On-shelf availability: the case of a UK grocery retailer

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Abstract

Purpose – On-shelf availability (OSA) has been a major cause of concern to UK grocery retailers over the last five years and the topic has been the focus of commissioned research reports by various trade associations. The purpose of this paper is to present a case study of how one major grocery retailer tackled the OSA issue that had been exacerbated by management focus on new technology and distribution facilities.

Design/methodology/approach – The purpose of the research was to determine if any relationship existed between OSA and store picking for home shoppers, OSA and promotions and OSA and store size. This paper discusses the academic and practitioner literature on OSA and out-of-stocks (OOS) and then presents a single company, in-depth case study of one multiple grocery retailer. Primary research was undertaken with senior managers of the company but also at regional distribution centre (RDC) and store level to chart how new logistics strategies were implemented at an operational level in Scottish stores.

Findings – It was noted that the advent of home shopping has aggravated the "last 50 yards" and a company can experience acute OSA difficulties. Network changes involving a mixture of old and new systems create short-term pressures and profitability shortfalls. The new high-tech networks push products out to stores but overstocks occur in backrooms of stores and do not reach the shelves. Demand and supply may not synchronised.

Research limitations/implications – Although there is primary empirical research related to the case study the major output is a framework presented for future investigation, thus there is no expansive empirical study in this paper.

Practical implications – With the exception of smaller stores where OSA remains a problem, the company has succeeded in improving OSA levels in the other areas.

Originality/value – This paper adds to our knowledge of OSA and OOS by investigating the flow of goods from the RDC to the store shelf and presenting various critical points in the process flow that have received scant attention from academics and practitioners.

Keywords Stock control, Retail trade, Scotland, United Kingdom

Paper type Case study

Introduction

In their major international study of retail out-of-stocks (OOS) Corsten and Gruen (2003, p. 603) argued that "availability of products is the new battleground in the fast moving consumer goods industry". The study of stockouts is not new; in the USA the Progressive Grocer (1968a,b) published the first major study on how grocery customers

reacted to stockouts and Schary and Christopher's (1979) study of grocery customers in London revealed that a high proportion of customers (48 percent) chose to shop elsewhere when faced with a stockout.

In the intervening years the grocery retail industry has been transformed, especially in the UK. At the time of the Schary and Christopher study manufacturers' brands dominated the shelves of a fragmented retail industry. If consumers could not find their favourite brands in one store, a competitor would be able to provide it in a nearby location. Almost 30 years later the rise of retail grocery giants, such as Tesco with over 30 percent of the UK grocery market, has led to a retail-controlled supply chain and the predominance of retailer, rather than manufacturer brands.

Accessibility is now measured in driving times to superstores rather than short-trips between butchers, bakers, fishmongers and supermarkets in the high street. Store loyalty has become as important, if not more important, than brand loyalty as evidenced by the largest grocers' ventures into non-grocery areas such as banking and other service-related sectors under their corporate brand umbrella.

In order to improve operational efficiencies UK grocery retailers streamlined their supply chains. From centralization of distribution in the 1980s companies began to integrate primary and secondary distribution to reduce lead times and take inventory out of the retail supply chain. Fernie and Sparks (2004) claimed that the UK had one of the most efficient supply chains in the world in the 1990s/early 2000s.

Despite these logistical innovations, on-shelf availability (OSA) was deemed to be a major cause of concern for British consumers (efficient consumer response (ECR) UK, 2004) and media attention focused upon J Sainsbury when the *Sunday Times* published a report indicating that in a 30 item shopping basket, on average Sainsbury had 10 percent OOS with the worst performing store only having two-thirds of items available (Fletcher, 2004). It was around this time that Justin King was appointed as Chief Executive of J. Sainsbury and he set out an agenda to "Make Sainsbury's Great Again". He undertook market research with Sainsbury customers and found that their greatest source of dissatisfaction OOS. Zentes *et al.* (2007) provide a detailed discussion of Sainsbury's problems as a case study in their recent book.

