Online Availability:

A Worldwide Study of Extent, Shopper Reactions, and Strategies for Non-Food Categories in Digital Retail

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EXECUTIVE SUMMARY

This report presents a research study of Online Availability (OLA) in six non-food consumer goods categories (baby care, fabric care, hair care, oral care, skin care, and shave care) at retailers in six major countries (China, France, Germany, Japan, United Kingdom, United States). It provides insight into the extent of Online Availability (OLA) and its opposite Non-Online Availability (NOLA) using data from online retailers' websites as well as reports from surveys of online shoppers. It illuminates online shoppers' encounters with NOLA and reactions to it with a detailed examination of switching to alternative options behavior. It estimates the lost sales opportunities and provides guidelines for improving OLA.

Background

Product availability is the precondition for selling brands at online and offline retail. No wonder that over the past decades, industry and trade associations have sponsored and/or released major reports on out-of-stocks (see Appendix). This constant attention points to one thing: product availability is a perennial problem and battleground in retail.

In 2002, we published a landmark study on retail out-of-stocks covering 52 separate studies, 29 countries, 32 categories and 72,000 shoppers. It presented the largest and most current single compilation of findings on the extent, causes, and consumer responses to retail out-of-stock situations in the fast-moving consumer goods industry. We found the level of out-of-stocks to be at 8.3 percent and that 72 percent of the responsibility for stock-outs was at the store level. We also found that - when confronted with an out-of-stock - 26 percent of shoppers switch brands, 31 percent switch stores, 19 percent substitute within the same brand, 15 percent delay their purchase and 9 percent do not purchase at all. In 2007, we published a follow-up study that described essential measures to reduce the level of stock-outs. The Procter & Gamble Company sponsored both studies. The results of these two previous studies present the benchmark with which we will compare the results of this new study about product availability at online retail.

Since the release of the two studies, retail has undergone dramatic change. A recent study shows that across major retail categories 30 percent of all shoppers regularly shop online and in stores. This number is slightly higher for beauty and personal care (32 percent) and somewhat lower for household care (16 percent). The study also shows that penetration of omni-channel shopping is around the average of 30 percent for four of the countries featured in this study, namely the US, Germany, France and Japan, and already substantially higher for the UK (48 percent) and China (56 percent).[1]

Definition of Online Availability

Online Availability: We introduce a new shopper-centric definition of "Online Availability" or OLA. An item is OLA if it can be purchased online, i.e. the product is displayed as (1) in-stock by the brand owner, or (2) can be bought at the retailer's marketplace (if the retailer maintains this option). (3) We also consider a product available online in the overall availability calculations when the product page displays an in-store only message, i.e. the shopper is informed that the product can be purchased in selected physical stores of the same retailer.[2]

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[1]GfK (2016): Future Buy

[2]This is a small overall percentage when measured by harvesting data from retailers' websites. In this situation, the supply chain has succeeded in making the item available at a multi-channel retailer, but the retailer has not provided the ability to purchase the item online. This situation pertains only to multi-channel retailers and does not pertain to online-only retailers (e.g., Amazon). Alternatively, in the shopper studies, we treat the "in-store only" message as a distinct non-availability online encounter type because this requires shoppers to alter their intended online shopping behavior.

Not Online Available (NOLA). An item is NOLA if it is (1) *Out-of-Stock* (OOS), i.e. the product page is accessible, but the retailer indicates that the item is physically *unavailable* for purchase, or (2) *void*, i.e. the product is digitally *inaccessible* because retailers have suppressed the product page for commercial or technical reasons.

Overall Study Methodology

We developed and employed a 5-stage process for this research study, beginning with an assessment of the OLA environment of retailers and their suppliers of fast moving consumer goods. With that understanding, we addressed each of the remaining stages and provided the summary findings in this Executive Summary. Detailed descriptions and findings follow in the remainder of the report. Exhibit 1 depicts the 5-stages of the method.

Exhibit 1: Study Method
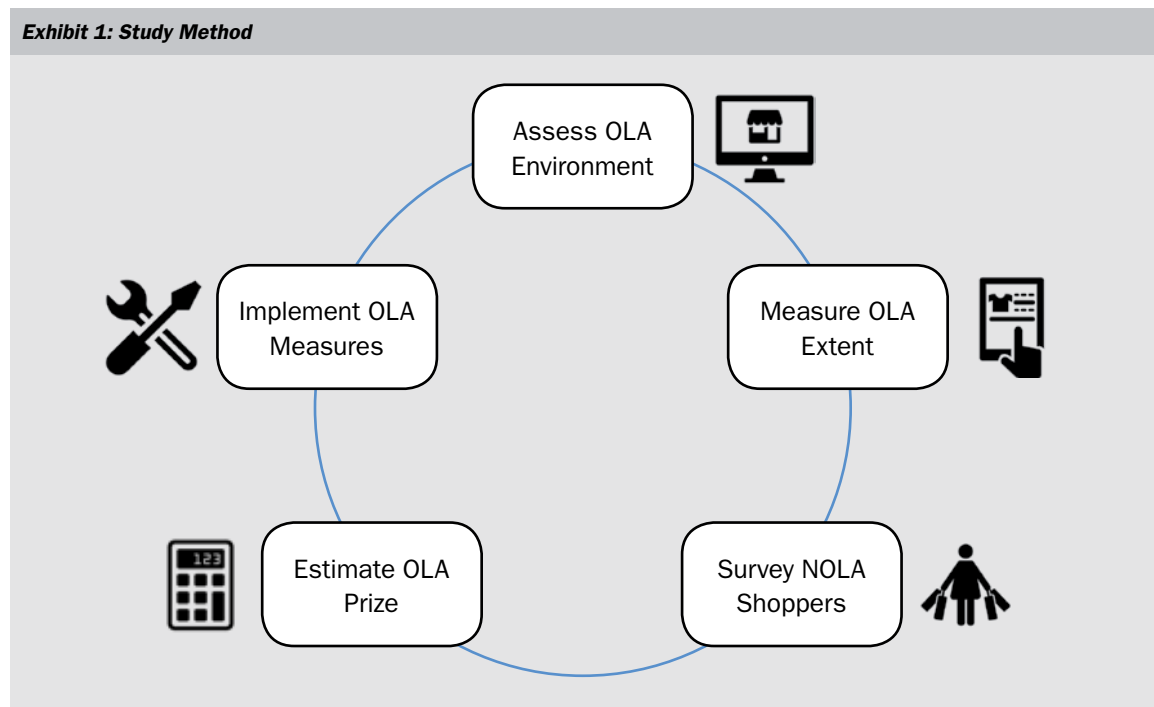
Measure OLA Extent: Findings from data harvested from retailers' websites

The degree to which items are OLA (or NOLA) varies across item, brands, categories, retailers and countries. To measure the extent, we compiled data that we harvested daily for nine months from online retailers' product pages for six categories across six countries.

Online Availability (OLA): The extent of products that are OLA for shoppers globally is 80.1 percent (Exhibit 2). OLA varies from 68.4 percent in China to 87.0 percent in Japan. The OLA total has three components. First, the global *in-stock* level is 74.0 percent (ranging from a low of 65.2 percent in China to a high of 87.0 percent in Japan). Second, the *marketplace* average is 5.4 percent of the cases. Third, contributing only 0.7 percent, *in-store only* is of marginal importance and limited to a few US multi-channel retailers that offer this option.

Non-Online Availability (NOLA): Mirroring the OLA results, the global level of NOLA is 19.9 percent. China is the outlier with 31.6 percent and the highest level of NOLA. Japan has the lowest NOLA level with 13.0 percent, and the other four countries range between 13.6 percent (Germany) and 18.2 percent (France). Items that are *Out-of-Stock* (OOS), i.e. specifically stated online to be *unavailable*, account for 8.1 percent. This figure resembles strikingly the level of shelf OOS in supermarkets reported in a global study previously by the same authors (2002).

The study revealed a second issue that affects availability in the online context, that of voids. Voids occur when the online retailer does not present the product page with the item to the shopper due to the item not being physically available, or due to some error with the information regarding the item. The extent of items that are *void* (i.e. have digitally *inaccessible* product pages) is 11.8 percent (Exhibit 3). Generally, voids occur more frequently than OOS with a global ratio of voids to OOS at 1.5 to 1 except for China where OOS (18.7 percent) is higher than voids (12.8 percent). France has substantially higher voids (17.4 percent) than OOS (0.8 percent). We also compared the OLA across categories but differences were minor with the exception of shave where availability was somewhat higher than average. The full report provides additional explanation of voids as well as the varying use of voids by retailers.

Exhibit 2: Overall Extent of OLA

Legend: In Stock, In Stores Only, Marketplace, Out of Stock, Void

Pie chart values: 74.0% In Stock, 0.7%, 5.4%, 19.9%, and breakout: 11.8% Void, 8.1% Out of Stock
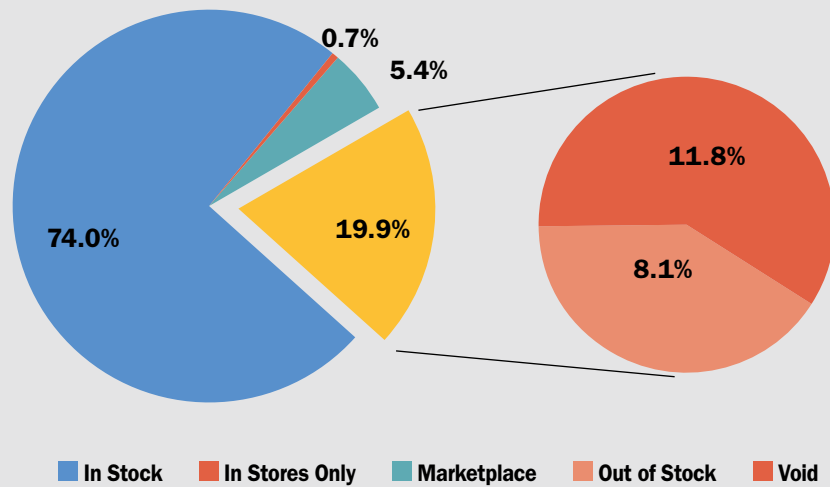
Exhibit 3: Chart: NOLA and OLA by Country

Country	Not Available	Available
USA	15%	85%
UK	15%	85%
Germany	14%	86%
France	18%	82%
Japan	13%	87%
China	32%	68%
Average	20%	80%
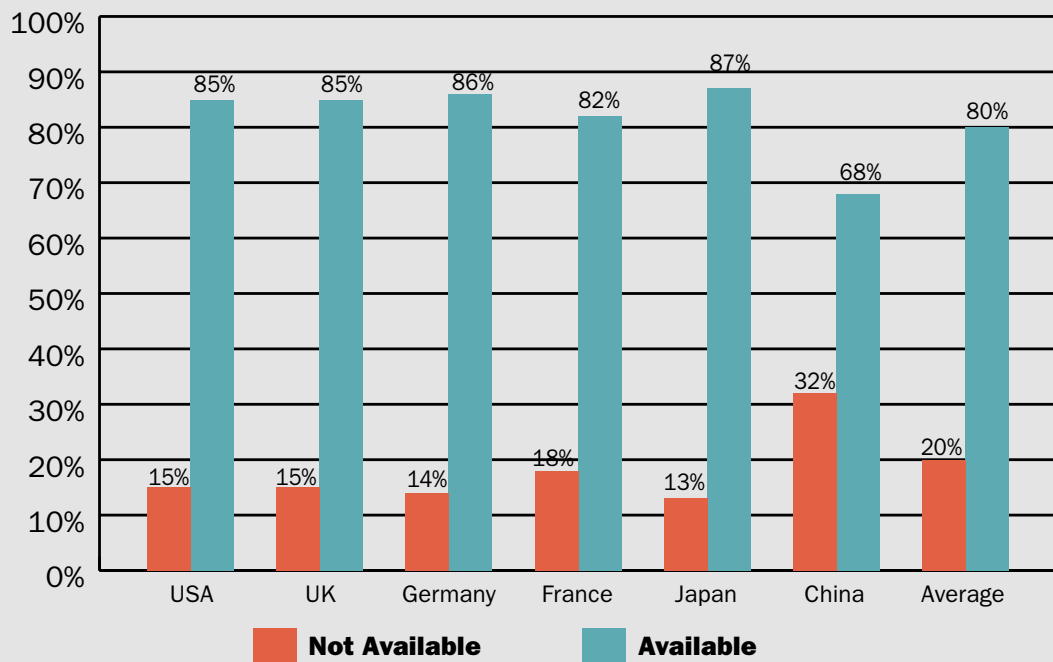
Perceived Extent of OLA: Findings from shopper surveys

We surveyed shoppers in the six countries and for the six target categories using two surveys. The first survey focused on the US only, where out of 8,185 shoppers, 84 percent found the exact item they were seeking online, and the desired item was NOLA for the remaining 16 percent of online shoppers. Keeping in mind that the directly measured level of OLA in the US was 14.5 percent, the convergence of the two figures is striking and provides validation for both results. For the US, there were only minor variations in NOLA among categories, where non-availability was above average in the baby care category and below average in the shave category (Exhibit 4). There were striking differences in the NOLA levels experienced across ethnicity and age, as non-white and younger shoppers experienced much higher NOLA levels than did white and older shoppers (Exhibit 5).

The data collection method used in the second shopper survey (UK, Germany, France, Japan, and China) was not designed to provide an absolute measure of the extent of NOLA. However, it does provide relative measures that allow for comparisons across the five countries. The incidence of NOLA for China was above the average, while NOLA was lower than the average for the UK. Across all countries, we found the same effect of age on NOLA extent as we found in the US study. Like the US study, there was little variation of NOLA across categories.

Exhibit 4: Components of NOLA by Country

Chart: NOLA Encounters by Age

20.9%

18.2%

14.3%

11.3%

25%

20%

15%

10%

5%

0%

< 25   25-34   35-44   45 +
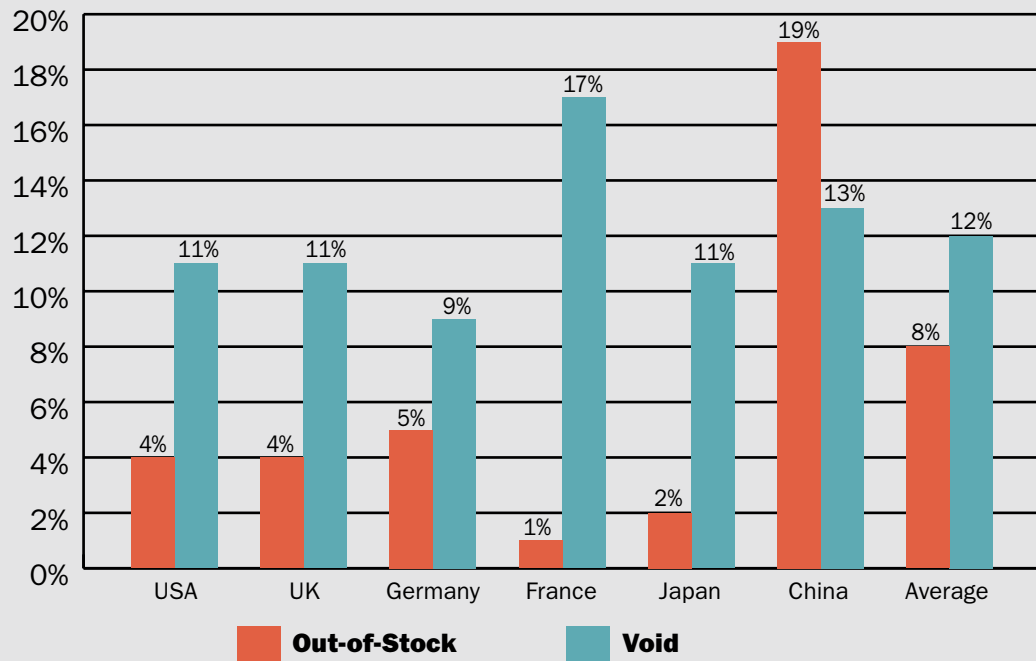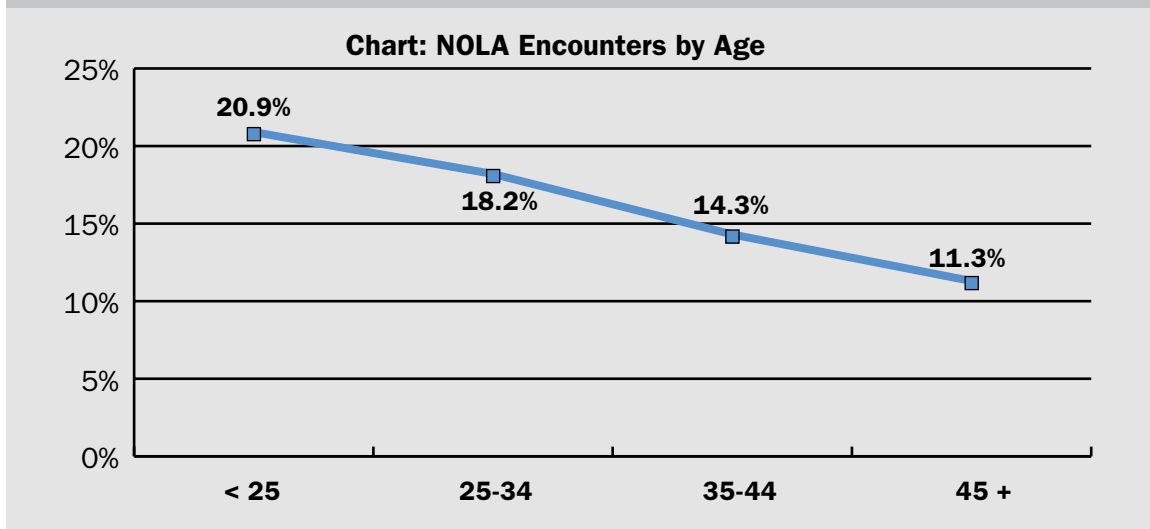
We also delineate and examine the four primary ways that online shoppers encounter and experience NOLA: (1) the item was stated to be out-of-stock (OOS) about 45 percent of the time, (2) delay in delivery or pickup about 27 percent, (3) item not displayed/ cannot be found about 20 percent, and (4) only available to purchase offline (in brick & mortar retail) about 5 percent (Exhibit 6).[3] The shopper OOS experience closely matches the measurements we found from the data harvested on retailers' websites where stated OOS accounted for 40 percent of total NOLA. Comparisons with the other three ways that online shoppers encounter NOLA cannot be directly compared with the website measurements.

Exhibit 6: How Shoppers Encounter NOLA (Average 6-Countries)

3%

5%

20%

45%

27%

- ● Stated OOS
- ● Delay
- ● Not Displayed
- ● Only in Retail Store
- ● Other

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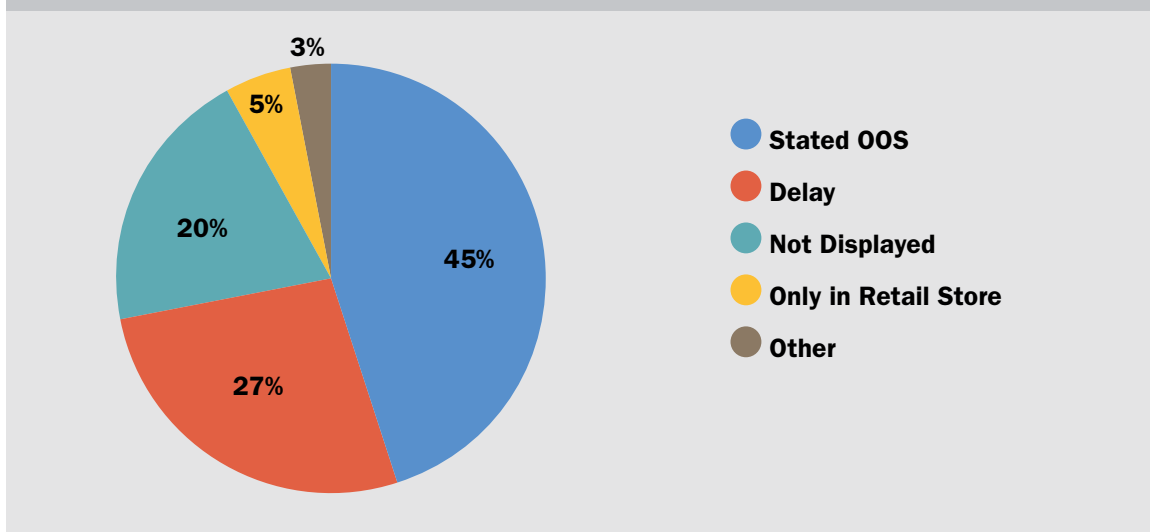
[3]The "in-store only" is considered to be "available" from the retailer perspective because the item is physically available, and the multi-channel retailer does not intend to sell the item online, but only show its in-store availability. Alternatively, from the online shopper perspective, an item that they cannot purchase online requires them to shift their intended behavior, thus it is considered as a distinct type of online non-availability.

Shoppers Reactions to NOLA

We asked the shoppers to indicate their initial search reaction and final behavioral reaction when they encounter a desired product that was not available. For their initial search reaction, on average 30 percent indicated that they would switch to another online retailer, while 70 percent indicated they would search for a substitute item in the same online store.

The mix of actual shopper behavior reactions varies substantially by country (Exhibit 7). In the US, 15 percent switched online stores to purchase the item they desired, while 60 percent purchased a substitute item from the same online merchant. Of the 60 percent, half switched brand, and half found a substitute within the same brand. About 10 percent went to a retail store to purchase the item they wanted, and about 15 percent indicated they delayed or canceled their purchase.

In the other countries, online store switching was noticeably higher than in the US, as nearly 25 percent indicated they purchased the item they wanted from a different online retailer. The percentage purchasing a substitute item or brand from the current online merchant was about 55 percent, which was slightly lower than the US study. About 10 percent purchased the item from a retail store, and 10 percent indicated delay or cancellation of purchase of the desired item.[4]

Exhibit 7: Ultimate Response in Purchase Behavior to NOLA

Legend: Switch OL Store | Switch Brand Variant | Switch Diff Brand | Switch Channel | Switch Intention

Country	Switch OL Store	Switch Brand Variant	Switch Diff Brand	Switch Channel	Switch Intention
USA	15%	31%	30%	8.6%	14.3%
UK	24.2%	22.7%	35%	9.7%	9.3%
Germany	27.3%	18.9%	33.6%	14.2%	6.3%
France	18.9%	27.7%	33%	14.2%	6.2%
Japan	26.2%	23%	20.6%	8.9%	21.3%
China	34.2%	27.9%	20.6%	9.0%	8.3%
Average	22.1%	26.8%	28.8%	10.1%	11.8%

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[4]In the exhibit, the category "switch channel" combines the responses from purchasing the item at the retail store of the online retailer and from a different retail store. The category "switch intention" combines the delay and cancel purchase responses. We combine these two because in the case of "delay" as well as "cancel", shoppers change their intention from purchase to not purchase during the online shopping trip; also, the individual response category percentages were small, therefore we combined the two.

