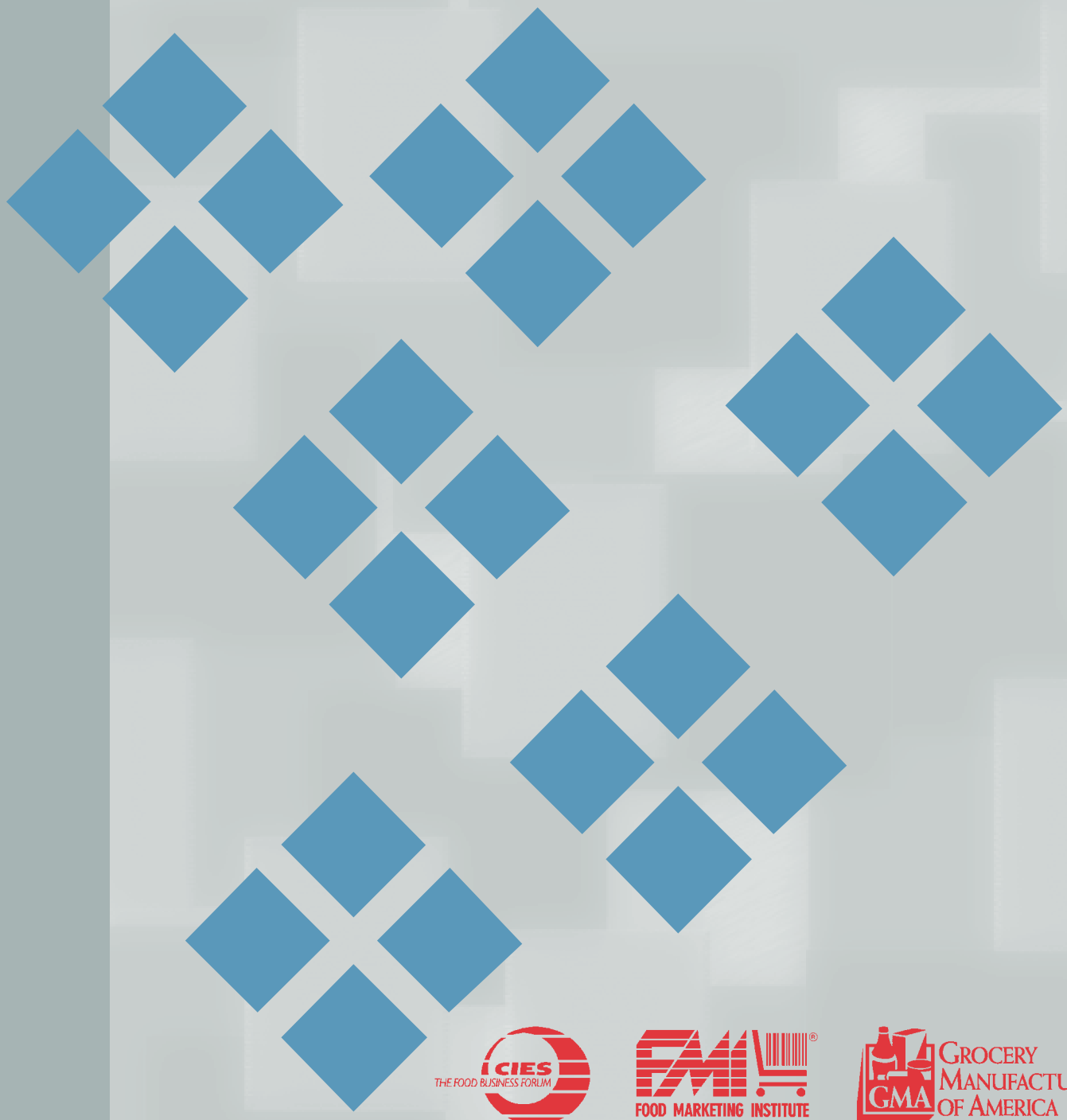
Retail Out-of-Stocks:

A Worldwide Examination of Extent, Causes and Consumer Responses



CIES
THE FOOD BUSINESS FORUM

FMI
FOOD MARKETING INSTITUTE

GMA
GROCERY MANUFACTURERS OF AMERICA

Retail Out-of-Stocks: A Worldwide Examination of Extent, Causes and Consumer Responses

A research study conducted at Emory University, Goizueta Business School, Atlanta, GA U.S.;
University of St. Gallen, Institute of Technology Management, Switzerland;
and College of Business and Administration, University of Colorado at Colorado Springs, U.S.

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Executive Summary

Executive Summary

Overview and Objectives

This report presents the largest and most current single compilation of findings on the extent, causes, and consumer responses to retail out-of-stock (OOS) situations in the fast-moving consumer goods industry. It is also perhaps the first study that enumerates OOS on a worldwide basis.

The inputs for this report come from 52 studies that examine out-of-stocks, including the previously published results of 16 industry and academic studies as well as the results from an additional 36 studies proprietary to this report. To provide a sense of the extensiveness of the studies that were used to develop this report, consider the following:

- ✓ Number of retail outlets examined: 661
- ✓ Number of consumer goods categories included: 32
- ✓ Number of consumers surveyed worldwide: 71,000
- ✓ Number of countries represented: 29
- ✓ Studies addressing extent of OOS: 40 (of 52 total studies)
- ✓ Studies addressing the root causes of OOS: 20 (of 52 total studies)
- ✓ Studies addressing the consumer responses to OOS: 15 (of 52 total studies)

The objective of the study has been three-fold:

- ✓ To present an updated and accurate map of facts surrounding retail out-of-stocks in the consumer goods industry.
- ✓ To examine out-of-stocks worldwide, analyzing rationale for similarities and differences.
- ✓ To examine differences in findings based on different methodologies of measuring out-of-stocks.

Key Findings

First

The Extent Has Not Decreased from Earlier Studies.

Out-of-stocks remains a large problem for retailers, distributors and manufacturers in the worldwide consumer goods industry. The advances in supply chain management, the initiatives of Efficient Consumer Response (ECR) and category management, and the investments in inventory-tracking technology have not – by and large – reduced the overall level of out-of-stocks on store shelves from what was reported in previous studies. Out-of-stock rates vary wildly among retailers and their outlets depending on a variety of factors, but the majority tends to fall in the range of 5-10 percent.

More importantly, in studies that examine faster selling and/or promoted products, the OOS rate regularly exceeds 10 percent. The overall average OOS rate worldwide is estimated at 8.3 percent and is illustrated on Exhibit 1.

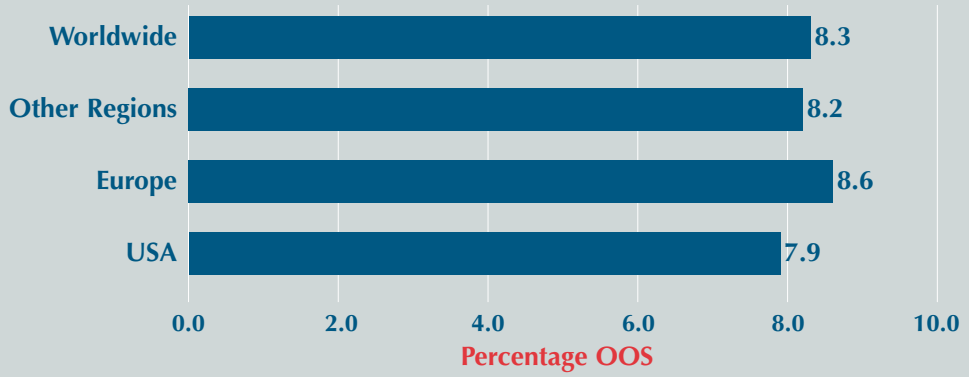
MOST OF THE DIRECT OOS CAUSES OCCUR AT — AND MUST BE REMEDIED AT — THE RETAIL STORE.

The analysis shows that 70-75 percent of out-of-stocks are a direct result of retail store practices (either underestimating demand or having ordering processes/cycles that are too lengthy) and shelf-restocking practices (product is at the store but not on the shelf). Exhibit I-2 divides the responsibility for OOS into its major components, and interestingly, the responsibility breaks out into the following approximate general groupings:

- ✓ Retail store ordering and forecasting causes (about one-half of OOS).
- ✓ Retail store shelving and replenishment practices in which the product is at the store but not on the shelf (about one-fourth of OOS).
- ✓ Combined upstream causes (about one-fourth of OOS).

The report provides extensive detail behind these general summary numbers in the section on Causes of OOS. (See Chapter 2, Section C for detailed information.)

Overall OOS Extent (Averages)



OOS Causes: Worldwide Averages

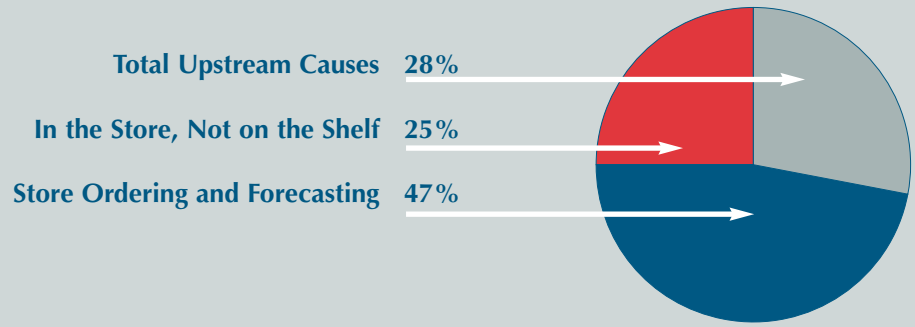


Exhibit 2 Exhibit 1

THIRD

NEW EVIDENCE IS PRESENTED THAT CHANGES PREVIOUS UNDERSTANDING OF THE WAYS CONSUMERS RESPOND TO OUT-OF-STOCKS.

Our consumer data of more than 71,000 consumers surveyed show an increasing willingness of consumers — when confronted with an out-of-stock situation — to seek those items at an alternative outlet. These consumer studies show — depending on the product category — that when confronted with an out-of-stock situation, 21 to 43 percent of consumers will make that purchase at another store, while another 7 to 25 percent will not buy the item at all.

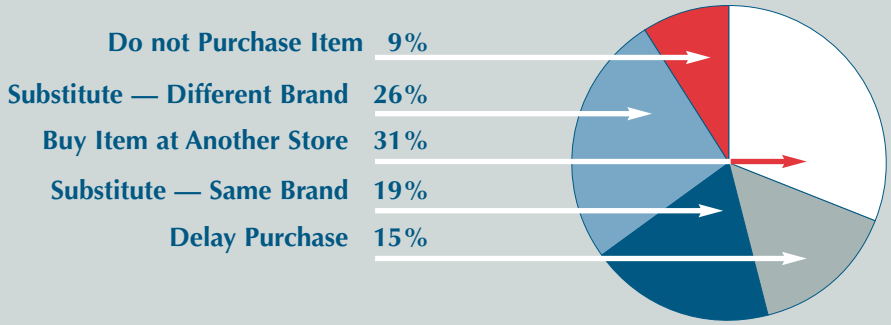
The consumer studies show that *retailers are likely to lose almost one-half of the intended purchases* when a consumer confronts an out-of-stock. This loss does not include the impact of substituting, which generally tends toward a cheaper substitute.

The worldwide averages across eight major categories are shown in Exhibit 3. The report provides extensive detail behind these general summary numbers in the section on consumer response to OOS (Chapter 2 B).

Exhibit 3

Worldwide Consumer Responses to OOS

(Average across eight categories)



FOURTH

THE IMPLICATION OF THE ABOVE FINDING SUGGESTS THAT THE COST OF OUT-OF-STOCKS TO RETAILERS IS GREATER THAN PREVIOUSLY REPORTED.

Our findings show that ***a typical retailer loses about 4 percent of sales*** due to having items out-of-stock. A loss of sales of 4 percent translates into a ***earnings per share loss of about $0.012 (1.2 cents)*** for the average firm in the grocery retailing sector, where the average earnings per share, already is about $0.25 (25 cents) per year. (For more details behind these general summary numbers, see the section on implications of retail OOS in Chapter 2 D.)

Fifth

This Examination of Out-of-Stocks Shows Some Striking Similarities Worldwide as well as Clear Differences by Region.

The aggregate root cause attributed to retail stores for OOS situations varies little across regions. However, while the causes attributed to the retail store are consistent in the aggregate, clear differences among the regions can be seen when it comes to the amount of store ordering vs. forecasting vs. replenishment.

When examining consumer reactions to OOS, consumer brand substitution varies greatly across regions. Differences in the variance of the extent of OOS can be found in developing countries (greater variance). This study sheds considerable light on both the worldwide differences and the worldwide similarities in terms of extent, causes and consumer responses to OOS.

Sixth

This Study Introduces OOS Comparison Measurements Using a New Method.

This study examined several measurements of out-of-stocks by a new method that uses scanner data and product movement to predict and identify out-of-stock situations. Most OOS studies (including many of the ones examined for this report) have relied on physical store audits that provide measures of out-of stocks at specific periods of time. However, identifying an out-of-stock through a physical audit does not necessarily identify the true effect of that out-of-stock, nor does it provide a precise measure of the duration of the out-of-stock. The latter consideration, the duration, is managerially relevant, since the length an item is out-of-stock indicates the true damage to the store's sales. The findings using the new method of measurement were reasonably consistent with the store audits, and this suggests that the new method provides reliable measures.

Chapter 1: Introduction and Overview of Study

Study Background and Objectives
Methodology and Description of Studies

Chapter One

Introduction and Overview of Study

In the past few years, three key forces have converged to add pressure and urgency to OOS issues. For the following three reasons, as never previously in history, the issue of out-of-stocks is of greater importance to retailers and their supply chain partners.

- ✓ First, to provide motivation to address the issue is the fact that consumers are becoming less tolerant of OOS situations. With more information at their fingertips and more available outlets and channels for purchasing, consumers are being trained to be less accepting of OOS situations. With worldwide consistency, consumers will increasingly shop at an alternate outlet to find the item they need. To NOT address the OOS issue is clearly becoming more hazardous.
- ✓ Second, the opportunity for direct impact when addressing the problem has increased. As retailing continues its consolidation and becomes global, retailers find solutions are becoming increasingly valuable, as they can provide solutions for these issues on a worldwide basis.
- ✓ Third, technology provides new ways to address OOS. This is providing retailers a new-found ability to address OOS, rather than the traditionally recommended solutions that carry the heavy ongoing costs of increased labor or greater inventory safety stocks.

Throughout this report, extensive background information and current data are provided relating to these primary findings of our 18-month worldwide study. As the Executive Summary highlights, OOS continues to be a problem for retailers and their supply chain partners. Previous published studies have examined the issue regionally, but this report shows that OOS can and must be addressed by retailers worldwide.

A. Study Background and Objectives

Out-of-Stocks and the Retailer

Retailing demands extraordinary commitment to detail from its managers. Retailing also presents its managers with multiple challenges that simultaneously beg for attention. One of those challenges has long been keeping products that customers want and need in stock and available.

If retailing were not extremely competitive, the implications of out-of-stock products would not command the attention of retail managers. In metropolitan areas worldwide, however, retail competition is keen and continues to intensify. Given this situation, having products in stock is becoming more and more a requirement to play in the game.

At the same time, products continue to proliferate. According to the FMI Web site, the number of SKUs in 2001 in an average grocery store was nearly 25,000. This makes the task of keeping products in stock and available all that more diffi-

cult. The retailer's problem with out-of-stock items validates the adage that "retail is detail."

International ECR and Recent Out-of-Stock Research Projects

Keeping items in stock is not the sole problem of the retailer, but rather is shared by the entire supply chain. The Efficient Consumer Response (ECR) initiative that was started in 1993 in the United States by grocery retailers, distributors and manufacturers of fast-moving consumer goods, sought to reduce many of the inefficiencies throughout the supply chain. One of its key strategies – category management – provided a means for determining what products were most important to the consumer and to ensure availability of these products. Through category management, all ECR supply chain players developed practices to guide the right mix of products more efficiently through the supply chain to the ultimate consumer.

As the ECR movement spread worldwide in the late 1990s, it provided a forum for common industry issues to be heard. One message that arose from all parts of the world was concern about out-of-stock items. Since all players in the supply chain share in the problem — and the solution — of out-of-stock items, ECR in Europe, Asia and Latin America plus joint industry initiatives in the United States provide venues to address and solve the problem. Despite recent efforts to stem the OOS trends, however, the level of out-of-stock continues to haunt retailers and their supply chain partners alike. It is clear that additional study of the extent, root causes and consumer reactions to out-of-stock items is necessary to clarify the problem for the industry. It is also necessary to provide insights and justification for the level of resources that can and/or should be committed to addressing out-of-stock issues.

Currently, OOS is one of the top agenda items for non-U.S. ECR. As the ECR organizations mature in Asia, Europe, Latin America and elsewhere, they have begun to shift their attention from the processes and components that lead to industry efficiency to more specific outcome objectives, such as reductions in out-of-stocks. For example, the 2001 ECR Asia conference theme was "50/50: 50 Percent Reduction in Inventory and 50 Percent Reduction in Out-of-Stocks." ECR Europe is currently conducting a large pan-European OOS study that is slated to be one of the major future discussion topics. ECR organizations that have recently conducted studies and released their findings include ECR Australia, ECR France, ECR China, and ECR Thailand. More have been proposed or are underway in other countries. (Additional information on ECR organizations and related links can be found on the Internet at www.globalscorecard.net, www.ecr-academics.org, and www.ecr-journal.org.)

Existing Research on Out-of-Stocks

While there is a flurry of recent activity in OOS research, the applied and academic studies over the past several years that have examined the out-of-stock issue have shed

light on the issue from specific perspectives. A study was conducted by Andersen Consulting and the Coca-Cola Retailing Research Council in 1996. This study examined 11 categories of consumer goods in 10 stores across the United States for a month and found that on average 8.2 percent of the items in the categories examined were out-of-stock on a typical afternoon. Additionally this study reported that 46 percent of consumer purchases were at risk of purchase at another store, purchase delay, or substituting a lower-value product when an out-of-stock situation occurred.

While the focus of the Coca-Cola study was on the grocery retailing, similar studies were conducted in the late 1990s by industry associations representing chain drug stores and convenience stores. In 2002, the Grocery Manufacturers of America (GMA) published a study that focuses on the top 25 grocery categories across, with an in-depth look at seven direct store delivery (DSD) categories. The study was the most comprehensive in years, tracking 1,600 items in 20 stores in four major U.S. retailers for 14 consecutive days. Additionally, one thoU.S.nd shoppers were interviewed. Additional data was provided on the top 25 grocery categories from 500 stores across five regions of the United States, resulting in more than 92 million individual store/item/day observations. The study found that shoppers can not find the item they want to buy 7.4 percent of the time. Some 40 percent of these shoppers – when confronted with an out-of-stock situation – either postpone their purchase or buy elsewhere, placing $6 billion in annual sales at risk in those top 25 categories. The study found that stock-outs can jump to as high as 17.1 percent during store promotions and that when a product is unavailable on the shelf, a retailer can potentially lose $75,000 annually per store.