However, this pattern was being repeated throughout the grocery sector and had become the focus of attention for ECR UK and IGD, formerly the Institute of Grocery Distribution, the main UK trade associations for addressing issues pertaining to the sector. It is the purpose of this paper to investigate the main causes of the OSA/OOS problem and discuss measures which have been undertaken to tackle OSA. Primary research was carried out with one major grocery retailer to evaluate how OSA initiatives from its headquarters were implemented at distribution centre (DC) and store level. It is first necessary to give a background to the research which has been published to date on this topic.

Literature background
Consumer reaction to stockouts
Research into consumer reactions to stockouts spans four decades and these studies identify five main reactions by consumers to a stockout in store:

(1) They buy the item at another store (store switching).

(2) They delay ordering or purchasing the item (postpone purchase at the same store).

(3) They do not purchase the item (a lost sale).

(4) They substitute the same brand (different size or type).

(5) They substitute for another brand (brand switching).

Research by IGD (2003) shows that 65 percent of UK consumers looking for a specific grocery item will adopt one of the first three reactions, thus not buying in that particular store on that occasion if a stock-out occurs. In 1979, the figure from the Schary and Christopher study was 78 percent. Despite the retail changes which have occurred since 1979, the degree of store switching is remarkably high for a sector which prides itself on customer loyalty programmes! Compared with the more general results of Corsten and Gruen (2003) the figure for the UK is high compared with other markets where the average is 31 percent.

Many studies discuss in-depth the causal factors which prompt consumer reactions to stockouts such as the product category, the nature of the brand loyalty, consumer type and the immediacy of need (Emmelhainz *et al.*, 1991; Verbeke *et al.*, 1998; Gruen *et al.*, 2002; Sloots *et al.*, 2005). The latter work not only investigated brand equity/loyalty but also the hedonic value of products. Thus, customers who possess high brand equity/high hedonic values on a product are likely to switch brands or stores to acquire the product. Further, they will do so without serious consideration of their own "personal logistics costs" or paying to have their groceries delivered by the retailer (Teller *et al.*, 2006).

Campo *et al.* (2000) identified three drivers that influence consumer reactions. They are the opportunity cost of not being able to consume immediately, the substitution cost of using a less preferred product or brand, and the transaction cost of the time required to acquire the invaluable item. Corsten and Gruen (2003) showed that consumers switch more in some categories rather than others, especially with brands which do not have a personal attachment associated with them. For example, they found more substitution occurred with paper towels compared with feminine hygiene products.

Academic research on customer reactions has been reinforced by reports from trade organizations. ECR UK have held conferences, seminars and written influential reports on the topic. In addition to the three factors identified by Campo *et al.* (2003), ECR UK (2004) discussed the profile of shoppers and noted that consumers tended to perceive OOS to be higher in promotional rather than non-promotional items.

Similarly, IGD's main logistics conference in 2004 focused upon this theme and commissioned research, published in 2005, on consumers' responses to stockouts in three different product categories – health and beauty, frozen food and dairy products. Similar results were found in Corsten and Gruen's survey where OOS in health and beauty products led to consumers shopping in other stores since substitution was more likely to occur in the other categories due to the immediacy effect.

The causes of retail out-of-stocks
The Corsten and Gruen (2003) research indicates that most OOS situations occur at the store level, primarily through ordering and replenishment practices. However, they did point out that the problem of replenishment from within store was more important in their work than findings from the Coca Cola Research Council (1996). Replenishment within store became a key issue for UK grocery retailers in the early 2000s and is known as the "last 50 yards" problem. Figure 1 shows that 35 percent of OOS problems occur with shelf replenishment in the store and 15 percent from the regional distribution centre (RDC) to the store.

Figure 1.
Root cause analysis
of retail out-of-stocks
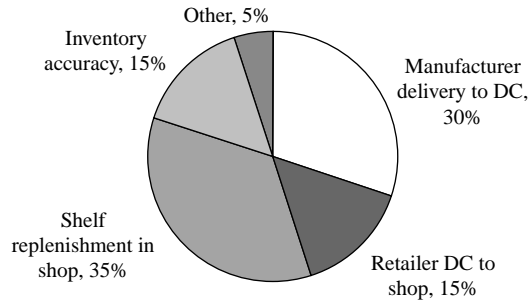
Source: Tesco

This situation was aggravated by the growth of internet ordering for groceries and the use of store-based picking strategies for e-fulfilment to home shoppers. Pioneered by Tesco in the mid 1990s, the other major grocery chains abandoned their dedicated picking centres for store picking in order to achieve greater market penetration at lower cost (Grant *et al.*, 2006). The problem with this strategy was that already congested backrooms were becoming more cluttered as RDCs delivered stock to meet demands of both store and home shoppers. Inevitably the possibility of an OOS situation increased (Fernie and McKinnon, 2003).