Estimate OLA Prize: Opportunities for Brands and Retailers from Online Lost Sales

We use the NOLA extent and shopper switching findings to estimate the brand and retailer loss due to NOLA items. A _retailer loss_ occurs when the shopper switches online stores, buys the item at a different physical store or cancels the purchase. A _brand loss_ occurs when the shopper switches brands or cancels the purchase. All other responses are considered neutral. Overall, retailer loss is around 33 percent and brand loss is approximately 31 percent. Exhibits 8 and 9 show these losses by country and category respectively.

Exhibit 8: Retailer and Brand Loss by Country

Legend: Retailer Loss, Brand Loss, Neutral

Data by country (Retailer Loss / Brand Loss / Neutral):
- USA: 25% / 35% / 44%
- UK: 32% / 40% / 33%
- Germany: 35% / 36% / 32%
- France: 27% / 35% / 40%
- Japan: 42% / 29% / 37%
- China: 40% / 22% / 40%
- Average: 31% / 33% / 40%
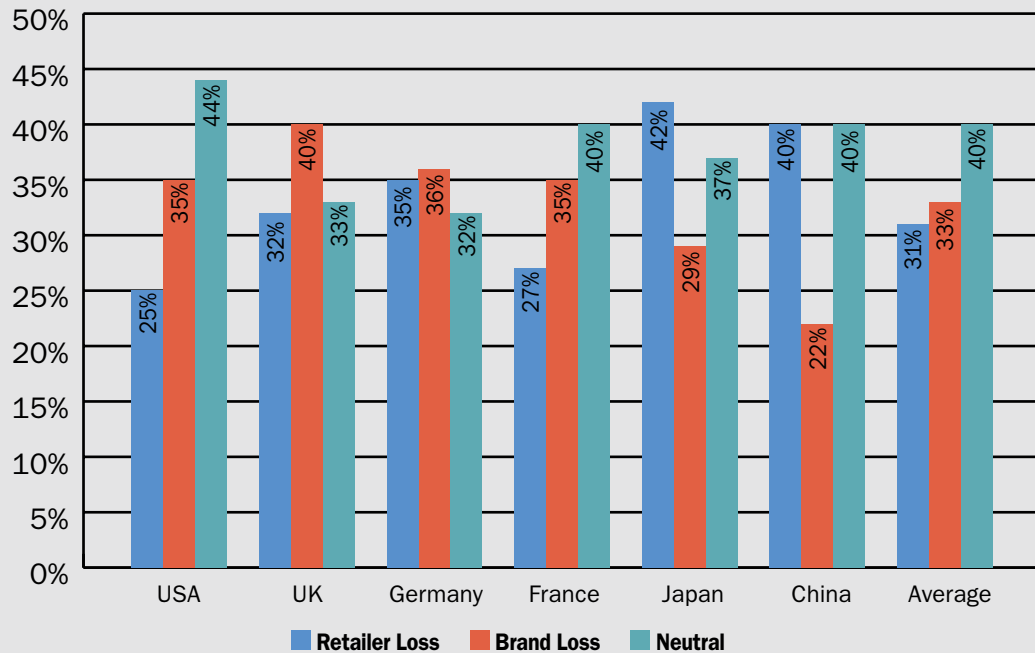
Exhibit 9: Brand and Retail Loss by Category

Legend: Retailer Loss, Brand Loss, Neutral

Data by category (Retailer Loss / Brand Loss / Neutral):
- Baby: 33% / 33% / 40%
- Fabric: 29% / 33% / 43%
- Hair: 32% / 33% / 40%
- Skin: 34% / 34% / 40%
- Oral: 30% / 35% / 39%
- Shave: 32% / 31% / 39%
- Average: 32% / 33% / 39%
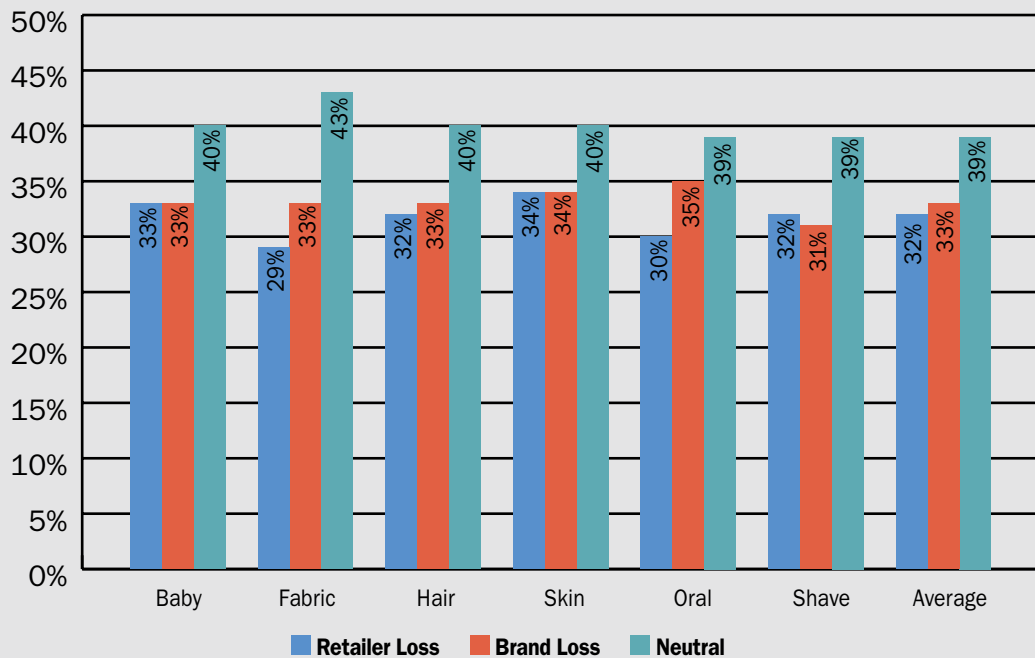
Our research allows us to estimate the potential sales opportunity of OLA. We developed and proposed a new metric, <u>Days Lost Online</u> (DLO), as a simple, flexible, and diagnostic way to determine the Online Lost Sales (OLS) opportunity for multiple levels of analysis: a single SKU, a collection of SKUs, a manufacturer, a retailer, and the overall industry. We conclude that for the consumer goods industry and retail the size of the prize of lost sales due to lack of OLA exceeds $22 billion at retail price value. We present formulas that can be used to estimate the OLS opportunity on the item level, the firm level, and the industry level. Readers of this report can use their own measures in the formulas to replace the estimates that we provide as illustrations.

Days Lost Online (DLO): A New KPI for the Industry

Our measures of OLA and NOLA count the days that a product is either available online or not available online. We present the measure of Days Lost Online (DLO) as a Key Performance Indicator (KPI) to measure the financial losses of NOLA, and we recommend its use as an industry-wide KPI.[5]

> DLO = Amount of Days that a SKU is not available online at a retailer's online shop

A SKU is available online (OLA) when it is (a) in-stock, (b) available at a store of the retailers, or (c) available on the retailer's marketplace. A SKU is not available online (NOLA) if it is (a) stocked-out, or (b) void. Our new measure complies with the requirements for a Key Performance Indicator (KPI) as it is valid, reliable, and actionable:

- Valid: It measures OLA as perceived by the shopper and is generalizable across countries, retailers and SKUs.

- Reliable: It is measured daily and automatically, which reduces the room for (human) error.

- Actionable: It is continuous, instantaneous and actionable. In addition, it is easily available and can be used for industry benchmarking.

Estimation for Any Single SKU

Using our measure of DLO we can approximate the maximum Online Lost Sales (OLS) per SKU using the following formula:[6]

> Example SKU: OLS = DLO x DSA x PRICE

DLO = Days Lost Online (days)

DSA = Daily Sales Average (units)

PRICE = Price (local currency)

For the following example calculations, we take the global average for OLA of 80 percent and for NOLA of 20 percent (365 days * 0.2 = 73 DLO) and assume that the SKU sells 100 units on average per day with a price of $5 per unit retail and $3 wholesale.[7]

- Brand OLS (wholesale value): 73 days * 100 units/day 100 % * $3 = 21,900

- Retailer OLS (retail value): 73 days * 100 units/day 100 % * $5 = 36,500

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[5]Our indicator DLO is based on a single measurement of OLA during a 24-hour period, and this ignores items that might go in and out of stock during the day. For instance, if a product becomes NOLA after the single measurement it is unavailable for a part of the day. Data service providers often account for this by measuring availability early in the morning. Retailers on the other hand often measure NOLA by counting the page views when a product is NOLA and dividing it by the total page views during the day. However, this measure is not available to brands unless shared by the retailer. Both brands and retailers have access to the same measurement of DLO, making this a KPI that can be shared by both parties.

[6]OLS at the SKU level only considers the sales lost on that specific SKU. Firms recoup much of that loss through item substitution.

[7]Brands and retailers can input their own data for each variable. Furthermore, this does not include substitution. Examples that include a substitution factor are provided in the full report.

Estimation for Manufacturers and Retailers

We provide illustrations of the calculation of the size of the prize for a consumer goods manufacturer or omni-channel retailer that sells in the non-food categories that this report features, using an example of $1 billion sales.[8] Following a recent study of the extent of online retail sales of consumer goods, we use a share of online sales of 5 percent ($50 million per $1 billion total sales).[9] We use the average NOLA of approximately 20 percent, which means that the online sales of $50 million were achieved in 292 of 365 days. Following this logic (and assuming that sales are not seasonal), then these firms could have achieved up to 20 percent or $10 million more online sales or if their product pages had been up and their products had been stocked at retail up to 100 percent of the time.[10]

> *Example Manufacturer and Retailer:* OLS = $1 billion sales *5 % online * 20% NOLA = up to $10 million of online lost sales

Estimation for the Consumer Goods Industry and Retail:

To extrapolate to the industry level, in 2016, the Global Top 100 publicly listed consumer goods manufacturers had sales of close to $1.7 trillion at wholesale value. If we accept that 5 percent of sales is online and NOLA is 20 per cent, then online sales are $85 billion industry-wide and the online lost sales opportunity is $17 billion.[11]

> *Example Consumer Goods Industry:* OLS = $1.7 trillion sales * 5 % online * 20 % NOLA = $17 billion online lost sales at *wholesale value*

Using an estimated retail mark-up on the suppliers' wholesale price for the categories that we investigate of 30 percent, then the retail sales value is $2.2 trillion, which leads to the overall size of the prize of improving OLA exceeds $22 billion at retail value.[12]

> *Example Consumer Goods Industry and Retail:* OLS = ($1.7 trillion sales + 30 percent retail mark-up) * 5 % online * 20 % NOLA = $22 billion online lost sales at *retail value*

If we accept industry forecasts that the share of online sales of consumer products will increase from 5.0% in 2020 to 10.0% in 2022[13], then the potential losses for manufacturers and retailers are likely to double over the next few years unless corrective actions are taken.

Implement OLA Measures: Capabilities, Causes, and Countermeasures

To understand the degree to which OLA was being addressed as well as to explore the state-of-the art practice in OLA management, we conducted an industry survey. These findings show that the measurement of OLA is a large and important industry concern but that retailers and brand manufacturers have not yet developed proper accountability for OLA. While both trading partners agree that having a high level of OLA is a strategic priority, retailers have implemented countermeasures more systematically than manufacturers. Neither side thoroughly understands the broad consequences of NOLA. Suppliers find it challenging to estimate online demand and manage

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[8]Companies can substitute their own sales figures into the formula in place of the $1 billion shown here.

[9]IRI (2017): E-commerce: Build, Drive and Earn E-commerce Growth for Retail Success

[10]Note that this calculation ignores substitution effects. Further, even for the best firms 100% OLA is unlikely and a 90% target OLA seems more realistic.

[11]https://consumergoods.com/cgts-top-100-consumer-goods-companies-2016.

[12]Our estimate is conservative as it ignores smaller consumer goods firms that are not in the Top 100 publicly listed firms. On the other hand, we do not account for substitution effects and it is unlikely that 100 per cent of OLA is achievable.

[13]IRI (2017): E-commerce: Build, Drive and Earn E-commerce Growth for Retail Success

inventory accordingly. They are also concerned about the accessibility of their product detail pages. We conclude that for both retailers and their suppliers, the current state of management practice in OLA is immature. The industry has much work to do to improve practices.

Conclusion

The results of this first global study show that OLA and its opposite NOLA present substantial challenges to retailers and their suppliers of fast moving consumer goods. The extent of NOLA as measured on online retail websites is surprisingly large, and this extent is exacerbated by the presence of voids. Shopper studies show reactions to NOLA include substantial switching to another online retailer or substituting items and brands at the same online store. Variations in levels of OLA are more due to differences between retailers and countries and less due to differences between categories and brands. The similar levels of retailer and brand loss show that brands and retailers will benefit mutually from improved OLA. We present a new method to calculate Online Lost Sales (OLS) using the measure of Days Lost Online (DLO), which can be used to examine any unit of analysis.

Our industry survey of causes, countermeasures and capabilities of OLA across food and non-food manufacturers and retailers shows that industry should improve its readiness significantly if it wants to compete in this growing segment of the business. The OLA Scorecard provided in the appendix will help the industry towards this objective. More details on the scorecard can be found at www. availabilitylab.com.

Ongoing unpublished research on OLA with food manufacturers confirms that they experience similar levels of OLA, that the causes of NOLA are comparable and that the reactions of food shoppers converge with those of non-food shoppers. Therefore, we are confident that the results of this report are generalizable across the whole consumer goods industry and its retail partners.

The findings of this study provide more than adequate evidence to encourage retailers and brands to collaborate and enhance online availability in the fast-growing area of online retail.

The Organization of the Report

The remainder of the report provides detailed descriptions and analysis of the items presented in the executive summary.* While some parts of the Executive Summary are repeated in the sections of the main report, we assume that readers of the following sections will be familiar with the background provided in this Executive Summary. The remaining sections follow the stages presented in Exhibit 1, starting with the extent of OLA. It then moves to a detailed presentation of the shopper survey findings, followed by an examination of root causes and estimates of the rewards for addressing the causes. It concludes with a presentation of a scorecard to assess, measure, and implement practices that enhance OLA.

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*If you have received this executive summary as a separate document without the rest of the report, you can access the full report at
   www.availabilitylab.com

MEASURE EXTENT OF ONLINE AVAILABILITY (OLA)

Methodology and Definitions

This section presents the findings from a nine-month examination of retailers' web pages.

Data Sample: In this study, we examine data provided by Clavis Insights, an online retail analytics company that harvests availability information daily from online retailer websites, and the study covers six categories in six countries.[14] Data on availability was collected in selected non-food categories including Skin Care, Baby Care, Oral Care, Hair Care, Laundry and Shave in the United States, United Kingdom, Germany, France, Japan and China. We report averages across the brands of five major suppliers in each category.[15]

Definition of Online Availability (OLA): We introduce a new shopper-centric definition of Online Availability (OLA). An item is OLA for the shopper if it can be purchased online,[16] i.e. the product is displayed as (1) *in-stock* by the brand owner, or (2) can be bought at the retailer's *marketplace* (if the retailer maintains this option).[17] (3) We also consider a product available if the product page displays an *in-store only* message, i.e. the shopper is informed that the product can be purchased in selected physical stores of the same retailer.[18]

Definition of Non-Online Availability (NOLA): On the other hand, an item is <u>NOLA</u> if it is (1) out-of-stock (OOS), i.e. the product page is accessible for the shopper but the online retailer indicates that the item is physically *unavailable* for purchase.[19] An item can also be (2) *void*, i.e. the product page is digitally *inaccessible* for commercial or technical reasons.[20] An item can only have one status but a retailer has some discretion in what status to assign. Some online retailers will void a product page when an item is OOS and the retailer has the policy not to show its stocked-out products to its shoppers. Retailers may also void a product page if there are errors on the page (e.g., picture, description, price, or product code are incorrect or not uploaded) even when they have the product in stock. They may also void a product page when they cannot match competitors' pricing on the item, even though they have the item in stock.[21] Irrespective of the reasons, a voided product is NOLA to a shopper.

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[14]Please see the appendix for a list of retailers included in this study.

[15]The sampled suppliers can differ by country.

[16]We consider a product OLA if shoppers can put it into the shopping cart and buy it regardless of any delay in delivery. Shoppers may or may not consider a delay as "unavailable", which is examined in more detail in the shopper studies. Also note that the OLA measure is like the measure of 'Visit Availability' that records the availability of a SKU at the time of a customer visit; in this method the 'visits' by Clavis Insights follow a regular daily schedule.

[17]This pertains primarily to retailers such as Amazon and Walmart that (1) buy and sell inventory on their own account and (2) maintain a marketplace where they earn a fee for completed transactions. If a retailer is a pure online marketplace (e.g. Tmall) than any availability is considered in-stock.

[18]Note that this case is not the same as "click and collect" where the shopper purchases the product online for in-store pick-up. Here the item cannot be purchased online, but it is available at the retail store for purchase. Because the shopper is shown availability within the retailer network, we include this option as OLA. This accounts for a small overall percentage, is limited to a few countries, and it is treated as a distinct non-availability encounter in the shopper studies.

[19]Items in the categories that we examine generally cannot be back-ordered and therefore items that are NOLA are not available for purchase. We are also aware that some retailers may not stock all products but rather procure them from a wholesaler once they received a customer order but we cannot identify this practice. Note that some online retailers proactively suggest substitute items for unavailable products. Our study does not track this.

[20]Some brands and retailers refer to 'voids' as 'not-listed' or 'unavailable', but we think this usage of this term is inappropriate as listing usually refers to the contractual agreement between retailer and supplier that a SKU is included in a retailer's assortment, and it should not refer to the technical status of a product's webpage being accessible nor not.

[21]At Amazon this is referred to as a "C.R.A.P." situation, meaning "can't realize a profit."

As an example of a void, consider the case of Pampers BD Nappies 23PK at ASDA in the UK (Exhibit 10). The green dots in the exhibit from Clavis Insights below show that the item has been in stock for five consecutive days. Then the color switches to grey dots to indicate the item's status has changed to void. From this day on, the product page is *inaccessible* for purchase when a shopper types the product description into the ASDA search engine. If a shopper enters the exact product code (RPC/UPC) because she has recorded it previously, the ASDA search engine signals *no-result-shown* and suggests an alternative product, often a nearby product code.

Exhibit 10: Example of Item Void Report

Asda	Image Not Available	L'Oreal Paris Volume Million Lashes Excess Waterproof Mascara Black 9ML **RPC:** 4318981	●	●	●	●	●	●	●
Asda	Image Not Available	PAMPERS BD NAPPIES 23PK **RPC:** 4322693 **UPC:** 4015400542940	●	●	●	●	●	●	●
Asda	Image Not Available	Bic Soleil Lady Disposable Razors 4 PACK **RPC:** 4338214	●	●	●	●	●	●	●

Data Collection: We extracted availability data at the category level for 273 days from January 1, 2016 to September 30, 2016. We collected for each retailer, category and country combination the daily product count for in-stock, marketplace, in-store only, out-of-stock or void if applicable. Within each retailer's category, we collected data of the SKUs of up to five typically pre-selected large suppliers (including Procter & Gamble).

An example data entry reads: Date: January 1, 2016; Country: China; Category: Baby; Retailer: Amazon; in-stock: 150 items (for all pre-selected brands and suppliers).

We then aggregated the count data to different benchmarks (e.g. retailer/country/category combinations). Since we use the raw count data and not percentages, the results are weighted by the number of SKUs in each country and category. In total, we analyzed 12,706,725 data points in what to our knowledge is the largest database on product availability. Note that we exclude the 4th quarter of 2016 when major events (e.g. Singles Day, Black Friday, Cyber Monday, Christmas) lead to seasonal sales spikes and a corresponding risk of NOLA.

Worldwide Extent

The overall extent of OLA across all countries, categories and retailers is 80.1 percent and correspondingly, the extent of NOLA is 19.9 percent. OLA can be further divided into *in-stock* (74.0 percent), *in-store only* (0.7 percent) and *marketplace* (5.4 percent). NOLA can be split into 8.1 percent *out-of-stock* and 11.8 percent *void* (Exhibit 11).

Exhibit 11: Overall Extent of OLA

Legend: In Stock · In Stores Only · Marketplace · Out of Stock · Void

74.0% · 0.7% · 5.4% · 19.9% · 11.8% · 8.1%
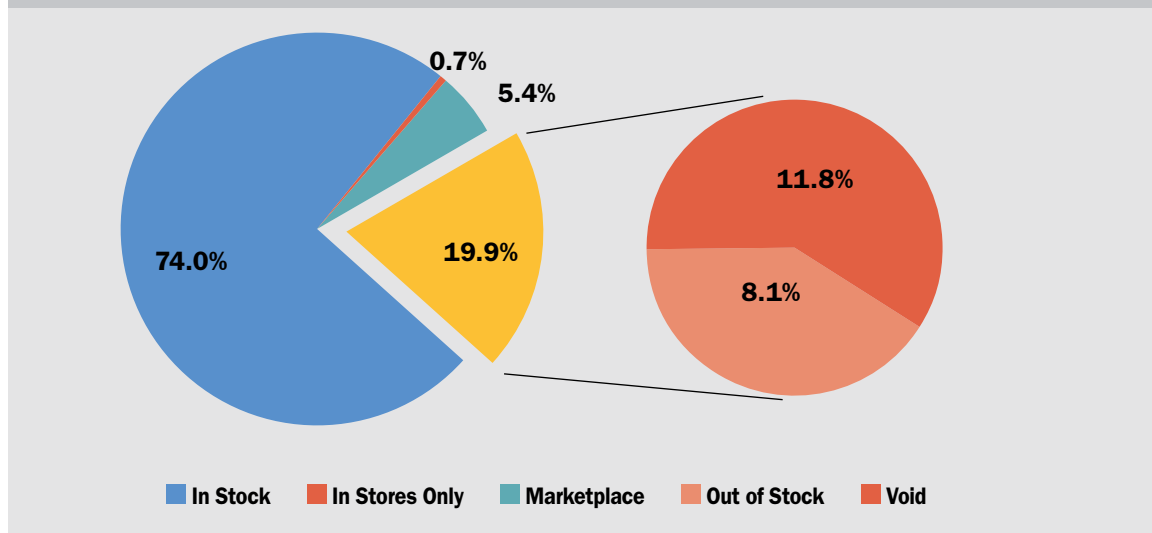
The 8.1 percent out-of-stock is surprisingly like the global stock-out rate of 8.3 percent established in our 2002 study for shelf out-of-stocks in physical retail stores. Our results are conservative as our data excludes smaller suppliers, slower moving products and the important seasonal demand spikes in the fourth quarter. No benchmark study is available to compare the void results. However, to check the validity, we also examined a food category where we found similar levels of out-of-stocks but much higher levels of voids across brands. This makes us confident that the extent of voids in our non-food categories is moderate and not 'inflated'.