The GMA study, the Coca-Cola/Andersen study and others have been conducted in the United States Additionally, a smattering of proprietary studies has been reported in business publications. Finally, in addition to the published studies done for industry, academic research has made important contributions to the understanding of out-of-stocks. A complete listing of all of the studies that were used as background for this current study can be found in Appendix A.

Difficulties in Measuring Extent, Causes and Consumer Reaction

The major limitation in studying out-of-stocks rest in the large number of factors that affect the outcomes of any particular study. Some of the primary factors that cause the extent of reported out-of-stocks to vary include:

- ✓ Definition of out-of-stock item. (For example, the product may be in multiple places in the store, but out-of-stock at one location but not another.)
- ✓ Methodology used in counting out-of-stocks (Includes frequency and timing of measures e.g. time of day, day of week and other seasonal factors.)
- ✓ The velocity or speed of turnover of items examined (When only the fastest moving items are examined, rates are higher than when all SKUs are examined.)
- ✓ The way new and discontinued SKUs are considered.
- ✓ Promotions and promotional coordination among channel members.

Similarly, a wide variety of factors also affect the causes of out-of-stocks such as:

- ✓ Shifts in consumer demand.
- ✓ Promotional planning periods.
- ✓ Sophistication of the supply chain and channel practices.
- ✓ Standard channel problems, such as demand amplification ("bullwhip effect").
- ✓ Allocation of shelving to SKUs based on case size, as opposed to product movement (which constrains and affects ordering practices).

Finally, while there are only a small number of primary actions that consumers can take when confronted by an out-of-stock situation, several factors affect the likelihood of action that will be taken in any given situation, such as:

- ✓ Category of products examined, due to varying willingness and ability to substitute, e.g., product loyalty.
- ✓ Geographic proximity of competitors.
- ✓ Overall extent of out-of-stocks (A decision to substitute or not is dependent on the total number of substitutions that a consumer will need to make in a particular shopping trip.)

Study Objectives

Because there are so many variables, existing studies have had difficulty making predictions beyond the specific categories, outlets, situations or regions studied. While several existing published studies have been made available, there has never been a synthesis of this material.

Based on the issues discussed above, this study has three central objectives.
Triangulate from a variety of studies to develop an overall range of the extent, root causes and consumer responses to out-of-stocks.
Examine the out-of-stock issue from a global perspective analyzing differences and similarities across national boundaries.
Present and examine the differences in measurement of out-of-stocks when using the traditional audit method vs. estimates out-of-stocks from store scanner data.

B. Methodology and Description of Studies Used in this Study

The basic process used for the study followed five general steps.

1. Collect and review published and unpublished OOS studies worldwide.
2. Collect and review related research on OOS from academic and applied sources.
3. Delineate findings from research.
4. Isolate limiting factors.
5. Synthesize findings and determine areas of consensus, trends, key findings.

More specifically, to develop this report, information was collected and synthesized from the following general sources:

- ✓ Previously published industry reports and studies of out-of-stocks.
- ✓ New data provided from two large-scale consumer studies conducted in 1999-2000 (one in U.S. and a second identical study conducted in 19 countries outside of North America).
- ✓ New data provided from studies of three retailers' scanner and inventory data conducted in 1999-2001.
- ✓ New data provided from a series of traditional store audit studies conducted in 1998-2000. (See Appendix A, Part 1.)
- ✓ Various academic articles published from 1962-2001 on out-of-stock studies. (See Appendix A, Part 2.)
- ✓ Industry press and articles that addressed and/or reported on other out-of-stock studies. (See Appendix A, Part 1.)

The academic and industry studies provided background and theory regarding the way out-of-stocks has been measured, the likely consumer responses to out-of-stocks, and the value of addressing the issue at the retail level. The majority of the academic studies focused on consumer responses and provided important theoretical and categorical approaches to examining consumer response data. The industry studies were examined to provide baselines for evaluating the information we would then examine from the new studies. The review of the industry studies led us to systematically arrange the information contained in all studies into the following categories:

- ✓ Methodology.
- ✓ Categories examined.
- ✓ Extent of out-of-stocks found.
- ✓ Consumer responses.
- ✓ Root causes identified and assigned.
- ✓ Efforts examined / suggested to address out-of-stocks, the costs and returns.

The logic of the arrangement is straightforward. First the methodology was reviewed to determine any likely limitations or concerns faced when examining the data from the study. This methodology also provided a way to categorize the studies. Second, the categories examined were listed in order to make comparisons among the studies that examined the same or similar categories. Consumer responses to OOS situations tended to vary widely among categories, thus category identification is a key variable.

Following general categorization, examination of the extent of out-of-stocks in the report was the logical place to begin, since it answers the question: "Is there a problem?" After identifying the extent, the logical next question is: "Does the OOS matter?" This is answered by examining the consumers' responses to OOS situations. The search for the cause to the problem leads to the next question:

"Who is responsible for causing the problem?" This leads to the final questions: "Can and should it be fixed? If so, how?"

The above paragraph explains the general format for the presentation of the detail of the findings. Next came the examination by region in the world (four regions), by category and by methodology. Chapter 2 presents the findings from the studies examined for this report.

Chapter 2: Overall Findings

Chapter Two

Overall Findings

A. What Is the Extent of OOS?

After examining 40 studies analysts found that the average OOS rate worldwide is 8.3 percent. While this is the average, the extent reported in each study varied not only by differing management practices, but also by what is measured. Thus, this section presents an examination of the extent or scope of out-of-stocks based on several sub-analyses. These include:

- ✔ What is the definition of an out-of-stock, and how is it measured and calculated?
- ✔ What is the overall extent of OOS?
- ✔ How does this vary by
  - Region
  - Category
  - Time of day / day of week
  - Promotion
  - Product movement
  - Brand
  - Duration?
- ✔ What is an acceptable level of OOS?

1. What Is an Out-of-Stock

The definition of what makes an OOS affects the extent that gets reported in studies. While many variations exist, recent studies tend to settle on a consumer-based definition. Even with agreement to use a consumer perspective, two general alternative definitions emerge based on the method of measurement.

As the first and most accepted approach, the OOS rate is measured as a percentage of SKUs that are out-of-stock on the retail store shelf at a particular moment in time (i.e., the consumer expects to find the item but it is not available). In general, studies using this approach begin with the selection of one or more categories to examine. Next, a sample of stores from a single retail chain is selected, and a series of physical audits is conducted at the retailer at specific times during the day over a specified period of time. For each category, the OOS rate is calculated as the average percentage of the SKUs not in stock at the time of the audits.

Normally, the OOS rate is reported for each category individually and then the categories are averaged (normally unweighted average) to create and report an overall rate for the study. Due to the number of studies that have used this approach, a major advantage of using this method is the availability of excellent baselines. The limitations to this type of measurement include the:

- ✔ Arbitrary nature of selection of the categories.
- ✔ Frequency and timing of the audits.
- ✔ Duration of the study.
- ✔ Human error that can and does enter from many sources.

A second and alternative consumer-based definition of an OOS is the number of times a consumer looks for the SKU and does not find it. The percentage rate is calculated as the number of times the consumer does not find the SKU divided into the sum of the times the consumer does find the SKU plus the number of times the consumer does not find it. Instead of relying on physical audits, the second approach is measured through the use of models that determine OOS rates from store scanner and inventory data. This view provides the advantage of determining the extent of out of stocks that actually matter to the retailer and the upstream supply chain members. The major limitation of this method is that the OOS rates are estimates based on historical sales patterns, and thus can only be calculated for SKUs that sell with a minimum frequency (thus cannot detect OOS for very slow moving products). Few studies have used this method, and therefore baselines do not readily exist. In this report, the data from three studies that used this method are provided.

Exhibit 4 below presents the worldwide averages.

Worldwide OOS Extent

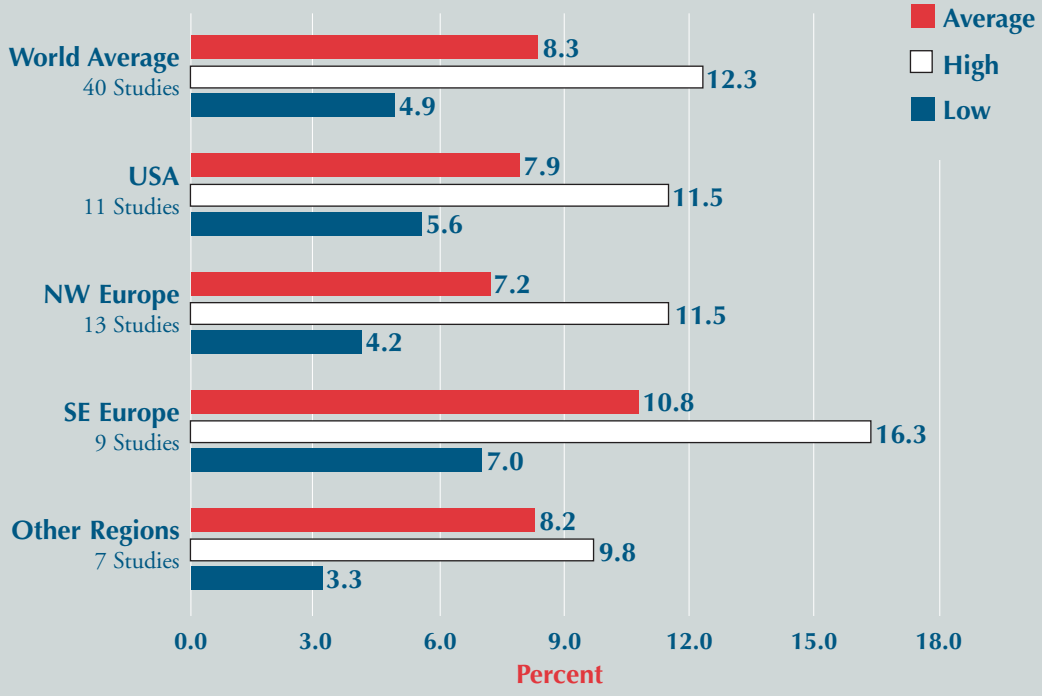


Exhibit 4

The average OOS rate for all 40 studies that reliably reported OOS extent was 8.3 percent. The average of the reported highs in the studies was 12.3 percent, and the average of the lows was 4.9 percent. This is similar to, though slightly higher than, the primary U.S. benchmark developed in the 1996 Coca-Cola Research Council sponsored study that was 8.2 percent, which was calculated as the simple average rate of eight categories that ranged from 3.9 percent to 11.1 percent. The 2002 GMA study reported an average OOS rate of 7.4 percent with DSD categories ranging from 3.2 percent (milk) to 11.2 percent (prepackaged bread).

Keep in mind that the 40 studies examined here used slightly different measurement methods and different people, measured different categories, and examined different durations and different daily and weekly factors. All of these can affect the measurement. However, when all of the various factors are considered together, the averages regress to an uncanny similarity, and this provides a sense that the findings are reliable in the aggregate, and the differences can easily be explained by variances in categories, methods and regions.

For this study, Europe was split into its northern and western region (Norway, Denmark, Sweden, France, Belgium, Netherlands, Germany, Switzerland, Austria) and into its southern and eastern region (Portugal, Spain, Greece, Poland, Hungary, Czech Republic, Slovakia). Countries within each of these two areas showed similarities in OOS rates, and differences between the two regions were substantial. Northwest Europe showed the lowest OOS rates, while Southeast Europe showed the highest. The Northwest examination was limited due to a lack of detailed studies from the UK, and Finland. Summary extent numbers were reviewed from four additional studies from the UK and the extents fell in line with those reported elsewhere in the region. Unfortunately, study analysts were unable to review the studies in detail and thus did not include them in the calculations in this request.

OOS rates in other regions (South America and Asia) were lower in average, although the extents varied as much or more than other regions, and the small number of studies does not provide a complete representation of these regions.

3. OOS Extent by Category

OOS is often measured by category. A category is a microcosm of the retail store, and category management principles encourage a focus on retail performance by category. Of the 40 OOS studies that examined the extent of OOS, 14 of these provided reliable OOS data by category. Additional studies measured OOS by category, but only reported the composite findings and did not report by category. In total, 18 categories provided OOS results except for the GMA DSD study, which detailed the top 25 categories. However, in only six of these 18 categories did data come from three or more studies. Thus, the averages were computed and the OOS rates were reported for these six categories only. Exhibit 5 illustrates the averages and ranges of OOS for the six categories. Exhibit 6 provides a chart of the category averages only. Note that the average of the six categories is slightly lower than the overall worldwide average based on 40 studies.

Out-of-Stock Extent by Category

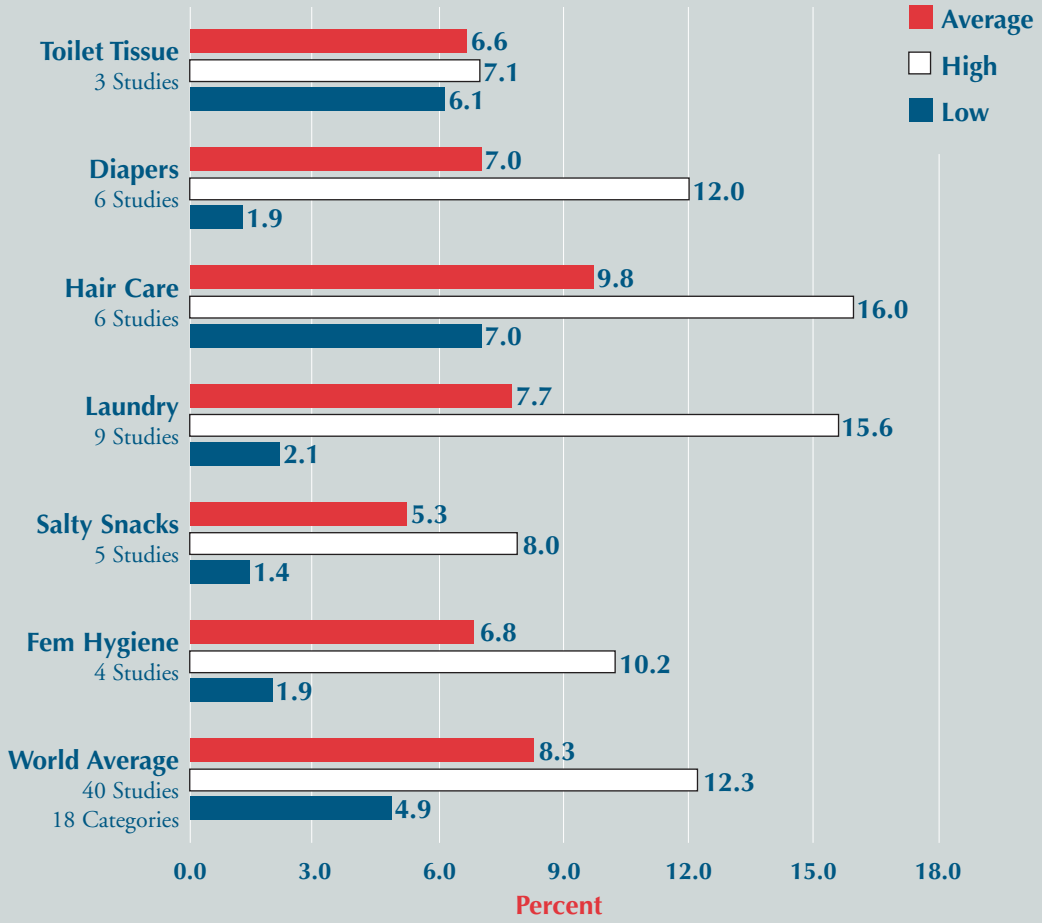


Exhibit 5

OOS Averages by Category

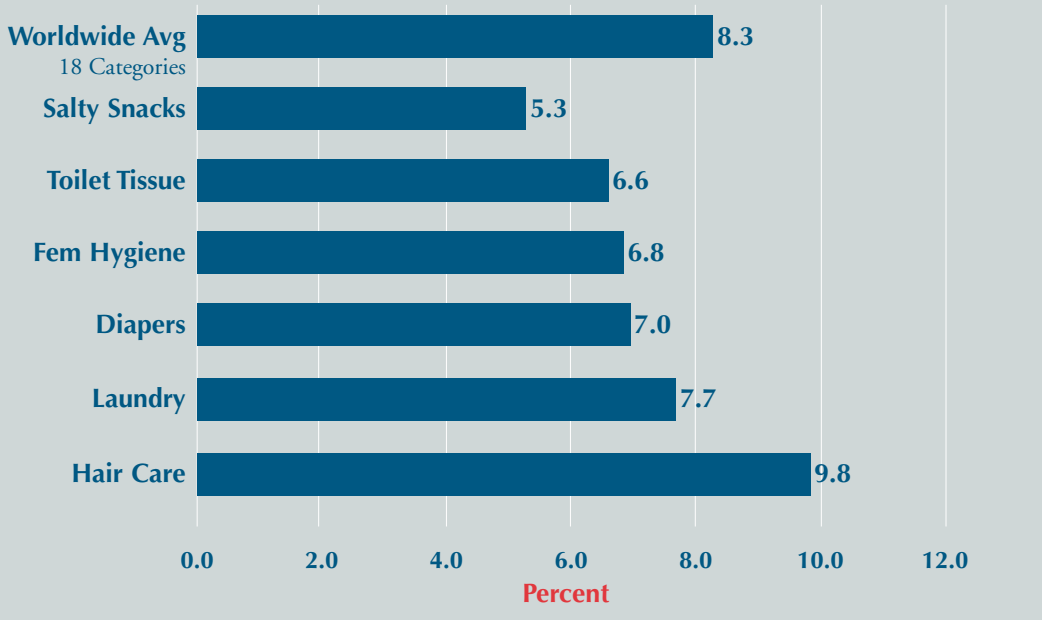


Exhibit 6

4. Variation in OOS Vary by Time of Day and Week

Thirteen studies measured and reported variations in OOS rates by time of day and/or day of the week. In general, there are two clear conclusions. First, consistent across all studies are patterns that showed increases in OOS rates in the early evening hours as opposed to morning or early afternoon. The highest OOS occurred in the evenings (after 8:00 p.m.), while the lowest were during the early afternoon. Morning rates were lower due to overnight restocking practices, slightly higher than those after noon, and lower than in the evenings. The conclusion from these findings is that ordering decisions and replenishment patterns as determined by store management have an effect on OOS rates.