It is normally at the store or RDC level that most retail shrinkage occurs in the supply chain, i.e. consumer, employee and supplier theft, which leads to inaccurate ordering and flawed forecasts. In the UK the average shrinkage rate is 1.4 percent of sales and is one of the highest in Europe (Centre for Retail Research, 2005). Of particular concern to retailers, however, is that 14.4 percent of shrinkage that can be attributed to "internal errors", such as processing errors, accounting mistakes and pricing discrepancies. For example, poorly trained staff at checkouts can scan items incorrectly thereby causing inaccurate sales data to be transmitted to suppliers.

Methods to improve on-shelf availability
Corsten and Gruen (2003) advocated an integrated approach based on process responsiveness, operation accuracy, and incentive alignment to address the causes of OOS. The process improvements were related to assortment planning and space allocation; ordering systems, inventory control and store flow replenishment. Operational accuracy remedies were focused upon the accuracy of inventory levels and the ability to measure and identify OSA. Clearly technological advances such as radio frequency identification can improve inventory measurement and accuracy in the future. The final remedy, incentive alignment, is about scheduling staff to improve shelf filling in addition to optimising overall management objectives rather than sub-objectives by functional area.

In the UK, ECR UK has been the medium through which the OSA/OOS problem has been addressed by all members of the grocery supply chain; ECR UK is affiliated with IGD. In their initial report in 2004 they commented upon a combination of processes and approaches to tackle OSA. Similar to the Corsten and Gruen study ECR Europe has identified seven "levers" that can be used to improve OSA; Figure 2. These are measurement "levers" which need "managerial attention" (levers 1 and 2); replenishment and in store execution, namely merchandising (levers 3 and 4); inventory accuracy (lever 5); promotional management and ordering systems (levels 6 and 7).

Source: ECR UK (2004)

These levers have subsequently formed the basis of the ECR UK availability agenda. In line with the measurement levers, the ECR UK availability survey is now the established method for measuring OSA of the largest grocery stores (15,000-50,000 square feet) in the UK; this quarterly survey deals with 350 stores and 200 fast selling lines across 11 departments.

In the wake of initial quarterly reports, ECR UK has also sought to investigate OSA issues that have arisen out of their reports and case studies from IGD conferences (IGD, 2005). In 2005 three sub-groups were established:

(1) Availability Insights.

(2) New Product Introduction.

(3) Promotions and Convenience (ECR UK, 2006).

The latter group mirrored the larger availability survey by undertaking a quarterly OSA survey across seven convenience store retailers, 97 products and 11 categories.

As noted earlier, the major survey focuses on larger stores however the largest chains have strongly moved into the convenience store market during the last five to ten years. The new product/promotions group was established to glean a better understanding of the impact which new product launches and promotions have on availability whereas the insights group has tended to focus on the health and beauty category because of its consistent poor performance in the availability survey.

In summary, some of these recent initiatives are being trialled by various grocery retailers where they believe they have a problem and can improve the situation. Our research objective was to undertake an in-depth investigation of one firm and examine its OOS/OSA initiatives to address the three overarching problems that have been identified in the literature and trade studies: the effect on OOS/OSA from in-store picking for home delivery, promotions, and store size.

Methodology

In the ECR UK reports and IGD conferences, generic information is given on causes and possible solutions to the OSA problem. Indeed, numerous case studies are given on best practice in order to further the dissemination of results to all companies involved in supplying products to stores. In our research, we focus upon one major grocery retailer that was experiencing acute OSA/OOS problems. We argue that exploring how companies deal with supply chain management and supply chain challenges is best

achieved through case studies (Ellram, 1996). A case study strategy has the ability to answer "how" questions and to put existing theory into a new light which again can generate new hypothesis as well as provide in depth insight into a previously little explored phenomenon (Ellram, 1996). Thus, this research consists of a single case study of the focal retailer to determine how they use extant theory in their setting, or develop new insights related to gaps in theory.

