Using the systematic literature review procedure to identify the root causes of out-of-stock in retail supply chains

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Abstract
The out-of-stock (OOS) problem has long been recognized as a key challenge for all retailers. However, any paper has grouped the causes of OOS and the proposed solutions. In this context this paper provides a systematic review from which it was found that collaboration and visibility are the essence of the solutions employed to reduce OOS situations. On the other hand, the actions proposed in order to manage the OOS situations looking for reduce its costs, but not addressing the causes itself, are marketing related, such as assortment, store/product loyalty and distribution channel.

Keywords: supply chain, retail, on-shelf availability

Introduction
The product availability problem has long been recognized as a key challenge for all retailers (Aastrup and Kotzab, 2009; Corsten and Gruen, 2003; Grant and Fernie, 2008; Schary and Christopher, 1979; Van Woensel et al., 2007). Stock-out or out-of-stock (OOS) can be defined as "a product not found in the desired form, flavour or size, not found in saleable condition, or not shelved in the expected location – from the perspective of the consumer" (ECR Europe, 2003). This definition does not imply that the systems inventory is equal to zero, as inventory might be in the back room. The rationale is that the customer only sees the inventory on the shelves, and as such he does not know about any inventory which might potentially still be available in the backroom but not accessible to him. On-shelf availability (OSA) is the complement to out-of-stock (OOS), also known as out-of-shelf. Therefore, reducing the OOS rate consequently increases the OSA.

Behind the idea of supply matching demand there are two distinct approaches which study the intersection between supply and demand on the shelf of the supermarket. First, the marketing side explores a consumer behaviouralist approach which is concerned with the consequences of an OOS situation. Following this approach, a number of researches have been carried out to identify and understand the consumer response to OOS situations (Schary and Christopher, 1979; Fernie and Grant, 2008). On the other hand, the supply chain side investigates what influences OSA, from the root causes of OOS (Aastrup and Kotzab, 2009) to ways to improve OSA (Pramatari and Miliotis, 2008; Trautrims et al., 2009) and reduce the OOS costs (Kucuk, 2004) . Finally, there

are some researches which integrate the two approaches, studying consumer response to OOS as well as its root causes for a specific product or product category (Corsten and Gruen, 2003; Van Woensel et al., 2007).

Consumer response to OOS has been reported by different authors, from late 70s until recently (Schary and Christopher, 1979; Van Woensel et al., 2007; Corsten and Gruen, 2003). Even though the consumer responses vary among product categories, Corsten and Gruen (2003) reported that across 8 categories the average consumer responses to OOS is that 9% of the consumers do not purchase the item, 15% delay the purchase, 19% substitute the item by other item of the same brand, 26% substitute the item by a different brand, and 31% go to another store to by the item. Fitzsimons (2000) identified that consumers react and respond to the presence of a stock-out even when they are not one of the most preferred option. Corsten and Gruen (2003) state that the total "cost" of OOS affects the entire supply chain. They divide these costs into four areas: (1) retailer shopper loss risk – when shoppers permanently switch stores due to OOS situations; (2) retailer sales loss risk – when shoppers choose one of the following three options – first, buy the OOS item at another store, second, cancel their purchase of the item, and third, substitute the item by a smaller and/or lower price one; (3)manufacturer shopper loss risk – when consumers switch to a competitor's brand within a category, not only for immediate purchase but also ongoing purchases; and (4) manufacturer sales loss risk – when consumers substitute a competitor's item or cancel a purchase.

Given the importance of OSA in the retail and the costs of OOS, this study is focused on trying to understand the OOS situation from their causes to how to manage with this problem in the retail supply chain. The aim of this study is, based on a systematic review approach, to answer the review questions:

- What are the root causes of OOS in the retail supply chain?
- How to cope with OOS in the retail supply chain?

Method

Systematic review is a specific methodology that locates existing studies, selects and evaluates contributions, analyses and synthesizes data, and reports the evidence in such a way that allows reasonably clear conclusions to be reached about what we do and do not know (Denyer and Tranfield, 2009). "In terms of outcome, where studies provide consistent results, systematic reviews might be expected to provide solid and dependable evidence that is robust and potentially transferable across different contexts" (Denyer and Tranfield, 2009). This approach has been chosen as it provides additional transparency to the research, mitigating subjectivity and bias. In this paper, the systematic literature review was carried out by applying a set of criteria to select the literature that was included in the review in order to identify a representative sample of studies and to avoid or minimize some bias present in traditional literature reviews.

