systems (PIS) has been received by the sector with an equal measure of scepticism and mild enthusiasm.

### **Retailer driven**

Non-stop price wars and the use of traditional store differentiators mean that consumers know exactly what to expect from their stores and retailers are aware of the need to create new differentiating factors to stimulate further consumer interest and buying. In response to this, retailers have been transferring to new interactive forms of marketing their products and services from the in-store onto the on-line environment, and so subtly moving away from their previously familiar face-to-face transaction-based exchange. The online shopping experience, as well as being a threat to retailers, may also provide some valuable insights into the potential early adopters of current and future interactive in-store technology. Existing research into what drives consumers to shop on-line can assist in understanding consumers’ changing shopping habits and their willingness to adopt new technology in-store, in particular with regard to the features and functionality of online store facilities (Perea et al., 2004). Customers’ adoption of technology and self-service schemes are likely to have a direct link to internet-related behaviours such as the anxiety and frustration associated with technology (Lin, et al., 2006). Retailers need to be aware of this anxiety and ensure that any injection of technology into the shopping experience is matched against the technological capabilities of all shoppers, and their propensity to learn (Lesser and Fontaine, 2002).

Retailers have increasingly looked at technological solutions as a means of addressing consumer indecision concerning the purchasing of products and services. These new technologies have included kiosks, interactive displays, information retrieval systems, hand-held shopper devices, and computer-enabled grocery trolleys. All for the purpose of providing important detailed product information, information that in many cases will both help the consumer to select and identify alternate products, and at the same instance enhance the in-store environment. Research (Burke, 2002) on specific product categories suggests that consumers have very different requirements, and therefore technologies need to be tailored to these highly differentiated consumer needs, which would also contribute to more personalised shopping experiences (Birtwistle and Tsim, 2005).

## Technology driven

Self-Service Technologies (SST) have been one of the most dramatic technological advancements to benefit the shopper over the last twenty years (Meuter, Ostrom et al., 2000). These SST's have reduced some of the more problematic areas of service interaction, those that often negatively contributed to the overall shopping experience. For the retailers they have often resulted in reduced labour costs and the general freeing up of retail staff to provide more valued-services to the customer. Examples of these SST's that have pervaded the retail environment are smart trolleys – providing touch screen and scanners for discerning prices of goods; self-scanning services – loyalty cards; teller machines; and self-service checkouts. The technological innovations behind these SST's come from the broader realms of Information Technology (IT) and the Software Industry, where their application in reducing labour costs and increasing customer convenience has been testified over the last fifteen years (Dabholkar and Bagozzi, 2002; Meuter, Ostrom et al., 2003; Du Gay, 2004). The categories and examples of SST in the broader marketplace are shown in Table 1:

**Table 1: Categories and Examples of Self-Service Technologies (SST)**

Purpose\Interface	Telephone/Interactive Devices	Online/Internet	Interactive Kiosks	PIS Innovative Systems
Customer Service	Phone Banking Flight Information Order Status	Packaging Tracking Account Information	ATMs Hotel Checkout	Loyalty Schemes
Transactions	Phone Banking Prescription Refills	On-line Purchases Paying Bills	Pay-at-the-Pump Hotel Checkout Car Rental	PDA Self-Scanners
Self Help	Information Phones	Information Searches Distance Learning	Blood Pressure Feedback Tourist Information	Information Kiosks (Music, Video)

\*\* adapted from Meuter, Ostrom et al. (2000)

Research (Burke, 2002) on in-store technologies suggests that customers use their perception of the value and ease-of-use of these technologies to influence their purchasing. In the next section the authors explore key trends driving consumer buying behaviour, and how Pervasive Information Systems (PIS) – the Kiosk device – helps in the consumer decision-making process.

## Enhancing the Consumers' Decision-making Process

Any retailer is driven by the primary goal of matching demand with supply, to effectively present a selection of goods and services that will satisfy the consumers' needs, and do so profitably. Previous research (Burke and Payton, 2006) has identified that the shopping environment is the most significant factor impacting on consumer purchasing. This same research has identified a number of factors associated with the shopping environment, and these have been grouped into four key themes:

- **Ambient factors** – improved visual simplicity and transparency;
- **Design factors** – multi-sensory engagement connection with salient and latent consumer needs;

- **Social factors** – understanding the complex needs of the consumer and creating new offerings to satisfy these;
  - **Situational factors** – making the shopping experience convenient and enjoyable.
- The conclusions from this research are that consumers are highly influenced by the store environment, and this influences both their decisions on what, and where, they buy the goods and services. These same consumers are influenced by the layout and presentation of product information (Massara and Pellosso, 2006).