Since the authors and researchers were involved in the research process the research method was considered to be participant observation. This method is different to action research, which requires a combination of participative action and critical reflection and where the researcher both contributes to the change process and evaluates the change process during the participation (Näslund, 2002). While we participated in meetings and discussed evidence of our findings during the research process we did not substantially contribute to the company's decision-making process. Our role was to informally provide knowledge transfer between ourselves and the company based on our research interests and scope of the research project.

This research is strongly deductive in nature drawing from the "industry – standard" ECR UK framework identified in Figure 2. This enabled the researchers to test the principles advocated by ECR UK in order to compare results from this work to ongoing IGD initiated research. Furthermore, the research from the case study allowed us to generate a conceptual framework for further research in this area and which is presented in the conclusions. The research was conducted in a series of phases. This is summarised in Table I which shows how the issue of OSA was perceived to be important at Senior Management level even before the new Supply Chain Director was appointed. The later phases of the research dealt with the implementation of the Focus on Availability strategy at both RDC and store level.

Initially the supply chain director and other senior management were approached to discuss their evolving logistics strategy and approaches to OSA. A series of face-to-face and telephone interviews were undertaken between 2003 and 2006 to chart progress on the company's strategy.

As part of the strategy was to take one store and align its processes to focus on OSA, interviews were also held with the management team implementing this project in Scotland, particularly the depot availability champion responsible for co-ordinating the project. From June to August 2005, visits and interviews were conducted at the Scottish RDC and nine stores in the "central belt" of Scotland, i.e. the 50 mile wide strip between the cities of Glasgow and Edinburgh that contains about 60 percent of Scotland's 5 million population.

Semi-structured interviews took place with managers of the stores to determine if the project improved availability, levels of inventory, communications between store and DC. Furthermore, any problems with implementation were discussed. Lastly, the flow of products from DC to shelf was observed and a practical application of stock allocation improvements was acquired.

The company operates an audit procedure whereby an independent company produces OSA reports every month, by store and department; thus it was possible to chart the success or otherwise of these initiatives. For supermarkets, 200 products are checked of which 160 are store-specific and the remaining 40 are items on promotion. Convenience stores only have 120 store-specific products and no promotions. These reports were made available to the authors.

	Applicable ECR improvement levers	Research questions	Data collection methods
Phase 1 (2003-2006)	Levers 1 and 2	To what extent is OSA/OOS an integral part of logistics strategy? What measures have been undertaken to improve OSA? How successful were these measures?	Semi structured interviews with Supply Chain Director (2003) and successor (2006). Telephone interviews with senior manager responsible for OSA. Use of monthly independent audit of OSA across all stores
Phase 2 (June to August 2005)	Levers 1, 3, 5 and 6	To what extent was Senior Management strategy implemented in the Scottish region? What practical measures were undertaken to improve the flow of product from RDC to store? How successful were these measures?	Semi structured interviews with management team at the Scottish RDC, especially the "availability champion". Participant observation of the process of replenishment and communication from RDC to nine stores in the region. Interviews with these store managers on the success or otherwise of implementation. Use of monthly reports to audit OSA performance
Phase 3 (November 2005 to February 2006)	Levels 1, 3, 4, 5, 6, and 7	To what extent does in-store picking for internet shopping effect OSA levels? What is the impact of in-store promotions on OSA? What is the relationship between OSA and store size?	Semi-structured interviews were held with managers of stores in the Edinburgh region, "availability champion" of one store, home shopping manager of another store and a convenience store manager. Monthly audit data to measure performance in relation to size, promotions and internet shopping (March 2005-February 2006), complemented by in-store OSA monitoring

Table I.
The research process

The final part of the project focused upon five stores in the Edinburgh area in order to discuss in-depth some of the key issues which were identified in the ECR UK general availability reports and other literature discussed in the earlier part of the paper.