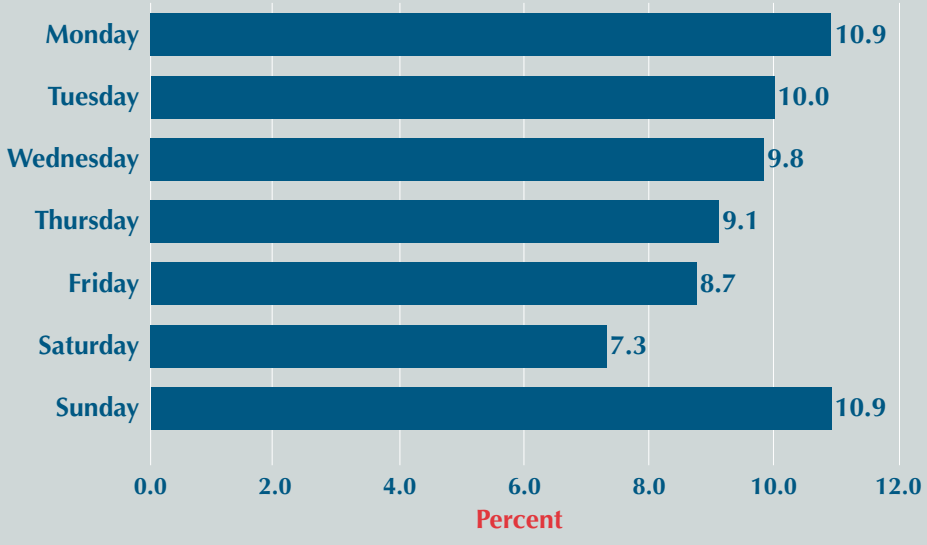
Second, consistent across all studies are weekly patterns where OOS rates rose and fell on different days of the week. The 2002 GMA DSD study, which measured time-of-day and day-of-week stock-outs, also showed that same pattern, whether or not the retailer is directly responsible for keeping the shelves stocked. Exhibit 7 shows how the OOS rates vary during days of the week.

All of the studies that reported daily OOS rates showed the same general pattern of decreasing rates throughout the week, but a large rate on Sunday (and the resulting carry-over to Monday). This pattern reflects both retail strategy and economic realities. Assuming the weekend to be the heaviest shopping days, re-ordering and deliveries occur on Monday and Tuesday. Another reason that Monday has a high average is that in some countries stores are closed on Sunday and restocking does not begin until Monday.

Exhibit 7

OOS by Day of Week

(Average of 13 Studies)



Throughout the week, restocking and preparations for the Saturday and Sunday promotions lead to lower OOS rates. Saturday, despite being the heaviest shopping day, has the lowest OOS as retailers employ extra labor and can fill-in using safety stocks for promoted items. In countries where stores are open on Sundays, labor is normally at a lower level, and safety stocks for high demand items begin to be depleted. Thus, any incorrect demand estimation becomes manifested in OOS increases.

Promotional Effects.
In general, the studies that reported OOS rates on promoted and non-promoted items consistently showed OOS rates to be higher on the promoted items. In some cases the differences were minor while in others the differences were substantial. Although the promoted items should be receiving attention from the retail store management, all studies that report promotional effects find substantially greater OOS on promoted items than everyday items.

While the differences vary among studies, in general a 2:1 ratio of promoted vs. non-promoted OOS rates was found. Examples of this in publicly reported studies include the ECR France study (where promoted items have a 75 percent greater OOS rates the 1996 Coca Cola U.S. study (where OOS levels of promoted items were approximately double of non-promoted items), and the 2002 GMA DSD study (where OOS levels of promoted items were approximately double of non-promoted items). Several of the proprietary studies examined for this report found similar results.

One study found that the increase in the amount of discount offered by a promotion corresponded with the OOS rate. Another study highlighted a related problem where promotional decisions (and the resulting last-minute advertising changes) based on responses to competitors led to increased OOS when the timing of the changes were too late to be included in the normal order cycle.

Velocity of Product Movement.
Somewhat overlapping with promoted items, studies that exclusively examined fast-moving items found higher OOS rates (13 percent-15 percent) than those that examined entire categories that include both fast-moving and slow-moving items (8.3 percent average). This translates to a 50-80 percent higher OOS rate for fast moving vs. all products. The GMA DSD study found that, on average, the top 10 percent of the fastest moving items accounted for 45 percent of the out-of-stocks. The studies that examine the fast moving items used a different methodology (scanner data analysis vs. visual audits), and thus some of the difference could be due to variances in measurement. However, it is clear that the faster-moving items — promoted or not — have higher OOS rates than slower-moving items.

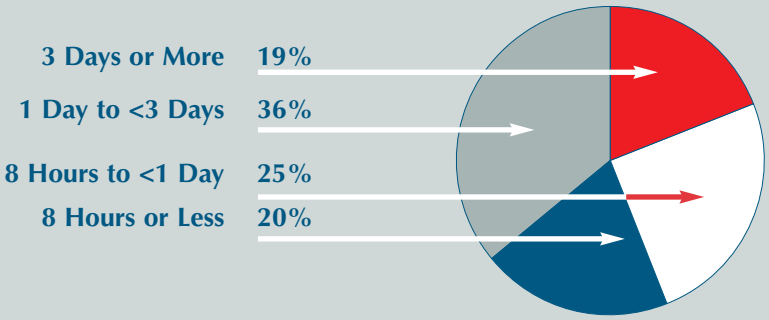
Product and Brand Effects on OOS Rates.
The sparse brand-level data available for this analysis was not adequate to make solid conclusions about specific brands within categories. However, it was clear that the faster-moving items also had more incidences of OOS, although the duration was not necessarily longer. Thus, in any category, the faster-moving SKUs are going to incur more frequent OOS, regardless of the brand. The implication of this – and the value of addressing the faster moving SKUs – is that the faster movers suffer disproportionately more due to OOS than do slower-movers.

Duration of OOS.
Data on duration of OOS, while sparse, is very interesting. Based on a study of 13 stores in the U.S. by Data Ventures, a U.S. software service provider, the following results were found. When products become OOS, only about 20 percent are replenished in less than eight hours while a similar percentage remain OOS for more than three days. Duration is a critical though under-used measure for the extent of OOS. The traditional measure of OOS (the percentage of SKUs not on the shelf at a particular point in time) does not provide the measure that is most meaningful from the perspective of the consumer. When the duration of the OOS item is considered along with the extent, then a better picture for managerial action emerges.

All of the above issues (promotion effects, velocity and duration) indicate that both retail store management systems and practices contribute to OOS extents. While this will be discussed in more detail with the other implications, it is important to note that there are two ways to address the higher OOS rates on faster-moving products. First, retailers can pay more attention to high velocity products to ensure that they get reordered and restocked more frequently. Second, following category management principles, retailers can examine a category and eliminate some slower-movers and allocate more shelf space to faster-movers. According to Broniarczyk et al.'s category management research (1998, *Journal of Marketing Research*, Vol. 35, pp. 166-176) sales and customer satisfaction for the category increases following a reduction in SKUs from a category review.

Exhibit 8

Duration of OOS



Why Does 8 Percent Keep Coming Up as the Extent of OOS? Is This the "Natural" OOS Level?

Given that so many variables can affect the measurement of OOS, in a study like this that averages the results across 40 studies, finding a number that is somewhat "typical" provides evidence that the number is reliable. Given the confidence we can have with this number, a reasonable hypothesis is that the 8 percent OOS rate may simply be the "natural" average for retailers engaged in the sales of fast moving packaged consumer goods given current methods and technologies in industry retailing.

What is clear from this study is that some retailers have found ways to consistently beat this benchmark, while others struggle with rates that are consistently higher. Thus, even if 8 percent is a typical rate, it is not necessarily an acceptable rate. The determination of an "acceptable rate" depends on the extent of the impact of a lower rate on retailer profitability.

On the expense side, obtaining a lower rate may require additional investments in inventory systems, labor training and management processes. Logically, one would expect a lower rate to translate into greater sales and customer loyalty. From the perspective offered by this study, it is apparent that enhancements to the supply chain through ECR and other industry initiatives have created an environment in which retailers and their supply chain partners can begin to address OOS rates. Full attention specifically to OOS management has only become a focal issue for global ECR organizations and for industry leaders and associations in the United States in the last two or three years. Industry thought leaders contend that retailers that do not address OOS levels will find themselves at a competitive disadvantage to those retailers that do. Further they believe that, due to the introductions of new technologies and methods, that OOS levels will decrease over the next three years and that follow-up studies will show average rates in the vicinity of 5-6 percent. If and when this new level becomes the expectation for consumers, this will create huge implications for buying behavior and store loyalty.

Do Higher Inventory Levels / Safety Stocks Correspond with Lower OOS Rates?

Despite the intuitive appeal that higher inventory levels should correspond with lower OOS rates, this study did not find this to be the case. The term safety stocks describes the level of goods kept on hand to prevent OOS. However, in the few studies examined for this analysis that provided data of both inventory levels and OOS rates, store inventory levels (not on the shelf) positively correlated with OOS rates. Excessive backroom inventory seemed to impede the ability of retailers to restock shelves quickly. Thus, safety stocks may indicate the presence of less effective in-store inventory management and ordering systems.

Increased safety stocks within the store can reduce the need for ordering frequency and accuracy. In this case, retailers rely on their own systems that — inside the backroom of the store — are relatively unsophisticated when compared with distribution center inventory management systems and practices. While there may need to be some backroom stock for very fast moving and promoted items, this analysis leads one

to conclude that reliable store processes, improved ordering systems and a responsive supply chain — rather than higher safety stocks — correspond with lower OOS rates.

B. Consumer Response to OOS Situations

Although academic research has identified and categorized up to 15 possible consumer responses to an OOS, typically, managerial researchers measure five primary responses that consumers will make when they encounter an out-of-stock for an SKU that they had intended to purchase. These are:

1. Buy item at another store (store switch).
2. Delay purchase (buy later at the same store).
3. Substitute – same brand (for a different size or type).
4. Substitute – different brand (brand switch).
5. Do not purchase the item (lost sale).

All five of the responses include negative consequences and result in direct and/or indirect losses to both retailers and manufacturers. However, some actions place greater direct losses on either the retailer or the manufacturer.

Direct Losses

First, *the retailer faces a direct loss of the potential sale* when a consumer faces an out-of-stock because the shopper purchases the item at another store or does not purchase it at all. Similarly, *the manufacturer faces a direct loss of the potential sale* when a consumer faces an out-of-stock because the shopper substitutes another brand or does not purchase the item at all. Additionally, *when a substitution is made, the retailer also loses an additional portion of the potential sale* because the shopper tends to switch to smaller and/or cheaper substitutes.

Data examined from the studies conducted by Data Ventures shows that consumers are risk averse when making substitutions and, therefore, more commonly substitute a smaller and/or cheaper item. The following table (Exhibit 9) demonstrates the losses to the manufacturer and to the retailer for each consumer action.

Who Bears the Direct Loss For Consumer Reactions to an OOS

Exhibit 9

Consumer Response	Retailer	Manufacturer
1. Buy Item at Another Store	Yes (Most problematic of all five options to the retailer.)	No
2. Delay Purchase	No (But negatively affects cash flow and inventory turns.)	No (But negatively affects cash flow and exaggerates demand fluctuation.)
3. Substitute – Same Brand	No (But there is partial loss when consumer substitution is smaller or cheaper.)	No (But there is partial loss when consumer substitution is smaller or cheaper.)
4. Substitute – Different Brand	No (But there is partial loss when consumer substitution is smaller or cheaper.)	Yes (Most problematic of all five options to the manufacturer.)
5. Do not Purchase the Item	Yes.	Yes

Indirect Losses

In addition to the direct losses, both the retailer and the manufacturer incur additional indirect losses due to decreased customer satisfaction that results in less overall reliance on the particular retailers and brands. When an OOS leads to purchase at another store, this provides the consumer an opportunity to try a different store. Consumer behavior theory argues that trial precedes adoption, and, thus, an OOS sets the stage for possible permanent store switching. (This topic is treated in more detail later in this section.) When an OOS leads to purchase of a competing brand, the consumer trial can lead to possible permanent brand switching as well.

A second key source of indirect losses comes in the form of supply chain inefficiencies. Consumer switching of brands, sizes and stores as well as delays of purchases provides an inaccurate picture to managers, who seek to have the supply chain deliver accurate levels and mixes of products to retail shelves. Systems dynamics research has shown that inaccurate signals from the retailer become amplified up the supply chain. Indirect losses are demonstrated in Exhibit 10.

Indirect Loss Due to OOS

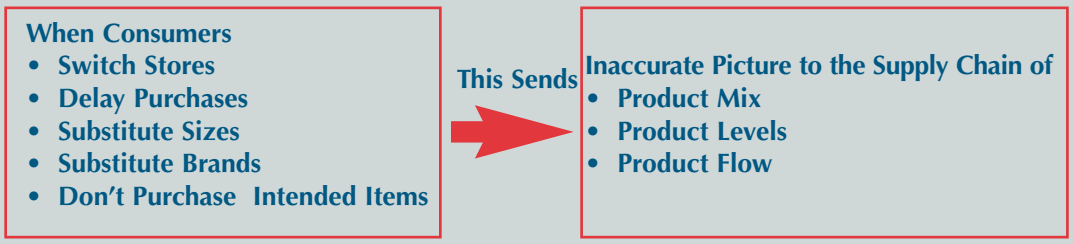


Exhibit 10

Finally, it is important to consider that the overall willingness of a consumer to purchase from another store as opposed to switching an item or brand at the store is related to the overall number of out-of-stocks that the shopper encounters during the shopping trip. When consumers only find one item out-of-stock, they will be more likely to delay or substitute. If, however, there are multiple items that the shopper cannot obtain, the odds of going to another store increases. Similarly, the overall willingness of a consumer to entirely switch stores is dependent upon the cumulative number of times the consumer encounters an out-of-stock at the same store. (This is addressed at the end of this section.)

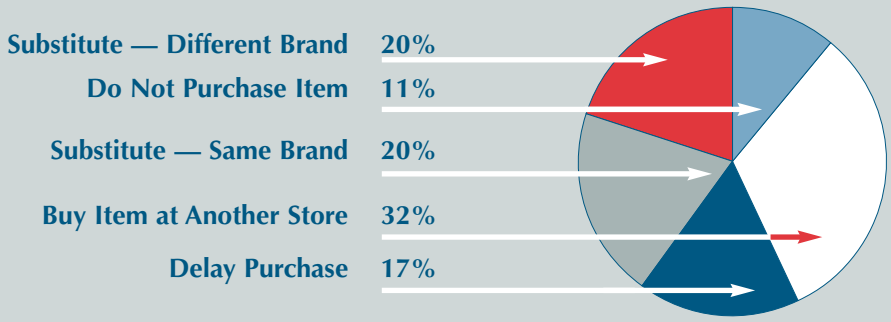
As mentioned in the methodology section, this report presents the results from two major consumer studies – one in the U.S. and the other conducted in 16 countries outside the U.S. This section reviews the summary findings from the

U.S. study, and a section that examines the U.S. findings by category will follow. Using this as a benchmark, the findings from the study outside the U.S. are discussed and compared.

Using the five general responses above, in the U.S. consumer study, 11 consumer packaged goods were examined. The results reported in the chart below (Exhibit 11) represent the average responses across the 11 categories. The survey consisted of interviews with a minimum of 360 primary grocery shoppers in each of the 64 IRI markets that together comprise the continental U.S.. Thus, the total sample is in excess of 23,000 consumers.

Exhibit 11

Consumer Response: Average Percentage Across 11 Categories (U.S. Only)



First, based on the above chart, *the retailer faces an average direct loss of 4 3percent of the potential sale* when a consumer faces an out-of-stock because the shopper purchases the item at another store (32 percent) or does not purchase it at all (11 percent). Similarly, *the manufacturer faces a direct loss of 31 percent of the potential sales* when a consumer faces an out-of-stock because the shopper substitutes another brand (20 percent) or does not purchase the item at all (11 percent). However, *when a substitution is made, the retailer also loses an additional portion of the potential sales* because the shopper tends to switch to smaller and/or cheaper substitutes. Previous research has demonstrated that consumers are risk-averse when making substitutions and, therefore, more commonly substitute a smaller and/or cheaper item.

3. Consumer Responses Vary Across Categories

While overall consumer responses are important as a benchmark, consumer responses vary significantly by category. The following bar chart shows how consumer responses differ across 11 product categories (U.S. study only). Analysis of the mix reveals three general groups or clusters among eight of the categories:

Toilet tissue and paper towels show high levels of substitution (Fifty percent of consumers will substitute within or between brands in the category.) and a corresponding low willingness to purchase the product at another store.
Feminine hygiene and diapers show very high levels of store-switching and low-levels of delay in purchase.
Four categories (toothpaste, pet food, laundry and shampoo/hair care) all have similar response patterns that reflect the overall averages.

For the remaining three categories no clear pattern emerges. Both cosmetics and coffee show low levels of substitution and a correspondingly higher willingness to delay the purchase or to not purchase the product at all. The salted snacks category has the highest level of consumers not buying the item at all, resulting in lowered consumption.

Consumer Responses Across 11 Categories

(U.S. Study)

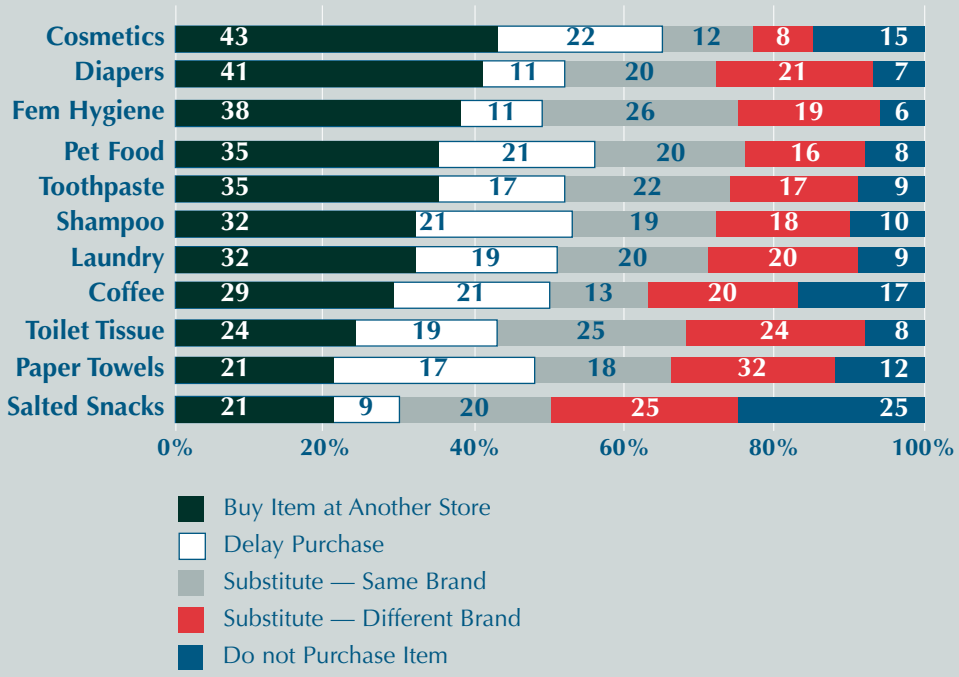


Exhibit 12

Similar to the U.S. consumer study, a worldwide study of more than 48,000 consumers was conducted in a series of 28 studies across 19 countries. The method and questions were as similar as possible to those used in the U.S. study. A variety of categories was examined in each of the countries.

For eight of the 11 categories examined in the U.S. study, data were also obtained on the same categories from four or more other countries. This allowed for composite comparisons for these eight categories (all of the categories illustrated in

4. Consumer Responses Vary by Region and Country

Exhibit 12 excluding cosmetics, toothpaste, and coffee). The results of this analysis are presented in the comparative bar chart and table below (Exhibits 13 and 14).