Extent by Country

Our results vary by country (Exhibits 12-15). Three countries stand out. Japan has overall the highest OLA (87 percent). In China, OLA is lowest with 68 percent because of a high stock-out rate (18.7 percent) and void rate (12.3 percent). France has an average OLA of 81.8 percent with the lowest out-of-stock rate (0.8 percent) and the highest rate of voids (17.4 percent). For the U.S., UK and Germany, stock-out (3.9-4.5 percent) and void ranges (9.1-11.5 percent) are similar. Only retailers in the US report the in-store only option.

We speculate that the results vary primarily due to country factors but also due to retailer-specific shopper notification policies in case of lack of availability. We find, for instance, that retailers in France and the UK tend to void product pages rather than indicating its unavailability on the product page. We believe that these retailers would prefer to avoid time-wasting searches for products that are not available and to avoid reputational damage if stock-outs are signaled. Additional research is needed to better understand how retailers decide whether it is more beneficial to indicate that an item is out-of-stock or to simply void the product page.

Exhibit 12: NOLA and OLA by Country

Country	Not Available	Available
World Avg	21%	79%
Germany	14%	86%
France	18%	82%
Japan	13%	87%
UK	15%	85%
USA	17%	83%
China	32%	68%

Legend: ■ Not Available ■ Available
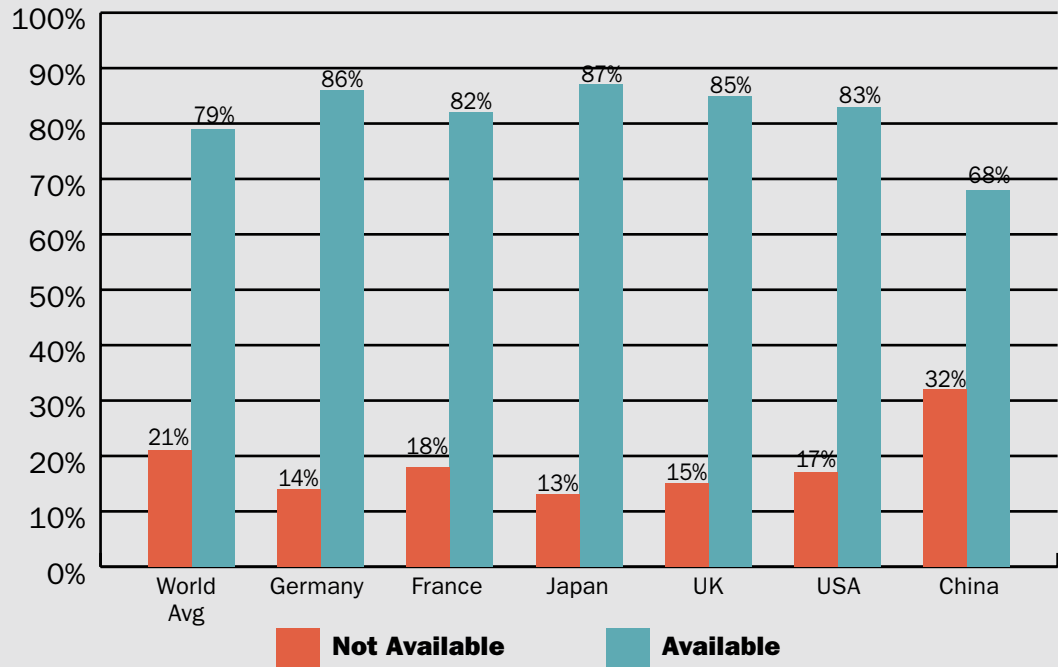
Exhibit 13: Components of OLA by Country

Country	In Stock	In Stores Only	Marketplace
World Avg	74%	1%	5%
Germany	77%	0%	10%
France	74%	0%	8%
Japan	87%	0%	0%
UK	79%	0%	6%
USA	75%	2%	8%
China	65%	0%	3%

Legend: ■ In Stock ■ In Stores Only ■ Marketplace
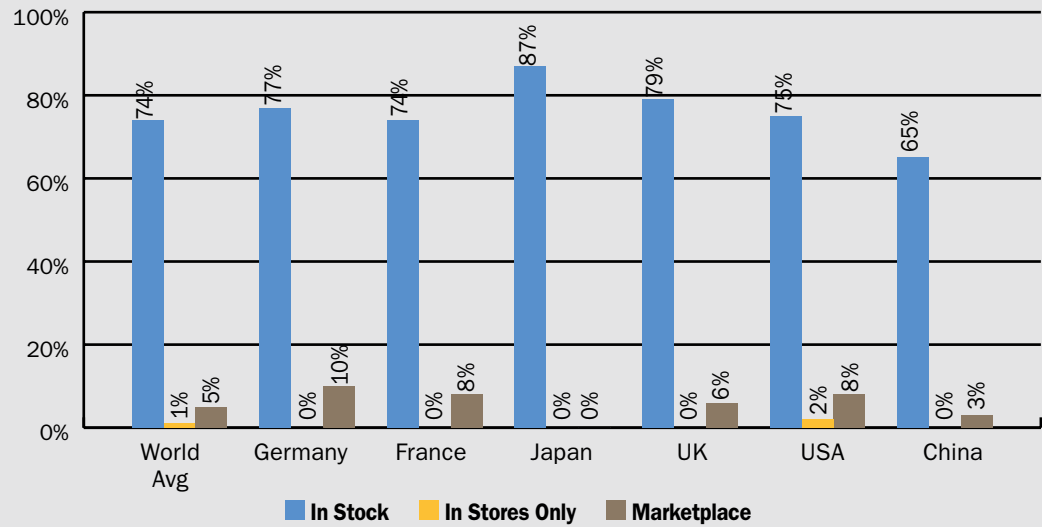
Exhibit 14: Components of NOLA by Country
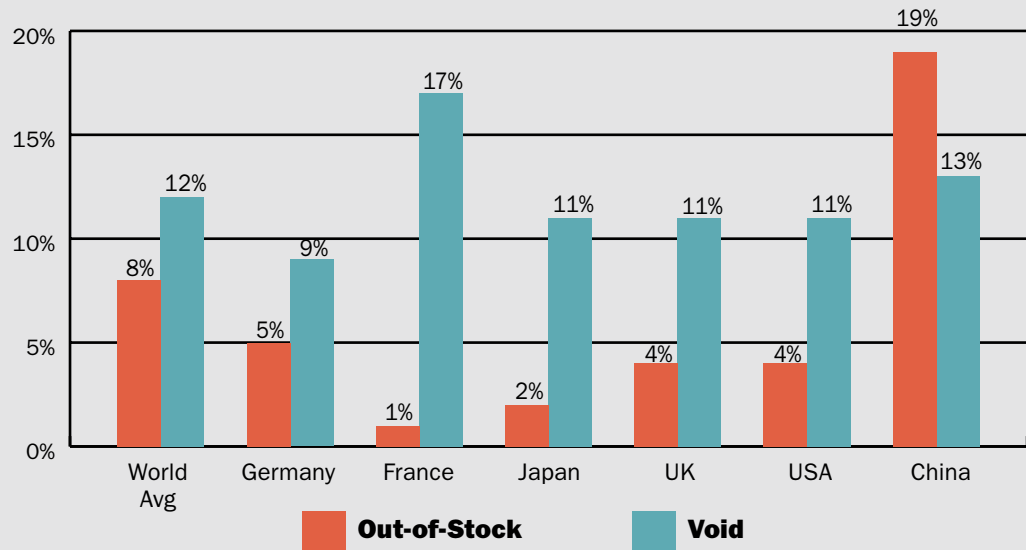
Exhibit 15: Summary Table of OLA and NOLA by Country

	In Stock	In Stores Only	Marketplace		Out of Stock	Void
WORLD	74.03%	0.67%	74.03%	WORLD	8.11%	11.76%
GERMANY	76.60%	0.00%	9.81%	GERMANY	4.52%	9.07%
FRANCE	73.78%	0.00%	8.03%	FRANCE	0.76%	17.44%
JAPAN	87.03%	0.00%	0.00%	JAPAN	1.95%	11.02%
UK	79.10%	0.00%	5.56%	UK	3.88%	11.46%
USA	74.87%	2.07%	8.48%	USA	3.88%	10.69%
CHINA	65.19%	0.00%	3.24%	CHINA	18.74%	12.83%

Extent by Online Category

OLA varies across categories between 72.1 percent (skin care) and 79.4 percent (shave), shown in Exhibits 16-18. Across all countries, the hair category has the highest (9.5 percent) and the shave category the lowest stock-out rate (4.6 percent). Voids are highest for fabric care (14.8 percent) and lowest for shave (9.8 percent). Comparing OLA by category and country, overall there is less variability among categories than among countries.

Exhibit 16: OLA by Category

Bar chart showing In Stock, In Stores Only, and Marketplace percentages by category:

Category	In Stock	In Stores Only	Marketplace
Total	74%	1%	5%
Baby	73%	1%	5%
Fabric	77%	0%	2%
Hair	73%	1%	7%
Oral	75%	1%	5%
Shave	79%	1%	5%
Skin	72%	0%	6%
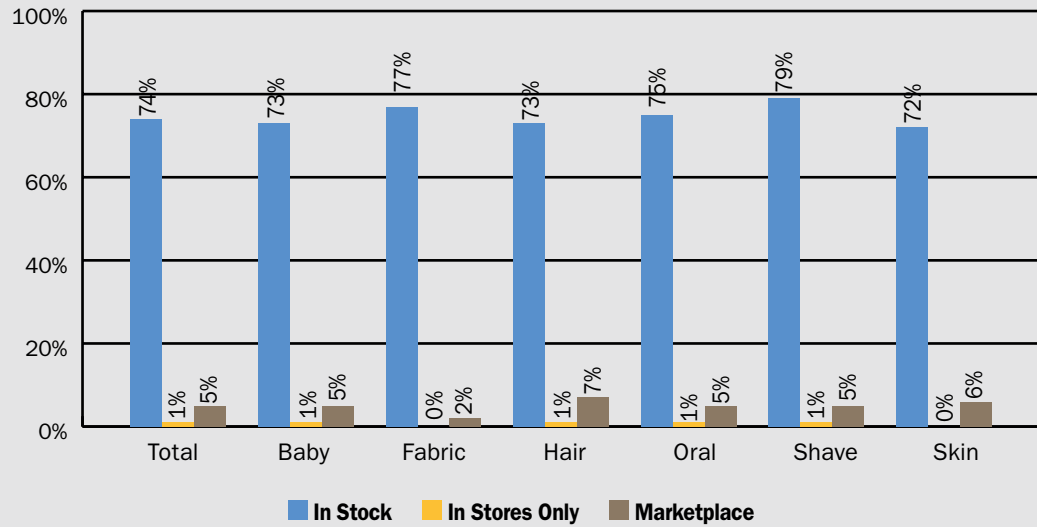
Exhibit 17: NOLA by Category

Bar chart showing Out-of-Stock and Void percentages by category:

Category	Out-of-Stock	Void
Total	8%	12%
Baby	9%	12%
Fabric	6%	15%
Hair	10%	11%
Oral	7%	12%
Shave	5%	10%
Skin	9%	13%
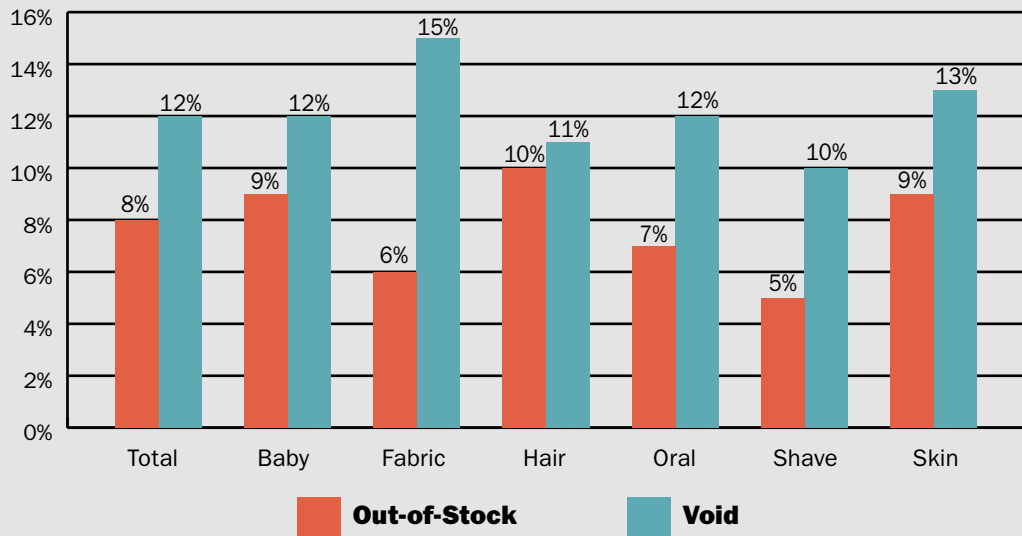
Exhibit 18: Summary Table of OLA and NOLA by Category

	In Stock	In Stores Only	Marketplace		Out of Stock	Void
TOTAL	74.03%	0.67%	5.43%	TOTAL	8.11%	11.76%
BABY	73.29%	0.98%	5.01%	BABY	8.61%	12.10%
FABRIC	77.26%	0.41%	1.96%	FABRIC	5.60%	14.77%
HAIR	72.53%	0.60%	6.62%	HAIR	9.59%	10.66%
ORAL	75.39%	0.88%	5.11%	ORAL	6.89%	11.73%
SHAVE	79.36%	1.26%	5.03%	SHAVE	4.54%	9.81%
SKIN	72.13%	0.33%	5.90%	SKIN	8.61%	13.02%

Extent by Online Retailer

We found substantial differences of OLA across channels where pure online retailers have higher availability than omni-channel retailers. This is in line with inventory theory because omni-channel retailers that pick online orders in stores will have more demand variability, since their store inventory must serve both online and offline demand. Pure online retailers only serve online demand and benefit from inventory pooling since they pick from warehouses that serve larger regions.[22]

Our sample has too few retailers per country to allow us to control for their picking and distribution method. However, with Amazon we have one retailer that is present in all countries and categories of interest. This allows us to compare the extent for the same retailer across categories and countries. If we assume that the different Amazon entities share similar characteristics, then we can attribute differences in OLA among Amazon subsidiaries to country or category differences. Indeed, we find that across the different countries in which it operates OLA for Amazon varies between 72.8 percent and 90.3 percent (Exhibit 19). Across categories, the difference is even more striking. For shave products it ranges between 87.1 percent and 93.8 percent, and in the oral care category it can be as low as 46.3 percent and as high as 94.1 percent. This implies that the variation of OLA is largely due to country and category differences.

Exhibit 19: OLA for Amazon by Category and Country

Amazon (6 Country Comparison)

Category	High	Low	Average
Baby	94.31%	64.21%	87.91%
Fabric	91.67%	75.27%	81.28%
Hair	93.08%	73.22%	85.25%
Oral	94.11%	46.30%	84.38%
Shave	93.78%	87.08%	90.00%
Skin	93.41%	73.82%	86.06%
Country	90.26%	72.79%	85.89%
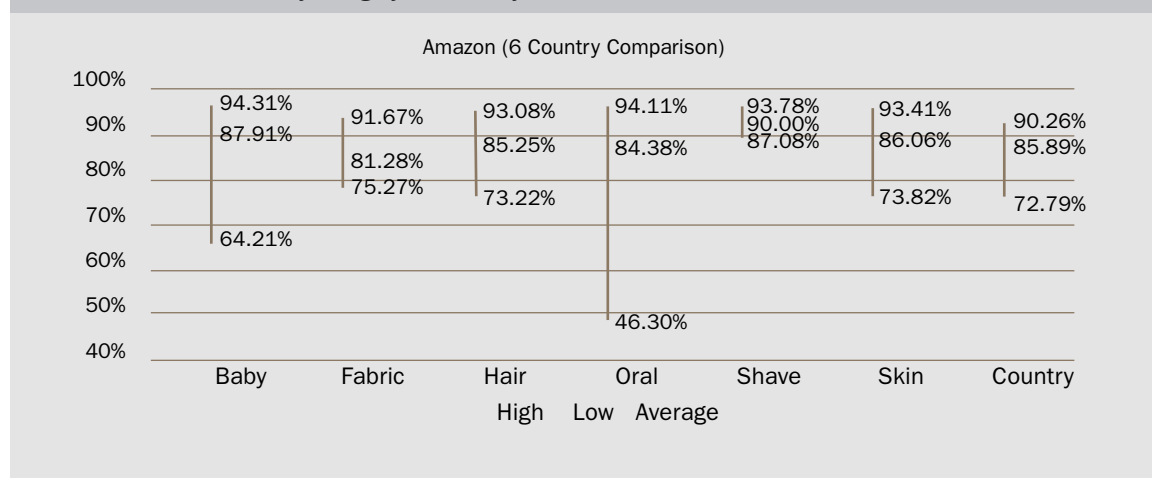
EXTENT OF OLA: ONLINE SHOPPER SURVEY

As part of the overall research project, we conducted two studies of shoppers to understand how shoppers encounter NOLA and how they respond when they discover that the item they desire is unavailable. One of the studies, surveying US online shoppers, also provided a measurement of the extent of OLA. For this study, we collected data between June 27-September 7, 2016, from InfoScout's panel of online shoppers (InfoScout is an online market research provider). When an InfoScout panelist would record an online purchase in any one of the six target product categories, they received an invitation to take a survey on their mobile device. Of 9,336 contacts, 8,185 qualified for the survey by verifying their online purchase of an item in one of our categories of interest. Once qualified, each panelist was asked if the item they purchased was the item they wanted to buy, and asked the intended item was available at the site where they originally wanted to purchase the item.

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[22]Note that an alternative point of measurement of availability by retailers is (order) picking accuracy at either the shelf or the warehouse (i.e. in-full, no-error, on-time). In addition, retailers that have a policy to substitute missing item may differentiate between picking accuracy before and after substitution. However, these retailer measures do not reflect the availability from the shopper's perspective, and they are not readily available for brands.

All qualified respondents had an identification number that permitted matching their responses to their shopping data and demographic information stored by InfoScout. From this data we could determine the following: 70.1 percent of responses had made their online purchase from Amazon, and 12.1 percent made their online purchase at Target. Baby care was the most-shopped category in the survey accounting for 37 percent of all responses, followed by skin care (19 percent), oral care (14 percent), hair care (13 percent), laundry/fabric care (11 percent), and shave (6.5 percent). When identifying their race/ethnicity, 76 percent of all respondents indicated that they were white. 78 percent were between ages of 25-44. Income was distributed relatively evenly between low, middle, and upper income groups.

From the 8,185 qualified respondents, the overall extent of NOLA was 16 percent (1,308), while 84 percent (6,877) found exactly what they wanted. Panelists who found the exact item they sought were thanked for their participation and did not answer any further questions. The sample used for the remainder of the analysis of extent as well as shopper reactions is the group of 1,308 online shoppers who did not find the item they wanted available.

Factors Affecting NOLA

The analysis showed several factors affecting NOLA. There were category effects for baby care (18 percent) and shave (11 percent), while the other categories did not vary significantly from the 16 percent overall average (Exhibit 20). There was an effect of race/ethnicity, with white shoppers encountering NOLA less than 14 percent of the time, while non-white averaged above 20 percent (Exhibit 22). Age and income also showed significant effects, with younger and lower income both encountering higher NOLA than older and higher income (age and income were also highly correlated, so the effects may not be independent). The effect of age on NOLA encounters is illustrated in Exhibit 21.[23] There was no substantial difference between male and female encounters of NOLA.

Exhibit 20: Extent of NOLA by Product Category (US Shoppers)

Category	Available	Not Available
Baby	82%	18%
Fabric	83%	17%
Hair	84%	16%
Skin	85%	15%
Oral	86%	14%
Shave	89%	11%
Average	84%	16%
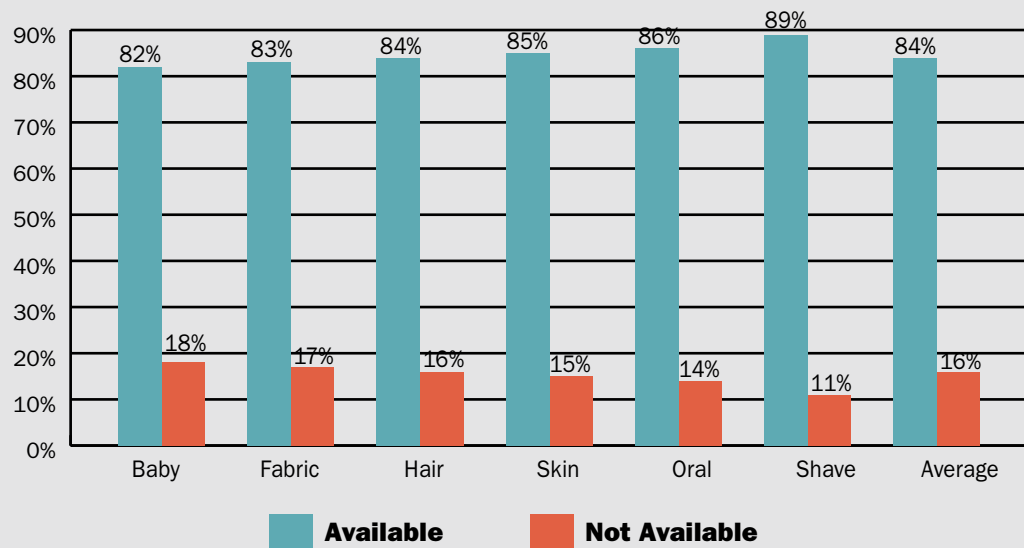
[23]The second shopper study showed the same pattern of results for age.