The following research questions were proposed:

- To what extent does the use of store-based picking for home shopping effect levels of OSA?
- What is the impact of in-store promotions on OSA?
- What is the relationship between OSA and store size?

In order to answer these questions, interviews were held with the "availability champion" at one store, the home shopping manager at another and the store manager of a convenience store within the chain. Audit data were collected from March 2005 to February 2006 and availability results were matched for:

- The home shopping store against a store in the area of comparable size.
- Two supermarket stores to measure promoted compared to lines not on promotion.
- One supermarket store in relation to the convenience store.

Findings

At the time of the initial interviews with senior management regarding the company's logistics strategy, a major restructuring of its network and systems was being undertaken. The company had been a leader in logistical innovation in the 1960s and 1970s and its efficient retail distribution had been a key contributor to its healthy profit margins. Unfortunately many of its original DCs were 25-35 years old and a new, sophisticated network of "fulfilment factories" were planned for the 2000s. OSA had become an issue for the company and it focused much of its attention upon accurately forecasting and planning promotions from suppliers to the store. Using collaborative planning software the company's buyers would agree with suppliers the level of promotion over a 13 week period, refining case quantities to match actual demand at their end of the planning cycle. The company focused upon its 1,000 best selling lines of which around one-fifth were continuously promoted.

With the advent of home shopping aggravating the "last 50 yards" problem the company began to experience acute OSA difficulties. Like many of their predecessors in the 1980s, network changes involving a mixture of old and new systems, created short-term pressures and profitability shortfalls. The problem for the company was that the new high-tech network was "pushing" product out to stores but overstocks were occurring in backrooms of stores and not reaching the shelves. Demand and supply were not synchronised, leading to marquees or tents being built in the back yards of stores to protect overstocks from the weather.

New management were appointed to the company, including a new supply chain director to tackle the range of problems identified above. After an initial audit of the situation he commented:

> There is nothing here I haven't seen before, it's just I've never seen it all at the same time and in the same place before.

The first problem tackled was the stores; if product was in the store it had to be on the shelf. A "Focus on Availability Strategy" was formulated by taking one store and

aligning all of its processes to focus on OSA. By achieving early success in reducing gaps and backroom stock, the company and its staff realised the benefits of such an approach. The marquees were dismantled and stock was re-organised within the warehouse so that everything had a place. Systems were then reviewed to action on-shelf "gaps" and to establish causes for OOS or overstocks. Local forecasting teams were established in each RDC.

Having achieved significant improvements in-store, it was then necessary to integrate store operations with supply chain improvements to reduce lead times and reduce costs. This meant more flexible working practices in RDCs' synchronisation of inbound deliveries and aligning transport schedules with store processes.

By mid-2006 a more retail centric culture was created, OOS was reduced by 75 percent and stock backroom levels were reduced by 53 percent. In logistics, depot productivity had increased by 20 percent, logistics network volumes increased by 10 percent and the automated sites were achieving volumes two and a half times greater than in 2004.

The implementation of the focus on availability strategy in Scotland
The RDC in Scotland is one of the most recent within the company's network, prior to the "fulfilment factory" plan of 2001. Built in 1997, it is a composite DC and is semi-automatic where carousel sorters channel product for picking by warehousemen. The opening of this RDC made delivery to Scottish and Northern Ireland stores more efficient as prior to 1997 these stores received stock from Yorkshire and Lancashire in England. Nevertheless, a pilot project was introduced to Scottish stores in late 2004 and 2005 to reorganise the backroom and yard of stores and integrate both incoming deliveries from the RDC and returns of trays, pallets, trolleys and waste packaging.

The principle behind the project was to change the way inventory was handled within the store. The main change in the backroom was the removal of some racking and the use of U-shaped trolleys to allocate overstocks from replenishment of the shelves and depot delivery. This ensured that the night shift, for example, puts all stock on the shelves and overstocks in the "U-shapes" according to need for replenishment. Prior to 8:00 a.m., the stock control team review "gaps" and readjusts forecasts prior to the inventory system being updated. The day team then replenishes from the "U-shapes" and do "gap" counts on the busiest days, i.e. Thursday through Sunday.