Exhibit 13

Average Consumer Responses by Region

Comparisons Across Eight Common Categories

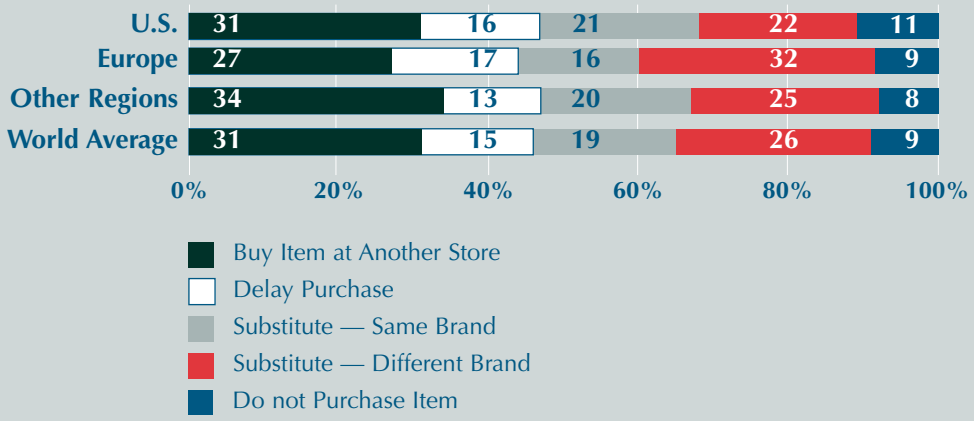


Exhibit 14

Table of Average Consumer Responses by Region

Comparisons Across Eight Common Categories

	World Average	U.S.	Europe	Other Regions	Difference U.S. vs. Europe	Difference U.S. vs. Other Regions	Difference Europe vs. Other Regions
Bought at Another Store	31	31	27	34	+4	-3	**-7**
Delay Purchase	15	15	17	13	-2	+2	+4
Substitute – Same Brand	19	21	16	20	**+5**	+1	-4
Substitute – Different Brand	26	22	32	25	**-10**	-3	**7**
Do Not Purchase Item	9	11	9	8	+2	+3	+1

In the aggregate, delay of purchase and not purchasing at all are reasonably similar worldwide. The major overall difference between U.S. and European consumers is the lower willingness of U.S. consumers to switch brands. European

consumers are almost 50 percent more likely to switch to a competing brand when faced with an OOS on the desired item.

Alternatively, U.S. consumers are more likely to substitute a different package size or variation within their preferred brand. Thus, in the aggregate, U.S. consumers act in a more brand-loyal manner than do consumers outside the U.S.. U.S. consumers may be influenced by having more availability of same-brand SKUs. Store switching is greatest outside the U.S. and Europe. Europeans are the least likely to switch stores due to OOS.

Just as the U.S. study showed that broad differences exist among consumer responses by categories, similar differences occur worldwide. The next question is whether there tend to be greater differences among countries or among categories.

Exhibit 15 presents the data by category, showing the worldwide average for each of the categories examined in the study. This provides a benchmark for comparing the individual country responses.

Average Worldwide Consumer Responses by Category

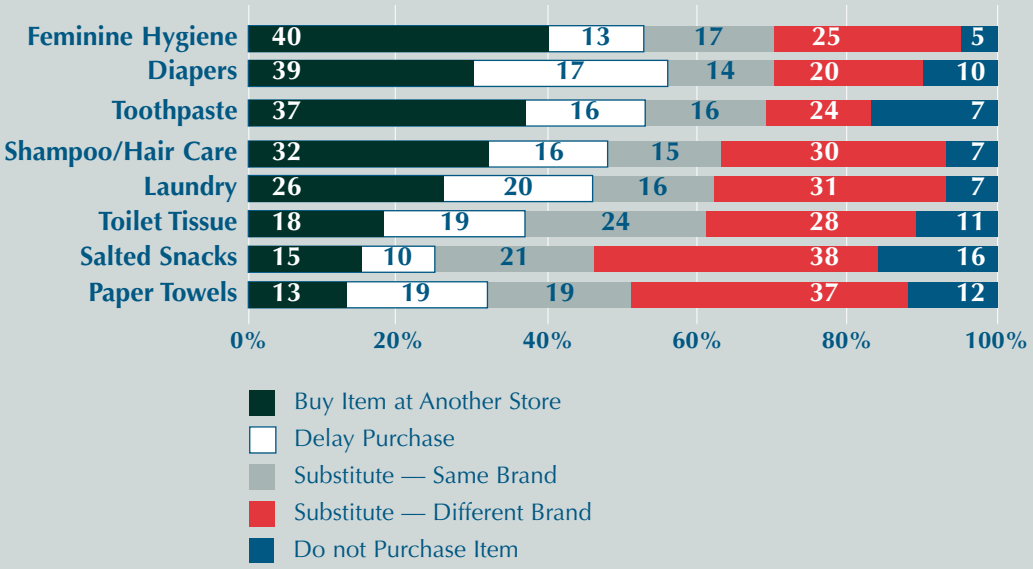


Exhibit 15

Eight additional graphs are presented in Appendix C. These show how consumer responses vary among countries for each category.

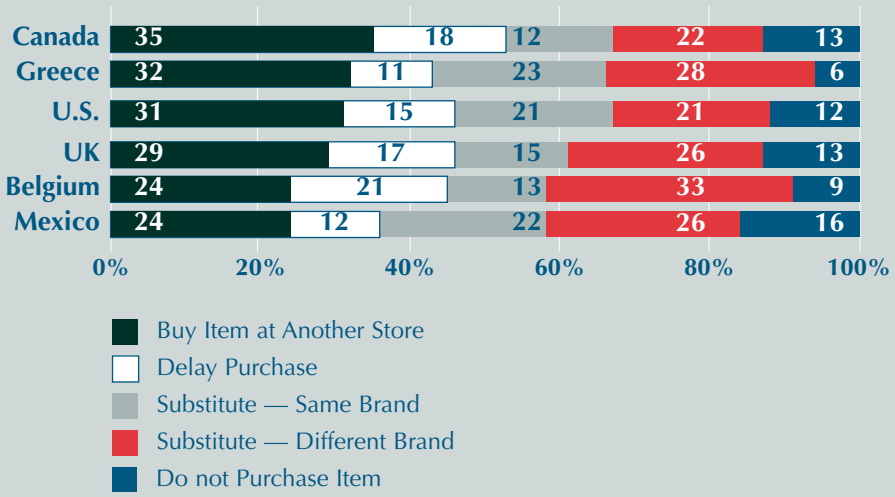
To a large degree, the aggregate responses by category have similarities across countries, suggesting some universal consumer responses based on the category. For example, despite the variance among countries, notice the overall large will-

ingness to switch stores for feminine hygiene and diaper categories and the correspondingly low willingness for salted snacks and paper towel categories.

Aggregate Comparisons Using Equivalent Categories.
In order to compare aggregate consumer responses to OOS by country, equivalent categories must be used. While the eight charts in Appendix C show the results from each national study for eight categories, data for four categories (shampoo/hair care, feminine hygiene, laundry, and salted snacks) are provided for six countries. This comparison is shown below in Exhibit 16.

Exhibit 16

Average Consumer Responses Across Four Categories



The results of the analysis show that behavior varies substantially among the six countries. Overall switching behavior is greatest in Mexico and Greece, and Belgium has the highest overall substitution of other brands. Obtaining the desired item at another store is lowest in Belgium and Mexico. Overall, both Belgium and Mexico show lower levels of brand loyalty with corresponding higher levels of store loyalty. Canada has the highest level of obtaining the item at an alternative outlet.

For detailed information on consumer responses for each country for these four categories, as well as for four additional categories, see Appendix C.

An additional analysis using the worldwide consumer response data by category data provides perspective on which party — the retailer or the manufacturer — is at the most risk for a particular category.

For this analysis, the immediate direct store loss (consumers that switched stores plus consumers that did not purchase) is compared with the direct brand or manufacturer loss (consumers that substituted brands plus consumers that did not purchase). Thus, if consumers either delayed their purchase or substituted for the same brand, we assume that neither the retailer nor the manufacturer sustained a loss.

Exhibit 17 shows that the categories of greatest loss to the retailers (e.g., diapers, feminine hygiene, and toothpaste) have the least effect on the manufacturer, while categories of greater loss to the manufacturer (toilet tissue and paper towels) have the least impact on the retailer.

Retailer vs. Manufacturer Loss by Category

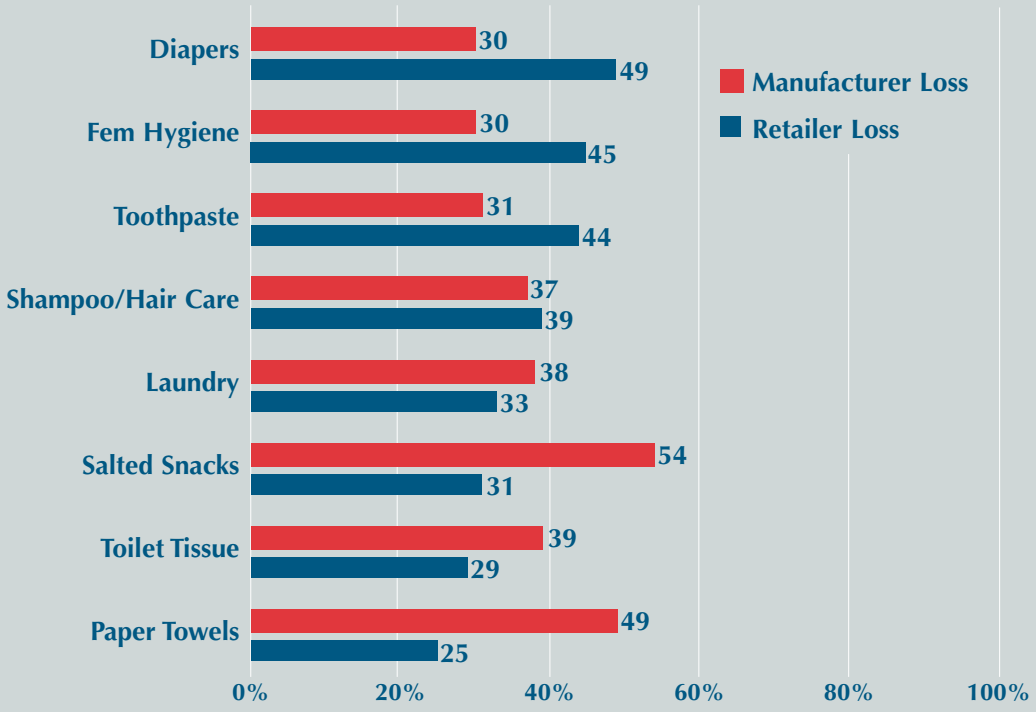


Exhibit 17

This situation poses a conflict when manufacturer and retailer trading partners to address out-of-stock issues. Based on this analysis, addressing the shampoo/hair care category would have the most mutual interest. It is important to note that the

above analysis shows differing "loyalty connections" to categories. Thus, for the retailer, it is critical to address categories where the brand loyalty is strong because that is where the greatest immediate loss (in terms of lost sales) and long-term loss (in terms of lost customers who find the brand they want at another store) rest.

While the major survey-based consumer studies have been the subject of the above analysis, other consumer data regarding OOS behavior using store scanner data coupled with frequent shopper data are also examined. Using algorithms developed by Data Ventures, a U.S. software service provider, estimates of consumer responses to fast-moving SKUs can be made. This method compares patterns of frequent shoppers' behavior and matches these with existing out-of-stock situations. The findings are presented in the table below in Exhibit 18 and represent a single store chain. The method cannot distinguish between purchasing the item at another store and not purchasing the item at all. These two consumer response categories are combined into the lost sale category.

Exhibit 18 Consumer Response to OOS Using Item Velocity Measurement

Product Group Measured	Lost Sale (LS)	Delay (D)	LS+D (Retailer Immediate Loss)	Substitute Same Brand	Substitute Other Brand (Mfr Loss)	Total Substitution
Top 2000 SKUs	66%	4%	70%	15%	15%	30%
Top 100 Private-Label SKUs	56%	2%	58%	20%	22%	42%
Top 100 Manufacturer SKUs	48%	5%	53%	24%	23%	47%
Diaper Brand A	67%	7%	74%	12%	14%	26%
Diaper Brand B	49%	1%	50%	39%	11%	50%
Detergent Brand A	52%	6%	58%	42%	0%	42%
Detergent Brand B	1%	1%	2%	0%	98%	98%
Paper Towel Brand A	47%	8%	55%	20%	25%	45%
Paper Towel Brand B	5%	4%	9%	35%	56%	91%
U.S. Survey Data (Benchmark calculated from Exhibit 11)	**43%**	**17%**	**60%**	**20%**	**20%**	**40%**

The above table shows that overall, the use of a different measurement system provides similarities and differences with the traditional measurement system. First, the major similarity is shown by the aggregate "immediate not purchase" vs. "total substitution," which are the two most basic responses to an OOS. Using item velocity measurement, the top 2000 SKUs (the 2000 items in the store that sell the fastest) show a 70 percent / 30 percent ratio of not purchase / substitution. On the other hand, the top 100 private brand SKUs have a 58 percent / 42 percent ratio, and top 100 Manufacturer SKUs have a 53 percent / 47 percent ratio. This is similar to the U.S. survey data of 60 percent / 40 percent ratio (see Exhibit 11).

Second, the above table shows large differences among categories, although only individual brands within categories are provided here. What it also shows — what the other surveys studied for this report do not reveal — was the extreme differences among items within a category. Some brands show considerably more loyalty than others.

It is also worthwhile to note the large number of lost sales for the top 100 private label SKUs. This may be due to the economic ability of the consumer of private label products. Since substitution from a private label would generally require a higher-priced branded product, these consumers may be unable to substitute effectively due to economic constraints. This also adds to the urgency for retailers to address OOS, since private-label products often carry larger retail margins than branded products.

The differences between the Data Ventures measurement system and traditional survey methods provide both advantages and disadvantages. A disadvantage since the Data Ventures method can only measure items that sell regularly, it is mainly effective at measuring OOS of the fast-moving products in a category. However, these are the items of most interest to managers when addressing OOS situations. As a key advantage, this method can provide more precise data on consumer substitution. It can show whether the substituted item is larger or smaller, more or less expensive, and the same or a competing brand.

9. Comparison of Consumer Responses With Previous OOS Studies

Several previous studies have examined consumer responses of OOS situations. In terms of total sample size, the survey presented here represents the largest number of consumers ever examined and provides key insights as to how consumer behavior varies both across countries and across categories.

As a summary comparison, Exhibit 19 shows how the findings from this study compare with data previously presented in other studies. Since not all studies reported the same five categories of consumer responses, data are combined into the two overall categories, following the two highlighted categories in Exhibit 18, "Retailer Immediate Loss" and "Total Substitution."

Comparison of Overall Consumer Responses With Previous Studies

Study:	Retailer Immediate Loss	Total Substitution
U.S. Data, 11 categories (from Exhibit 11)	60	40
Worldwide Data, 8 categories (from Exhibit 12)	55	45
Schary and Christopher, 1979, UK	78	22
Data Ventures top 2000 SKUs, 1999, U.S.	70	30
Campo, et al., 2000, Belgium (Two categories)	45	55
A.C. Nielsen, 1962, U.S.	42	58
Coca-Cola Retailing Research Council, 1996, U.S.	40	60
GMA DSD, 2002, U.S.	40	60
National Association of Convenience Stores, 1998, U.S.	29	71

Exhibit 19

10. Final Questions Regarding Consumer Responses to OOS Situations

Much of the differences among studies can be attributed to the methods used to collect the data and the categories examined. However, all studies show that both manufacturers and retailers incur losses when consumers face OOS situations.

This study did not directly address several key questions concerning consumer responses to OOS situations. However, through the data obtained for this study along with the insight provided by previous studies we examined, we are able to offer some insight to these questions.

Why Consumers Take One Action Over Another when Encountering an OOS?
Several factors affect the consumer response to OOS items. Traditionally these have been categorized based on the nature of the category, type of product, type of consumer, the immediacy of need, and the general brand loyalty. However, all of these factors interact, making it difficult to develop a generalized scheme to determine the likelihood of a consumer's reaction.

To present a generalized approach, similarities in multiple academic consumer research studies that have examined this issue were found. All suggest that three primary drivers interact and cause the consumer to take one action over another. Using economic theory, Campo, Gijsbrechts and Nisol (2000) present the opportunity cost of not being able to consume the product immediately, the substitution cost of decreased use of a less-preferred alternative, and the transactions cost of the time and effort required to obtain the preferred item. Using the Campo, et al. terminology, Exhibit 20 was constructed to show how the levels of each of the three cost components interact to explain a consumer's likely response to an OOS situation.

Exhibit 20

Consumer Cost Components and OOS Behavior

When the Opportunity Cost Is . . .	And the Substitution Cost Is . . .	And the Transaction Cost Is . . .	Then the Consumer Will . . .
High	High	Low	Buy Item at Another Store
Low	High	Low	Delay Purchase
High	High	High	Substitute – Same Brand
High	Low	High	Substitute – Another Brand
Low	High	High	Not Purchase Item

When the opportunity cost of not being able to immediately consume the product is high (for example, when one runs out of diapers), the consumer will either substitute or find the item at another store. Alternatively, a low opportunity cost will lead to either purchase delay or cancellation. When the substitution cost of using a less-preferred brand is high (for example, in the case of feminine hygiene and laundry), the consumer will take any action except to substitute another brand.

When the transactions cost is high (the time and effort to purchase later or elsewhere), the consumer will either substitute or cancel purchase outright.

Each individual cost component is limited in its ability to explain the consumer response. However, Exhibit 20 shows how the different reactions can be explained by the interaction of the three components. This perspective demonstrates when some categories are more difficult to switch than others. For example, we found that feminine hygiene showed low substitution rates. Since these are very personal products, there is a high substitution cost. However, when the brand is less personal (e.g., paper towels), more substitution between brands may occur.

When and How Generic Demand/Consumption is Affected by OOS?
The way to view the effect of OOS on aggregate consumer demand is to examine the consumers' willingness to cancel purchases. Thus, the salted snack category experiences lowered demand in an OOS situation, while categories like feminine hygiene, diapers, toilet tissue, etc., are influenced mainly by primary consumer need. Most of the categories we examined in this study had very low scores for "did not buy item." In each of these cases, consumers have little choice in the amount they consume, and an OOS may affect the timing of their purchases, but it will not affect the use of the product.

To What Degree do Consumers Permanently Switch Stores Based on OOS Levels?
While the study examined here shows the willingness of consumers to switch stores to purchase an item that is OOS, it does not measure the effect that OOS has on permanent store switching behavior. In general, there is little reliable research that examines permanent store switching due of the influence of out-of-stocks. The difference between losing a customer for a single item as opposed to losing a customer for good has been referred to as sales loss risk or shopper loss risk (Exhibit 21).