For this purpose the set of criteria applied to select papers from the literature is composed by the following seven stages.

1. Only scholarly peer reviewed journals.
2. Search the EBSCOhost Business Source Complete and ABI/INFORM databases.
3. Selected article must contain at least one of the keywords of the filter 1 in their title or abstract.
4. Selected article must contain at least one of the keywords of the filter 2 in their title or abstract.
5. Selected article must contain at least one of the keywords of the filter 3 in their title or abstract.

6. Exclude the repeated papers that appeared more than one time in each database or that are in both databases.
7. Read the remaining abstracts to ensure that only papers which contribute to answer the review questions were selected.
8. Ensure substantive and empirical relevance by reading all remaining articles.

Reading the full text, it was identified which papers really address or contribute to answering at least one of the review questions. Besides this, the contributions were classified into core and peripheral contribution. Papers that address one or both review questions in their core subject were classified as core contribution, while papers in which the contribution is not part of the core subject were classified as peripheral contribution. In addition, the papers were divided into papers that provide empirical evidence or recommendations. One example of papers not selected because they do not contribute to answer the review questions are specific simulations concerned with better demand forecast, but does not relate this with better OSA or lower rates of OOS.

Table 1 shows the results of applying the systematic procedure.

Table 1 – Paper selection results.

Search string/ procedure	ABI result	EBSCO result	Total
Shelf availability OR On-Shelf availability OR OSA OR OOS OR Out-of-stock	173	48,636	48,809
Inventory OR distribution OR supply chain OR sevice level	82	5,066	5,148
Retail OR fast moving consumer goods OR Perishable OR retailer OR Grocery OR Shelf life	34	236	270
Search for repeated articles inside the sample, inside each sample, and also comparing the samples	12	209	221
Reading the abstract of the 221 papers, to identify which ones should be included/ read full text	9	31	40
Read the full text of the remaining 41 articles to confirm which add to answer the review questions	4	14	18

The following section presents the analysis of the selected articles and the contributions to the review questions.

Findings

The sample of literature selected was analyzed in order to gather the contributions to the review questions. Table 2 relates the references with the review questions (RQ) so that each provides a contribution, and classifies this contribution as core, when the RQ is addressed by the paper or peripheral, when the contribution exists, but it was not the aim of the paper. Finally, each contribution is classified according the type. The contribution is empirical when it is based on empirical evidence, and theoretical when is based on theory or recommendations.

The root causes of retail OOS

Corsten and Gruen (2003) found that between two-thirds and three-quarters of OOS are caused in the store, while one-quarter to one-third is due to upstream causes. The authors broadly classify the causes of OOS into three major areas: ordering practices, replenishment practices and planning practices.

Table 2 – Classification of contributions to answer the review questions.

Reference	RQ1	RQ2	Core	Peripheral	Empirical	Theoretical
Emmelhainz et al., 1991		x		x		x
Chaouch, 2001		x		x		x
Gruen and Corsten, 2002.	x	x	x		x	
Corsten and Gruen, 2003	x	x	x	x (RQ2)	x	x (RQ2)
Kaipia and Tanskanen, 2003		x		x	x	
Gimenéz and Ventura, 2003		x		x	x	
Kucuk, 2004		x		x		x
Pibernik, 2006		x	x			x
Van Woensel et al., 2007	x			x	x	
Grant and Fernie, 2008	x		x		x	
Hardgrave et al., 2008		x	x		x	
Pramatari and Miliotis, 2008		x	x		x	
Waller et al., 2008		x		x		x
Morgan and Dewhurst, 2008		x		x	x	
Fernie and Grant, 2008		x	x		x	
Aastrup and Kotzab, 2009	x		x		x	
Pramatari et al., 2009		x	x		x	
Pero et al., 2010		x	x			x

Van Woensel et al. (2007) confirm the research reported by Corsten and Gruen (2003). One of the results obtained by Van Woensel et al (2007), which is particularly relevant here, is that the store performance in terms of OOS is mainly influenced by the timing of the initial filling of the shelf and the later replenishments during the day, the consistency of the assortment in the day-to-day ordering process and the experience of the person actually ordering the product.