During visits to the stores and interviews with management, it became clear that the changes being implemented in store backrooms were eliminating excessive stock. The shift to almost a "just-in-time" basis had been challenging but had brought an element of discipline into stock allocation. Some problems still needed to be resolved, for example shelf facings, especially during promotions, often had two much or too little allocation. Also, there were restrictions on night and early morning deliveries for some stores which led to embarrassing "gaps" for fresh products first thing in the morning.

Interviewees felt that communications with RDC management were good but that problems with cage and pallet stacking led to unloading difficulties and damage to products. The accumulation of returns, stock, trays, etc. was creating space problems in the yard; although the depot "availability champion" stressed that one truck per day was designated to pick up returns from stores and such an accumulation was due to some stores not managing their returns on a daily basis. The success of the project was confirmed from the audit data of September 2004 to July 2005 which showed an overall

availability improvement from 90 to 94 percent and promotions improvement from 89 to 96 percent. In Scotland the scores were better with one store achieving 98 percent availability.

The Edinburgh survey
As noted above the purpose of the research into the Edinburgh stores was to gain a deeper insight into issues such as the impact of home shopping picking, promotions and store size on OSA. Audit data were collected and analysed between March 2005 and February 2006 to answer the research questions outlined in the methodology.

From the audit data availability results were not dissimilar between the store that carried out internet delivery and a similar size store that did not: 96.2-96.9 percent, respectively. This seemed surprising considering that store-based picking models for home shoppers were deemed to be partially responsible for OOS. In Edinburgh, however, the main store responsible for home deliveries had its backroom extended for the purpose of processing internet orders. The use of such a dedicated site minimises the effect of home shopping on the "last 50 yards" problem.

Further, this store generates daily and weekly reports provided by personal shoppers who pick orders in store. These personal shoppers therefore provide an accurate real-time review of what home shoppers are experiencing with regard to product availability and this is communicated to stock control and store management. These reports are invaluable to store management and complement the monthly audit reports:

> Although the audit reports are important because it is how the company assesses performance, the daily reports we receive are the most important to me since they provide me with a view of how availability is now, not how it was last month (Store manager).

All products which are substituted because of an OOS situation are communicated to the department manager to carry out a root cause analysis of why this has occurred. When a more detailed analysis of audit results was carried out, it was apparent that the internet store performed poorer than the conventional store on produce and fresh food categories, including organic items. This is a concern for store management in that:

> Our internet shoppers tend to be more affluent customers who purchase a lot of organic and fair trade products (Store manager).

Contradictory results to those initially expected were also found when comparing audit results for promoted items compared with those being promoted. The average availability for lines excluding promotions was 95.5 percent compared with 97.7 percent for promoted items. It was noted earlier that the company as early as 2003 had focused on improving OSA for promotions. The new store operations project had enhanced OSA:

> Throughout the day, department managers' priority is to ensure that all shelves offering promoted items are full and dressed and an employee is allocated to this task alone every morning (Store manager).

Promotional items have been allocated extra shelf space in recent years and departmental managers can override system-generated orders if they feel that such orders will not meet demand. Co-ordination with the retail support team at the RDC is important to realise these orders.

The final part of the Edinburgh research was to compare audit data between a conventional superstore and that of a convenience store. The differences were marked; the superstore achieving 96.9 percent compared with 89.5 percent at the convenience store.

The company has acknowledged that availability targets are more difficult to achieve with smaller stores and have set targets accordingly: 93.5 percent compared with 95.5 percent for supermarkets. Nevertheless, the 89.5 percent actually achieved is well below the target and this store failed to meet its availability target on nine occasions. This failure by categories included fresh foods (9 times), produce (8), baking (6) and grocery (5). This was particularly unfortunate in that milk, bread and produce are the most popular lines in this convenience store.

The causes of this poor performance can be related to supply from the RDC and store replenishment issues. The company had developed a large network of convenience stores in recent years and in some regions, such as the Southeast of England, it has a dedicated distribution network which supplies convenience stores. In Scotland this is not the case and all stores, regardless of size, are served by the Scottish RDC. Store managers can get frustrated by this state of affairs:

> Convenience stores are bottom of the food chain in terms of out of stock products. If my store and X superstore both sell out of something, and there is only one case in the RDC, the supermarket will get it (Convenience store manager).