### **Pervasive Information Systems (PIS)**

If the shopping experience is a key factor influencing consumers' buying behaviour, then Information Technology (IT) is an increasingly attractive tool by which the retailer can enhance this experience, and therefore make shopping convenient and enjoyable (Kourouthanassis, Giaglis et al., 2007). These Pervasive Information System devices can influence all four key themes identified above, associated with the shopping environment, but most significantly they influence the shoppers' perception of the efficiency and effectiveness of the shopping process.

At the heart of these interactions is a new level of human-like communications capable of sensing and recognizing the consumer needs, and thus delivering information in both an attractive and interactive fashion, and thus providing both information and entertainment. These PIS devices can raise the level of shopping experience and really deliver valued-services beyond those previously offered through sales staff and desktop-based technologies (Burke, 2002; Chang, 2002; Thusoo and Kumar, 2006).

### **Kiosks**

Kiosk usage has been explored and categorised by a few researchers, the most recent by Slack and Rowley (2002) who have split usage into four main functions. As kiosk usage becomes more prevalent the categorisation of usage is likely to expand. Currently the key functions of kiosks are:

- As an information tool (to promote products and inform consumers of their use);
- As an interactive shopping tool (both to provide and receive information from the consumer) that improves upon the shopping experience for the browser
- As a transactional tool (to deliver a service and make a sale);
- As a relational tool (to develop and reinforce the relationship between the retailer and the consumer).

Whilst some kiosks may only include one of these functions, others may incorporate all four (Slack and Rowley, 2002). These kiosks are self-service devices supplying product or store information and media sampling. These types of kiosks are gaining ground in the USA and Europe, a recent AMR research study suggested that over 44% of retailers have at least one of these kiosks in their stores (AMR, 2005). This trend is set to increase as more and more retail system suppliers are developing and delivering new interactive kiosk devices to meet the increasing demand for information searches in-store (Burke, 2002; Thusoo and Kumar, 2006).

If PIS devices have such a positive influence on shoppers' experience, and most importantly are able to help them with information, improve interactional delivery of products and services, and are entertaining, then why is this technology not more widely

used? The next section attempts to understand some of the enablers and barriers to PIS devices adoption and dissemination in the retail sector.

### **Enablers/Barriers to the Adoption and Dissemination of In-store Pervasive Information Systems**

Understanding the customer/retailer perspectives on the use of Pervasive Information Systems (PIS) could be crucial to future retailing success, since its use can both enhance shopping convenience and improve shopping experience. As outlined earlier retailer differentiating factors are key motivators in encouraging shoppers to browse in the first instance. PIS cements that consumer/retailer relationship, as it goes a long way to improving the customer experience through its engaging and innovative interaction. This new world of virtual products and services holds important information that can be channelled and filtered to meet the requirements of the customer needs (Rayport and Sviokla, 1994). The new challenge is to understand the importance of these technology-based encounters from two perspectives: the customers, and just as importantly, the retailers.

### **Customer-Technological Interface (CTI)**

These technology-based service encounters experienced by the customers had both satisfying and dissatisfying effects research by Meuter et al. (2000) categorized these as follows:

**Table 2: Customer Categories associated with Satisfying and Dissatisfying Experiences of PIS**

Consumer Satisfying Categories	Satisfying Experiences	Dissatisfying Experiences
Intensifying Need (Availability)	11%	43% (Technology Failure)
Easy-to-Use	16%	17% (Confusing)
No Hassle (from Service Personnel)	3%	4% (I needed help to use it)
Saved Time	30%	19% (Service Design Failure)
When I want	8%	-
Where I want	5%	-
Saved Money	6%	-
Did its Job	21%	17% (Failure in Process)

\*\* adapted from Meuter et al. (2000)

Meuter et al.'s (2000) research concluded three interesting broad factors likely to influence customers' perception of PIS devices associated with their satisfying and dissatisfying experiences:

#### *Attribution of Satisfaction/Dissatisfaction to the Technology*

Over 63% of the participants acknowledged the critical role that technology played in the service encounter and roughly 50% of these had negative outcomes from their experience. Interestingly, only 6% attributed these negative outcomes to their failing in the encounter. Over 25% instead cite both themselves and the technology at fault. Most

participants take credit for satisfying experiences from these technology-based service encounters.