Van Woensel et al. (2007) state that the OOS rate depends on the approach or priority of the person who orders the product to the next day. When the priority is on giving a good customer service, this includes high inventory, and higher probability of waste, as their study analysed fresh oven bread. On the other hand, when the priority is low waste, it implies low inventory and thus higher probability of OOS, or lower customer service. Their findings can be summed up as follows: “the on-shelf availability was shown to be strongly influenced by the actual refilling and ordering process. Also, the effect of the store clerk doing the ordering and replenishment during the day had an important influence on the performance of the retailer” (Van Woensel et al., 2007).

Although ideally the priority should not vary according to the person, but according to the company policy; the main contribution that can be extracted from Van Woensel et al. (2007) is the relationship among inventory, replenishment process, availability, customer service and waste, particularly for perishable products.

Aastrup and Kotzab (2009) examined the extent and root causes of OOS in the Danish independent grocery sector. They also carried out a comparison between the Danish independent grocery sector and the centrally controlled chain store. They grouped the root causes of OOS into in-store causes and out-of-store causes. The in-store causes are sub-divided into store replenishment causes and store ordering causes. The out-of-store causes are sub-divided into wholesale or central warehouse-causes and supplier causes. To some extent, the categories presented by Aastrup and Kotzab (2009) are similar to the groups of causes presented by Corsten and Gruen (2003). In spite of the similarities, the causes classified as planning/in-store by Corsten and Gruen (2003) were grouped by

Aastrup and Kotzab (2009) as store ordering causes. Another difference is that Aastrup and Kotzab (2009) grouped the out-of-store causes while Corsten and Gruen (2003) divided the out-of store causes into distribution centre (DC), wholesaler/headquarter and supplier causes.

Based on the results of their study, Aastrup and Kotzab (2009) state that the in-store causes (store replenishment and store ordering) directly affect OOS situations, whereas managerial attention, organizational issues, and allocation of space affect the store ordering and store replenishment tasks and thus indirectly causing OOS situations. Aspects of store size are also considered as conditioning factors.

Grant and Fernie (2008) report an exploratory investigation of OSA/OOS in non-grocery retail. The issues they found fall into two main gaps or categories: (1) Measurement/replenishment processes, and (2) "Demand chain" versus "supply chain". They also consider there remains much to be investigated, like other factors and causes of OOS affecting OSA from a total supply chain perspective, particularly in the under-researched area of non-grocery retailing. In response to the dearth of non-grocery studies, their research consisted of in-depth qualitative interviews of four different national brand companies: one each in the mobile phone, general merchandise, bookshop and electronics sector.

Although Grant and Fernie's (2008) findings do not differ from the causes previously identified in the grocery retail sector, their research findings indicate that these retailers are not as focused on OSA as grocery retailers. Retailer OSA performance suffers as a result of poor supplier performance, lack of system data accuracy, lack of investment in stock and technology, and poor in-store replenishment processes. There is little collaboration taking place to improve performance and almost none of these retailers is participating in joint initiatives, which have proved to be successful in the grocery sector.

Table 3 summarizes the root causes identified in the researches analysed in this section. Also, it is important to identify in what stage of the supply chain the causes of OOS are. There is no definitive number (Corsten and Gruen, 2003), but at least the magnitude of the problem in each stage of the supply chain is known. Figure 2 presents the service level along the supply chain. This can be considered as a guide for where the causes of OOS are. The OOS rates are reflected in the customer service delivered. The numbers from 1 to 4 are to point in what stage of the supply chain that cause is identified, as follow: 1 – Store; 2 – Distribution Centre; 3 – Wholesaler/ Retail Headquarter; 4 – Supplier. And the letters are to point the source of each cause as follow: a – Corsten and Gruen (2003); b – Van Woensel et al. (2007); c – ECR Europe (2003); and d – Aastrup and Kotzab (2009). only the articles reporting primary empirical data were included

Coping with OOS in the retail supply chain

Both retailers and manufacturers can take actions to reduce the impact of OOS. Emmelhainz et al (1991) suggest that the retailer it can develop mechanisms to increase the chance of product substitution within the store, avoiding that the consumer visit the competitors. They consider three product characteristics (brand, size and variety) and suggest that the retailer should offer two of the three characteristics of the OOS item. Based on consumer behavior studies, they state that between 61% and 78% of the consumers will replace the OOS item if they find two characteristics substitute. According to their study, the best replacement is the item with same size and variety. So, the retailer should design their product assortment strategy including two brands for each product size and variety, and two varieties for each brand and size.