Risks of OOS

Sales Loss Risk	**The risk that a consumer will go to another store to purchase the desired item that was out-of-stock**
Shopper Loss Risk	**The risk that a consumer will switch the majority of their regular shopping to another store due to encountering out-of-stock items**

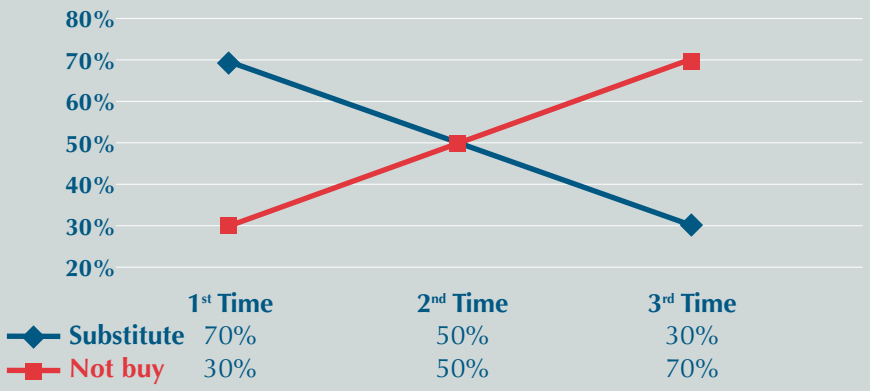
Exhibit 21

One study that did directly examine this issue is the National Association of Convenience Stores study (1999, U.S.). This study found that categories with higher planned purchases face higher shopper loss risk due to OOS, while those with lower planned purchases face only sales loss risk. The study reported that *when a consumer faces an OOS in a planned purchase category, the shopper will permanently switch stores after an average 2.4 such experiences.* Because the retailers measured for the study were convenience stores (and an OOS in a planned purchase is the opposite of convenience), we would expect permanent store switching is expected to be higher for this channel than for other retail channels (e.g., mass, drug, grocery).

One of the proprietary studies that was examined for this report tracked customer behavior for repetitive OOS. Findings in this study say that consumers would reduce their substitution as they encountered repetitive OOS situations (as illustrated in Exhibit 22). While this does not directly measure permanent store switching, it does indicate that consumers will increasingly fill their needs at other stores when presented with consistent OOS situations.

Exhibit 22

Response to Repetitive Out-of-Stocks



	1st Time	2nd Time	3rd Time
Substitute	70%	50%	30%
Not buy	30%	50%	70%

Thus, permanent store switching is a function of three interrelated factors:

- ✓ The total number of planned purchase items that are OOS during a single store visit.
- ✓ The frequency with which the consumer experiences OOS (percentage of visits that the consumer is disappointed).
- ✓ The importance of the product to the consumer.

Overall, consumers will — all other factors being equal — go to the store that has fewer out-of-stocks of their desired products. A store that continually disappoints its customers will lose those customers to stores that provide more satisfying experiences.

In OOS Situations Where the Consumer Substitutes, is the Tendency to "Buy-Down" in Terms of Price and/or Size as Opposed to "Buying Up"?
Previous OOS studies note that when confronted with an OOS on the desired brand, if both a larger and a smaller size of the same brand are available, the tendency is to select the smaller size.

When another brand is substituted, the tendency is to select a cheaper substitute. The analysis by Data Ventures examined for this study confirms this notion. This general tendency is consistent with a general risk-averse tendency of the consumer. Smaller and/or cheaper lowers the economic and total usage risk of an unknown substitute.

C. Causes of OOS

From the many studies we examined, we found that both the range of causes as well as the appropriation of causes varies significantly. This makes finding a reliable consensus somewhat challenging. However, several commonalties emerged which allowed us to draw several conclusions as well as make additional observations.

Previous studies have placed most of the responsibility for OOS on retailer store ordering and forecasting practices. Retailer store managers must simultaneously manage thoU.S.nds of SKUs and work with hundreds (often thoU.S.nds) of simultaneously promoted items (which cause demand to fluctuate), while keeping personnel costs in reason. Furthermore, retailers face complementary issues such as shrinkage that becomes more difficult to control as inventories increase. Thus it is not surprising to see a strong linkage of OOS with store ordering practices. However, the story is more complex.

Summary of Findings of OOS Causes

Worldwide Average

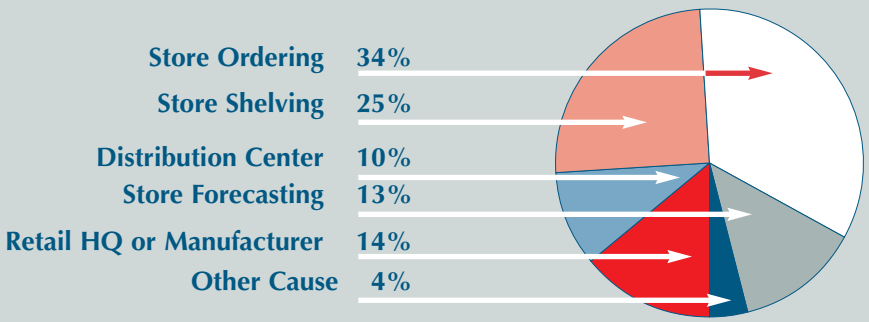


Exhibit 23

As shown in Exhibit 23, between *two-thirds and three-fourths* of OOS are caused in the store, while *one-fourth to one-third* are due to upstream causes at the distri-

bution center or headquarter level. If the causes are sliced by retail processes, *almost half* of the assigned OOS cause is related to ordering problems (i.e., retailers ordering too late or in insufficient quantities) often because they have inaccurate or unreliable forecasts. This is particularly the situation in the U.S.

To the surprise of some study analysts, *about a third* of the causes can be attributed to replenishment problems, predominantly having the product in-store but not getting it onto the shelves. Additional replenishment problems concern the material flow from warehouse to the store. Finally, *one-fifth* of the causes are due to planning decisions and management problems, which include inadequate shelf-space allocation, low planogram compliance and lack of communication between the retailer warehouse and headquarters. Thus, while the retailer is directly linked to the OOS (for example, through insufficient ordering), much of the responsibility rests further up the retail organization or in the supply chain.

The remainder of this section examines the common processes categories where root causes and the responsibility for OOS are typically assigned. Next, a summary of the root causes as reported from several studies examined for this report is presented. A summary of the findings as well as a discussion of examining root causes by using different methods of measurement concludes the section.

1. OOS Causes By Region

The examination of 18 studies worldwide provided the following general ranges and tendencies of OOS causes. These are summarized in Exhibit 24. The studies that provided the most reliable measures were segmented into three regions: U.S. (6 studies), Europe (10 studies), and Asia (2 studies). This enabled the comparisons to be made by region that are reported here.

Typically, causes of OOS tend to be assigned to one of the following three general processes: ordering, replenishing and planning.

- ✓ **Ordering Practices.** This covers two general categories. First, the retail store may have ordered too little or too late so that the warehouse could not deliver before the retailer ran out of the item. Second, the retailer forecast may have misjudged demand for an item and ordered an insufficient supply. Often when an item is promoted, inadequate supply is ordered to meet demand. Other ordering practices affect these categories also, including insufficient ordering by the warehouse, when a major promotion by the chain may have caused demand to exceed supply.
- ✓ **Replenishment Practices.** In this case the product is in the store (often in the backroom, but also sometimes in another area of the store), but it is not on the shelf when the consumer comes to buy the product. This can be caused by inadequate shelf space allocated to the item so that it runs out before regular restocking occurs, lack of an adequate signal to retail management that the product is not on the shelf, or poor back-room inventory handling procedures that impede the ability of store personnel to get product from the back-room inventory onto the shelf.

Replenishment issues also occur upstream from the retail store. On the warehouse level the warehouse may have insufficient inventory to meet demand and "scratches" the retailer's order.

✓ **Planning Practices.** This category covers several possible causes. The item may have been discontinued but that information may not have been communicated to the retailer. The manufacturer may not have shipped adequate inventory, or there may be a product "drought" where the manufacturer is unable to produce enough to meet demand.

It is important to note that in these studies, the root causes are estimated or calculated rather than directly measured. For example, if an item is out-of-stock and was ordered at the most recent opportunity, the assumption is that the retailer ordered too little to meet demand, and, thus, the cause would be assigned to retailer forecasting. Alternatively, if the item was not ordered at the most recent opportunity, then the assumption is that the store ordered an insufficient quantity. This is why the assigned causes may not be true "root causes" but simply the most plausible place to assign responsibility. In some cases, this may reflect the symptom rather than the cause.

Given the differences in methods and reporting of root causes across the studies, it is difficult to present averages confidently. However, several insights can be made from examination of the data presented here. Exhibit 24 presents a simple average of all of the 18 studies. A detailed listing of the studies examined and the reported causes for each is presented in Appendix D. It is important to use these averages as benchmarks, because they may not necessarily represent true worldwide averages. However, given the relative consistencies across the various studies, many observations can be made. The first three causes are the direct responsibility of the store, while the last three causes are upstream responsibility.

OOS Causes by Region

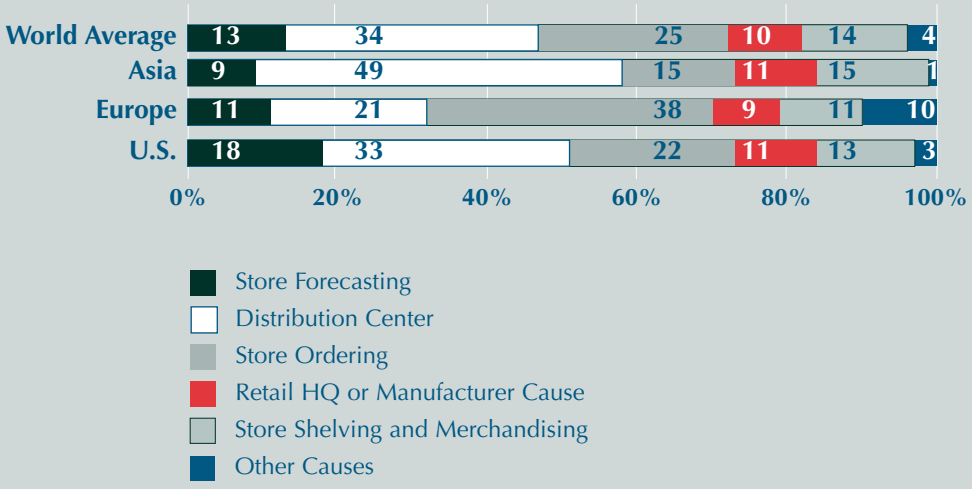


Exhibit 24

Worldwide, the two greatest causes are inaccurate forecasting (34 percent), an indicator of increasing demand volatility, and shelf-replenishment (25 percent). The latter is particularly surprising when compared with the much-cited 1996 Coca Cola Research Council study. While this study attributed a higher percentage to ordering (19 percent) and forecasting (54 percent) it traced an average of only 8 percent of the OOS situation to product being available in the back-room but not on the shelf. Similarly, the 2002 GMA study on DSD categories showed only an average of about 4 percent OOS where product was available in the back room but not on the shelf. However, in nearly 25 percent of OOS, product could be found in a secondary location in the store. This may be characteristic of DSD categories. In the proprietary studies we examined, where it was specifically measured, study analysts found much greater responsibility attributed to having products in the store but not on the shelf.

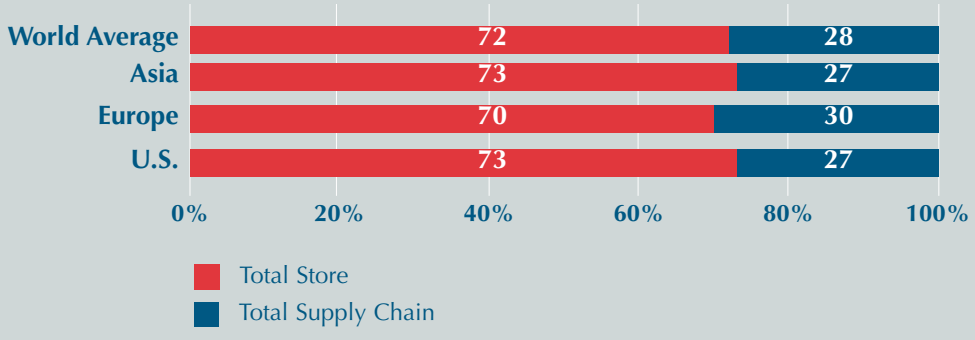
Although (or because) most manufacturer efforts that address OOS are directed to the warehouse, this represents only 10 percent of the root cause. Clearly, if manufacturers and others want to see reductions in OOS levels, they need to address the more prominent issues of store ordering, forecasting and replenishment.

Study analysts were surprised to find that in the United States, significantly more causes of OOS are attributed to ordering practices (51 percent) than in Europe (32 percent). On the other hand, in Europe there seem to be more problems with replenishment (47 percent) than in the U.S. (32 percent), particularly shelf replenishment especially when the product is already in the store. This is counterintuitive, as one would have guessed that smaller back rooms and efficient transport networks in Europe would alleviate this cause. Asia seems to be slightly worse in the area of ordering; however, the Asian sample is very limited.

Somewhat striking, 72 percent of all OOS across the world are caused in the store by bad store practices, by late and insufficient ordering, wrong forecasts, or shelf restocking problems. Interestingly, as demonstrated in Exhibit 25, the aggregate number is almost the same in the United States, Europe and Asia.

Exhibit 25

Aggregate Store OOS Responsibility Is Similar Worldwide



Another way to examine OOS causes is to slice them by management process, whether they can be attributed to ordering, replenishing or planning. (See table below.) Each can then be examined by the responsibility level (whether they occurred in the store, at the RDC/distributor or at the retailer or supplier headquarters).

Overall, we find that almost half (47 percent) of the causes are attributed to ordering practices, more than a third (35 percent) to replenishment practices and almost a fifth (18 percent) to management decisions and other problems. Exhibits 26 and 27 illustrate the allocation of the OOS to specific processes as well as showing where the responsibility rests.

OOS Causes by Process and Responsible Entity

Exhibit 26

Worldwide Average

	Ordering	Replenishment	Planning	Total
In-Store	47%	25%	——	72%
Supply Chain	——	10%	18%	28%
Total	47%	35%	18%	100%

Detailed OOS Causes by Process

Exhibit 27

Worldwide Average

	Store Ordering	Store Forecasting	ORDERING	Store Stocking	Warehousing	REPLENISHMENT	Management	Others	PLANNING
U.S.	18%	33%	**51%**	22%	11%	**32%**	13%	4%	**17%**
Europe	11%	22%	**32%**	38%	9%	**47%**	11%	10%	**21%**
Asia	9%	49%	**58%**	15%	10%	**25%**	16%	0%	**16%**
World	13%	35%	**47%**	25%	10%	**35%**	14%	4%	**18%**

Ordering Problems (47 percent)

Ordering problems are caused predominantly by inaccurate inventory, bookkeeping or forecasts that lead to late orders or no orders at all. Study analysts were surprised to find that in Asia and in the U.S., significantly more causes of OOS are attributed to ordering practices (58 percent and 51 percent) than in Europe (32 percent).

If late ordering is an indication of a process problem (e.g., inadequate attention to reorder necessities), then wrong forecasting may be a sign of volatile demand (e.g., influenced by promotions). In this sense, in the U.S. there may be too little focus on reorder patterns whereas in Europe demand may be more volatile leading to inaccurate forecasts. Forecasting also seems to be the major problem is Asia. However, some of the studies did not make a clear division between ordering and forecasting, so conclusions must be drawn with care.

Replenishing Problems (35 percent)
Typical replenishing problems stem from store practices of infrequent, late or no shelf filling, congested backrooms where stock was not found or damaged, bad planogram execution, insufficient or busy staff, or simply unreliable store processes. At the distribution-center level, stores can be replenished infrequently, late or not all. Supply chain causes include long lead times, inaccurate deliveries and production or supply problems.

We found that in Europe, more problems with regards to replenishment (47 percent) than in the U.S. (32 percent) or in Asia (25 percent). In particular, shelf replenishment poses huge problems. In Europe more than a third (38 percent) of the OOS are caused by products that are in the store but not on the shelf. In the U.S. (22 percent) and Asia (15 percent) these rates are considerably lower. This is counterintuitive, as study analysts deducted that due to smaller backrooms and efficient transport networks, these causes would be less frequent in Europe.

OOS that are caused by products that are available at the RDC/distributor but do not get shipped to the store seem to be equally distributed through out the world.

Planning and Related Problems (18 percent)
These OOS causes consist of a mix of category-planning-related problems, including assortments, advertising, promotions and standard product planning, plus inadequate shelf space allocation. It also includes data and communication problems, such as incorrect master data when SKUs are newly introduced or discontinued. No significant differences were found in planning-related causes throughout the world as the above table shows. However, in Europe 10 percent of the causes of OOS are attributed to "other causes," e.g. joint planning problems that are difficult to specifically attribute to any one party or cause.

Manufacturer Capacity Constraints
Few studies provided any information regarding the amount of OOS that can be attributed specifically to the supplier being unable to produce enough product to meet demand. In general, any specific references to this constraint also bundle this root cause with ones that reflect a lack of communication between the manufacturer and the retailer, and/or other communication issues (such as discontinued items that retail stores continue to order). Regardless, based on the little information in the studies, manufacturer product (i.e., ability to place adequate stock in

the supply chain) supply issues would be 3-4 percent maximum. This would likely vary by category, and this variance would depend on raw material supplies, factory capacity and consumer willingness to substitute.

Conclusion

In general, previous studies have shown that retail store practices are responsible for 80-90 percent of OOS. In comparison, this study shows an approximate 70-75 percent retail store responsibility. Although these findings are lower, it still means that most of the attention given to resolving OOS issues needs to begin at the retail store.

Alternatively, one must keep in mind that retail store practices are not independent from supply chain practices, whether these occur at the retail headquarter or at the manufacturer. Even when the upstream channel members may not be the direct link to the measured OOS on the shelf, they cannot be absolved from any responsibility for affecting the OOS problem.

3. Other Explanations Or Attributions of OOS

In addition to the root causes examined in this report, some studies attributed out-of-stocks to a variety of causes that are related to but do not exactly match the five general categories above. These include the following causes.

- ✓ **Inadequate Shelf Capacity:** Mentioned twice previously in this report, this issue needs to be emphasized again. One of the obvious reasons that some items are OOS is that adequate shelf space has not been allocated to the SKU. Some products that are OOS have limited shelf capacity relative to their demand. With shelf space as a scarce commodity in the retail store, many slow-moving products occupy an inordinate amount of shelf space compared to their movement. These crowd the space available for faster-movers. In spite of this obvious cause, none of the studies examined have specifically addressed or empirically tested the potential impact of reallocation of shelf space on OOS levels. One of the constraints in reallocation is the common practice of allocating shelf space based on case-pack size. The minimum retail shelf allocation is normally determined by the size of a case pack (typical minimum space is 1.5 cases). This places a minimum constraint on available shelf space, which limits the remaining shelf space available for faster-moving SKUs.
- ✓ **Inverse Effect of Inventory:** Of interest, it was found in this study that the amount attributed to this cause was inversely correlated with the general inventory carried in the store. That is, the greater the inventory that is warehoused in the backroom of the store, the greater the portion of assigned OOS to this cause. While this initially seems counter intuitive, logically it makes sense. Assigning the cause to "in store but not on the shelf" takes away the ability to blame insufficient ordering as an alternative cause. However, it may also be that too much safety stock hides the true causes of OOS that wreak havoc once the safety stock wears off. The ECR Australasia report states, "Experience seems to point to inventories

being the cause rather than the solution to stock-outs. Excess inventories cause congestion in the supply chain and reduce the degree of synchronization between different replenishment processes."