#### *Complaining about the Technology-based Service Encounter*

As expected very few participants after experiencing a positive outcome come forward to make suggestions about how the service encounter could be improved. But over 51% of those dissatisfying experiences resulted in the participants making complaints to the retail staff. Overall, the three most complained about categories from Table 2 above, were process failure 68%, technology failure (55%) and service design failure (51%).

#### *Recommendation and Repurchase*

Most obvious is that customers were more likely to re-engage with the technology-based service encounter if they had satisfying rather than dissatisfying experiences. However, the reason for their satisfaction with the technology-based service encounter did not influence recommendation or repurchase. For the dissatisfying experiences then technology failure and customer faults were the two least likely to stop participants re-engaging with the technology-based service encounter, whereas process failure and service design failure would more likely not repeat their technology-based service encounter.

The consequence of the research into technology-base service encounters highlights the need to both prevent service failure and the importance of service design, along with the need to educate customers on the role they must play in maximising the benefits of these exchanges.

#### *Retailer-Technological Expectations (RTE)*

If retailers are indeed intent on improving shopping experience, see 'Retail Drivers for In-store Innovation' section, then the four main functions of PIS devices: information, interactivity, transactional and relational; are useful themes by which to explore some of the enablers and barriers to their adoption and dissemination.

#### *Information Tool*

In the last five years an increasing array of info-kiosks has emerged in the retail outlets, offering information and interactive advertisements. These kiosks are intended to help the consumers to make purchasing decisions, and others are to be both, entertaining, and cut-down the routineness of day-to-day shopping trips (Kourouthanassis, Giaglis et al., 2007). One of the enabling factors associated with PIS kiosk devices is their knowledge, reliability, trustworthiness, quickness and their inability to get bored, tired or impatient (Dawes and Rowley, 1998). Both staff and customers will need training on these info-kiosks, thus helping them to understand the potential sources of the information available. In time these additional sources of information will be become invaluable to the customer, helping them with their purchasing decisions.

#### *Interactivity*

If the customer's shopping experience, their enjoyment, can be enhanced by increasing the degree of interactivity (hands-on shopping), and there is some research that

points to this being so (Arnold, Reynolds et al., 2005), the retailers need to work more closely with retail systems manufacturers to increase the overall interactivity of these PIS devices (Wood, 2002). The benefits of increasing interactivity in-store, to both speed-up the process of information search and making it entertaining, overcomes some of the obstacles encountered during the shopping process, and therefore directly increases the purchase conversion rate (Chang and Burke, 2007). Hence retailers' interest in trialling these PIS devices and exploring the broader benefits that this type of information service technology can offer to both enhance overall shopping experience and increase the conversion of browsers to buyers (AMR, 2005).

#### *Transactional*

One concern raised by retailers is the changed nature of the transaction between the retailer and customer the PIS kiosk device can put itself between the retailer and the sales of the product or service. But the PIS kiosk devices also potentially cuts down the variability of service provision, and therefore it is easier to manage both customers expectations, and perceptions, regarding the shopping the experience (Dawes and Rowley, 1998). The general move towards PIS devices is starting to produce a culture of 24-7, where customers are expecting instant access when and where they want it. This creates problems for the retailers in terms of location and security.

#### *Relational*

If the shopping experience is, indeed affected by the reasons why customers buy goods and services, then part of the shopping process is likely driven by the needs to maximise the utility and efficiency of this (Kourouthanassis, Giaglis et al., 2007). The retailer wishes to encourage this interactional relationship because by helping the shopper to maximise the benefits and efficiency of the shopping process he will benefit from quicker throughput in his retail outlet, and maximise the overall selling opportunities. In traditional retail outlets the shopping experience of the customer is largely achieved through the store environment and at the checkout point. PIS has the ability to offer a superior interactional opportunity by which the retailer can further engage the customer and thus influence positive feelings concerning his shopping experiences, by offering services that they want, and that have tangible benefits.