On the other hand, Emmelhainz et al (1991) recommend that the manufacturer should ensure product availability at the store level by offering at least two variations and two sizes of each brand and also encouraging the retailer stocking the entire line, offering incentives if necessary. This actions increase the probability that in an OOS situation the consumer would choose another size or variation from the same brand. In addition to the availability at the store level, they recommend that the manufactures should widespread distribution within a specified geographic area, thus in cases of store OOS, since some shoppers do go to another store to purchase an OOS item. Finally, they suggest that the manufacturer should assist the retail in monitoring inventory levels. This last recommendation could be seen as a pre-vendor managed inventory practices, seeing that this is one of the functionalities of vendor managed inventory.

Table 3 – Root causes of OOS. (Source: adapted from Corsten, Gruen, 2003).

Planning	Ordering	Replenishing
1. Incongruence between shelf capacity and replenishment frequency[a(1)]	12. Bad point of sale (POS) data, inaccurate records[a(1,2,3,4)]	19. Staffing (insufficient or busy staff) [a,c(1)]
2. Product purchasing frequencies[a(1)].	13. Inaccurate forecast, long cycles[a,c(1,2,3,4)].	20. Backroom congested[a(1)]
3. No information with regards to waste, orders and sales for perishable products[b(1)]	14. inaccurate inventory or book-stocks[a,b,c(1,2,3,4)]	21. Receiving errors, inaccurate records[a,d(1,2)]
4. Large number of SKUs in assortment[a(1)].	15. Manual ordering process for perishable products, without any support from a computer or any other system[b (1)]	22. Infrequent shelf replenishment, late or no shelf filling[a,d(1)]
5. Delisting by store staff[c(1)].	16. No order, late order, wrong order, backorders[a,d(1,2,3,4)].	23. Timing of the initial filling of the shelf and the later replenishments during the day[b(1)]
6. Planogram design and implementation(Shelf allocation)[a(3)]	17. The consistency of the assortment in the day-to-day ordering process[b (1)]	24. Planogram (bad execution and compliance) [a(1)].
7. Store layout and service levels[a(3)].	18. The experience of the person who actually orders (for ordering without computer or system) [b(1)]	25. Shrinkage (damage, theft) [(1,2)a]
8. New or discontinued item assortment[a(3,4)].		26. Transportation (shipping, loading) [a(2)]
9. Data and communication (master data) [a. (3,4)]		27. Storage (put away/ break pack) [a(2)].
10. Promotion and price decisions[a(3,4)].		28. Infrequent, late or no store replenishment [a(2)].
11. Advertising and display planning[a(3,4)]		29. Lead times (long and infrequent) [a(2)].
		30. Shortage [a(3).]
		31. Unavailability of packing, raw material and ingredients) [a(4)]

While the contributions provided by Emmelhainz et al (1991) were mainly based on the consumer response to OOS situations, Morgan and Dewhurst (2008) demonstrate the value of consistently monitoring supplier performance from a retailer perspective. They report the use of statistical process control (SPC) to measure supplier performance in retail supply chain. They conclude that: "Tracking suppliers' patterns and making them visible using charts control could help both buyer and supplier to quickly establish when problems are emerging (diagnosis) and closely monitoring efforts to overcome them (treatment)".

Gimenéz and Ventura (2003) investigate the effect of collaboration on absolute performance. They conclude that when companies (manufacturer and retailer) achieve a

high level of internal integration leads to a better absolute performance. A high level of collaboration among internal processes contributes to achieving cost, OOS and lead time reductions. Also, achieving external integration level leads to a better absolute and relative performance.

Pramatari and Miliotis (2008) also study the effect of collaboration and performance in terms of product availability. They have an attempted to analyze and evaluate the impact of a collaborative store replenishment practice, enabling information and knowledge sharing between retail store managers and suppliers' salesmen over an internet-based platform, in order to achieve increased order accuracy and, as a consequence to improve product availability. They present an empirical research involving a field experiment in which they analysed the impact of collaborative store ordering through pre- and post-experiment data analysis.