Exhibit 21: Extent of NOLA by Age Category (US Shoppers)

Chart: NOLA Encounters by Age

Age Category	Value
< 25	20.9%
25-34	18.2%
35-44	14.3%
45 +	11.3%
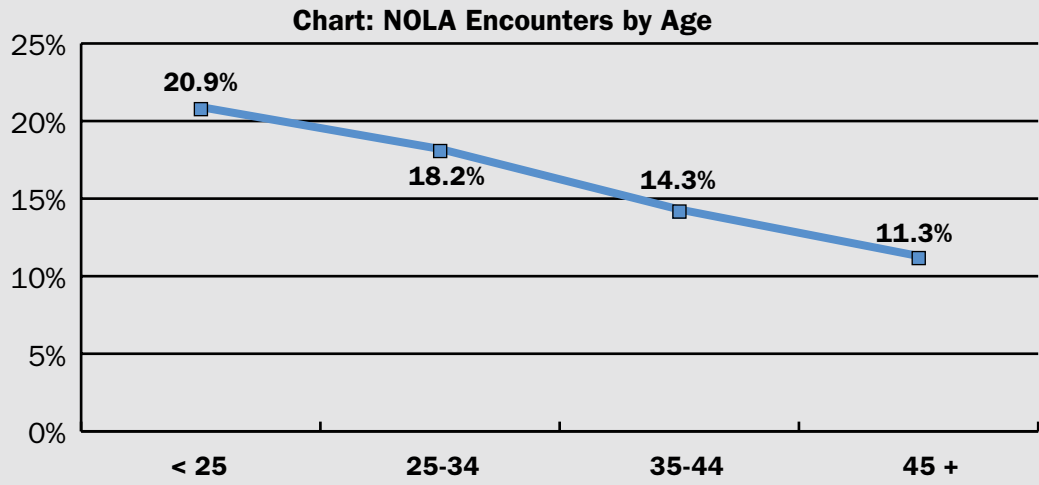
Exhibit 22: Extent NOLA by Race/Ethnicity (US Shoppers)

Category	Value
Average	16.0%
White (Non-Hispanic)	13.6%
Other	20.5%
African-American	21.6%
Hispanic	24.6%
Asian	25.0%
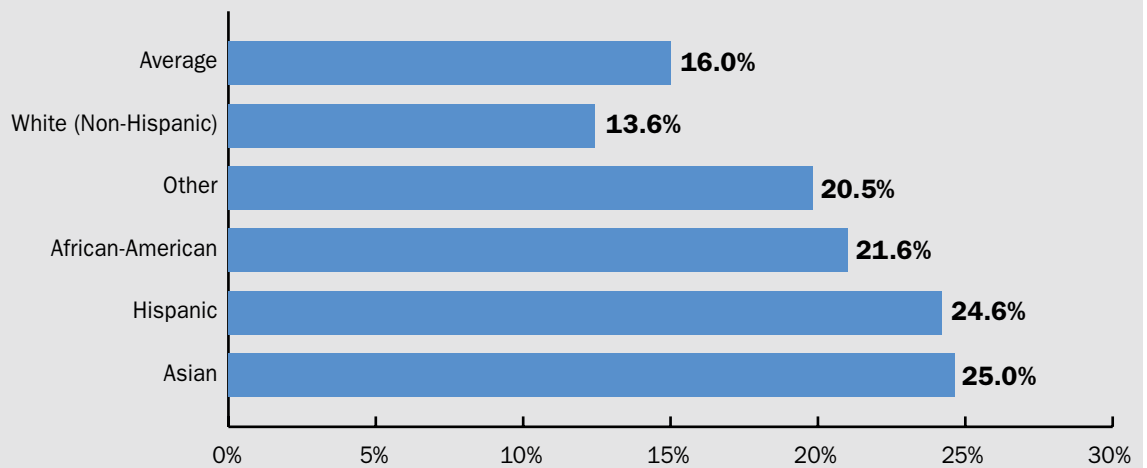
SURVEY SHOPPER REACTIONS TO NON-ONLINE AVAILABILITY (NOLA)

We conducted two studies to understand shoppers' reactions when encountering NOLA. The first study surveyed US shoppers (the methodology was explained in the previous section on extent), and the second study surveyed shoppers in China, France. Germany, Japan, and the United Kingdom (methodology explained below).

Methodology and Definitions

We collected data between September 27-October 10, 2016 with PlanetRetail, a global market research provider, who contacted (via e-mail) panelists from their quarterly *Shopology* study over the past 4 quarters. The target sample was 1,000 respondents per country, and the final sample had slightly more than 1,000 from each country except China, where there were 861 respondents. Overall, there were 5,039 qualified responses across 5 countries. Each of the respondents answered the same questions as those asked in the US shopper survey. The survey was translated into the respective native language of each country. Information about each respondent as well as their previous *Shopology* survey answers were also merged into the dataset. Responses by category were hair care (23 percent), skin care (22 percent), shave (19 percent), oral care (17 percent), fabric care (11 percent), and baby care (8 percent).

Of the 5,039 respondents, 42.8 percent (2,159) did not find the item available as desired, while 57.2 percent (2,880) found exactly what they wanted. We established two groups from the 5,039 respondents: (1) *actual* NOLA (2,159), who were asked about their reactions due to the item they wanted being unavailable (which can be compared with the US shopper survey), and (2) *hypothetical* NOLA (2,880), who were asked what their reaction "*would have been if*" the item had been unavailable. Each group answered the complete survey, although the questions were adjusted to the second group, asking "if the item had not been available, then...." Except where specifically identified, all further analysis focuses solely on the group of 2,159 that did encounter a NOLA item.

It is important to note that the design of the data collection for this survey of the PlanetRetail *Shopology* panel was not intended to provide a valid indicator of the overall extent of OLA in those countries. However, we can examine how the relative percentages of those encountering NOLA vary across categories, countries, and age groups, and make comparisons with the variations observed in the survey of US shoppers. The variations in NOLA levels were consistent with the results we saw from the US shopper survey and the online retailer data. There was a category effect, where baby care had the highest percentage NOLA, followed by skin care. The other four categories had roughly equivalent levels of NOLA. There was also a clear age effect, with younger shoppers encountering NOLA at almost double the rate of older shoppers (this validates the findings from the US shopper study that showed a strong effect of age on NOLA encounters).

How Shoppers Encounter NOLA

Prior to conducting the shopper surveys, we identified four primary ways that an online shopper can encounter NOLA:

1. The first is that the item is specifically stated to be unavailable or "out of stock" on the web page.

2. The second occurs when the shopper is informed that there will be a substantial delay in shipping or pick-up, indicating that the item is not immediately available (typically backordered).

3. The third occurs when the shopper cannot locate the specific item they want on the web or mobile site. This may occur when the item is purposely not shown by the online merchant

(void, as discussed in a previous section of this report), not appearing due to programming errors (also considered void), or not found due to user error (the shopper types in the wrong item name or code, or simply overlooks a page).

4. The fourth is that the item is not available for purchase online and only available to purchase in a retail store.[24]

Exhibit 23 shows that shoppers across all six countries reported that on average 45 percent of the NOLA encounters were stated "out-of-stock." Twenty-seven percent of shoppers indicated there would be a long shipping delay (back-ordered), 20 percent of shoppers could not find the item, 5 percent of shoppers were informed that the item was only available for purchase in the store, and 4 percent of shoppers did not indicate the reason the item was NOLA.

Exhibit 23: Reason Item NOLA by Country

Country	Stated OOS	Delay	Not Displayed	Only in Retail Store	Other
Average	45%	27%	20%	5%	3%
China	39%	32%	24%	1%	4%
Japan	61%	19%	16%	2%	2%
France	46%	28%	19%	5%	2%
Germany	37%	33%	20%	5%	5%
UK	43%	30%	18%	6%	3%
USA	41%	16%	26%	10%	6%
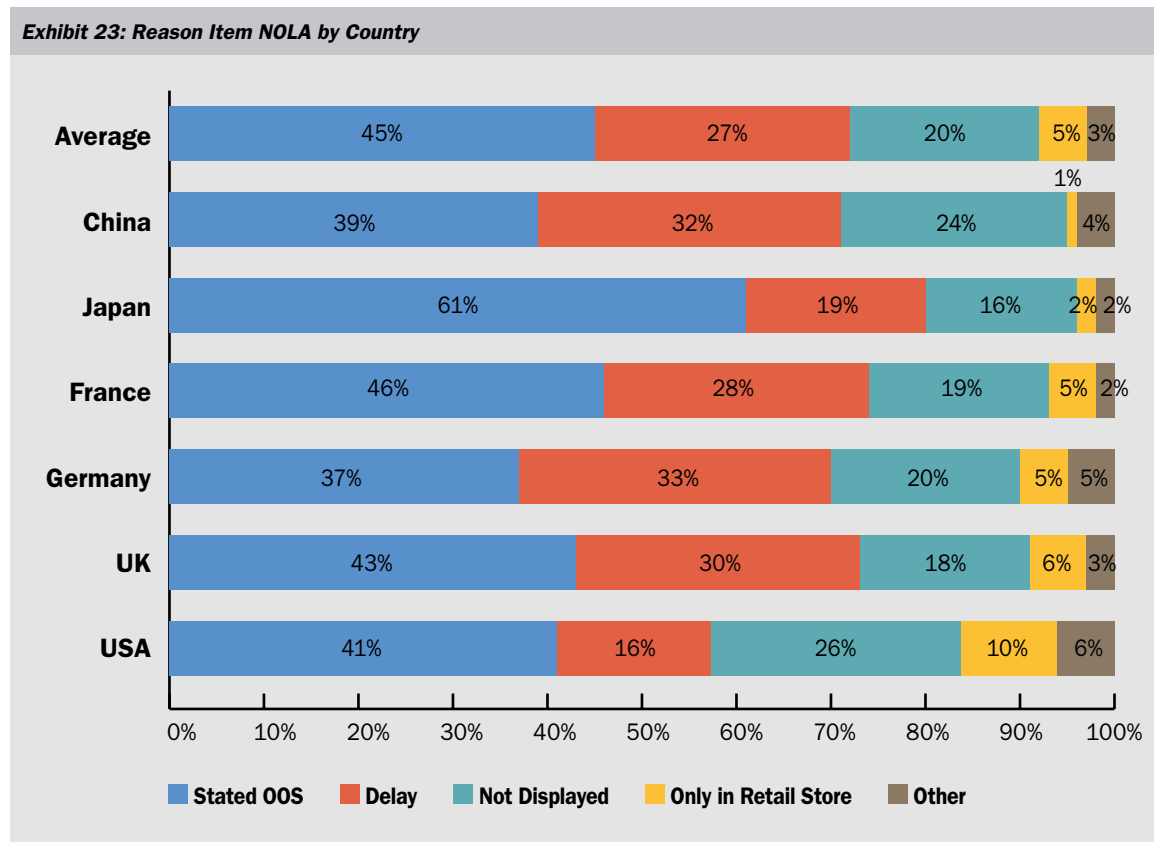
Of note, in the US, only 16 percent of shoppers indicated a delay in shipping/pickup (lowest of all countries), and 10 percent found the item can only be purchased in the retail store (the highest of all countries). Except for Japan, all other countries indicated higher levels of delay than the US. Japan has the highest percentage of identified out-of-stock items. China and the US have the highest percentage of items not being found (24 percent and 26 percent respectively).

Comparing harvested data and shopper study data: While our methods do not allow us to draw exact comparisons of the extent as harvested from the retailer websites and extent reported by shoppers, we are able to offer several observations. First, the overall extent of OLA in the US was 15 percent (4 percent OOS and 11 percent void) in the harvested data, and it was 16 percent in the shopper study. In 45 percent of their NOLA incidents, US shoppers encountered items that

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[24]Noted previously, this differs from the retailer perspective where the intention is only to provide retail store availability and not online purchase availability. From the shopper perspective, the inability to purchase the desired item online requires them to shift their intended behavior.

were stated out-of-stock, and in another 27 percent items that had a shipping delay. Combined, shoppers reported the item was found but not currently available in 72 percent of the cases. In only 20 percent of the cases the item was not found. This suggests that online shoppers may be more cognizant of stated out-of-stocks than items they cannot find. This could have an implication on managerial practices of voiding out-of-stock items as opposed to stating they are out-of-stock when substitute items exist. However, this practice could encourage shoppers that seek a non-substitutable item (e.g. with specific dietary or nutritional qualities) to more extensively search alternative online retailers. Additional research into these shopper responses should be made before using this finding to make a specific managerial decision to void or state out-of-stock.

Reactions to NOLA

To examine how shoppers react when confronted with their desired item NOLA, both shopper studies obtained information on the shoppers' immediate search reaction, their ultimate switching behavior, and the long-term effect on brand and store loyalty.

Immediate Reaction to NOLA - Change in Search Behavior: We asked respondents for their first reaction when they found the item to be unavailable, i.e., how they changed their online search behavior prior to making any ultimate change in their purchase behavior. The response options seek to understand changes in shoppers' search behaviors when NOLA interrupts the intended customer journey. Because online shoppers often search in more than one place before deciding what action to take (e.g., look for the variant of the brand at the same store and look for their desired item at another online store), respondents can select more than one option, thus the total percentages add to more than 100 percent. Exhibit 24 shows the overall average for each search option and how they differ by country.

Not surprisingly, the most frequent search reaction to NOLA was to seek a substitute of the same brand at the same online store (40 percent across all countries). This is most frequent search behavior for the US as well as for the three European countries. It is the easiest and least risky option for the shopper, as they do not have to leave the online store and can look for a variant (different size or style) of their desired brand.

There are striking differences among countries when shoppers decide to search at other online stores. This occurs in more than 50 percent of the cases in China and Japan, nearly double that in the US and UK. Also of interest, the three European countries have the highest level of searching for a different brand on the same online store. Regarding omni-channel search behavior, Japan and US are least likely to search an offline retailer when the item they want is unavailable online.

Of additional interest is the difference in cumulative willingness to search. As noted earlier, respondents could select more than one option for this question, depending on the breadth of their search. When adding the total search percentages, China is highest at 148 percent, while the US is lowest at 113 percent. This would make sense as in China online shoppers encounter NOLA more often, and thus would be conditioned to additional search.

Exhibit 24: Search Reaction to Item NOLA

	Search other OL Stores	Search same Brand	Search other Brand	Search for offline purchase	Close site
USA	28%	43%	30%	12%	11%
UK	27%	41%	37%	18%	11%
Germany	32%	37%	35%	23%	14%
France	35%	43%	35%	17%	11%
Japan	54%	30%	23%	12%	8%
China	51%	46%	31%	20%	8%
Average	38%	40%	32%	17%	10%
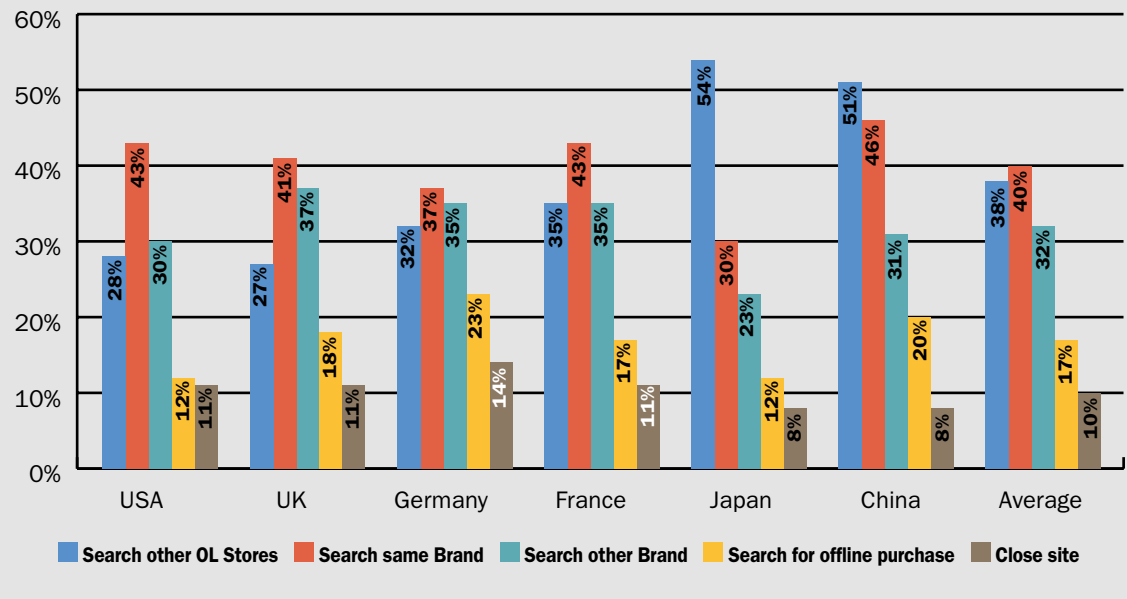
Ultimate Response in Purchase Behavior to NOLA: There are substantial differences among the six countries for shoppers' ultimate purchase behavior responses (Exhibit 25). One hypothesis suggests that these differences are due to the online retail structure among the six different nations we studied. For example, in the US with Amazon holding the major market share, there is less online retailer switching and more switching within the same online store. All three European countries have very high brand switching, which may be due to the presence of strong private brands. Japan has the highest intention switching (delay/cancel), which may indicate strong supply chains that will likely provide the desired item later without further search. China has strong online store competition; so online shoppers can find their item easily at other online stores. We provide more detailed discussion of the actual shopper behavior below.

USA: In the US, only 15 percent of the online shoppers switched online stores while more than 60 percent purchased a substitute item on the same online store. Given the dominance of Amazon (and Amazon Prime) in US online retail, we suspect that shoppers find it more convenient to purchase another brand at Amazon rather than switching to another online retailer. About 8 percent purchased the item they wanted from a retail store, and 15 percent either delayed or cancelled their purchase (switched intention). Of the 60 percent who substitute items, half of those switched brands, while half substituted a variation of the brand of the initially desired item. Comparing search reactions to ultimate response, in the US only about half of those who searched another online store ended up purchasing from another online store.

Chart data:

	Switch OL Stores	Switch Brand Variant	Switch Diff Brand	Switch Channel	Switch Intention
USA	15%	31%	30%	8.6%	14.3%
UK	24.2%	22.7%	35%	9.7%	9.3%
Germany	27.3%	18.9%	33.6%	14.2%	6.3%
France	18.9%	27.7%	33%	14.2%	6.2%
Japan	26.2%	23%	20.6%	8.9%	21.3%
China	34.2%	27.9%	20.6%	9%	8.3%
Average	22.1%	26.8%	28.8%	10.1%	11.8%
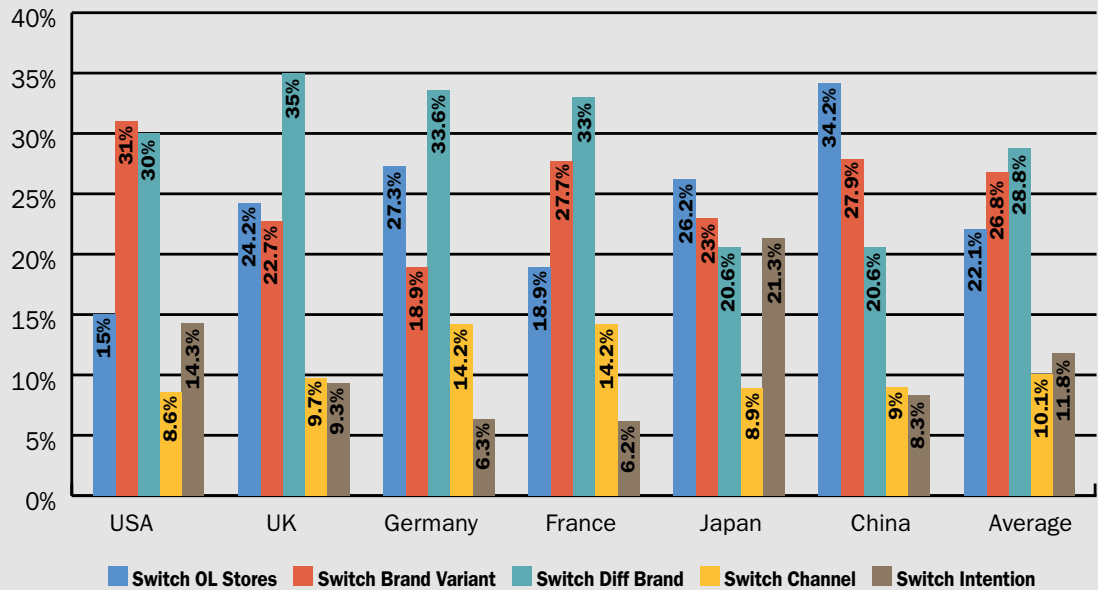
Note on exhibit: the category "switch channel" combines the responses from purchasing the item at the retail store of the online retailer and from a different retail store. The category "switch intention" combines the delay and cancel purchase responses. We combine these two because in the case of "delay" as well as "cancel", shoppers change their intention of purchasing an item to not purchasing an item during the online shopping trip; also, the individual response category percentages were small, therefore we combined the two.

China: In China, shoppers are more brand loyal when they encounter NOLA. About half researched another online store, and 34 percent ultimately ended up purchasing the same item from a different online store, indicating that Chinese online shoppers frequently choose from alternative online stores. Only 20 percent switched brands in the same online store.

UK, Germany, France: Shoppers from the three European countries are much more willing to switch brands within the same store - which may be a function of the strength of private brands in these countries. Shoppers from Germany and France are more likely (than average) to switch channels and less likely to delay or cancel. German shoppers are more likely to switch online stores than UK or France.

Japan: Shoppers in Japan are willing to switch online stores and delay or cancel their purchase (switch intention). They exhibit lower willingness to switch brands, preferring to switch online stores or wait.

Intentions versus Behaviors: To probe these reactions further, we examined the intentions of the hypothetical NOLA group with the behaviors of those who encountered NOLA. There are two differences worth noting. First, shoppers believe they will switch online stores more than they do (one-third indicate they would switch online stores, while only one-quarter switched online stores). What is even more striking in Exhibit 26, is that shoppers who encountered NOLA were much more likely to switch brands than shoppers who faced a hypothetical NOLA. More research is needed for confirmation, but this finding suggests that brand managers who depend on brand loyalty surveys of purchase intention may be overestimating actual brand purchase loyalty.