- ✓ **Ad and Price Changes:** One study reported that ad and price changes were made up to 10 days prior to the release of the ad. Coupled with inadequate communications with warehouse and store logistics and purchasing managers, this was reported as a source for nearly one-third of OOS that occur on advertised items.
- ✓ **New Product Phase In and Out:** OOS frequently occur when products are phased in or out of the marketplace. This requires system changes and a host of communication breakdowns can occur.
- ✓ **Manufacturer Minimum Order Sizes:** One upstream issue is that of minimum order sizes from the manufacturer or upstream channel members. Minimum order sizes can lead to delaying an order, and this increases the risks of OOS.

One study went so far as to detail 94 possible root causes for OOS. However, for obvious reasons the actual analysis was never completed. Exhibit 28 provides a list of potential causes of OOS collected from the various studies examined in this report.

4. Determining Root Causes of Retail Chain Characteristics

Root cause analysis is traditionally measured by manual audits. A typical flow chart for the manual audit process is shown in Appendix D, Part 2. An alternative way to measure root causes is through the methodology employed by Data Ventures, a U.S. software and service provider, to estimate OOS based on product velocity. This method examines store-scanner data for multiple stores (such as an entire chain or a regionalized group of stores).

A key piece of information that his method provides is showing the number of stores in which an item is simultaneously out-of-stock. Examining simultaneous stock-outs provides insight into the probable cause of the OOS situation.

For example, consider a chain or regional group of 11 stores all served by the same warehouse. If an item is OOS at one or two stores, the root cause most likely rests at the store level and thus would be attributed to either store ordering or shelf restocking. This problem would need to be addressed at the store level. However, if the item is simultaneously OOS at three to five stores, there is likely a process problem caused by a policy, delivery schedule or promotion. In this case the problem would need to be addressed at both the retailer and the headquarters level. If the item is simultaneously OOS at six to 10 stores, then the cause is likely to be higher in the channel, and possibly due to inadequate ordering by headquarters for the warehouse. Finally, if the item is OOS in all 11 stores, a likely cause is at the manufacturer where the item may have been discontinued or otherwise in short supply.

Root Causes

Planning	Ordering	Replenishing
STORE		
• Incongruence between shelf capacity and replenishment frequency. • Product purchasing frequencies. • Large number of SKUs in assortment.	• Data (bad POS data, inaccurate records). • Forecasting (inaccurate forecast, long cycles). • Inventory (inaccurate inventory or book-stocks). • Ordering (no order, late order, wrong order, backorders).	• Staffing (insufficient or busy staff). • Backroom (congested). • Receiving (receiving errors, inaccurate records). • Shelf replenishment (infrequent, late or no shelf filling). • Planogram (bad execution and compliance). • Shrinkage (damage, theft).
DISTRIBUTION CENTER		
	• Data (bad data, inaccurate records). • Forecasting (inaccurate forecast). • Inventory (inaccurate inventory or book-stocks). • Ordering (no order, late order, wrong order, backorders).	• Transportation (shipping, loading). • Receiving (loading errors, inaccurate records). • Storage (put away/ break pack). • Replenishment (infrequent, late or no store replenishment). • Lead times (long and infrequent). • Shrinkage.
WHOLESALER/RETAILER HEADQUARTERS		
• Assortment (new or discontinued item). • Data and communication (master data). • Planogram design and implementation (shelf allocation). • Promotions and pricing decisions. • Advertising and display planning. • Store layout and service levels.	• Data (bad data, inaccurate records). • Forecasting (inaccurate forecast). • Inventory (inaccurate inventory or book-stocks). • Ordering (no order, late order, wrong order, backorders).	• Availability (shortage).
SUPPLIER		
• Assortment (new or discontinued item). • Data and communication (master data). • Promotions and pricing decisions. • Advertising and display planning.	• Data (bad data, inaccurate records). • Forecasting (inaccurate forecast). • Inventory (inaccurate inventory or book-stocks). • Ordering (no order, late order, wrong order, backorders).	• Availability (packaging, raw materials and ingredients).

Exhibit 28

In their analysis of a group of retail stores, Data Ventures reported the following distribution of simultaneous OOS that is presented in the table below (Exhibit 29).

Exhibit 29

Examining OOS Causes Through Simultaneous Occurrences

Simultaneous Occurrences	Percentage of Occurrence	Associated Cause
1 or 2 Stores	51 percent	Retail Store Ordering and Stocking
3 to 5 Stores	28 percent	Retail Store Process or Policy
5 to 10 Stores	19 percent	Headquarters
All 11 Stores	4 percent	Manufacturer

Note the interesting similarity between the sum of the two retail store-related causes above (=79 percent) and the retail store responsibility for OOS (=72 percent) that were drawn from the other studies (Exhibit 23) analyzed for this report.

The advantage of using this method of analysis is the reduction of labor required to determine OOS causes. This method can be deployed in a real-time situation, and thus it could quickly point management in the likely direction for an effective response.

D. The Financial and Managerial Implications of OOS

In this section we take the information from the extent and consumer response sections and estimate the implications that stock-outs have for the food and consumer packaged goods industry. First, an overview of the implications that were reported in the studies is examined, followed by estimating the typical costs of OOS based on the extent and consumer responses. These costs are analyzed for both the retail and manufacturer sections. Based on these costs, the "fixes" for OOS are outlined along with their costs. In order to see the benefits of managerial efforts that address OOS, some case examples of retailers that have invested in addressing OOS are featured. This leads to the final conclusion, summarizing findings in this report and making recommendations.

1. Defining the Implications of OOS

While most studies concentrate on the sales loss to the retailer created by OOS items, the total "cost" of stock-outs affects the entire supply chain and can be divided into four areas:

- ✓ **Retailer Shopper Loss Risk.** This deals with shoppers permanently switching stores due to OOS situations. Either the new preferred store has overall lower OOS levels, or it has lower OOS levels on items of greatest value to the consumer. In the aggregate, assuming heterogeneity in consumer

value on items, the store with a lower overall OOS level will lose fewer of its own customers and gain more customers from other stores.

- ✓ **Retailer Sales Loss Risk.** This is from three components: consumers buying the OOS item at another store, consumers canceling their purchase of the item, and the net difference created when consumers substitute a smaller and/or lower-priced item. This is calculated by combining the estimated lost sales percentage from the three components and multiplying this by the extent of OOS. The result provides an estimate of the percentage of the retailer's total gross sales that are lost due to items being OOS.
- ✓ **Manufacturer Shopper Loss Risk.** This area covers consumers switching to a competitor's brand within a category for not only the immediate but also ongoing purchases.
- ✓ **Manufacturer Sales Loss Risk.** This deals with consumers substituting a competitor's item or cancel a purchase.

Other implications of OOS include logistics and information inefficiencies in the supply chain. Irregular, fill-in and rush orders due to out-of-stock situations cause logistics-fulfillment inefficiencies. These are subject to demand amplification or the "bullwhip effect" where small shifts at the retail level become magnified further up the supply chain. Information inefficiencies are created when the ordering signals sent up the supply chain reflect a pattern other than true consumer demand.

The key to understanding the implications of OOS (as well as the benefits of addressing OOS at the retailer) is that the areas of loss are interdependent. A reduction in the sales loss to the retailer also reduces the resulting shopper loss risk, the risk to the supplier, and the resulting supply-chain inefficiencies. The retailer shopper and sales loss is addressed in more detail in the sections that follow.

Retailer Shopper Loss Risk.

Two of the studies examined for this study surveyed consumers to estimate the amount of retailer shopper loss. It is difficult to generalize on a wide scale, however, because in order to do so, many assumptions need to be made. These include among others:

- ✓ The frequency the customer visits the store.
- ✓ The value of the OOS item to the consumer.
- ✓ The number of pre-planned items the consumer wants to purchase.
- ✓ The expected duration of the OOS at the retailer.
- ✓ The availability of a convenient alternative retailer.
- ✓ The OOS level at the alternative retailer.

The critical consideration is the likelihood that a consumer will be satisfied when visiting the store. First, the greater the number of preplanned items sought by the shopper on that particular trip, the greater the likelihood that the customer will be

disappointed by an OOS. When the average OOS rate is 8 percent, then the consumer is likely to not find at least one of every 12 to 13 items on the shopping list. The odds that any shopper leaving the retailer store completely satisfied (i.e., finding every pre-planned item available) are extremely low.

Suppliers and retailers naturally focus on the availability of individual product lines, which can be as high as 99 percent. Customers on the other hand have a basket of goods on their mind and notice when either a product is missing or is not exactly what they wanted. Using the 99 percent availability as an example, if a shopper has 40 items on the shopping list with a 99 percent probability of each being available, the chance of getting the complete basket is 66 percent (99x99x99 ….. 40 times). However, when the worldwide OOS average of 92 percent availability is used, *the chance of the shopper being completely satisfied is less than 5 percent.* If acceptable substitutes are included, the rate is somewhat higher, but it is still much lower than most people imagine. Appendix E shows a table demonstrating the probability of completely satisfying a customer based on varying levels of availability.

Given this somewhat dreary scenario, it does not much matter that almost no reliable information exists that will provide a reliable estimate of shopper loss. What is clear is that a store with a lower OOS rate will net more customers (have fewer of their own customers leave and attract more customers from other stores) than a store with a higher OOS rate. Therefore, not to address OOS levels when competitors are addressing the levels places a retailer at a competitive disadvantage.

Retailer Sales Loss Risk.
Most of the attention in measurement has been in the area of retailer sales loss. This is typically estimated based on the following formula:

Percentage of Consumer Responses that Negatively Affect the Retailer x OOS Extent.
An additional loss due to lower price substitution can also be estimated and included in the percentage of consumer responses. Exhibit 30 shows how the retailer sales loss can be calculated based on the formula above. It also illustrates the results of this study. The data from the first three data columns (the percentage who buy item at another store, the percentage who do not purchase item and the percentage of reduced sales) are taken from Exhibits 13 and 15. The percentage of reduced sales is calculated by taking the sum of substitute – same brand and substitute – different brand, and then multiplying that number by an estimated amount that consumers will reduce purchases.

Based on the studies from Data Ventures that specifically examine the effects of substitution, a conservative estimate this of a 15 percent reduction of the intended purchase can be made. These three amounts are then added and presented in the column four: SUM: Total Sales Loss." The numbers for column five are taken directly from Exhibits 4 and 6.

Estimated Retail Sales Losses Due to OOS Items

Column:	1	2	3	4	5	6
	Buy Item at Another Store (%)	Do Not Purchase Item (%)	Percentage of Reduced Sales (1)	SUM (1-3): Total Lost Sales of OOS Items (%)	OOS Extent (%)	PRODUCT (Columns 4x5) Estimated Sales Loss (%)
Region (from Exhibit 13)						
World Average	34	8	7	49	8.3	3.9
U.S.	31	11	6	48	7.9	3.8
Europe	27	9	7	43	8.6	3.7
Other Regions	34	8	7	49	8.2	4.0
Category (2) (from Exhibit 15)						
Toilet Tissue	18	11	8	37	6.6	2.4
Hair Care	32	7	7	46	9.8	4.5
Laundry	26	7	8	41	7.7	3.2
Salted Snacks	15	16	9	40	5.3	2.1
Diapers	39	10	5	54	7.0	3.8
Fem Hygiene	40	5	6	51	6.8	3.5

(1) Substitution loss is estimated to be 15 percent of the total substitution, based on Data Ventures findings.
(2) Paper towel category in Exhibit 15 not included here due to lack of data on worldwide extent of OOS for the category.

Exhibit 30

Exhibit 31 graphically presents the results of the calculations in the above table. The worldwide benchmark average is 3.9 percent sales loss at retail due to OOS items. The regional averages, as well as worldwide averages by category, are also presented. The chart shows that overall sales losses are similar worldwide, with a narrow range from 3.7 percent to 4.0 percent. However, category sales losses vary dramatically from 2.1 percent to 4.5 percent. Regardless of how the data are cut, the implication is still the same: Both the manufacturer and the retailer have created value for the consumer, but nearly 4 percent of this effort is wasted because the retailer cannot extract the value from the consumer due to OOS items.

Sales Losses Due to OOS

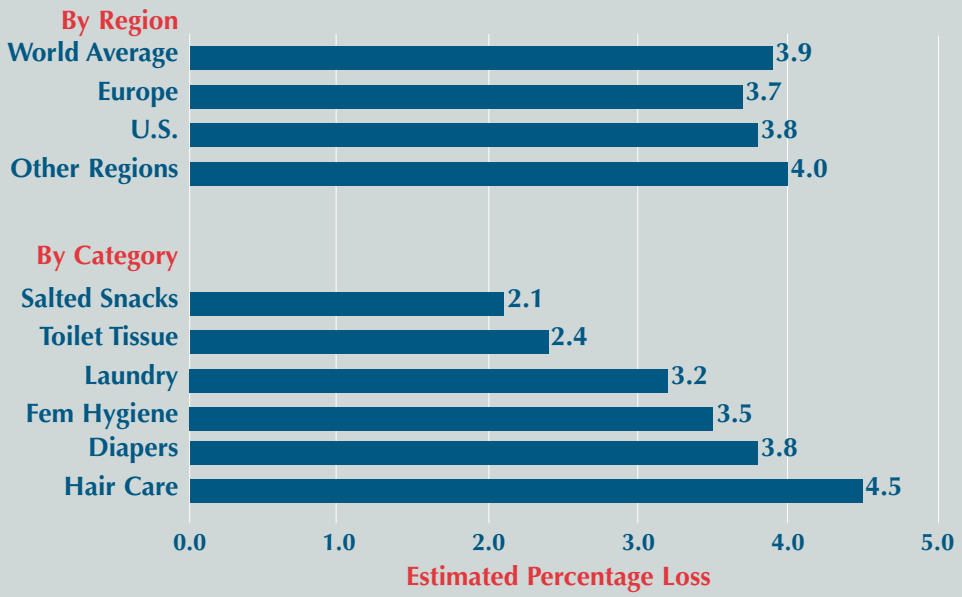


Exhibit 31

3. Reported Costs Of OOS

Several of the studies that were examined for this report had calculated or otherwise presented the implications for OOS. These are summarized in Exhibit 32. As with previous tables, the name of the store chain associated with the information is not shown due to the proprietary nature of the data.

The table clearly shows the value to the retailer of addressing out-of-stocks. Determining the size of the sales opportunity for an individual retailer is simply a matter of multiplying the estimated sales loss by the total sales (turnover) for that retailer. For example, a retailer with $1 billion total sales will lose approximately $39 million due to OOS items (based on the worldwide average estimate of 3.9 percent). Using a similar approach, the 2002 GMA DSD study estimated that 2.9 percent of sales were at risk due to OOS items.

One of the studies noted below calculates that OOS reductions trim shopping

receipts by $1.73 per shopper. Viewed in terms of a 4.0 percent sales loss, this translates into the average shopper's basket being reduced from $43.25 to $41.52.

This shows how OOS impacts sales but does nothing to reduce costs. Thus, the profit impact of incremental sales gained through fewer OOS is likely to be greater than the overall retailer profit. That is, if a retailer increases sales due to addressing OOS, the benefit comes through increased sales to shoppers that are already in the store.

Implications Specifically Reported in Studies

Study/ Report	Implications to Retailer	Comment
Spain (1)	Improved shelf availability will add 1.8-3.2percent sales.	Estimate based on measures of OOS extent in laundry and shampoo categories and assume 35 percent lost sales of OOS items.
Spain (2)	Improved shelf availability would add 4percent-5percent incremental sales.	Estimate based on measures of OOS extent in household cleaners and shampoo categories.
Spain (3)	Improved shelf availability would add 3.5percent incremental sales.	Estimate across 8 categories with avg. OOS extent 8.7 percent and 40 percent retail OOS.
Belgium	OOS reduces sales by 2.94 percent.	Estimate based on a single category.
Norway	OOS reduces sales avg. of 2.23 percent.	Estimate across 4 categories, range is 0.6 percent to 3.8 percent, depending on category.
Greece	Estimate $35 additional sales for each $1 cost to address OOS.	Source of cost estimate not reported.
U.S. (1)	Estimate a loss of $1.73 per shopping trip (3.1percent of sales).	Based on average 8.2 percent OOS rate.
U.S. (2)	Estimate of $271,000,000 sales loss in 4 departments.	Estimated from measured losses of $380,000 in four departments in three test stores. Percentage of total revenues that the four departments make up is not reported.
U.S. (3)	Estimate that a 50 percent reduction of OOS would result in $33 million in sales, $1.3 million profit.	Total sales opportunity is $66 million; profit margin is 4 percent.
U.S. (4)	Estimate lost sales of 11 percent on top 2000 items.	Demonstrates that prize of addressing top selling items is large.
U.S. (5)	Estimate potential loss of $75,000 annually per store in the top 25 grocery categories.	Total sales opportunity for boosting U.S. annual retail sales by 3 percent or $200,000 per average supermarket.

Exhibit 32

It is important to think of the averages as conservative estimates. One study in the above table shows that when examining the top-moving items only (instead of entire categories), sales losses are almost three times greater than the estimated averages. This makes intuitive sense because the fast-moving items account for a larger portion of the retailer's sales than a typical item.

Several of the studies mentioned in the previous section also reported (along with the costs and losses of OOS) the value obtained when reducing the level of OOS. This section summarizes the findings from these studies.

To the surprise of study analysts, only a few studies mentioned fixes that were undertaken to solve the problem of OOS. What at first may seem to be negligence turns out to be a bigger problem. While it is relatively easy to solve other problems – such as inventory reductions at the regional distribution center – the problem of OOS is a systemic problem that cannot be solved in a short-term initiative. As a matter of fact, while it seems that many retailers are interested in knowing what the extent of OOS is, few seem interested in understanding the root causes. Even fewer are willing to attack the problem as it goes right through the heart of their operations.

Reducing OOS requires changing processes in the stores, the supply chain and at the suppliers. It also requires the latest data and information technology, plus a passion for excellence and execution. Most of all, however, it requires management priority that is usually scarce, and, despite the adage that "retail is detail," often the love of details is missing in many organizations. Furthermore, the responsibility cannot be limited to the supply chain only. While execution is a problem, some of the root causes found in this study are in the marketing department and include ineffective category management, poor promotion and advertising planning, and simply not understanding the mechanics of price-quantity relationships that manifest as inaccurate forecasts.

The next section outlines several approaches recommended to address OOS.

Reliance on Safety Stocks

Logic would suggest that the level of OOS will be inverse to the level of safety stock at the store. However, that is not what this study found. Two studies examined for this report clearly showed that higher safety stocks correlated with higher OOS levels. Moreover, at a grand scale, the U.S. typically has higher inventories than European retailers, and, therefore, one would expect OOS rates to be lower in the U.S.. However, that is not the case.

OOS rates of North and Western European countries are slightly lower than the U.S. rate. Moreover, increasing inventory levels carry additional costs of financing, managing and shrinkage that reduce the benefits gained through lower OOS levels. Therefore, from the perspective of this study, the increase of safety stocks does not necessarily lead to a reduction in OOS, and the corresponding benefits are still elusive.