It can be observed that there is an general agreement of the positive effect of information technology as a tool for sharing information and improve internal and/ or collaboration, and consequently product availability (Gruen and Corsten, 2002,Gimenéz and Ventura, 2003, Pramatari and Miliotis, 2008, Hardgrave et al., 2008, Pramatari et al., 2009). It is also agreed that the process for integrating systems, developing the practice of sharing information in a consistent way takes time, and must be done gradually. Skipping stages can undermining the overall results expected by any initiative.

Pibernik (2006) present a study in which the aim is to manage with the OOS situations from a supplier perspective, in this case the industry. He states that the company should be able to anticipate stock-out before they occur and make pre-allocation decision based on individual stock-out costs, in such a way that overall costs are minimized. He also acknowledges that cost resulting from unfilled demand can depend on specific types of customers. Although Pibernik's study focus on the relationship between industry and retailer, the rationale of prioritizing customers taking in consideration their relative importance and the implications of supply rupture can also be applied to the wholesaler – retailer relationship as well as within the retailer decision making process, when allocating products to different stores in shortages periods. As well as Pibernik, Waller et al. (2008) suggest that by adjusting case pack quantity suppliers have the ability to take advantage of the store-level fill rate for faster rate-of-sale stock-keeping units due to a lower frequency of shelf replenishment which exposes the supplier to fewer stockouts at the retail shelf. Further, suppliers may be able to use lower case pack quantities to mitigate the backroom logistics effect for slower rate-of-sale stock-keeping units.

Kaipia and Tanskanen (2003) propose a demand fulfilment model based on outsourcing from the point of view of the retailer. The main idea of their model is outsource, giving the responsibility to the supplier, the category that are not core categories. Even so they present a case study of successful implementation, they recognize that the model is not for all product category. The benefits in this practice are better shelf availability, up-to-date assortment, increased sales and profit and visibility in the supply chain.

Finally, Pero et al. (2010) provide a single contribution trying to identify the relation of dependent and independent variables. They focus on the relations between the OOS situations at the retail, which is a dependent variable, and four supply chain design decisions, which are the independent variables. The independent variables they consider are multiple sourcing, splitting, distance between nodes and number of levels in the supply chain.

Table 4 summarizes the contributions of the literature analysed in order to answer the research question: How to cope with OOS situation in retail supply chain? The first group shows the actions to reduce the OOS costs, but does not suggest any action towards the reduction of the OOS situations itself, while the second group show actions to reduce the rate of OOS.

Table 4 – Coping with OOS.

	Managing to reduce OOS costs	Developing solutions to reduce OOS situation
Manufacturer	• Offer entire line of products (Emmelhainz et al, 1991) • pre-allocation decision (Pibernik, 2006) • Widespread distribution (Emmelhainz et al, 1991) • Brand loyalty (Kucuk, 2004)	• Changes in case pack quantity (Waller et al., 2008)
Retailer	• Product assortment strategy (Emmelhainz et al, 1991) • Improve assortment effectiveness and store loyalty (Kucuk, 2004)	• CRP – Continuous Replenishment Program Collaboration from store to DCs (Pramatari and Miliotis, 2008, Pramatari et al.2008) • Use of RFID (Hardgrave et al.,2008) • Monitoring performance (Morgan and Dewhurst,2008)
Joint collaboration	• Know the trade-off among inventory investment, the required frequency of delivery and the expected losses from shortages (Chaouch, 2001)	• Use of information technology/ data exchange/ visibility (Gruen and Corsten, 2002, Kaipia and Tanskanen, 2003) • VMI (Emmelhainz et al., 1991, Kaipia and Tanskanen, 2003) • Outsourcing: VMCM – Vendor Managed Category Management (Kaipia and Tanskanen, 2003) • CPFR – Collaborative planning forecasting and replenishment (Pramatari and Miliotis, 2008)

Summary and managerial implications

It is agreed that collaboration and visibility are beneficial both to the retailer and manufacturer. In contrast, based on the empirical evidence can be concluded that the retailers still have restriction in share POS information with manufactures. Broadly speaking, collaboration and information sharing/ improved visibility are the essence of the solutions to reduce OOS situations reported by the literature analysed. On the other hand, the actions proposed in order to manage the OOS situations looking for reduce its costs, but not addressing the causes itself, are marketing related, such as assortment, store/product loyalty and distribution channel.