Exhibit 26: Actual vs. Hypothetical Response to NOLA

Chart data (Actual Percentage / Hypothetical Percentage):
- Substitute same brand: 24.2 / 24.1
- Substitute different brand: 28.2 / 14.2
- Switch online stores: 26.4 / 33.4
- Purchase item at same retail store: 5.9 / 4.3
- Purchase item from different retail store: 5.1 / 8.8
- Delay purchase: 6.5 / 11.1
- Cancel purchase: 3.7 / 4.2

Legend: Actual Percentage | Hypothetical Percentage
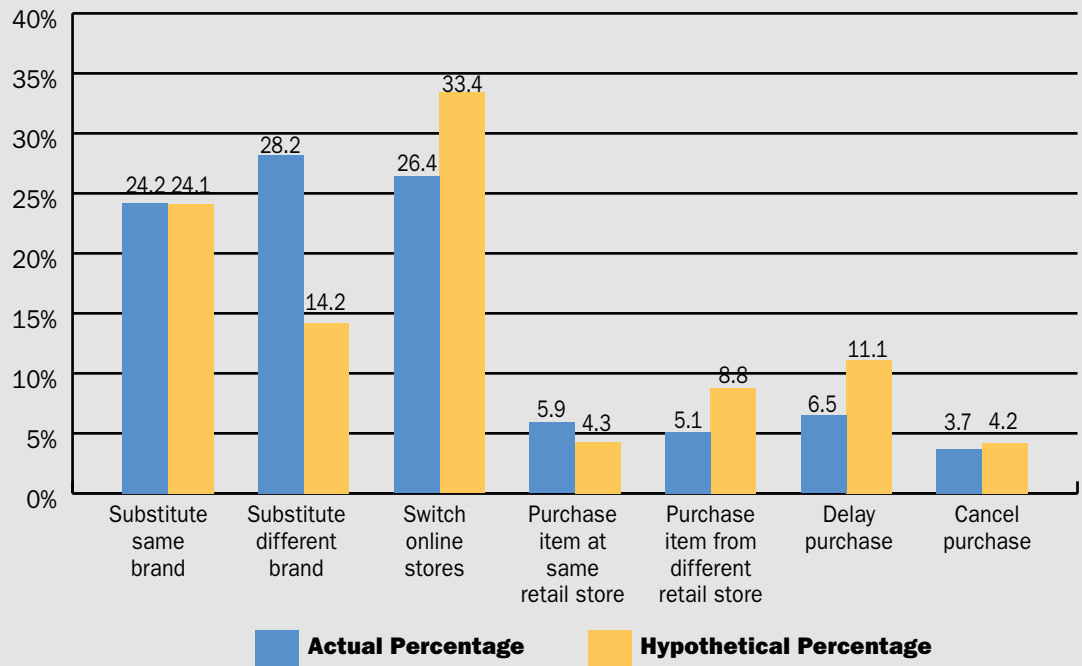
Long-term Loyalty

We asked respondents in both shopper surveys to indicate the anticipated effect of NOLA on future shopping at the online store and for the brand. Our hypothesis was that this would affect the store more than the brand, as the shopper would likely attribute NOLA as the fault of the online retailer, thus reducing their satisfaction with the online store. Brands would be penalized mainly due to the shopper's trial of a substitute brand and the disruption of the habitual loyalty, rather than due to dissatisfaction caused by NOLA in the shopping process.

Shoppers were asked to respond on a scale of 1-5 where "1" indicated much less likely to shop at the same store (purchase the same brand), and "5" indicated much more likely. There was a clear difference between the responses to the two surveys. Surprisingly, in the survey of Europe, Japan, and China, shoppers did not indicate that NOLA would negatively affect their future shopping at the store or for the brand. As Exhibit 27 shows, stores are penalized slightly more than brands across all 5 countries, confirming our hypothesis. However, the mean is above the midpoint 3.00 (which indicates no future intention change), thus we do not see any indication of NOLA impacting the future intentions to shop at the store or buy the desired brand.

Exhibit 27: Impact of NOLA on Future Store Loyalty and Brand Purchases

Bar chart showing values for Future Shop - Store and Future Shop - Brand by country:
- UK: 3.3 / 3.5
- Germany: 3.3 / 3.4
- France: 3.3 / 3.3
- Japan: 3.4 / 3.5
- China: 3.5 / 3.6
- Total: 3.4 / 3.5
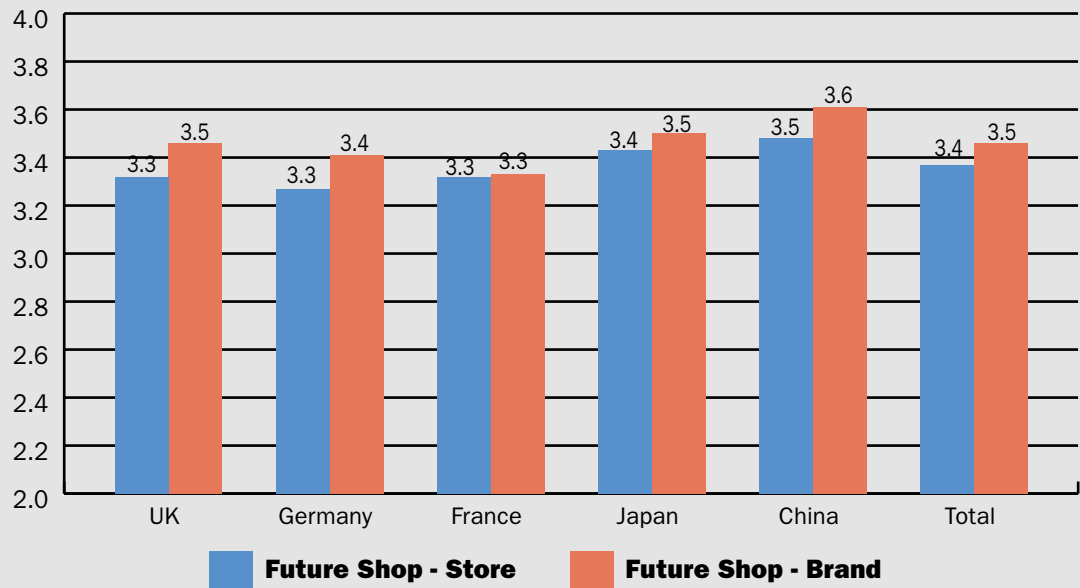
The results for the US study were markedly different from for the 5-country shopper study. The mean scores for the effect of NOLA on future shopping at the online store were 2.62, and the mean score for the effect of NOLA on future purchase of the brand is 2.57. Both are well below the midpoint (3.00), which indicates that NOLA negatively affects the long-term loyalty to both the store and the brand. As another likely indicator of the strength of Amazon in the US, the negative impact on the brand is greater than that of the store, which is the opposite of what we would hypothesize, although the statistical difference is non-significant.

Detailed Switching Behavior

Category Effects. To understand category effects, we compare the switching behavior within individual categories to the overall average. Where significant differences between the category and the overall average occur, we examine that category effect in more detail.

USA: Exhibit 28 shows distinct differences among product categories. Laundry and shave demonstrate strong brand loyalty and that a substitute item of the same brand is acceptable. For baby care, shoppers will search other online stores to get the item they want. For skin care, hair care, and oral care, NOLA sends an invitation to try a different brand.

Exhibit 28: How Switching Behavior Varies by Category (USA)

Legend: Switch OL Stores | Search Brand Variant | Switch Diff Brand | Switch Channel | Switch Intention

Category	Switch OL Stores	Search Brand Variant	Switch Diff Brand	Switch Channel	Switch Intention
Baby	19%	29.6%	26.9%	8.6%	15.9%
Skin	15.7%	30.4%	33.5%	5.7%	14.8%
Hair	13%	28%	35.4%	6.8%	16.8%
Oral	9.8%	29.3%	37.2%	11.6%	12.2%
Shave	8.8%	42.1%	28.1%	5.3%	15.8%
Fabric	9.4%	39.6%	21.5%	13.4%	16.1%
Total	15%	31.2%	29.8%	8.6%	15.4%
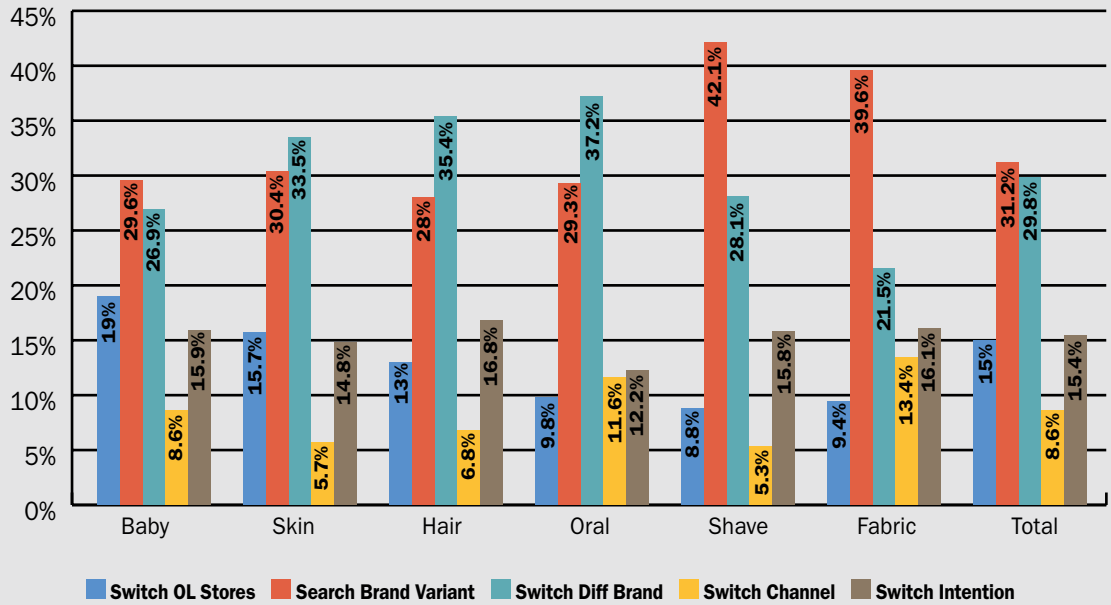
Exhibit 29: How Switching Behavior Varies by Category (China)

Legend: Switch online store | Substitute Same Brand | Substitute Diff Brand | Switch Channel | Switch Intention

Category	Switch online store	Substitute Same Brand	Substitute Diff Brand	Switch Channel	Switch Intention
Baby	37%	20%	17%	20%	7%
Fabric	21%	37%	26%	12%	4%
Hair	35%	30%	18%	5%	13%
Skin	46%	20%	17%	8%	10%
Oral	28%	33%	26%	8%	5%
Shave	33%	27%	21%	12%	8%
Total	34%	28%	21%	9%	8%
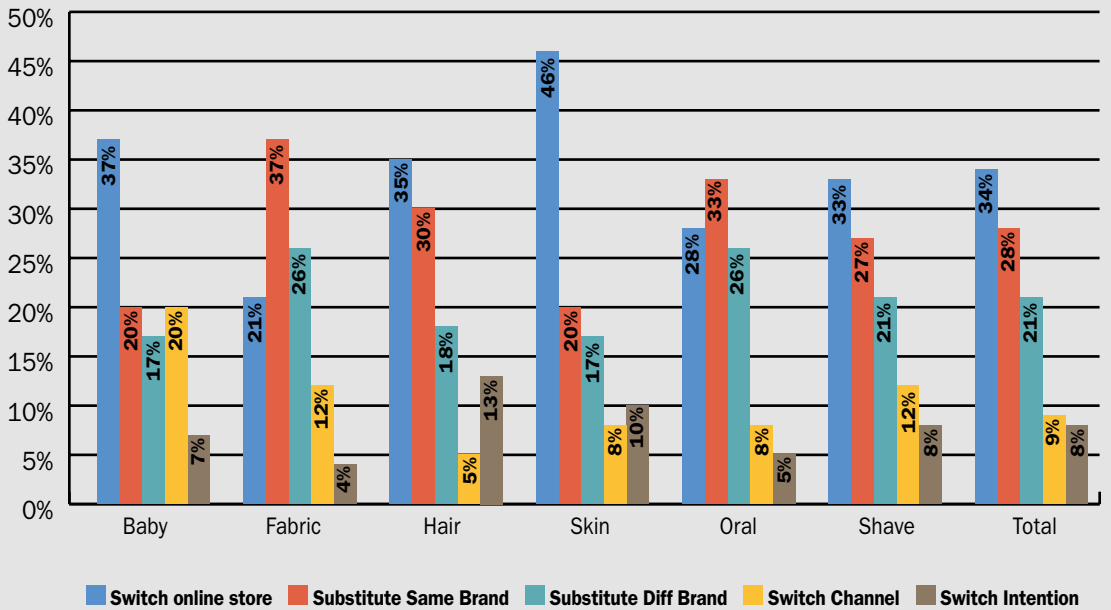
China: China has the highest overall online store switching of all countries. This is most pronounced in the skin care category and least in the laundry category (Exhibit 29). On the other hand, NOLA leads to lower same brand switching in skin care and higher same brand switching in laundry.

Japan: Japan shows the most variation by category (Exhibit 30). For baby care, shoppers will switch to another online store and are less willing to switch channels. Skin care shoppers also switch stores rather than switching to another item within the same online store. Laundry shoppers tend to switch to a different brand rather than switch stores. Oral care and skin care shoppers will switch intention (delay or cancel purchase).

Exhibit 30: How Switching Behavior Varies by Category (Japan)

Legend: Switch online store, Substitute Same Brand, Substitute Diff Brand, Switch Channel, Switch Intention

Category	Switch online store	Substitute Same Brand	Substitute Diff Brand	Switch Channel	Switch Intention
Baby	33%	25%	21%	4%	17%
Fabric	18%	25%	29%	14%	14%
Hair	28%	26%	18%	9%	20%
Skin	33%	15%	19%	7%	27%
Oral	18%	27%	20%	9%	27%
Shave	23%	29%	24%	11%	13%
Total	26%	23%	21%	9%	21%
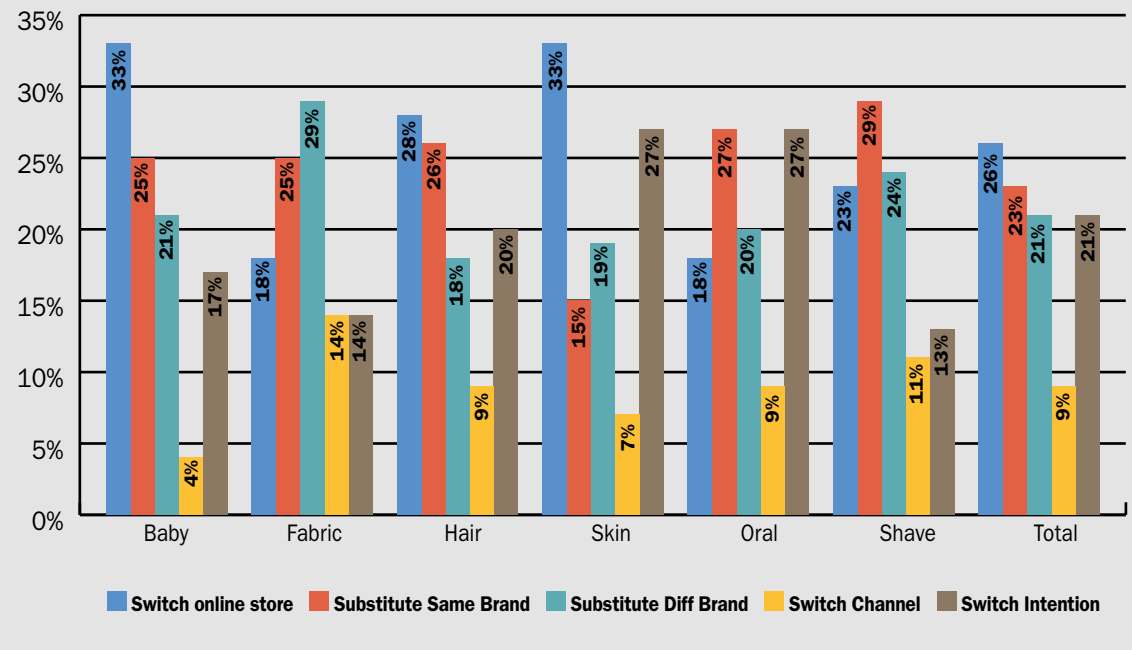
France: Of all the countries, France shows the least variation among categories to the overall switching behavior. The most noticeable difference is higher brand switching in the oral and shave categories and higher channel switching in the baby category (Exhibit 31).

Exhibit 31: How Switching Behavior Varies by Category (France)

Chart data (France):

Category	Switch online store	Substitute Same Brand	Substitute Diff Brand	Switch Channel	Switch Intention
Baby	18%	31%	27%	19%	5%
Fabric	18%	27%	34%	15%	7%
Hair	18%	31%	29%	14%	8%
Skin	21%	25%	34%	14%	7%
Oral	21%	22%	38%	14%	5%
Shave	18%	30%	38%	11%	4%
Total	19%	28%	33%	14%	6%
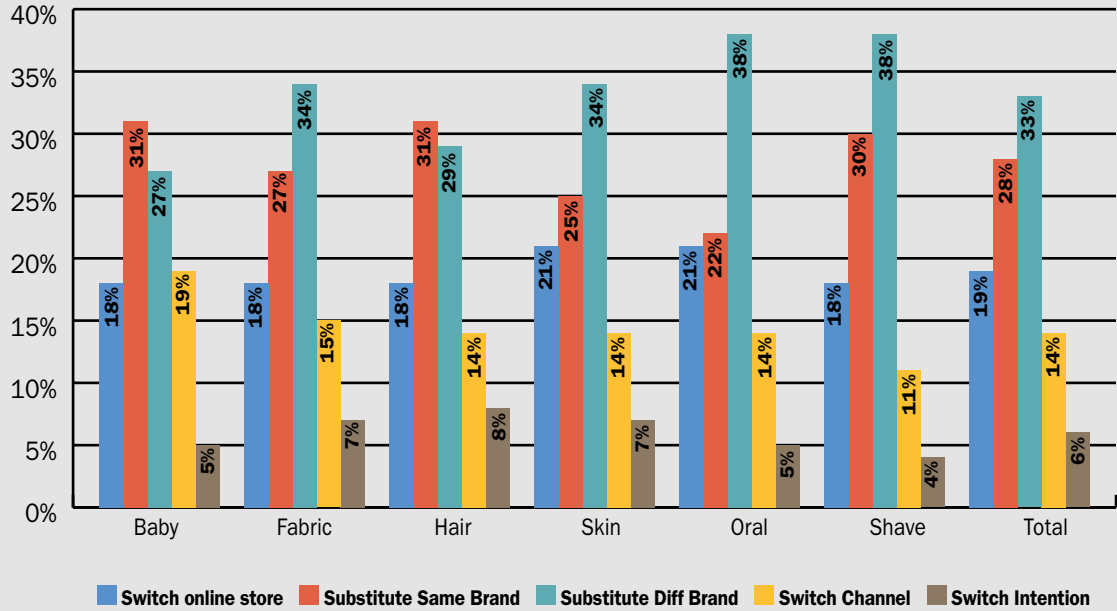
Germany: Germany has the most variation among categories of the three European countries we examined (Exhibit 32). Laundry and hair care have very low same brand substitution and correspondingly high brand switching. Skin care also has a high brand switching. Oral care and shaving have higher store switching and low intention switching.

Exhibit 32: How Switching Behavior Varies by Category (Germany)

Chart data (Germany):

Category	Switch online store	Substitute Same Brand	Substitute Diff Brand	Switch Channel	Switch Intention
Baby	26%	24%	30%	9%	11%
Fabric	28%	10%	39%	18%	5%
Hair	26%	14%	39%	16%	5%
Skin	21%	22%	38%	8%	11%
Oral	32%	28%	26%	11%	2%
Shave	32%	17%	28%	20%	4%
Total	27%	19%	34%	14%	6%
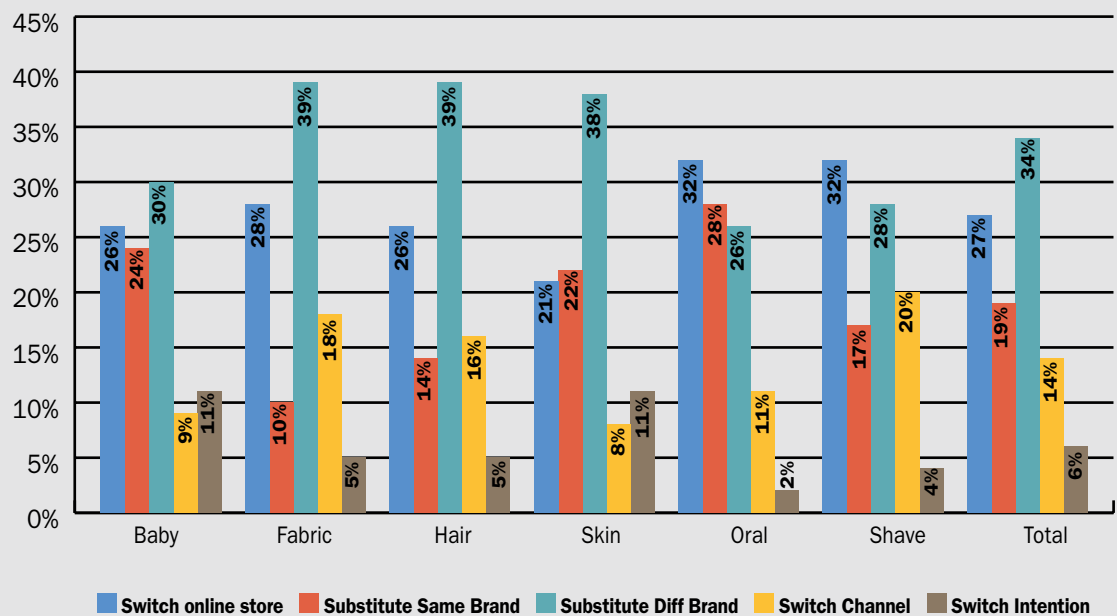
UK: In the UK, there is high online store switching and low channel switching. Across all categories, there is high brand switching, except for hair care where there is more same brand substitution (Exhibit 33).