Similarly, if an error occurs in replenishment from the RDC such as "overs/unders" to store, the convenience store is affected more than a superstore which has larger backrooms and receives more frequent deliveries to rectify any systems errors. Store replenishment is also a problem as shelf stackers and warehouse teams have become part of the rejuvenated solution to OSA in large stores whereas small staff numbers in convenience stores invariably have to leave shelf filling to serve customers.

Conclusions

The research undertaken with this major UK grocery retailer demonstrates how they have addressed OSA/OOS problems to improve levels of availability. Extant research by Corsten and Gruen (2003) and ECR UK (2004, 2005, 2006) highlighted the measures which could be used to improve OSA. The "seven levers" advocated by ECR UK (2004) have been implemented by this company. Measurement levers (1 and 2) have been acted upon through the audit procedures carried out by an independent company on a monthly basis. In addition, at the store level daily and weekly reports keep departmental managers up to date on availability issues on a more regular basis.

Replenishment and in-store execution (levers 3 and 4) have been the focus of much managerial attention. The first task of the new supply chain director was to ensure that if the product was in the store it had to be on the shelf. The "Availability Focus Strategy" was formulated by taking one store and aligning all processes to focus on OSA. Stock was re-organised in the backroom so that everything had a place. This meant introducing a new system in the backroom to ensure the proper rotation of stock on receipt of deliveries from the RDC. Inventory accuracy (lever 5) has improved with local forecasting teams at RDCs and stock control teams within stores re-adjusting forecasts prior to the inventory system being updated.

Regarding our research question on the impact of promotions on OSA, promotional management and ordering systems (levels 6 and 7) had been a feature of the company's logistical strategy before the appointment of a new management team. The company focused on the best selling 1,000 lines of which one-fifth were promoted at any one time. They then worked with suppliers to match supply with demand through a 13 week planning cycle. It is perhaps not unexpected that the Edinburgh store survey showed that promoted items had better OSA than non-promoted items, especially as a member of staff in store is allocated the task to ensure that all shelves with promoted lines are full and dressed every morning.

The two other research questions in the study which were analysed during the survey were the impact on OSA of store picking for home delivery and store size. Although the literature (Fernie and Sparks, 2004; Fernie and McKinnon, 2003) suggests that store picking has aggravated the OSA problem, this was not the case in the Edinburgh store. Here, the store backroom was extended to give a dedicated site for internet orders. Furthermore, personal shoppers provide real time input to stock control by reporting gaps on the shelves, OOS and substitution levels.

The main problems facing the company in Scotland are poor OSA levels at convenience store level. Unlike some other regions these stores are serviced by the same RDC which serves all stores in the region. The primary research reinforces the view that convenience stores are low in the priority list when stock problems occur at the RDC and low staffing levels in these stores mean that many of the successive operational procedures carried out in large stores have been less successful in smaller stores.

Our overall conclusion stemming from investigation of the three research questions is that OSA issues can be overcome by simple techniques that focus on human resources. Extending a store backroom to handle more stock is easy, however we determined that the key difference between good and poor OSA levels at this company revolved around management and staff commitment to solving the problem; i.e. having dedicated staff to address promotional items and personal shoppers for in-store picking versus having insufficient staff to stock shelves and service customers in the convenience store.

This paper has provided a view of one company's approach to solving OOS/OSA problems from 2004 through 2006. Clearly much progress has been made but yet work remains to be done in some areas. Nevertheless, this case study shows how an integrated approach from head office through RDCs to stores, including providing sufficient asset and human resources, created a "can do" culture to improve not only OOS/OSA but depot productivity and overall network volume capacity.