However it has not been scrutinized all the effects of the proposed actions, the solutions presented in order to reduce the OOS situations are far from to cover all the causes indentified. Furthermore, the previous researches have classified the causes of OOS according to where they are visible. On the other hand, this does not mean that a cause classified as store cause will be solved by store staff. Table 5 suggests a classification of the OOS causes listed in Table 3 regarding the level of decision required to address each cause. Further empirical investigation is required in order to confirm with empirical data this classification.

Nevertheless, 31 different causes of OOS were identified a study of the "real" root cause is required for each cause. For example, infrequent shelf replenishment is identified as a cause of OOS, but is this case the root cause or is there any other hide cause behind the infrequent replenishment? Apparently, infrequent shelf replenishment is an operational problem. On the other hand if the infrequent shelf replenishment is caused by staffing (insufficient or busy staff), the "real" root cause of OOS is not an operational issue, but a tactical issue, such as workforce management. This is only one example of how the apparent causes are not always the real or root causes of OOS. Therefore, the correlation among the causes of OOS should be included in the research agenda. Empirical studies mapping the causes, applying simple techniques from quality management such as fishbone, could provide valuable information, giving directions on what are really root causes of OOS and what are only effects of other hide root causes.

*Table 5 – Decision level required for address the OOS causes in the supply chain**

Decision level	Supplier	wholesaler	DC	Store
Strategic	6, 7, 10, 11	10, 11		4
Tactical	13, 8	13, 8	13	1, 2, 3, 5, 13, 17, 19
Operational	9, 12, 14, 16, 31	9, 12, 14, 16, 30	12, 14, 16, 21, 25, 26, 27, 28, 29	2, 3, 12, 14, 16, 18, 20, 21, 22, 23, 24, 25

(* The cell numbers refer to table 3)

Limitations, contributions to theory and future research

The limitation of this paper is an inherent characteristic of structured review. However the method applied in this review provides transparency through the selection criteria, its limitation is that what is not included in the sample is not known. Cross reference could be applied in order to minimize the effect of this limitation, but this would not gather the most recent literature missing in the sample. Besides this, by doing the cross reference the findings would be more vulnerable to some bias and researcher subjectivity. Hence, it can be concluded that there is a trade off in conducting structured reviews between choosing string search that narrow the sample of articles to a feasible size and the missing articles through the process of sample selection.

This review has contributed to the research on OOS/OSA by grouping previous studies addressing the causes and some of the possible solutions and improvements surrounding the OOS problem. Also by bringing together, in one single article, the causes and the routes reported by different researches can reveal the field that has not yet been exploited. Some of these questions that should be included in the research agenda are: the correlation among the causes of OOS, the effect of in-store employees' qualifications on store performance, the alignment of retail chain and store strategy.

A further underlying question of the research of the OOS/OSA problem, and not addressed by the literature analysed in this paper is the decision of when and to what level the OSA should be improved. This decision should be taken under the lights of the company strategy as well as service level that the retailer to aim to deliver to their consumers.

Besides this, theoretical research in each problem found can be developed individually including simulation, and also future field research to verify the results in real situations is required. Although many simulations are available, they are not linked to empirical research to confirm, disconfirm, or even clarify to what extension the findings are feasible in the practice.

Acknowledgments

The authors are grateful to FAPESP (São Paulo State Foundation for Research Support) and CAPES (Co-ordination for Graduating and Pos Graduating Personal Improvement).

References

Aastrup, J and Kotzab, H (2009), "Analyzing out-of-stock in independent grocery stores: an empirical study", *International Journal of Retail & Distribution Management*, Vol. 37, No. 9, pp. 765-789.

Ben A Chaouch (2001), "Stock levels and delivery rates in vendor-managed inventory programs", *Production and Operations Management*, Vol. 10, No. 1, pp. 31-44.

Corsten, D. and Gruen, T. (2003), "Desperately seeking shelf availability: An examination of the extent, the causes, and the efforts to address retail out-of-stocks", *International Journal of Retail & Distribution Management*, Vol. 31, No. 11/12, pp. 605-617.