Exhibit 33: How Switching Behavior Varies by Category (UK)

Legend: Switch online store · Substitute Same Brand · Substitute Diff Brand · Switch Channel · Switch Intention

Category	Switch online store	Substitute Same Brand	Substitute Diff Brand	Switch Channel	Switch Intention
Baby	30%	18%	35%	5%	13%
Fabric	22%	19%	41%	16%	3%
Hair	20%	30%	30%	11%	9%
Skin	22%	25%	39%	4%	10%
Oral	25%	19%	32%	11%	13%
Shave	28%	21%	35%	9%	7%
Total	24%	23%	35%	9%	9%
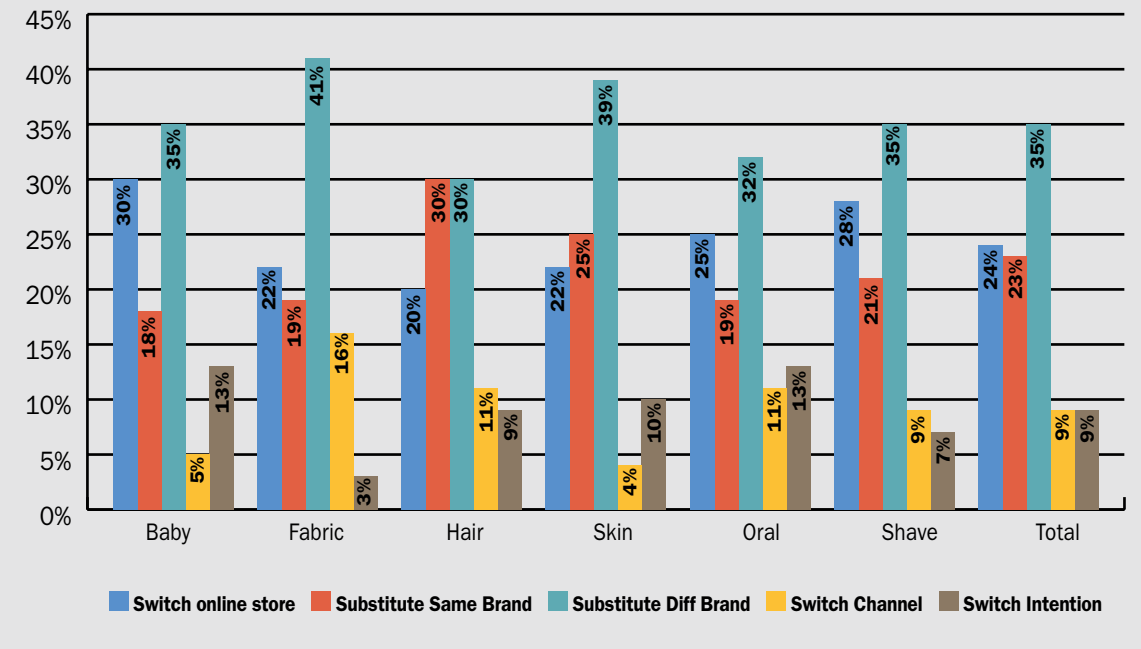
Encounter-type effects. Here we hypothesized that the way shoppers encounter the NOLA item will influence their switching behavior. Based on previous research, we would expect that if the item is shown as out-of-stock, the shopper would be more likely to search within the site to find an alternative. If the shopper cannot find the item, for instance, because it has been voided, she will be more likely to search another store, as she would conclude that the online retailer does not carry the item at all. However, the results from our US study show that the switching behavior patterns are nearly identical for items stated to be out-of-stock and those not displayed (Exhibit 34).

We do find differences in places where we would expect to find them. When the item is stated to have a delay in shipping/pickup, we see the highest level of switch intention and correspondingly lower levels of switching within the store. As expected, when the shopper is informed that the item is for sale offline in a retail store only, we see the largest percentage of channel switching (13 percent), almost double than when the item is stated to be out-of-stock. This also leads to the greatest level of online store switching (21 percent), as shoppers seek an alternative online store where they can purchase the item.

Legend:
- Stated Item OOS, N=536
- Item not displayed, N=345
- Delay in shipping or pick-up, N=210
- Only ATP off-line, N=135
- Total

Category	Stated Item OOS	Item not displayed	Delay in shipping or pick-up	Only ATP off-line	Total
Switch OL Store	14%	15%	16%	21%	15%
Switch Brand Variant	33%	33%	26%	27%	31%
Switch Diff Brand	33%	29%	28%	28%	30%
Switch Channel	7%	10%	10%	13%	9%
Switch Intention	14%	13%	21%	11%	15%
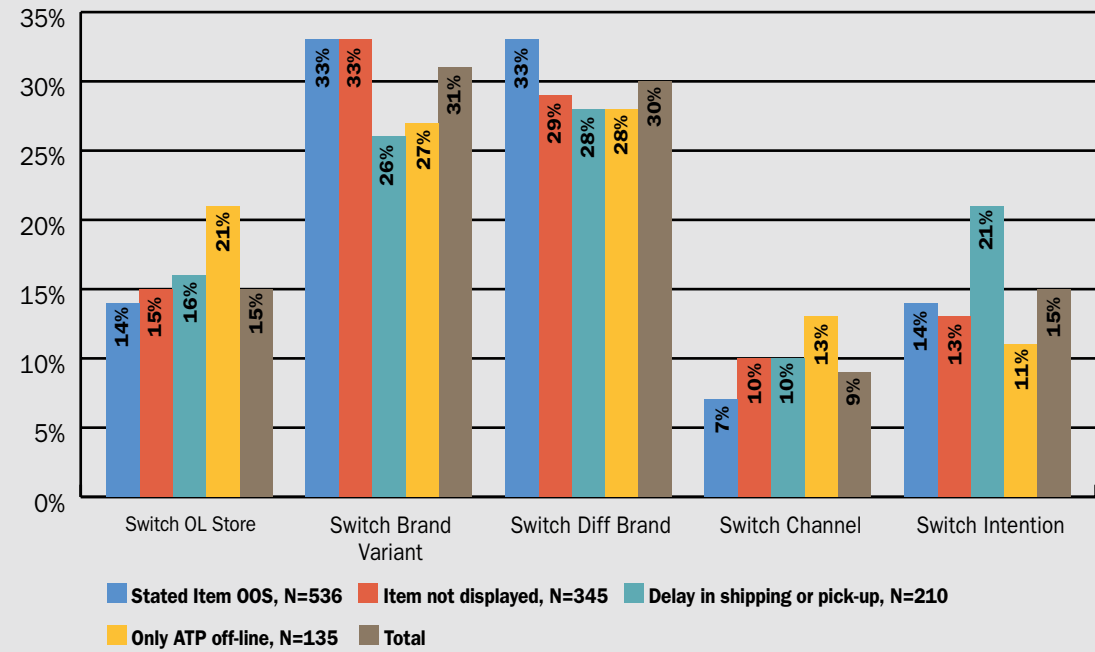
Basket timing effect. This analysis explores how the timing of NOLA during the online shopping trip influences shopper reactions. We hypothesize that with every decision to put an item into their baskets over the course of a trip, shoppers exhaust their mental resources and switching brands or stores requires additional effort when shoppers encounter NOLA. Exhibit 35 shows for US shoppers that when the first item encountered is unavailable, the highest level of brand switching occurs (35% vs. 30% average). When it is the last item on the shopping trip, this shows the highest level of store switching (27% vs. 15% average). When it is the only item in the shopping trip, shoppers are more likely to switch channel (13% vs. 9% average) or switch intention (delay/cancel; 23% vs. 15% average). Additional research is necessary to investigate whether loyalty to store or brands or other variables can explain these effects.

What is clear is that shopper switching behavior clearly changes depending on the moment when NOLA is encountered during the shopping trip. This also suggests tactics to online practitioners to develop algorithms to provide different offers to shoppers during their shopping trip. For shoppers who encounter a NOLA item early in the trip, the manufacturer may want to offer a promotion for staying with the same brand. If the item is encountered later in the shopping trip, the retailer might offer a promotion to keep the shopper, and ensure that she finishes the shopping trip at the retailer.

Exhibit 35: How Switching Varies by NOLA Encounter During Shopping Trip (USA)

	Switch OL Store	Switch Brand Variant	Switch Diff Brand	Switch Channel	Switch Intention
First (546)	14%	32%	35%	7%	12%
Last (148)	27%	27%	23%	10%	13%
Middle (482)	13%	33%	27%	9%	18%
Only Item (132)	12%	27%	28%	13%	23%
Total (1308)	15%	31%	30%	9%	15%

Legend: ■ First (546) ■ Last (148) ■ Middle (482) ■ Only Item (132) ■ Total (1308)
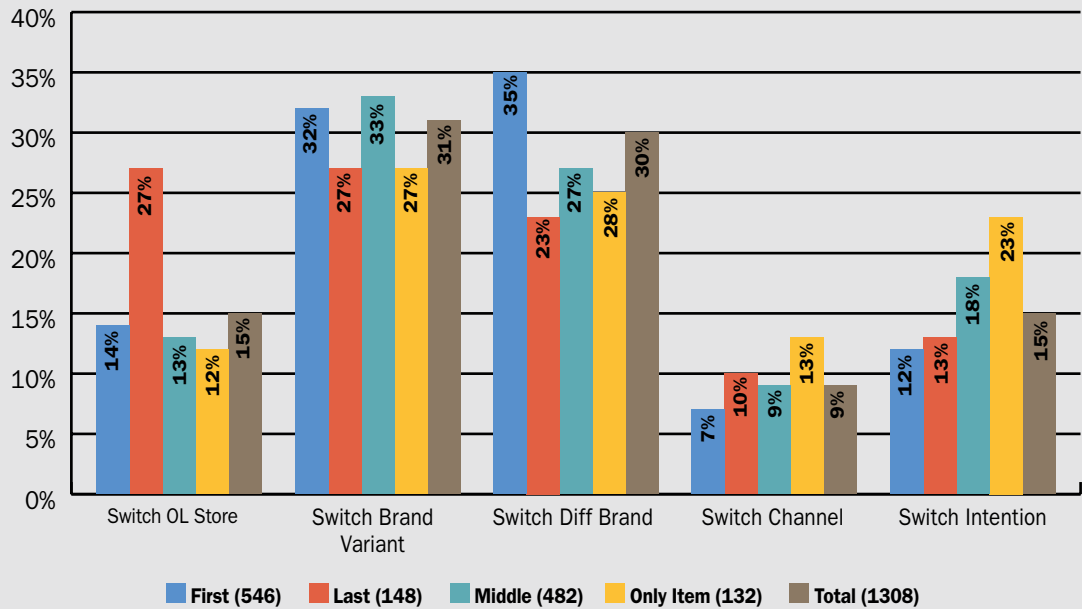
Psychological costs of switching: The switching patterns among categories can be explained in part by three shopper costs (transaction, substitution, and opportunity costs), originally identified by Campo, et al (2000), and further explained in our previous study (2002). The first cost is the opportunity cost of not being able to consume the product immediately, the second is the substitution cost of decreased use of a less-preferred alternative, and the third is the transaction cost of the time and effort required to obtain the preferred item. When encountering a NOLA item, shoppers incur these costs, and naturally shoppers will seek to minimize the total of these costs. To present a generalized approach, Exhibit 36 shows how the levels of each of the three cost components interact to explain a shopper's expected response to an OOS situation (Gruen et al., 2002).

Exhibit 36: Shopper Costs and Switching Behavior

When the Opportunity Cost Is...	And the Substitution Cost Is...	And the Transaction Cost Is...	Then the Shopper 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	Do not Purchase Item

When the opportunity cost of not being able to immediately consume the product is high (for example, when a retailer runs out of diapers), the shopper 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 laundry), the shopper will take any action except to substitute another brand. When the transaction cost is high (the time and effort to purchase later or elsewhere), the shopper will either substitute or cancel purchase outright.

An examination of the *transaction* costs in the US shows two distinct groups of shopper reactions based on category: hair care, oral care, and skin care all have noticeably higher transaction costs than the other categories (Exhibit 37). These three categories also have the highest levels of brand switching. The analysis of *opportunity costs*, needing the item right away, and *substitution costs* did not show any major differences among categories.

Exhibit 37: Average Transactions Costs by Category (USA)

A bar chart showing average transaction costs by category:
- Baby: 2.99
- Hair: 3.22
- Fabric: 2.96
- Oral: 3.11
- Shave: 2.98
- Skin: 3.17
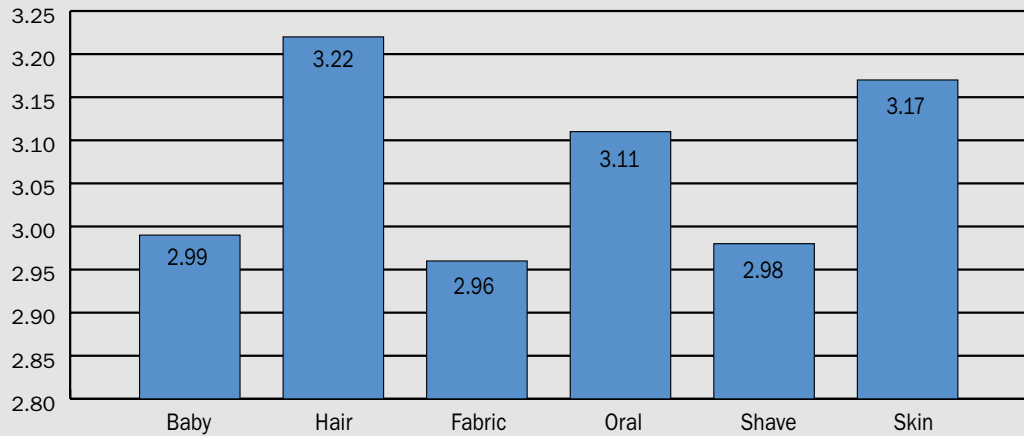
Exhibits 38-40 show the effects of each cost type on switching behavior. As expected (based on predictions from Exhibit 36), higher opportunity costs correlate with increased product switching, both for a brand variant and for a different brand (Exhibit 38). Exhibit 39 for substitution costs provides an even clearer picture where the willingness to switch items decreases as the costs increase, and willingness to switch channels and online stores increases as these costs increase. With transaction costs, shoppers are more likely to substitute items as these costs increase rather than to seek the item at a different store (Exhibit 40).

Exhibit 38: How Opportunity Costs Affect Switching Behaviors (USA)

A grouped bar chart with categories Low, Average, High, Very High:

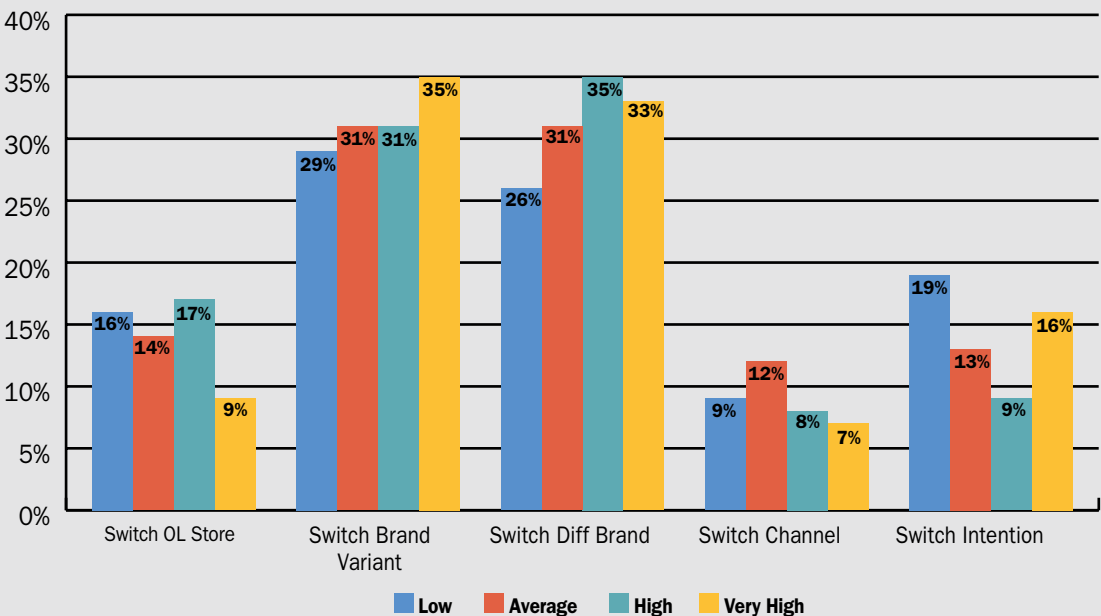|	Low	Average	High	Very High
Switch OL Store	16%	14%	17%	9%
Switch Brand Variant	29%	31%	31%	35%
Switch Diff Brand	26%	31%	35%	33%
Switch Channel	9%	12%	8%	7%
Switch Intention	19%	13%	9%	16%

Exhibit 39: How Substitution Costs Affect Switching Behaviors (USA)

Switch OL Store: Low 9%, Average 13%, High 17%, Very High 17%
Switch Brand Variant: Low 37%, Average 37%, High 30%, Very High 30%
Switch Diff Brand: Low 37%, Average 35%, High 30%, Very High 24%
Switch Channel: Low 5%, Average 7%, High 9%, Very High 12%
Switch Intention: Low 13%, Average 9%, High 14%, Very High 17%

Legend: Low, Average, High, Very High
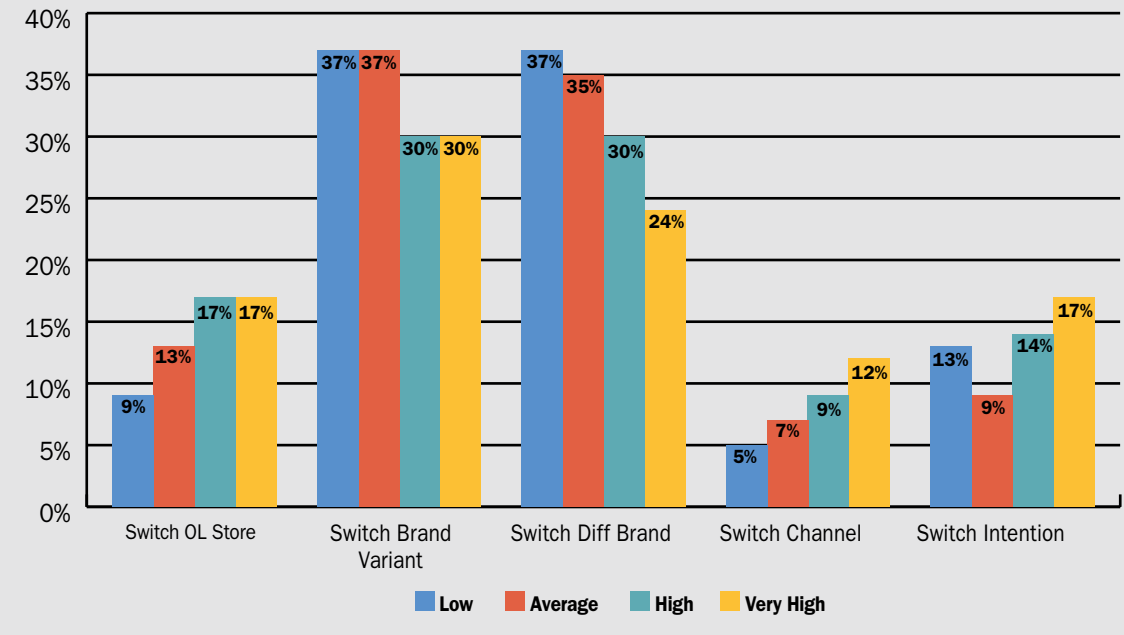
Exhibit 40: How Transactions Costs Affect Switching Behaviors (USA)

Switch OL Store: Low 16%, Average 14%, High 17%, Very High 9%
Switch Brand Variant: Low 29%, Average 31%, High 31%, Very High 35%
Switch Diff Brand: Low 26%, Average 31%, High 35%, Very High 33%
Switch Channel: Low 9%, Average 12%, High 8%, Very High 7%
Switch Intention: Low 19%, Average 13%, High 9%, Very High 16%

Legend: Low, Average, High, Very High
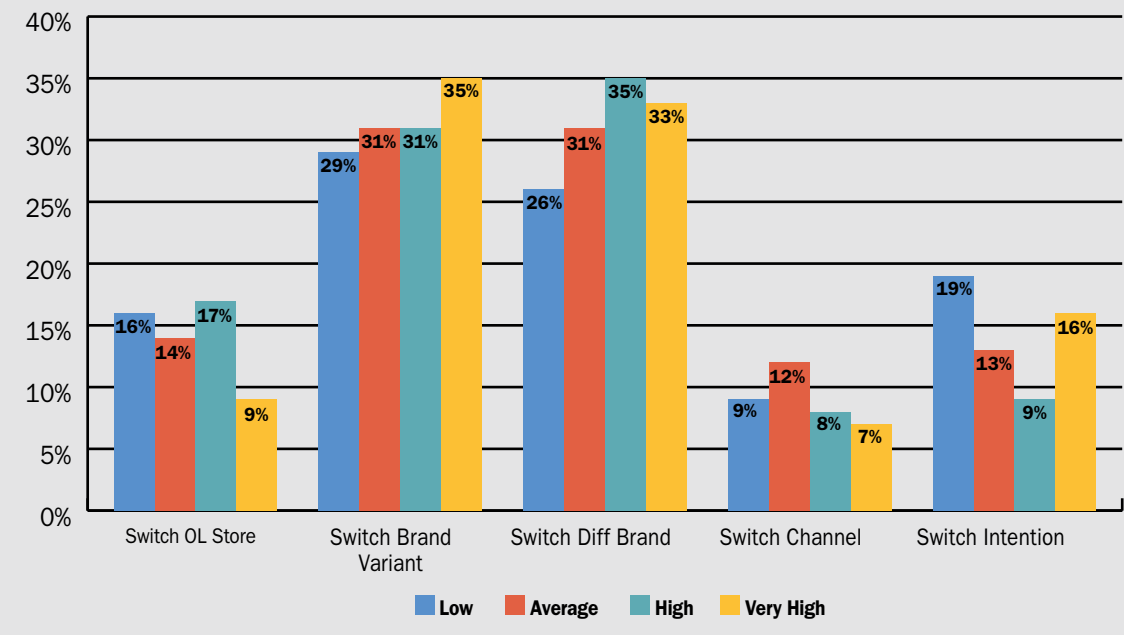
Demographic Effects, Age, Ethnicity, Gender: Exhibits 41-43 illustrate the demographic differences in switching behavior for US shoppers. As demonstrated in Exhibit 41, brand switching decreases with age, with the youngest shoppers being the most willing to switch brands. This would be expected, as younger shoppers are less likely to have developed strong brand loyalty than older shoppers with longer experience with the respective brands. In the US, switching online stores does not vary greatly among age groups, demonstrating a possible strong Amazon effect across all age groups. Older shoppers are noticeably more willing to switch intentions (delay/cancel). From the management perspective, brand managers will want to address younger shoppers who are forming their brand loyalties and are likely to

try alternate brands when the brand they want is NOLA. Online retailers and brand managers should be concerned with the potential sales losses from older shoppers who switch their purchase intention when they do not find the item they wanted.