Reliance on Manpower

The NACDS study reports that solving OOS is one of the top four issues that retail managers address when working on the store floor. Therefore, management is already committing expensive managerial resources that address the OOS problem

but do not focus on solving any of the root causes. One option – such as that used by some retailers – is to commit a person to physically "walking the aisles" and looking for OOS items. Sainsbury (UK) terms this method, "PAM," which is the acronym for Physical Availability Monitoring. Even though Sainsbury targets 500 key SKUs with this process, the method only provides a "snapshot" of availability at a single point in time.

Over the short run, this may be a good option for retailers in that it will reveal many of the realities of the OOS situation, and it may also lead to enhanced processes for addressing out-of-stock issues. However, over the long run, the full cost of training and other labor costs may become prohibitive, especially when examined at the aggregate corporate level. Additionally, such action does not address the timing of OOS that occur throughout the day and not just at the time when a physical check is made.

Personnel and Turnover

One would expect that higher employee turnover to correlate with higher OOS levels. Thus, it is not simply the number of people required to address the problem, but also the experience of the personnel that will affect OOS levels. While evidence in this study is anecdotal, study analysts found that retail stores with longer tenured employees had lower OOS levels.

CPFR

Collaborative Planning, Forecasting and Replenishment (CPFR) promotes the use of common tools and processes to improve supply chain planning through accurate and timely information flow. This process requires timeline management, data standards and specific accountabilities to be used by all appropriate trading partners. It also requires that the basic planning data be identical for all trading partners, ideally based on point-of-sales scanning data.

The CPFR methodology was developed in the United States and became an initiative under the U.S. ECR before ECR was ended in the United States. CPFR has been adopted by VICS (Voluntary Interindustry Commerce Standards, www.vics.org), a U.S. organization and by ECR Europe (www.ecrnet.org). CPFR consists of a nine-step process that proceeds in the three building blocks (planning, forecasting and replenishment) and enhances coordination of all trading parties in a supply chain. It centers on the sharing of the following data: business plans, promotion plans, new product plans, inventory data, POS data, production and capacity plans, and lead-time information. Collaboration and alignment are the keys to success. CPFR has only been recently adopted, and the verdict is still out. However, case studies in the U.S. support the value proposition of CPFR. Kimberly Clark and KMart, Nabisco and Wegman's, and Procter & Gamble with Target, Kroger and Wal-Mart, and others report benefits such as reduced out-of-stocks, higher order-fill, improved forecast accuracy, higher inventory turns and higher category turnover.

In Europe 19 trials are under way, among others with Sainsbury's, Tesco, Metro, Procter & Gamble, Kraft, Unilever and Kimberly Clark. Initial findings suggest that forecast accuracy, fill-rate and in-store and on-shelf availability can be significantly increased and supply chain stock decreased.

Efficient Replenishment (Vendor-Managed Inventory, Cross Docking)
Efficient replenishment is one of the four basic tenets of ECR and describes a set of collaborative practices to replenish stock in all stages in the supply chain driven by true consumer demand and measured at the point-of-sale. The most widely used techniques, Continuous replenishment or vendor-managed inventory, represent new protocols for controlling the flow of information and product between a supplier and retailer. Retailers report daily to their suppliers their recent demand and current inventory position, and the supplier uses this information to determine the replenishment quantity and timing that optimizes supplier supply management without compromising the retailer's service level. While these systems have been successful in reducing supply chain inventory – or at least pushing it upstream – efficient replenishment is only indirectly effective in reducing OOS.

Category Planning and Shelf-Space Allocation
Issues on assortment (such as the total number of SKUs) and shelf-space allocation can affect OOS. Category reviews typically reduce the assortment of a category by 10 to 15 percent of the SKUs. This not only means that there are fewer SKUs to manage (fewer potential OOS), but it also frees up valuable shelf space occupied by very slow moving or redundant items. Thus, more freedom is provided for shelf space to be matched with demand. Category planning also includes enhancement of promotions where any changes in promotions, that are within four weeks can lead to the supply chain being unable to adequately match demand.

Technology and Better Signaling
Technology appears to provide promising solutions for addressing OOS issues. The key for technology is to be able to as quickly as possible, provide a signal to the retail manager that an OOS exists or may soon exist. This then makes other efforts to solving OOS issues more productive. For example, safety stocks can be pinpointed to support the items that are likely to be OOS on the shelf. Thus, safety stocks become part of the supply chain flow rather than inventory that is being held by the retailer. Second, manpower can be directed efficiently to filling in known or likely OOS, rather than be directed in a hit-or-miss approach across the thoU.S.nds of SKUs carried at the retailer.

Study analysts are aware of three models that have been publicly reported that address out-of-stocks. The first is a system built by and proprietary to Sainsbury's (UK) titled *Shelf Availability Monitor (SAM)*. A published Sainsbury's report states that SAM tracks the transaction data for the store's top 2,000 products and can be used to flag items that may be out-of-stock. The second model is a solution called *e-replenishment* that was developed jointly by IBM and IMI, a supply chain man-

agement vendor, and was unveiled at the National Retail Federation's annual convention in 2000. The system uses real-time point-of-sale consumer sales data to drive overnight replenishment through the supply chain. This system depends on inventory record accuracy, which may not always necessarily be complete. The third model is the solution discussed earlier in this report that was developed by Data Ventures and The Procter & Gamble Company. The *Item Velocity Monitor* predicts with 90 percent accuracy the OOS status for items that move four or more times per day. This can provide a real-time signal to store managers and does not depend on store inventory records.

These new solutions all share the ability to harness technology – as opposed to inventory or manpower – to address OOS items in a rapid basis. This provides the potential benefits of reduced OOS levels without committing high cost labor to address the problem. Furthermore, these provide the ability of linking the shelf OOS information to supply chain partners. While none of these reported solutions have provided cost information (to purchase and implement), the following case scenarios in the next section provide compelling reasons for industry companies to address OOS levels.

5. Examples of New, Best of Breed Scenarios

Examples are beginning to be reported in which retailers that address OOS find impressive results from their efforts and investments. The following cases are drawn from the published studies reviewed as background for this report. What is interesting about these results is that they demonstrate relatively large payoffs when reduction in out-of-stocks is addressed. Moreover, these reports only cover immediate sales gains and do not take into account other benefits garnered through reduced OOS, such as increased customer satisfaction and greater supply chain efficiencies.

- ✓ The National Association of Chain Drug Stores (U.S. 2000) conducted an experiment in which average in-stock levels were increased in test stores from 91.6 percent to 93.9 percent (a 2.3 percent increase in availability) on promoted items. The sales increase was 26 percent higher than that of the non-test stores.
- ✓ In another experiment, NACDS examined three laundry SKUs. Over a four-week period, a 14 percent increase in the number of days in-stock for these SKUs resulted in a 34 percent increase in sales.
- ✓ In an experiment at a French grocery retailer (franchisee of Carrefour), the IMI-IBM *e-replenishment* product was reported (Stores, 2000) to have increased the shelf availability level from 88 percent to 98 percent while reducing inventory 21 percent and substantially reducing the number of people involved in ordering. Sales increases were reported to be as high as 30 percent depending on the category.
- ✓ In Franklins Supermarket (Australia), a 2001 ECR study reports that reductions of OOS levels on 130 targeted products led to an increase of 5 percent of the sales of those items in a 20 week period. Coca-Cola and Procter & Gamble found higher results for their products, with 33 percent

and 14 percent increases in sales growth respectively.

- ✓ A report from China at the 2001 Asia ECR Conference boasted OOS reduction efforts (from 21 percent to 6 percent) produced a sales increase of 40 percent while reducing operating capital 33 percent.
- ✓ A report from the Europe at the 2002 ECR Europe Conference identified seven levers to improve OOS, namely measurement, management attention, replenishment and ordering systems, merchandising and promotion management as well as inventory accuracy. Initial findings from pilot trials with ten retailers – including Safeway (UK), A. Heijn (Netherlands), Spar (Austria), Del'Haize (Belgium), Auchan (France), dm (Germany) and Pingo Doce (Portugal) – are promising but need follow-up.

6. Conclusions

There are many lessons contained in the preceding pages, but what conclusions can be drawn?

- ✓ First, all of the studies examined for this report point to a common concern: OOS has been, is and will continue to be a problem. The aggregate extent we found of 8.3 percent (and the similar results found through other industry studies) continue to – and should – raise alarms throughout the industry.
- ✓ Second, OOS is costly. While the total costs to the supply chain have not been investigated, this study, along with others, have assessed the likely sales losses to the average retail store. We found that the worldwide average sales loss due to OOS is 3.9 percent.
- ✓ Third, not all OOS are the same. A slow-moving item that is OOS will be less costly to the store than a fast-moving item. Similarly, consumer substitution varies extensively among categories, affecting the retailer and manufacturer to different degrees.
- ✓ Fourth, duration of OOS is important. While techniques for measuring the duration of OOS are fairly new, the impact of long-term OOS problems affects not only the sales of the item but also the likely potential of a consumer to switch stores.
- ✓ Fifth, most of the responsibility for lowering OOS rests in the retail store. Unfortunately, manufacturers have placed their resources toward lowering OOS on solving supply chain problems. This focus will need to shift if the problem of OOS is to be addressed effectively.
- ✓ Sixth, it is important to understand the limits of projecting based on the findings of this report. The data were not collected in such a way that macroeconomic projections of the total cost to the industry can be confidently projected from these findings. However, any retailer can use the findings here as a benchmark when addressing OOS items. For example, if the retailer estimates sales losses as greater than our estimated average of 3.9 percent due to OOS items, the retailer will likely have a large payoff from addressing the issues. Alternatively, if the retailer estimates sales

losses as much less than 3.9 percent (for example if the losses are about 2.1 percent), then the payoff may be much lower.

- ✓ Seventh, examining consumers across the world, we found that shoppers are indeed localized in their choices. However, when their choice is taken away through a item being OOS, consumers behave in a similar manner globally. In the end, the retailers (and their supply chains) that satisfy customers will be those more likely to succeed.

Any way you look at it, the OOS problem remains a major issue for not only the retailers but also for all parties in the food and consumer packaged goods supply chain. As many retailers are beginning to address out-of-stocks with the newer technologically sophisticated solutions, they are setting a new standard in OOS levels that consumers will expect as the level required to earn their business.

Appendices

Appendix A

Listing of Studies Examined (52 Total Studies)

Published / Publicly Available Studies (16 Existing Studies Reviewed)

- ✓ Industry (Seven studies)
  - ECR Australasia (2001)
  - ECR France (2001)
  - ECR Asia /Thailand (2001)
  - Coca-Cola / Arthur Anderson (1996)
  - National Association of Convenience Stores (1998)
  - National Association of Chain Drug Stores (2000)
  - Grocery Manufacturers of America study of DSD categories (2002)
- ✓ Academic and Business Publications (Nine studies, bibliography follows)

New studies used in this report (36 New Studies)

- ✓ Consumer Studies:
  - Consumer Studies (2), North America, Outside of North America
- ✓ Retail Studies Conducted by Data Ventures
  - Retailer A: Conducted 1999
  - Retailer B: Conducted 2000
  - Retailer C: Conducted 2001
- ✓ Traditional Retail Audit Studies
  - U.S. (Five Different Retailers)
  - Europe (21 Total Studies)
    - Netherlands (3)
    - Norway
    - Denmark
    - Belgium
    - France
    - Germany
    - Switzerland
    - Spain (3)
    - Sweden
    - Greece
    - Turkey (2)
    - Czech Republic (2)
    - Poland (2)
    - Hungary
    - E. Europe (Four countries Composite)
  - Other geographic areas (Five Total Studies)
    - Taiwan
    - China
    - Philippines
    - Argentina (2)

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Appendix B

Consumer Reaction

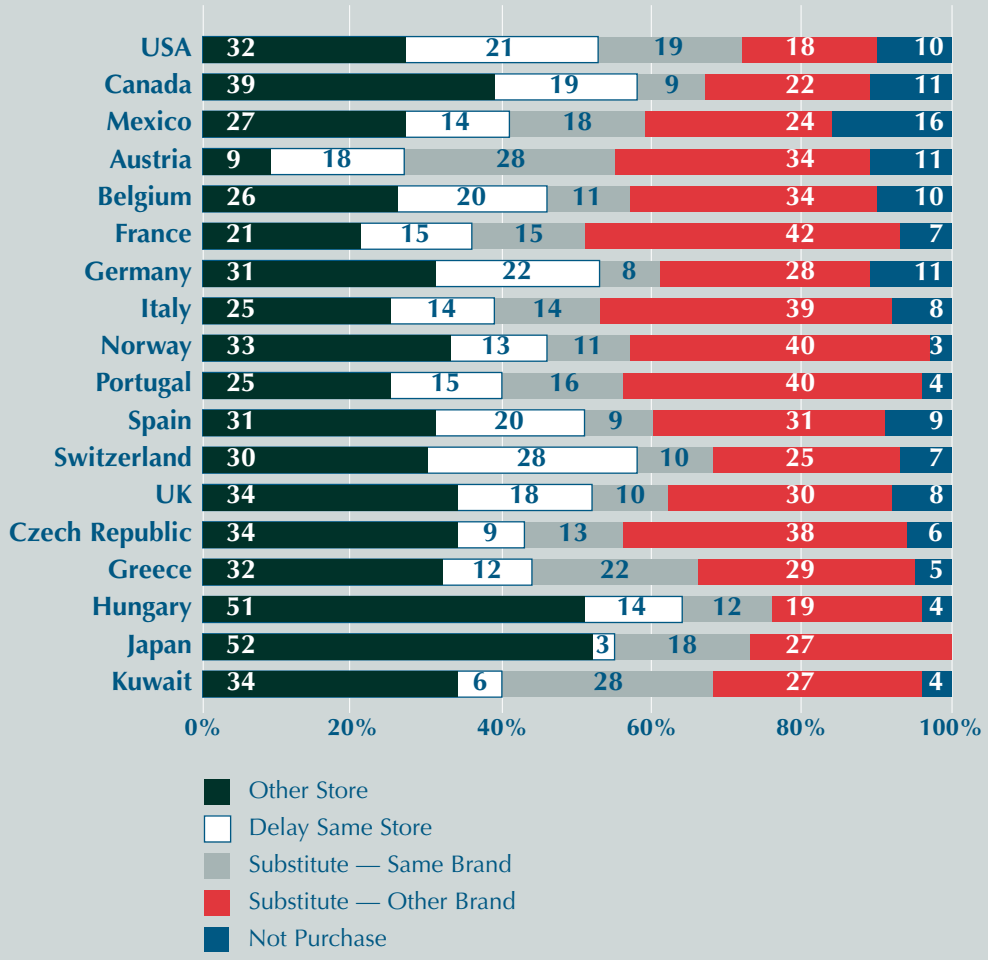
The following table provides a listing of the countries and sample sizes used to measure consumer responses in countries outside the U.S. (The U.S. study was conducted separately with a sample size of 23,000.) Generally a different market research firm was used to collect the data in each country. When multiple surveys were conducted within a single country, generally the same firm conducted each study.

Country	Sample Size	Country	Sample Size
Austria	1503	Kuwait	584
Belgium	1923	Mexico	Not provided
Canada	640	Norway	1157
Czech Republic	1559	Poland	1563
France	1780	Portugal (A)	1500
Germany (A)	5816	Portugal (B)	1036
Germany (B)	4570	Spain (A)	2213
Greece (A)	2028	Spain (B)	1789
Greece (B)	1032	Switzerland (A)	1542
Holland (A)	1758	Switzerland (B)	416
Holland (B)	872	Switzerland (C)	1347
Hungary	1504	UK (A)	1268
Italy	1476	UK (B)	1004
Italy	1027	UK (C)	2776
Japan	596	UK (D)	1763
		TOTAL SAMPLE	**48,042**

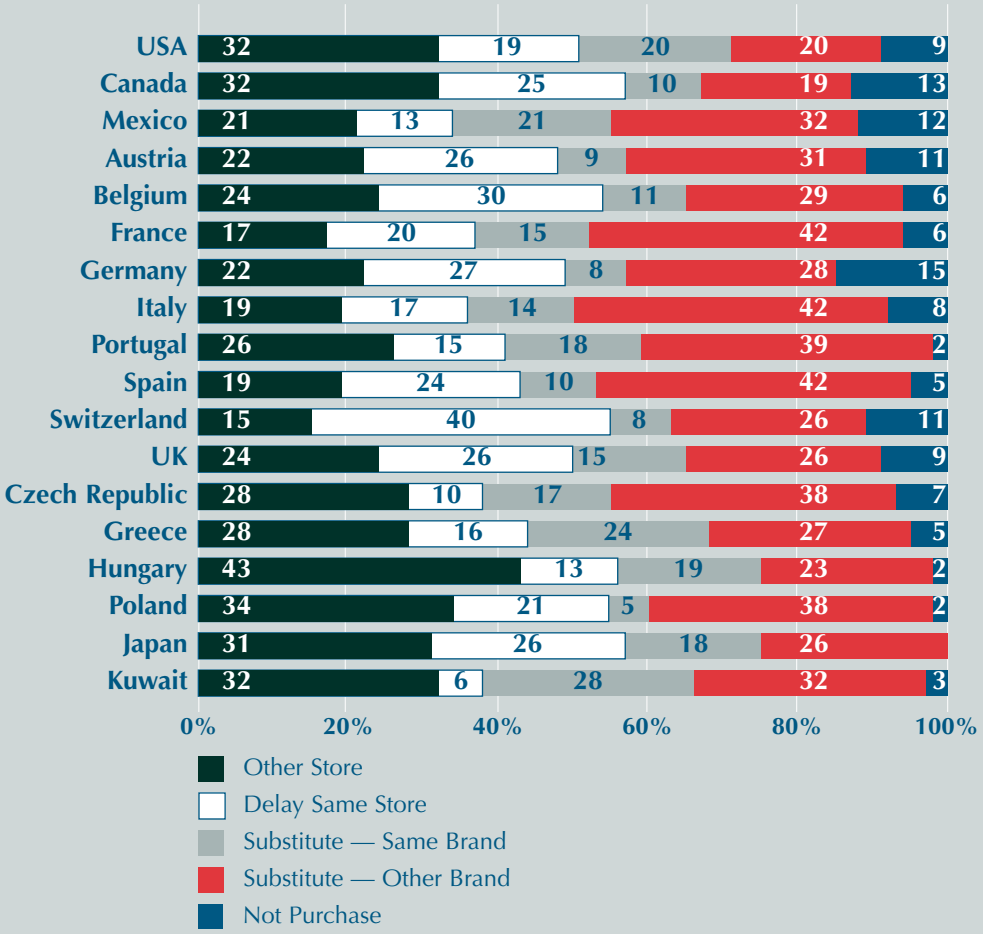
Charts of Consumer Responses by Country

Appendix C

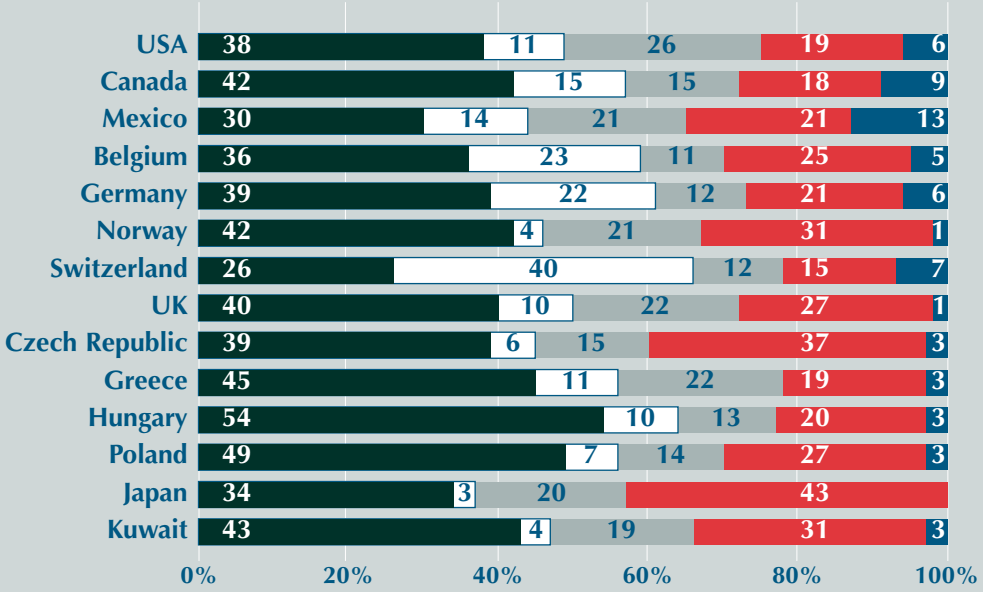
Shampoo/Hair Care (% Response)