Denyer, D and Tranfield, D. (2009) "Producing a systematic review". In Buchanan, D.A. and Bryman, A. (Eds.), *The Sage Handbook of Organizational Research Methods*, Sage Publications, London, pp. 671-689.

ECR Europe (2003), *Optimal Shelf Availability - Increasing shopper satisfaction at the moment of truth*. ECR Europe and Roland Berger. Available at: < http://www.ecrnet.org/>. Accessed on: 23/03/2010.

Emmelhainz, L. W., Emmelhainz, M. A. and Stock, J. R. (1991), "Logistics implications of retail stockouts", *Journal of Business Logistics*, Vol. 12, No. 2, pp. 129-142.

Fernie, J. and Grant, D. B. (2008), "On-shelf availability: the case of a UK grocery retailer", *International Journal of Logistics Management*, Vol. 19, No. 3, pp. 293-307.

Fitzsimons, G. J. (2000), "Consumer Response to Stockouts", *Journal of Consumer Research*, Vol. 27, No. 2, pp. 249-266.

Gimenéz, C. and Ventura, E. (2003), "Supply chain management as a competitive advantage in the Spanish grocery sector", The International Journal of Logistics Management, Vol. 14, No. 1, pp. 77-88.

Grant, D. B. and Fernie, J. (2008), "Research note: Exploring out-of-stock and on-shelf availability in non-grocery, high street retailing", *International Journal of Retail & Distribution Management*, Vol. 36, No. 8, pp. 661-672.

Gruen, T and Corsten, D. (2002), "Rising to the challenge of out-of-stocks", *ECR Journal*, Vol. 2, No. 2, pp.45-58.

Hardgrave, B. C., Langford, S., Waller, M. and Miller, R. (2008), "Measuring the impact of RFID on out of stocks at Wal-Mart", *MIS Quarterly Executive*, Vol. 7, No. 4, pp. 181-192.

Kaipia, R. and Tanskanen, K, (2003), "Vendor managed category management – an outsourcing solution in retailing", *Journal of Purchasing & Supply Management*, Vol. 9, No. 4, pp. 165-175.

Kucuk, S. U. (2004), "Reducing the out-of-stock costs in developing retailing sector", *Journal of International Consumer Marketing*, Vol. 16, N.3, pp. 75-104.

Morgan, C. and Dewhurst, A. (2008), "Multiple retailer supplier performance: an exploratory investigation into using SPC techniques", *International Journal of Production Economics*, Vol. 111, No. 1, pp. 13-26.

Pibernik, R. (2006), "Managing stock-outs effectively with order fulfilment systems", *Journal of Manufacturing Technology Management*, Vol. 17, No. 6, pp. 721-736.

Pero, M., Rossi, T., Nóe, C. and Sianesi, A. (2010), "An exploratory study of the relation between supply chain topological features and supply chain performance", *International Journal of Production Economics*, Vol. 123, No. 2, pp. 266-278.

Pramatari, K, Evgeniou, T. and Doukidis, G. (2009), "Implementation of collaborative e-supply-chain initiatives: an initial challenging and final success case from grocery retailing", Journal of Information Technology, Vol. 24, No. 3, pp. 269-281.

Pramatari, K. and Miliotis, P. (2008), "The impact of collaborative store ordering on shelf availability", *Supply Chain Management*, Vol. 13, No. 1, pp. 49-61.

Schary, P. B. and Christopher, M. (1979), "The Anatomy of a Stock-Out", *Journal of Retailing*, Vol. 55, No. 2, pp. 59-70.

Trautrims, A., Grant, D. G., Fernie, J. and Harrison, H. (2009), "Optimizing on-shelf availability for customer service and profit", *Journal of Business Logistics*, Vol. 30, No.2, pp. 231-247.

Van Woensel, T., Van Donselaar, K., Broekmeulen, R. and Fransoo, J. (2007), "Consumer responses to shelf out-of-stocks of perishable products", *International Journal of Physical Distribution & Logistics Management*, Vol. 39, No. 9, pp. 704-718.

Waller, M. A., Tangari, A. H. and Williams, B. D. (2008), "Case pack quantity's effect on retail market share: an examination of the backroom logistics effect and the store-level fill rate effect", *International Journal of Physical Distribution Management*, Vol. 38, No. 6, pp. 436-451.