Exhibit 41: How Switching Behavior Varies by Age Category (USA)
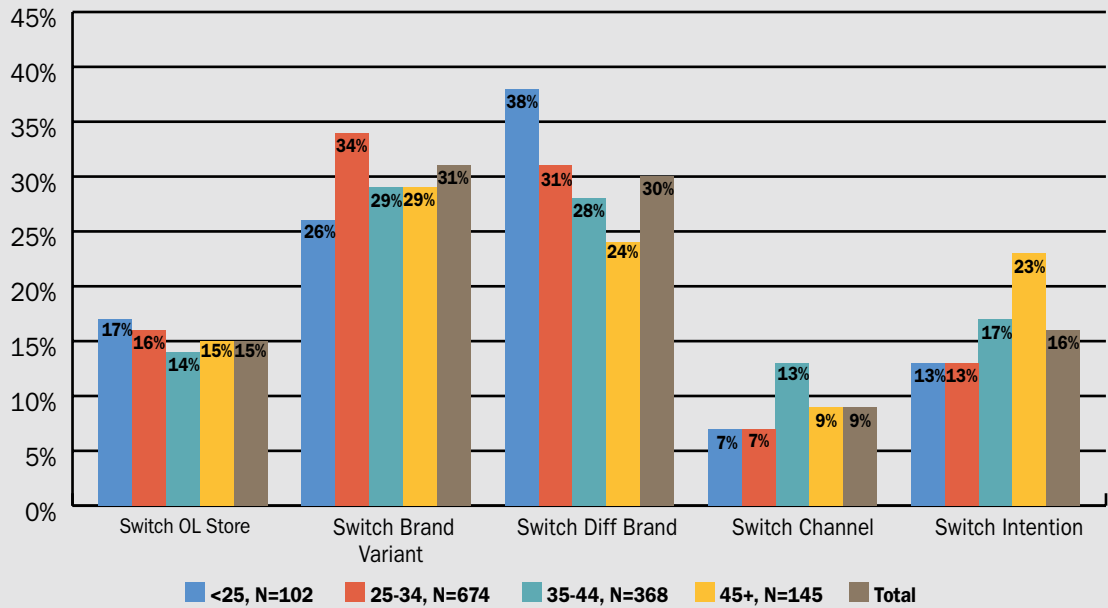
We found few differences in switching behavior among lines of race/ethnicity (Exhibit 42). The differences in the extent of NOLA encounters by age and race (discussed in previous section) is the greater story when considering race/ethnicity.

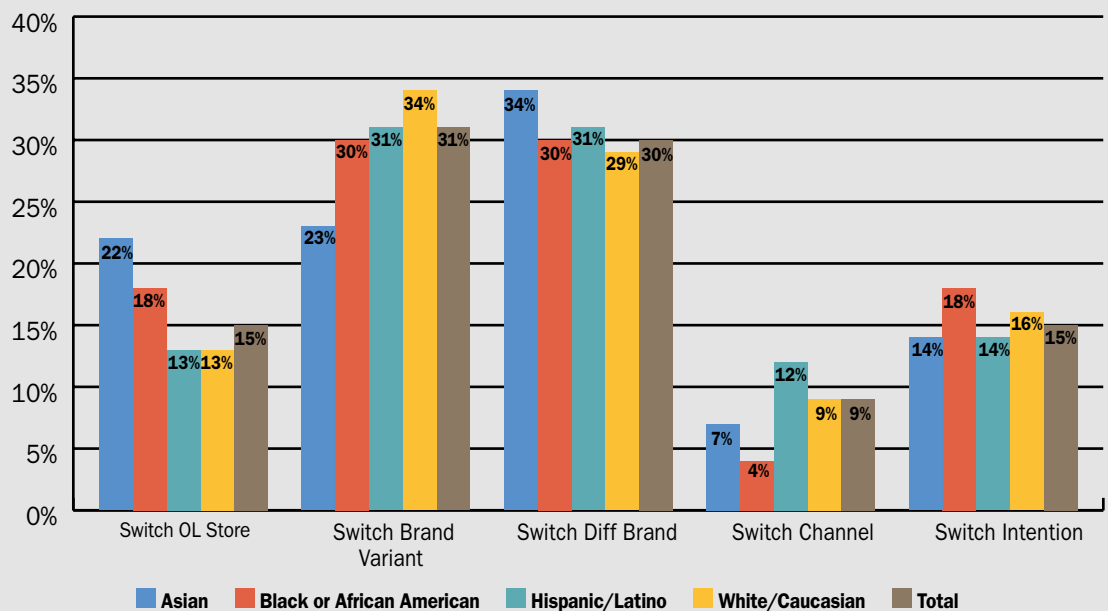**Exhibit 42: How Switching Behavior Varies by Race/Ethnicity (USA)**

Exhibit 43: How Switching Behavior Varies by Gender (USA)
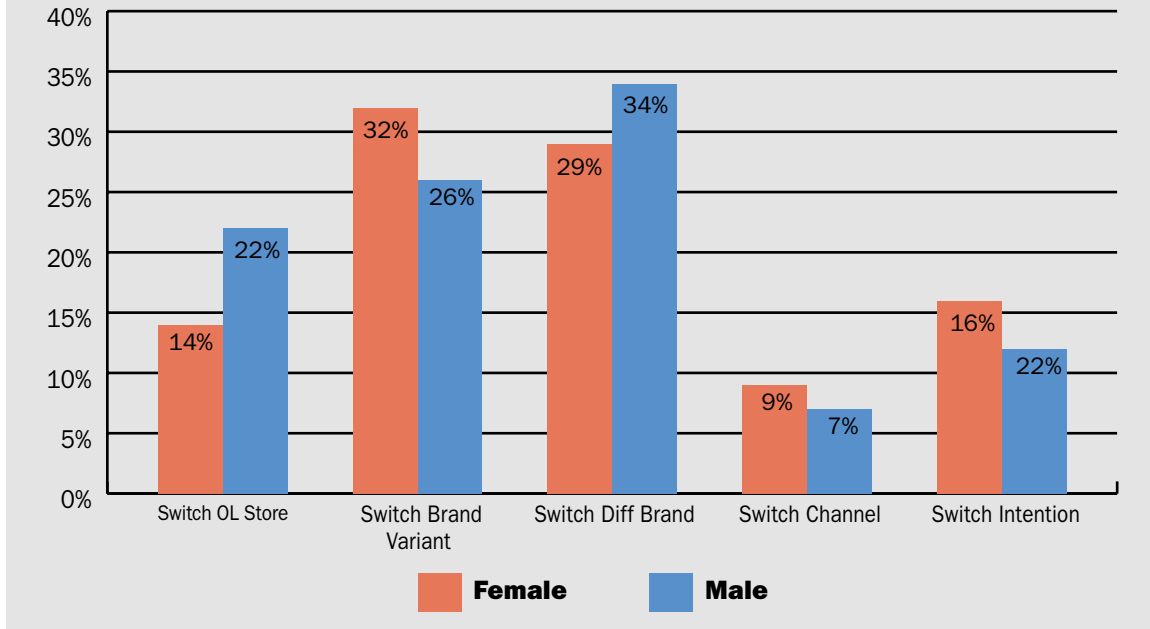
Gender differences are very apparent (Exhibit 43). Men are more willing to switch online stores and are less willing to cancel/delay than are women. Men are more willing to switch brands, and less accepting of a brand variant when confronted with their desired item to be NOLA. From the managerial perspective, retail managers and brand managers should both be concerned with the online store and the brand losses from their male shoppers. Keep in mind that in this study only 12 percent of the US respondents are male.

Online Store Effect - examination of Amazon Prime shoppers' switching behavior

Since Amazon has a high market share of US online retail in the categories examined in this study, we expected Amazon shoppers to have a comparable share of our sample. When we found that store switching due to NOLA was higher in other countries than in the US, we explored whether Amazon Prime membership was the reason for this. We conducted a follow-up study of the Amazon shoppers, exploring their membership in Amazon Prime. Of the 917 Amazon.com shoppers in the initial survey, 620 (68 percent) responded to our follow-up survey. Of these respondents, 522 (84 percent) indicated that they were current Prime members. We examined the differences between Amazon Prime and other Amazon shoppers (Exhibit 44). The noticeable difference is that Prime members are less willing to switch stores or channels and more willing to switch items within the store. This would be expected and consistent with Amazon's goals for Prime members.

Exhibit 44: Switching by Amazon Prime vs. Amazon Non-Members (US)

	Switch OL Store	Switch Brand Variant	Switch Diff Brand	Switch Channel	Switch Intention
Non-Prime	22%	26%	28%	10%	14%
Prime	15%	30%	31%	8%	17%

Legend: Non-Prime, Prime
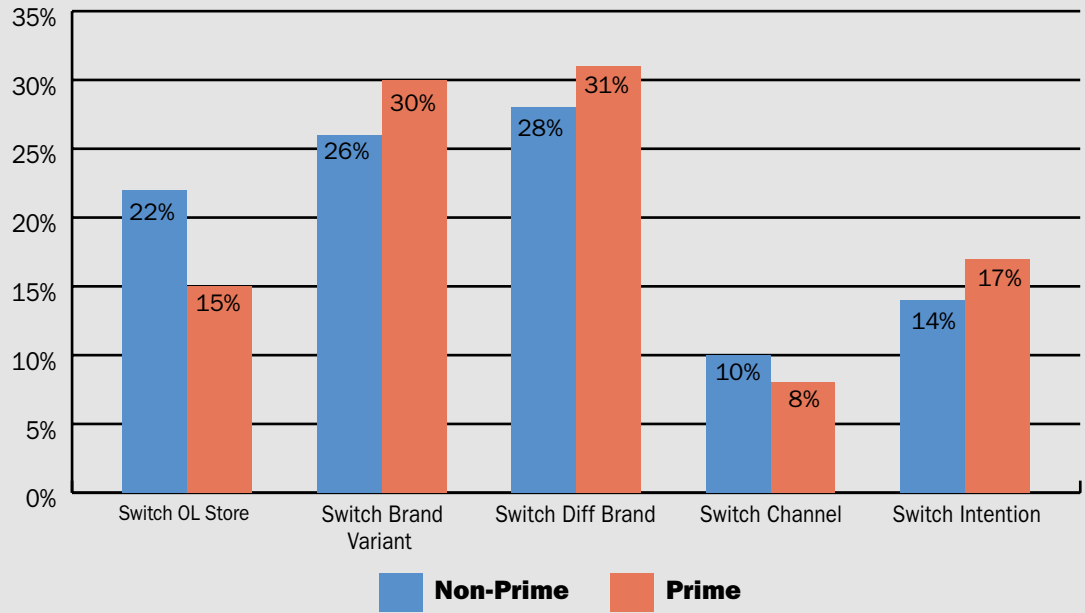
ONLINE SHOPPER TYPES

In addition to examining demographic segments, we also explored online shopping attitudes to better understand switching behavior. We asked the online shoppers a series of questions to determine their attitudes and behaviors towards online shopping in general. We then conducted an exploratory factor analysis that provided a factor score for each survey respondent on two composite variables (factors). We termed the first factor "online shopping interest", and the second "multi-channel shopping interest."[25]

Using each respondent's factor scores as segmentation variables (i.e., their levels of each type of shopping interest), we then ran a cluster analysis, if two clusters (segments) would emerge, with one segment representing those who preferred online shopping and the other group representing those preferring multi-channel shopping. However, all statistical indicators showed that a three-cluster solution was superior to a two-cluster solution (i.e., there are three distinct segments rather than two segments). We describe the three clusters (segments) that emerged from the analysis, shown in Exhibit 45.

Exhibit 45: Average Factor Scores for Each of the Three Clusters (USA)
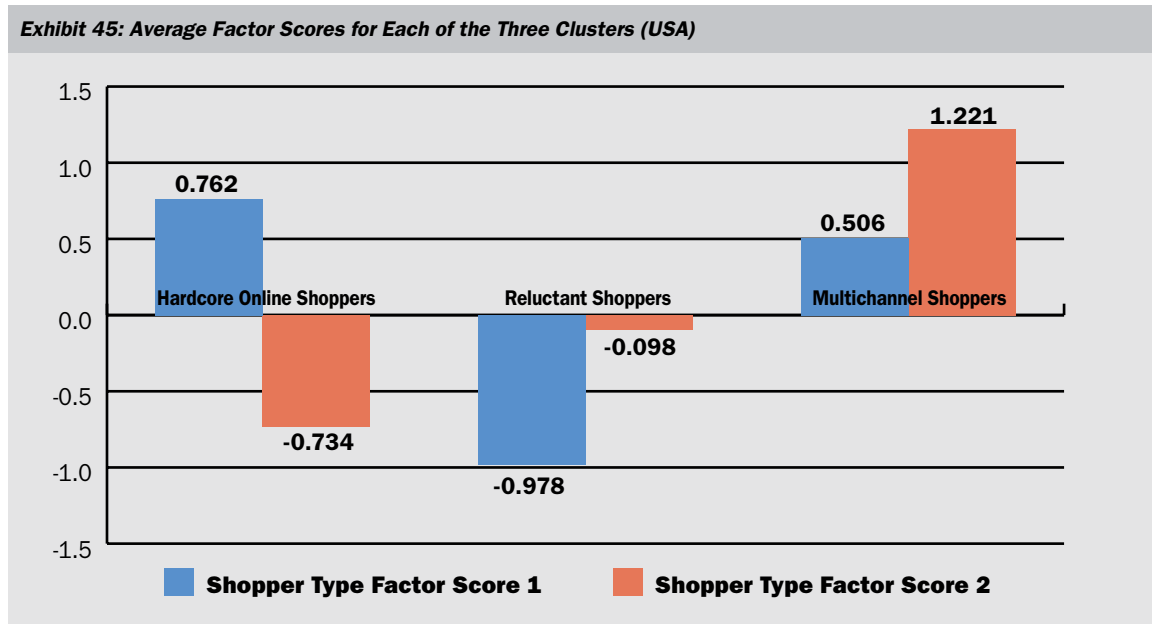
Each of the three clusters show distinct differences based on the combination of the two factors. Shopper group 1 (n = 462) which we termed "hardcore online shoppers" had very high online shopping interest scores and a low multichannel shopping interest scores, demonstrating a clear preference for online shopping and an aversion to retail shopping. Shopper group 2 (n = 526) showed an aversion to online shopping, and they appear somewhat agnostic towards retail shopping. Thus, we categorized this group as "reluctant online shoppers." Shopper group 3 (n = 320) showed moderately high interest in online shopping as well as very high interest through other channels, thus demonstrating that they are interested "multichannel shoppers." Analysis of the demographic profiles of the three different groups showed no differences in age or gender among the groups. Analysis of Amazon Prime membership among the Amazon.com shoppers shows that the hardcore shoppers are 90 percent members, the reluctant shoppers are 80 percent, and the multichannel shoppers are 85 percent.

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[25]The factor analysis, the specific question items, and factor loadings are explained in more detail in the Appendix.

Validation of shopper types: 5-country survey. To validate the segments found in the US study, we repeated the series of questions across each of the five countries in the second survey. The factor loadings for each of the six items were very similar to those in the US survey (see Appendix for full details). Using the factor scores as segmentation variables, we repeated the cluster analysis from the US survey, and we found a nearly identical three-cluster solution, as shown in Exhibit 46.

Exhibit 46: Average Factor Score Per Cluster – 5 Country Study
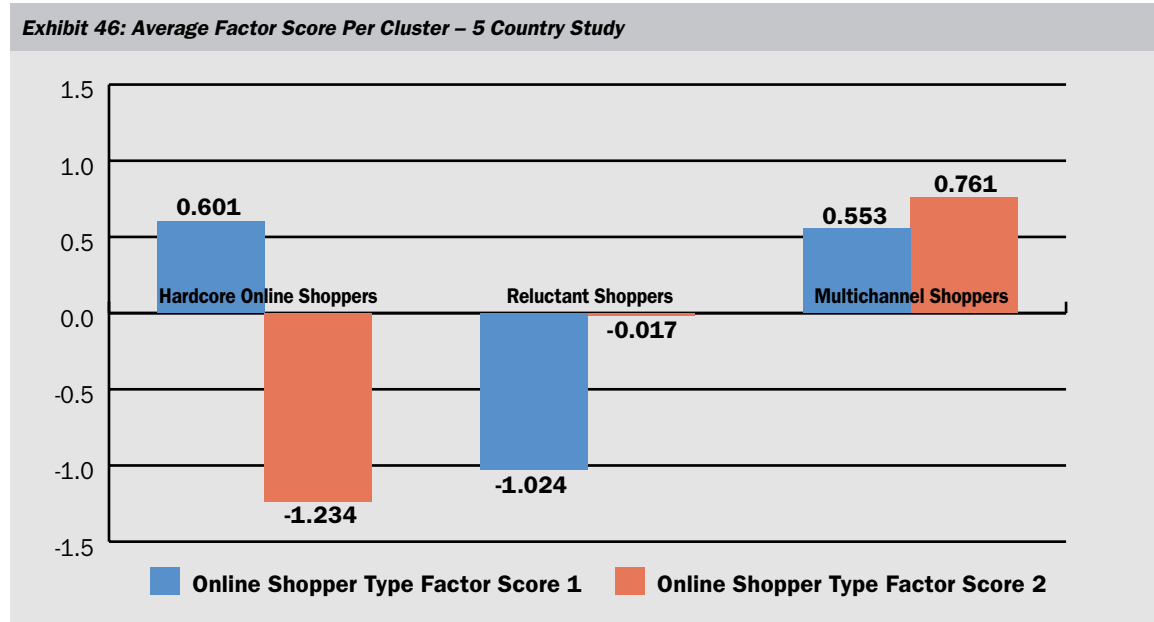
However, there is a clear difference with the group size in terms of the percentage of respondents in each segment between the two studies (Exhibit 47). For the five-country study, the largest segment is multi-channel shoppers (N = 864, 40 percent of total), and the smallest segment is hardcore online shoppers (N = 522, 25 percent), and reluctant shoppers in the middle (N = 773, 30 percent).

Exhibit 47: Comparison of Shopper Segment Percentages USA vs. 5-Country Study

Shopper Type	US Total	US Percentage	5-Country Total	5-Country Percentage
Hardcore Online	462	35%	522	25%
Reluctant	526	40%	773	35%
Multi-channel	320	20%	864	40%
Total	1808	100%	2159	100%

Shopper types and switching behavior. In addition to the differences in shopper segment size, there are clear differences in switching behavior between the US study and the 5-country study. In the US study, there are clear segment effects of switching behavior, especially with the hardcore shoppers. They are very unlikely to switch stores or channels and very likely to find a substitute item on their preferred website (as mentioned previously, 90 percent are Amazon Prime members). They are also more willing than the other segments to delay or cancel their purchase. Exhibit 48 shows the comparison of the three groups and their switching behaviors.

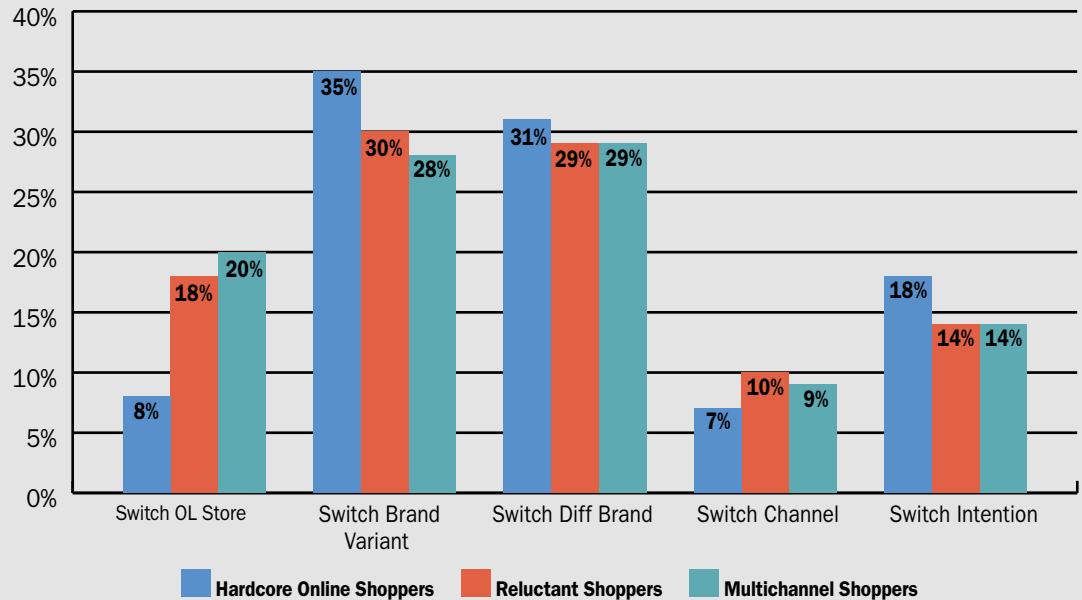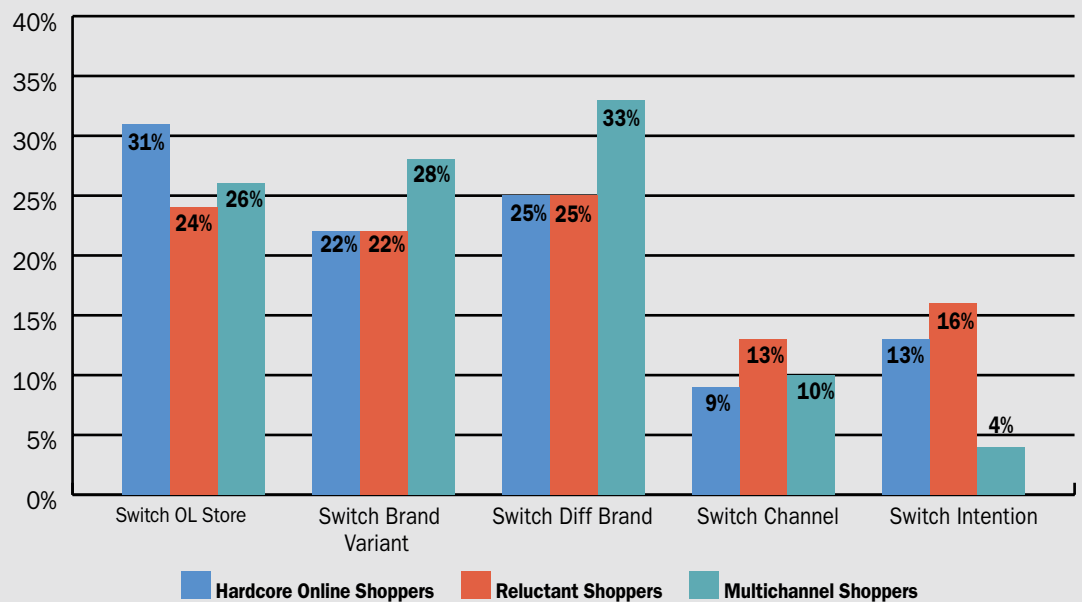**Exhibit 48: Switching Varies by Shopper Segment (USA)**

Switch OL Store — Hardcore Online Shoppers: 8%, Reluctant Shoppers: 18%, Multichannel Shoppers: 20%
Switch Brand Variant — Hardcore Online Shoppers: 35%, Reluctant Shoppers: 30%, Multichannel Shoppers: 28%
Switch Diff Brand — Hardcore Online Shoppers: 31%, Reluctant Shoppers: 29%, Multichannel Shoppers: 29%
Switch Channel — Hardcore Online Shoppers: 7%, Reluctant Shoppers: 10%, Multichannel Shoppers: 9%
Switch Intention — Hardcore Online Shoppers: 18%, Reluctant Shoppers: 14%, Multichannel Shoppers: 14%

Legend: Hardcore Online Shoppers, Reluctant Shoppers, Multichannel Shoppers

Exhibit 49: Switching by Shopper Type- 5-Country Study

Switch OL Store — Hardcore Online Shoppers: 31%, Reluctant Shoppers: 24%, Multichannel Shoppers: 26%
Switch Brand Variant — Hardcore Online Shoppers: 22%, Reluctant Shoppers: 22%, Multichannel Shoppers: 28%
Switch Diff Brand — Hardcore Online Shoppers: 25%, Reluctant Shoppers: 25%, Multichannel Shoppers: 33%
Switch Channel — Hardcore Online Shoppers: 9%, Reluctant Shoppers: 13%, Multichannel Shoppers: 10%
Switch Intention — Hardcore Online Shoppers: 13%, Reluctant Shoppers: 16%, Multichannel Shoppers: 4%

Legend: Hardcore Online Shoppers, Reluctant Shoppers, Multichannel Shoppers

In comparison to the US, the segments in the other countries exhibit different switching behavior (Exhibit 49). Again, this is likely due to the dominant share of Amazon in the US. Looking outside the US, the hardcore online shoppers are most likely to switch stores to get the item they want. They are less likely to accept a brand variant or switch brands. Multichannel shoppers are more likely to switch brands in the same online store and are unlikely to delay or cancel their purchase (switch intention).