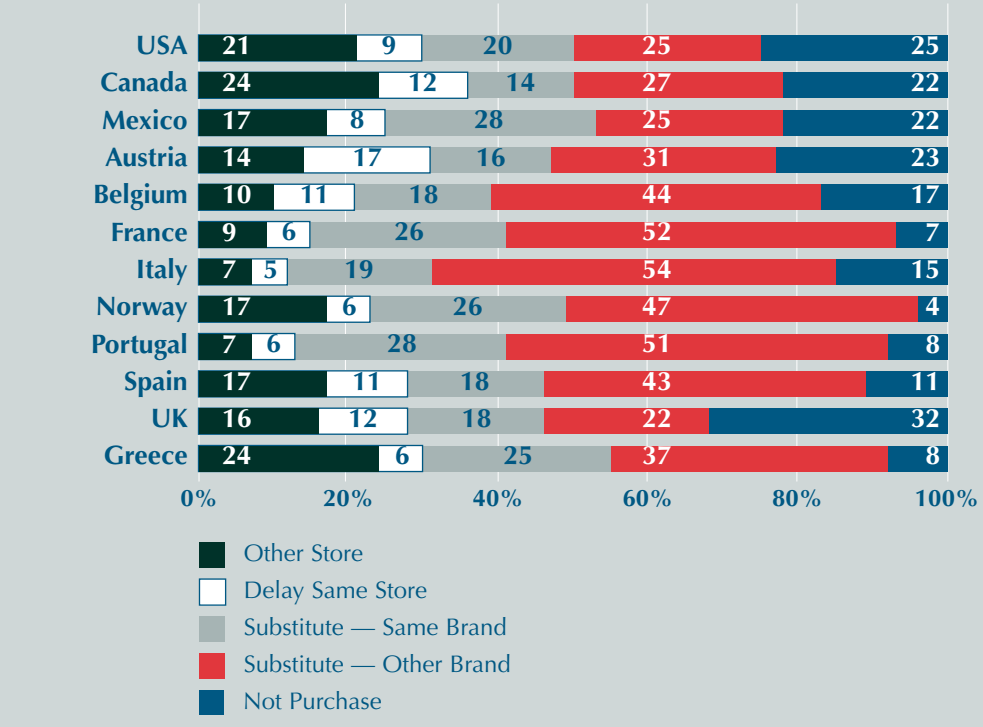
Laundry (% Response)



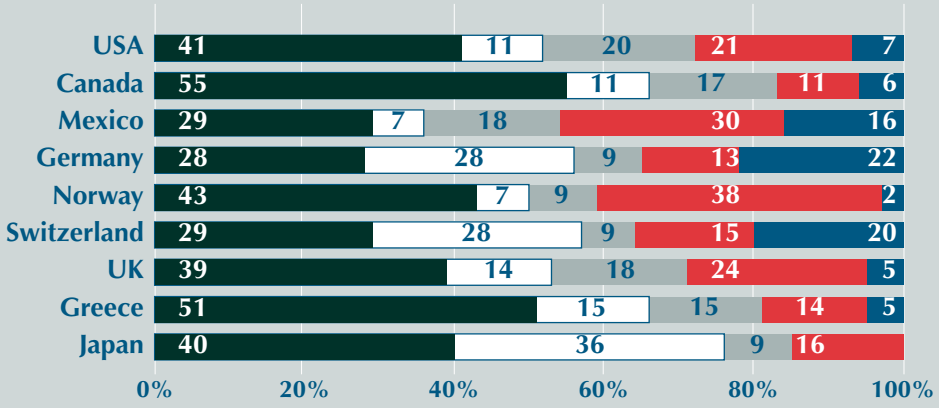
Feminine Hygiene (% Response)



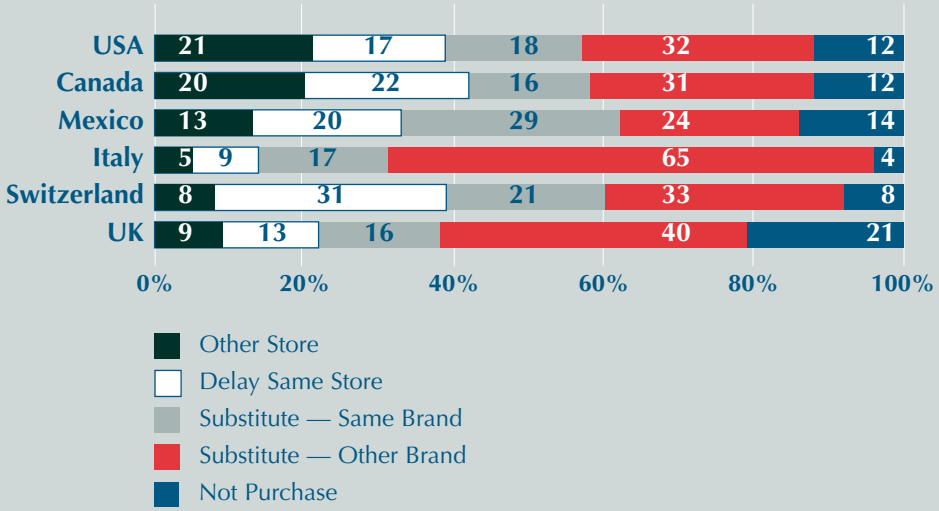
Salted Snacks (% Response)



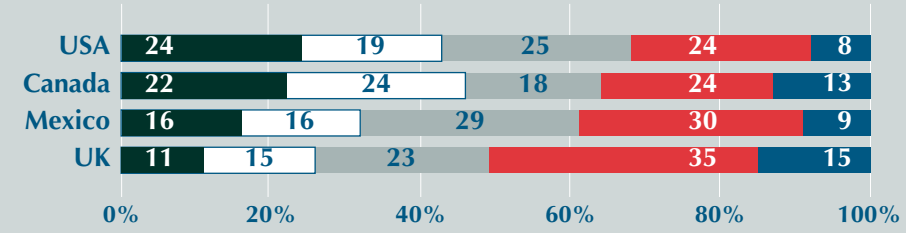
Diapers (% Response)



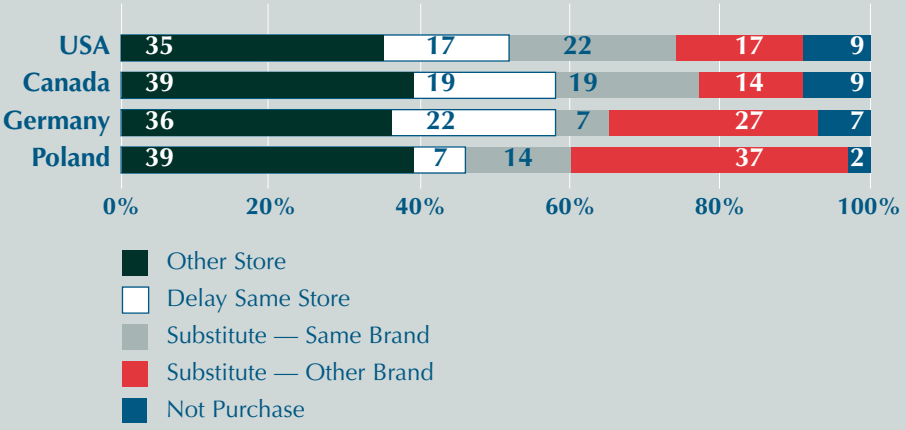
Paper Towels (% Response)



Toilet Tissue (% Response)



Toothpaste (% Response)



Appendix C

General Observations of Consumer OOS Responses in Various Countries

While there are not adequate categories to make composite comparisons for the countries not shown in Exhibit 16, the eight charts in Appendix C that show responses by country for each category, illustrate some consistencies and characteristics within countries. These findings are listed below:

- ✓ **Austria:** Somewhat lower store-switching accompanied with higher substitution of the same brand.
- ✓ **France:** Among the highest in substituting other brands (42-52 percent).
- ✓ **Germany:** Somewhat higher in purchase delay, otherwise generally reflects worldwide averages.
- ✓ **Italy:** Across all four categories examined, much lower than average store-switching accompanied with among the highest substitution of other brands.
- ✓ **Norway:** Low levels of delay and no purchase with correspondingly higher product substitution.
- ✓ **Portugal:** Except for salted snacks (where substitution is high), tend to reflect worldwide levels.
- ✓ **Spain:** Lower same brand substitution and higher other-brand substitution.
- ✓ **Switzerland:** Overall has a very high level of purchase delay. This could be due to either large home safety stocks, few choices of retail outlets, or frequent shopping trips.
- ✓ **Czech Republic:** Exhibit somewhat higher other-brand substitution and lower delay, but otherwise tends to reflect worldwide averages.
- ✓ **Hungary:** Very high store-switching.
- ✓ **Japan:** Behavior varies greatly by category. Diapers and laundry show a very high willingness to delay. Shampoo shows low level of delay accompanied by high store-switch, while feminine hygiene shows low level of delay accompanied by high other-brand switch.
- ✓ **Kuwait:** Tends to reflect worldwide averages.

Detailed Listing of Root Cause Studies Examined

Appendix D

Aggregate Root Causes to Six Major Cause Categories

(Percent)

Study[1]	Store Forecasting	Store Ordering	Store Shelving	Distribution Center	Retail HQ or Mfr.	Other Causes
U.S. 1	34	36	nm[2]	5	29[3]	0
U.S. 2	16	23	34	15	12	0
U.S. 3	nm[4]	50	nm	27	23	0
U.S. 4	24	50	nm	9	11	6
U.S. 5	nm[4]	66	nm	11	nm	23[6]
U.S. 6	nm[4]	52	26	22	nm	0
Netherlands 1	17	nm[4]	58	2	nm	23
Netherlands 2	nm[4]	15	26	19	18	22
Netherlands 3	9	7	55	13	nm	16[6]
Sweden	48	12	13	5	nm	16
Switzerland	nm	20	35	nm	15	30[6]
France (ECR)	18	30	32	15	5	0
Spain	nm[4]	27	51	nm	23	0
Greece	7	64	25	3	1	0
Poland	nm[4]	13	71	nm	16	0
E. Europe	nm	40	50	nm	nm	10
Taiwan	10	50	15	15	20	0
Australia (ECR)	nm[4]	58	18	8	16	0
Other Studies with Data but Not Used in Calculations for this Study:						
Coca Cola Research Council 1996 U.S.	19	54	8	3	nm	16
Argentina	18	32	30	nm	nm	20

Notes:

[1]Unless study is publicly available, studies are listed by country only.

[2]"nm" refers to "not mentioned."

[3]Linked to advertising planning changes, thus assigned to retail HQ as a process/policy cause. Total > 100percent due to overlap of HQ policy and retailer ordering.

[4]Cannot separate ordering from retailer forecasting; thus, they are combined. Overall, they refer to overall store ordering practices.

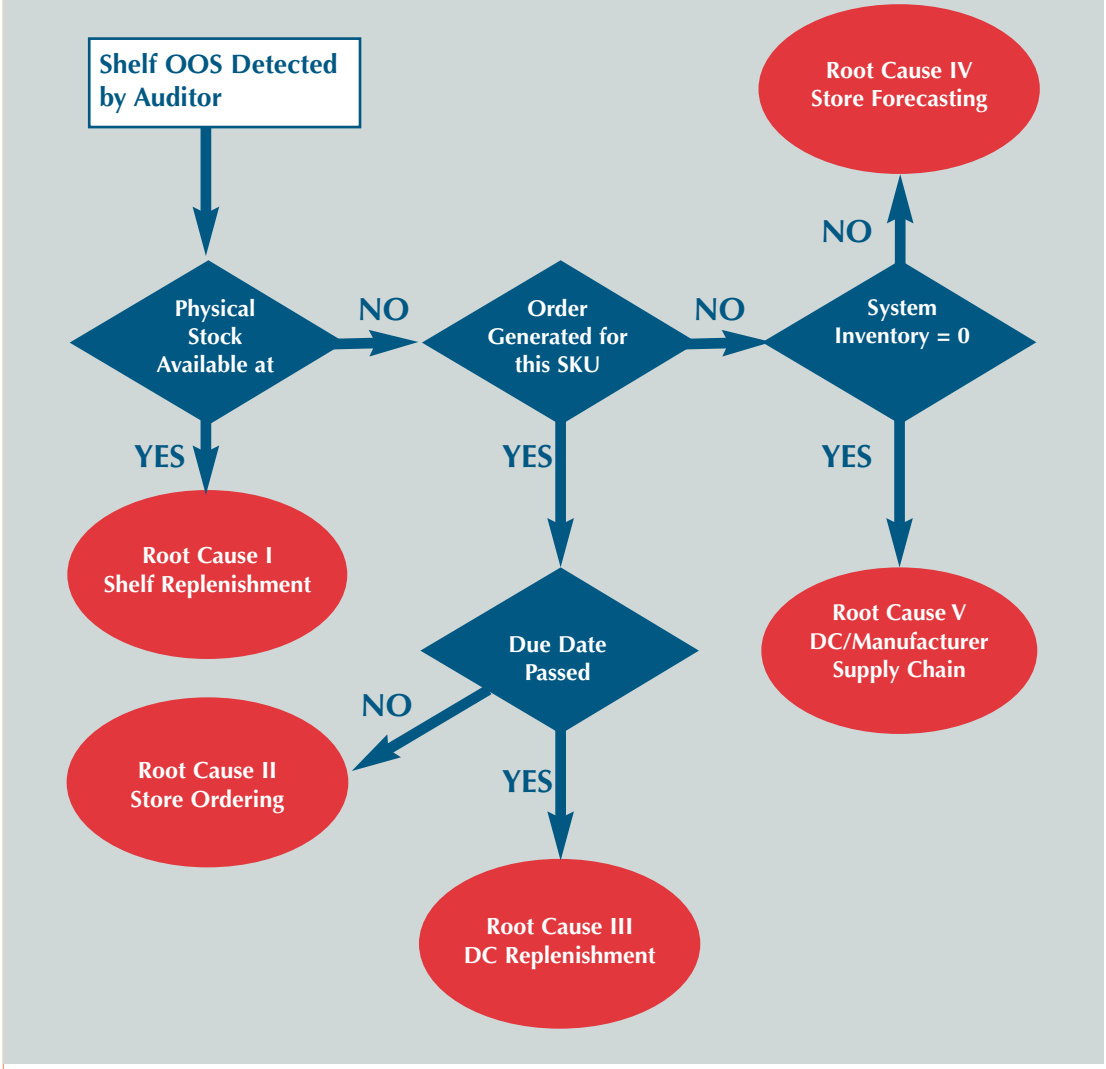
[5]Included in "ordering," specific information not reported.

[6]Assigned to total 100percent. Specific attribution not mentioned.

Appendix D

Root Cause Analysis Flowchart.

Basic Root Cause Analysis Flowchart



Appendix E

Probability of Complete Satisfaction

PROBABILITY OF SHOPPER BEING 100% SATISFIED

	# Items to Purchase				
Percentage Availability	10	20	30	40	50
99%	90%	82%	74%	67%	61%
98%	82%	67%	55%	45%	36%
97%	74%	54%	40%	30%	22%
96%	66%	44%	29%	20%	13%
95%	60%	36%	21%	13%	8%
94%	54%	29%	16%	8%	5%
93%	48%	23%	11%	5%	3%
92%	43%	19%	8%	4%	2%
91%	39%	15%	6%	2%	1%
90%	35%	12%	4%	1%	1%
89%	31%	10%	3%	1%	0%
88%	28%	8%	2%	1%	0%
87%	25%	6%	2%	0%	0%
86%	22%	5%	1%	0%	0%
85%	20%	4%	1%	0%	0%

Appendix F

Authors' Vitae

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Since 2001, Tom Gruen has served as assistant professor of marketing at the University of Colorado at Colorado Springs. Prior to 2001, he was assistant professor at Emory University's Goizueta Business School. He is also visiting professor of marketing at ESCP in Paris, France. He received his Ph.D. from Indiana University in 1997.

Dr. Gruen's research interests focus on the demand side of ECR and he has published on the topic of category management in the *Journal of Retailing, ECR Journal* and the *Financial Times Mastering Marketing* series. He also serves on the ECR Global Scorecard committee. Gruen has also published extensively and won several awards for his research in the area of relationship marketing/customer relationship management. This research has appeared in the *Journal of Marketing, Journal of Business Research, International Journal of Research in Marketing* and *Business Horizons*. He teaches marketing strategy, CRM, e-commerce and marketing research.

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Daniel Corsten is co-editor of the *ECR Journal - International Commerce Review* and a member of the ECR Europe Academic Advisory Panel. His research interests include supply chain management, efficient consumer response and networked organizations. He has worked extensively with marketing and logistics of consumer goods and industrial goods companies and can be reached at daniel.corsten@unisg.ch.

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At Goizueta, Dr. Bharadwaj teaches marketing management and business-to-business marketing in the MBA and Executive MBA programs. He also teaches in non-degree executive programs including strategic customer management, strategic pricing and e-marketing programs. He has published in the *Journal of Marketing, Management Science, Journal of Academy of Marketing Science*, the *Journal of Business Research*, the *Journal of Product Innovation Management*, the *Journal of Services Marketing*, the *Journal of International Consumer Marketing*, the *Marketing Education Review*, and *Vikalpa*. His journal publications have received numerous awards, including the prestigious MSI/PAUL ROOT AWARD for best paper published in the *Journal of Marketing* having an impact on managerial practice in 1999.

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