The research reported here adds to the growing body of research undertaken by ECR UK through their three sub-groups, Availability Insights, New Product Introduction and Promotion and Convenience. The "seven levers" have formed the basis of the availability agenda through these sub groups in that levers 1 and 2 (measurement and management attention) were the original focus of attention prior to undertaking more in-depth research on specific categories. For example, the researchers have contributed to work for the ECR UK Availability Insights sub-group, especially to investigate how retailers and suppliers can work together to maximise sales and profit potential through increased product availability for customers. In a recent study, of the chilled juice sector it was shown that high levels of

OSA can eventually lead to poor profitability because of the high marginal costs to achieve greater availability (ECR UK, 2007).

The situation in the grocery sector in the UK is somewhat unique in that retailers and suppliers work closely together through ECR UK and IGD. There is not an equivalent forum for grocery research anywhere else in the world. Indeed, research by Grant and Fernie (2008) shows that in the non-grocery sector in the UK, the issue of OSA has not been addressed with the same degree of management attention. Supplier-controlled distribution is still the norm in many cases and the degree of collaboration in sharing data is low relative to the grocery sector.

As the UK grocery sector provides a useful case study environment for research into OSA, the authors have provided a conceptual model for OSA improvement based on the ECR "seven levers" as shown in Figure 3. In order to address the "seven levers", certain pre-requisites are required such as management commitment and a motivated workforce; a strong information technology, centralised buying and logistics network infrastructure; and a high degree of intra and inter collaboration within the sector. Then, management can tackle the availability agenda using the "seven levers" blueprint as a guide in the same way as ECR Europe provided 14 improvement areas for implementing ECR initiatives in the 1990s. The outcomes from implementation would be greater consumer satisfaction because products are in stock in addition to improved logistics network reliability and improvements in overall productivity, thereby reducing costs.

The application of the conceptual model at the present time is limited to only a few markets. Fernie *et al.* (2000) developed a four stage model of logistics development from a supplier-controlled, direct delivery stage to one of relationships. The latter stage, with implementation of ECR principles, is well advanced in the UK but even in other parts of Europe, many of the pre-requisites in Figure 3 have not been realised. For example, Aastrup *et al.* (2008) showed that a lack of collaboration
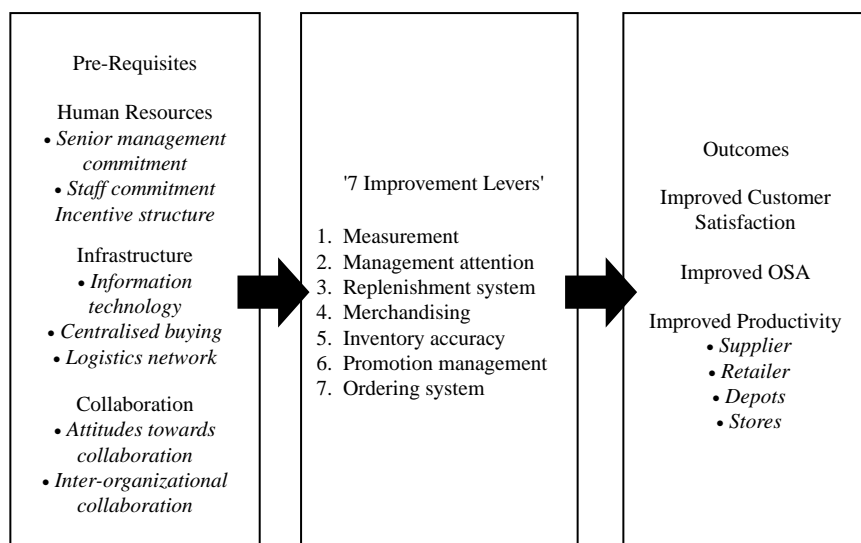

Figure 3.
Conceptual model for
on-shelf availability
improvement

between supply chain partners was a barrier to successful ECR implementation. Similarly, Fernie *et al.* (2004) highlighted the importance of a centralised decision making systems and advanced IT systems in realising CPFR objectives in Europe. As noted in our research, this work identified UK companies to be the most advanced in CPFR implementation.

As companies move from the supplier-controlled stage to relationships in the Fernie *et al.* (2000) model, the applicability of our conceptual model in Figure 3 has greater chance of success. With the increased globalisation of retailing through an elite group of transnationals such as Wal-Mart and Tesco, our model will have worldwide relevance in the future.

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