Increasingly research on interpersonal relationships between salespersons-customer have shown that this factor more than any other has influenced the shoppers experiences (Arnold, Reynolds et al., 2005). However attempting to substitute a PIS kiosk device for a salesperson also has significant risk for the retailer. The first of which is the point raised in the last section concerning the education of the customer in the use of the technology. The second is that customers must feel comfortable with the IT-based service delivery (Dawes and Rowley, 1998). The third is that do these PIS kiosk devices cultivate customer loyalty and evoke emotional responses that we know are important in their enjoyment of the overall shopping experience. The CTI and RTE secondary research above suggests that initial adoption of PIS Kiosk devices may depend on the retailers' expectations and consumer perceptions of the added-value that these devices can or should deliver. Therefore, the authors propose the following broad research themes.

- Pervasive Information System Kiosk devices adoption by retailers is expected to lead to increased sales, and perceived increase in consumer shopping experience compared to in-store environments without this technology.
- Pervasive Information System Kiosk devices operational issues are not significant in affecting either the commitment or motivation of the retail staff, or the perceived strategic value of implementing it.

Undertaking an initial exploratory research study with high street retailers would provide some perspective of what their perceptions are of the enablers and barriers to these PIS Kiosk devices.

### Research Study Method

The research study was split into three distinct phases, the first phase reported here was to conduct initial secondary research on the existing retailer knowledge and experiences regarding Pervasive Information Systems (PIS), and in particular the Kiosk PIS-device, and conduct initial exploratory interviews with retailer staff involved in the operation and management of in-store information systems. The subsequent research phases include evaluating the customers' reaction and responses to these PIS Kiosk devices, and the retailers' strategic perspectives on the rollout of PIS into other areas of the in-store environment, will be reported separately. For the first phase of this research study a total of 8 operational retail managers were interviewed. These were split into two equal groups, those who had experience of PIS kiosk devices and those who had no experience of these devices.

### Design

This research study utilises semi-structured interviewing to explore the adoption and dissemination issues associated with PIS Kiosk devices for in-store utilization. Two broad research themes were developed and data collected from those retail outlets who have experience of the technology, and those who do not. The interview questions were split into two broad themes, those with the technology and their experiences, and those without the technology and their perceptions of this technology. The constructs identified in the table below were drawn from past highly cited studies, since the nature of this phase of research was to explore the broad issues of adoption and dissemination of PIS then no instrumentation, internal or statistical conclusion validity tests were carried out. However, the questionnaire was pre-tested and the resulting data coded and analysed to check for usability. Table 3 below shows the four main themes for each semi-structured interview:

**Table 3: Interview Themes for the two sets of Interviews**

<b>Interviews with Retailers with the PIS Kiosk Devices</b>	<b>Interviews with Retailers without PIS Kiosk devices</b>
Retailer Experiences - experiences of using the technology?	Retailer Knowledge - What is your understanding of PIS devices?
Perceived Customer Experiences - Perception of customer use?	Application in-store - What's the potential impact of the use of this technology?
Performance Metrics - what is the direct impact on sales?	Perceived Operational Issues

<p>Operational Issues</p> <ul style="list-style-type: none"> <li>- What are the common problems of PIS devices?</li> </ul>	<ul style="list-style-type: none"> <li>- What would be the problems with its introduction?</li> </ul> <p>Strategic Value</p> <ul style="list-style-type: none"> <li>- What is the potential value of the technology?</li> </ul>
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*Procedure*

Two prominent UK retailers agreed to participate in this study, and interview dates and times were arranged for retail outlets, with and without the technology. Interviews were conducted over an 8-week period in the summer months. The interviews were recorded on tape and later transcribed, and the transcripts were checked for accuracy. The transcripts were coded by two researchers, and then the inter-coder reliability (Hak and Bernts, 1996) calculated (90%). The transcripts were then coded and these codes were further coded (axial coding) into themes relating to the two concerns of adoption and dissemination of PIS Kiosk devices.

**Retailer Perspective of PIS Kiosk devices**

The analysis of the interview findings for both the retailers with the PIS Kiosks and those without showed a focus around three principal themes concerning the current and future adoption, and dissemination, of PIS devices: Implementation, Operational and Metric issues. Therefore the initial research findings are reported under these broad headings.

*Implementation*

Retailers without the PIS technology – one of the most common factors quoted was the lack of space to house the technology most retailers are under immense pressure to utilize all the available space for selling merchandise. The second most important factor was a lack of information about what the technology can do.

Retailers with the PIS technology – the occurrence of the PIS Kiosk in the retail environment is still a relatively new phenomenon, and the retailing staff’s reaction to it is relatively sceptical. But all retailers were in agreement about the interactive and interaction benefits:

- ‘it provides excellent information about the product’
- ‘in the entertainment area, having pictures and sounds to demonstrate what an artists looks and sounds like is very beneficial’
- ‘it creates interest, our customers flock around it’
- ‘it provides an interactive element to the consumers shopping experience’
- ‘it definitely provides an encouragement to buy’

*Operational*

Retailers without the PIS technology – all retailer managers questioned had utilized the technology in other stores and therefore had some experience of its operation. The most common problem noted was the reliability, often they had tried using the PIS devices only to encounter faults, and as a consequence of this were put off pushing for it in their stores.

Retailers with the PIS Technology – the most common problem encountered was the lack of time to both familiarize themselves with the information provide and its

operation. Fortunately few customers asked for or need help in using these technologies. The overall conclusion was when it worked it was pretty good. Having concluded that the entertainment value was important regards its repeated use by the customer, concerns were expressed about the content being regularly updated and augmented.

### *Metrics*

The retailing staff both with the technology and without it, were unaware of the means by which to measure the success or otherwise of the PIS Kiosk device. Because of the interest by the customer in this new technology, and the ability to interact with it to find more information they were willing to suggest this could have some benefit in terms of helping customers to make purchasing decisions, but none of the retailing stores currently using these Kiosks had direct data associated with any increases in sales. The majority of users of the technology, especially those kiosks providing entertainment or electronic device information were in the 8-12, 18-25 year old ranges.

The first of our research themes looked for a positive relationship between the adoption of PIS Kiosks and increased sales and consumer shopping experience. Unfortunately, the results of our interviews are not conclusive, certainly the perceived interactivity and additional information were assumed by the retailers to increase overall consumer shopping experience. The retailers were unable to assert any direct link between this increased consumer shopping experience and increased sales. The second of our research themes explores the operational issues of PIS devices and their likely impact on staff commitment and motivation. Retailing staffs' experiences of operational and implementation issues relating to these PIS Kiosk devices did impact on their commitment and motivation to support and justify their use in the store.

### **Conclusions and Future Research**

This initial research is more of an exploratory study of the most promising factors that are likely to influence the retailers and consumers adoption of the PIS Kiosk device. From these initial research findings there is a strong relationship between the customer's use of these PIS Kiosk devices and the overall perceived shopping experience, however, there is still little direct data positively linking these to their actual purchase decision-making of products or services. Like the other PIS research (Bellotti, Berta et al., 2002; Kourouthanassis, Giaglis et al., 2007) these devices can both entertain and improve the overall shopping efficiency of consumers and in so doing generate new and positive consumer shopping experiences.

At the same time the PIS device provides an opportunity for the retailer to enhance the interactivity, transactional, relational and informational links with the consumer and by so doing create new differentiated service provisions. More importantly the retailer can make the consumer an integral part of the overall operational process of browsing and buying, by engaging them in real-time information search and retrieval they can directly improve their forecasting and therefore meet future demands with more confidence, for the consumer they should see less out-of-stock situations. This future forecasting of consumer needs has other benefits for the retailer they can use this information to guide future marketing and promotional campaigns. The overall benefits of PIS devices to the retailer are that they can continue to enhance the consumer shopping experience by speeding up shopping browsing and purchase decision-making

(Kourouthanassis, Giaglis et al., 2007); they can offer more value in providing accurate information and less out-of-stock situations; and finally by minimizing the shopping stress provokers, like queues and lack of information, they will enhance positive shopping experience.

The limitations of this research study are that two other stakeholders' perspectives are missing. The PIS Kiosk devices potential impact on shopping experience and barriers to its implementation can only be fully ascertained with a more detailed analysis of customer and retailer attitudes. To this aim the authors propose to undertake further evaluation of PIS Kiosk devices and explore the consumers' perspective of the benefits and costs of using this technology; and at the same time identify the retailers' strategic perspective of this technology. There is still a wider issue of how these PIS devices will be integrated into the broader retailer in-store strategies on customer interaction and relational management.

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