When we examined shopper types by those who were only looking for a single item, we found a strong relationship. Relative to the other types, reluctant shoppers are more apt to be looking for a single item. Encountering a non-available item means they cannot get the single item they wanted, which reinforces their low attitude towards online shopping.

ESTIMATE OLA PRIZE: SIZE AND IMPLICATIONS

In this section, we discuss the various financial implications of OLA and NOLA. We propose ways to estimate the lost sales opportunities and present the overall size of the prize for the industry in improving OLA.

Methodology and Definitions

Our research has identified multiple adverse consequences of low OLA:

- *Direct Lost Sales:* The previous sections emphasize that NOLA can lead shoppers to switch to other brands, stores or channels, or switch intentions, all of which causes lost sales.

- *Substitution Effects:* Switching can also lead to partial lost sales due to indirect substitution cost when, for instance, shoppers chose lower priced product alternatives. In a similar vein, when products are available when the shoppers make the purchase but not when the retailer picks the order, retailers often replace a NOLA item in a customer order with a higher priced substitute product.

- *Basket Abandonment:* We have discussed that the timing of the encounter of a NOLA matters. When a shopper decides to switch stores to substitute an item, she can either replace only the missing item or she can abandon the whole basket she filled or intended to fill to online. This phenomenon is also known as "shopping cart abandonment" and is a major concern for retailers.

- *Search Rank Impact:* Online retailers do not publish the details of the algorithms of their search engines. However, besides page views and sales, a major factor in their ranking of search results for product pages is product availability. Items that are NOLA drop quickly in the ranking and are slow to reclaim their position since other products now benefit from prominent ranks.

- *Buy Box Losses:* Retailers such as Amazon usually reserve the position next to the rectangular order button ('Buy Box') on the top of the product page for the brand owner. However, when the item is NOLA and retailers allow resellers on their marketplace to offer the same item, a brand can lose this 'Buy Box'. While the shopper is still able to obtain the desired item, brands can suffer, as they control neither the price nor the supply chain of the reseller.

Rather than focusing on lost sales and other punitive aspects of NOLA, the goal of this section is to illustrate the sales opportunity that can be achieved by increasing OLA.
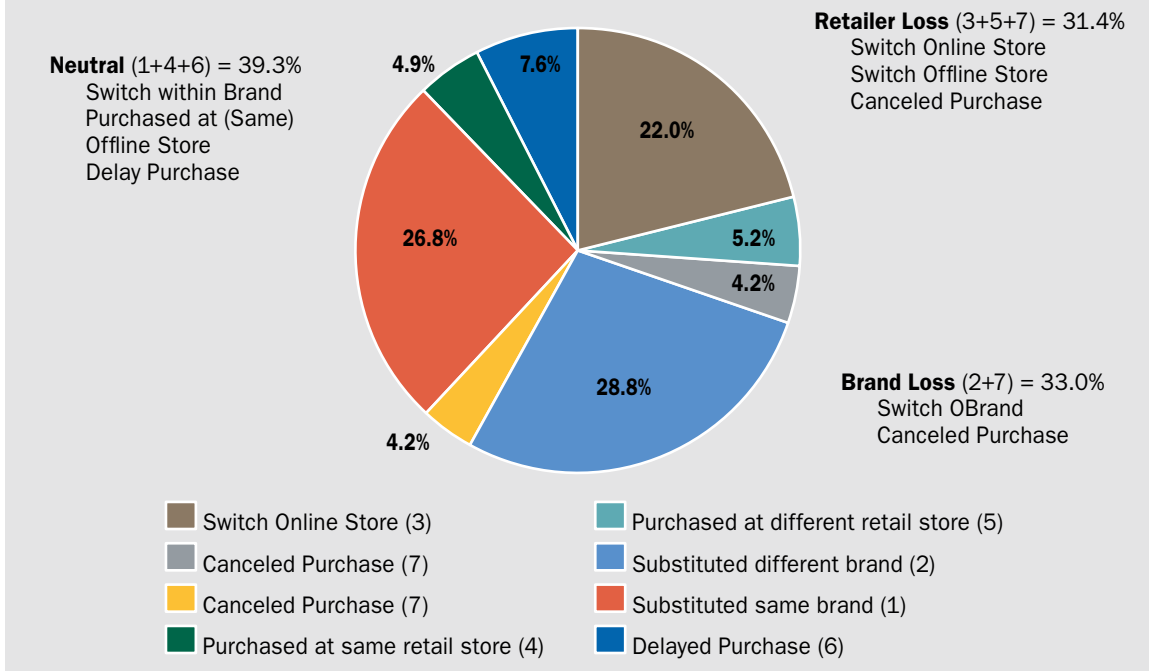
Retailer and Brand Loss

The unique data of this report about online availability from retailer websites and survey data about shopper reaction to NOLA allow us to compute the online sales opportunity for brands and retailers in a novel way. For this, we adopt the methodology of our 2002 GMA study to the context of OLA. We define the following losses for retailers and brands:

- Retailer Loss: Retailers lose if shoppers – when confronted with a missing product (a) switch to a different online store, (b) switch to a different offline store, or (c) cancel their purchase.

- Brand Loss: Brands lose if shoppers (a) switch brands, or (c) cancel their purchase.

- Neutral: Neither retailer nor brands lose if (a) shoppers stay with the online retailer and switch items within the same brand, (b) purchase the same item at the retailer's offline store, or (c) delay their purchase.
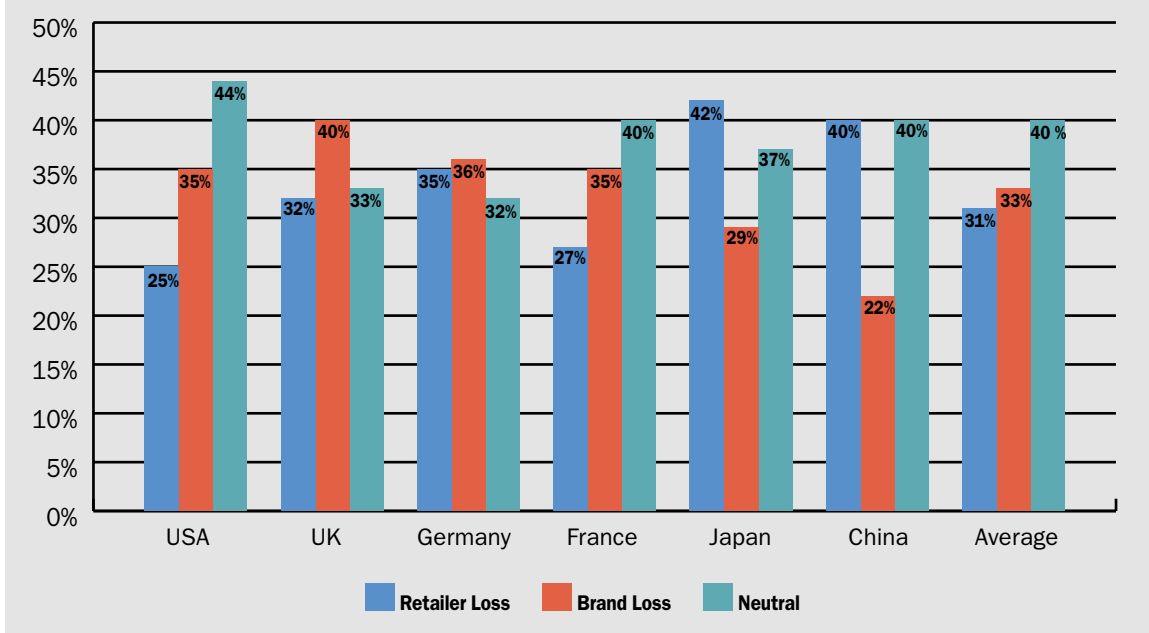
We find that retailers and brands lose almost equally from NOLA (Exhibit 50). Across the six countries and six categories, the retailer loss is 31.4 percent whereas the brand loss is 33.0 percent. Neutral reactions amount to 39.3 percent. Note that the sum of the three aggregate measures is more than 100 percent since we count canceled purchases for both retailers and brands.

Neutral (1+4+6) = 39.3%
Switch within Brand
Purchased at (Same)
Offline Store
Delay Purchase

Retailer Loss (3+5+7) = 31.4%
Switch Online Store
Switch Offline Store
Canceled Purchase

Brand Loss (2+7) = 33.0%
Switch OBrand
Canceled Purchase

4.9%   7.6%
22.0%
5.2%
4.2%
28.8%
4.2%
26.8%

- Switch Online Store (3)
- Canceled Purchase (7)
- Canceled Purchase (7)
- Purchased at same retail store (4)
- Purchased at different retail store (5)
- Substituted different brand (2)
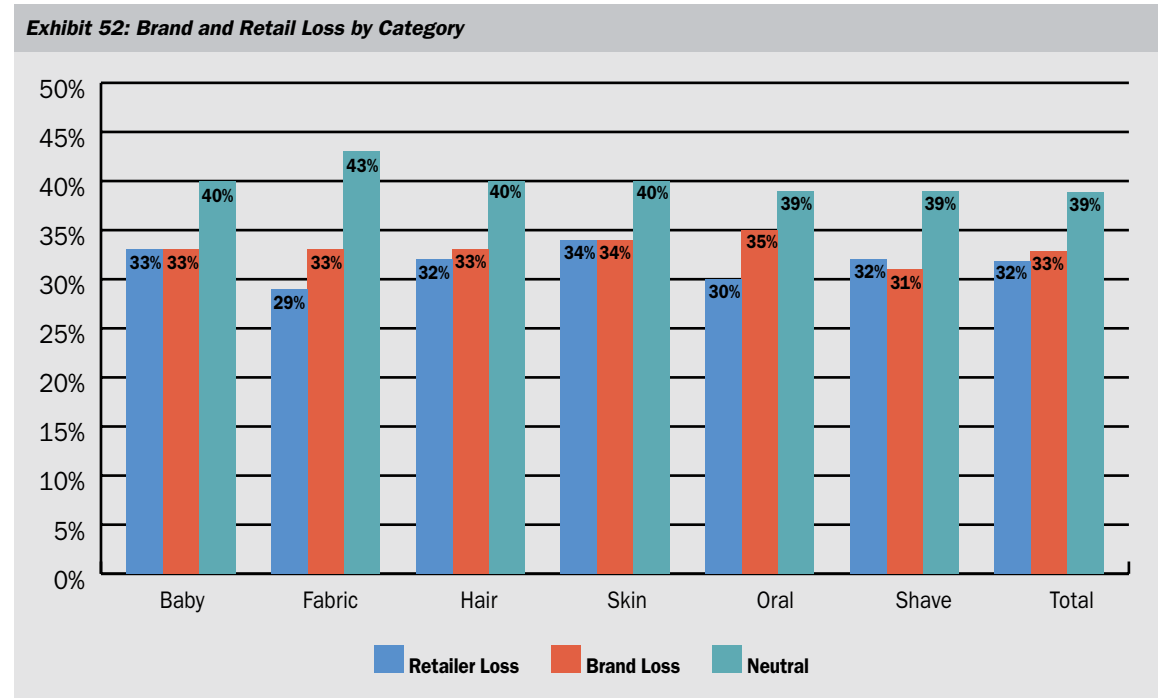- Substituted same brand (1)
- Delayed Purchase (6)

Retailer and brand loss differs across countries (Exhibit 51). Retailer loss is substantially above the 31.4 percent worldwide average in China (39.5 percent) and Japan (41.9 percent), while it is substantially lower in the US (25.2 percent). In contrast, compared to the 33.0 percent world average, brand loss is significantly higher in the UK (40.2 percent) and substantially lower in China (22.4 percent). Germany (35.8 percent), France (34.5 percent) and US (34.9 percent) share similar levels of brand losses. Interestingly, the US also has the highest percentage of neutral reactions (43.7 percent) because shoppers either switch within the brand or delay their purchase.

Exhibit 51: Brand and Retail Loss by Country

	Retailer Loss	Brand Loss	Neutral
USA	25%	35%	44%
UK	32%	40%	33%
Germany	35%	36%	32%
France	27%	35%	40%
Japan	42%	29%	37%
China	40%	22%	40%
Average	31%	33%	40%

A comparison shows much smaller differences in retail and brands loss across categories than across countries (Exhibit 52). All category results are within 2 percent of average except for retailer loss for fabric care/laundry (3.2 percent lower) and brand loss for shave (2.8 percent higher). We tentatively conclude that differences in OLA online are due to differences between retailers and countries rather than to differences between brands and categories.[26]

Exhibit 52: Brand and Retail Loss by Category

Category	Retailer Loss	Brand Loss	Neutral
Baby	33%	33%	40%
Fabric	29%	33%	43%
Hair	32%	33%	40%
Skin	34%	34%	40%
Oral	30%	35%	39%
Shave	32%	31%	39%
Total	32%	33%	39%

Opportunity for the Industry

Our research allows us to estimate the potential sales opportunity of OLA. We developed a new metric, Days Lost Online (DLO), as a simple, flexible, and diagnostic way to determine the Online Lost Sales (OLS) opportunity for multiple levels of analysis: a single SKU, a collection of SKUs, a manufacturer, a retailer, and the overall industry. We conclude this section showing that for the consumer goods industry and retail the size of the prize of lost sales due to lack of OLA exceeds $22 billion at retail price value. We present formulas that can be used to estimate the OLS opportunity on the item level, the firm level, and the industry level.[27]

Days Lost Online (DLO): A New KPI for the Industry

Our measures of OLA and NOLA count the days that a product is either available online or not available online. We present the measure of Days Lost Online (DLO) as a Key Performance Indicator (KPI) to measure the financial losses of NOLA, and we recommend its use as an industry-wide KPI.[28]

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[26]Applying the logic of retailer (brand) loss can be problematic if the effects of switching are offsetting. In other words, if two or more retailers (two or more SKUs) have low OLA and shoppers switch stores (switch SKU) at the same rate then the effects can cancel each other out. Therefore, any meaningful analysis of the effect of substitution on sales must happen with detailed switching information on a SKU-by-SKU and store-by-store basis.

[27]Readers of this report can use their own measures in the formulas to replace the estimates that we provide as illustrations.

[28]Our indicator DLO is based on a single measurement of OLA during a 24-hour period, and this ignores items that might go in and out of stock during the day. For instance, if a product becomes NOLA after the single measurement it is unavailable for a part of the day. Data service providers often account for this by measuring availability early in the morning. Retailers on the other hand often measure NOLA by counting the page views when a product is NOLA and dividing it by the total page views during the day. However, this measure is not available to brands unless shared by the retailer. Both brands and retailers have access to the same measurement of DLO, making this a KPI that can be shared by both parties.

> DLO = Amount of Days that a SKU is not available online at a retailer's online shop

A SKU is available online (OLA) when it is (a) in-stock, (b) available at a store of the retailers, or (c) available on the retailer's marketplace. A SKU is not available online (NOLA) if it is (a) stocked-out, or (b) void. Our new measure complies with the requirements for a Key Performance Indicator (KPI) as it is valid, reliable, and actionable:

- Valid: It measures OLA as perceived by the shopper and is generalizable across countries, retailers and SKUs.

- Reliable: It is measured daily and automatically, which reduces the room for (human) error.

- Actionable: It is continuous, instantaneous and actionable. In addition, it is easily available and can be used for industry benchmarking.

Estimation for Any Single SKU

Using our measure of DLO we can approximate the maximum Online Lost Sales (OLS) per SKU using the following formula:[29]

> *Example* SKU: OLS = DLO x DSA x PRICE

DLO = Days Lost Online (days)

DSA = Daily Sales Average (units)

PRICE = Price (local currency)

For the following example calculations, we take the global average for OLA of 80 percent and for NOLA of 20 percent (365 days * 0.2 = 73 DLO) and assume that the SKU sells 100 units on average per day with a price of $5 per unit retail and $3 wholesale.[30]

- Brand OLS (wholesale value): 73 days * 100 units/day 100 % * $3 = 21,900

- Retailer OLS (retail value): 73 days * 100 units/day 100 % * $5 = 36,500

Estimation for Manufacturers and Retailers

We provide illustrations of the calculation of the size of the prize for a consumer goods manufacturer or omni-channel retailer that sells in the non-food categories that this report features, using an example of $1 billion sales.[31] Following a recent study of the extent of online retail sales of consumer goods, we use a share of online sales of 5 percent ($50 million per $1 billion total sales).[32] We use the average NOLA of approximately 20 percent, which means that the online sales of $50 million were achieved in 292 of 365 days. Following this logic (and assuming that sales are not seasonal), then these firms could have achieved up to 20 percent or $10 million more online sales or if their product pages had been up and their products had been stocked at retail up to 100 percent of the time.[33]

> *Example Manufacturer and Retailer:* OLS = $1 billion sales *5 % online * 20% NOLA = up to $10 million of online lost sales

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[29]OLS at the SKU level only considers the sales lost on that specific SKU. Firms recoup much of that loss through item substitution.

[30]Brands and retailers can input their own data for each variable. Furthermore, this does not include substitution. Examples that include a substitution factor are provided in the full report.

[31]Companies can substitute their own sales figures into the formula in place of the $1 billion shown here.

[32]IRI (2017): E-commerce: Build, Drive and Earn E-commerce Growth for Retail Success

[33]Note that this calculation ignores substitution effects. Further, even for the best firms 100% OLA is unlikely and a 90% target OLA seems more realistic.

Estimation for the Consumer Goods Industry and Retail:

To extrapolate to the industry level, in 2016, the Global Top 100 publicly listed consumer goods manufacturers had sales of close to $1.7 trillion at wholesale value. If we accept that 5 percent of sales is online and NOLA is 20 per cent, then online sales are $85 billion industry-wide and the online lost sales opportunity is $17 billion.[34]

> *Example Consumer Goods Industry:* OLS = $1.7 trillion sales * 5 % online * 20 % NOLA = $17 billion online lost sales at *wholesale* value

Using an estimated retail mark-up on the suppliers' wholesale price for the categories that we investigate of 30 percent, then the retail sales value is $2.2 trillion, which leads to the overall size of the prize of improving OLA exceeds $22 billion at retail value.[35]

> *Example Consumer Goods Industry and Retail:* OLS = ($1.7 trillion sales + 30 percent retail mark-up) * 5 % online * 20 % NOLA = $22 billion online lost sales at *retail value*

If we accept industry forecasts that the share of online sales of consumer products will increase from 5.0% in 2020 to 10.0% in 2022[36], then the potential losses for manufacturers and retailers are likely to double over the next few years unless corrective actions are taken.

IMPLEMENT OLA MEASURES: INDUSTRY SURVEY OF CAPABILITIES

In our 2002 GMA study on the extent, causes and consumer reactions to shelf out-of-stocks, we examined specific root causes of shelf out-of-stocks collected at numerous workshops between Procter & Gamble and their retail partners. Specifically, we reported that around 72 percent of shelf out-of-stocks were caused at retail and 28 percent at upstream level. Within stores, 25 percent of stock-outs were due to shelf replenishment issues and 47 percent to store ordering. In our subsequent 2007 GMA report, we provided a comprehensive guide to retail out-of-stock reduction. Understanding both root causes and countermeasures provided a systematic approach to out-of-stock reductions that led to massive industry-wide efforts to improve on-shelf availability. Building on our previous work, we present our approach to address availability for online retail.

Methodology and Definitions

This report uses data automatically collected from retailer websites. While the findings suggest causes, this method does not allow us to directly identify the detailed causes of NOLA. Therefore, building on a series of interviews and workshops with leading retailers and suppliers, we developed the OLA Scorecard on capabilities, causes and countermeasures.

We validated the tool in two workshops with the ECR Europe Shrink and On-Shelf Availability Group in February 2018. The ECR Europe Shrink and On-Shelf Availability Group counts more than 50 retailers, suppliers, service providers and academics of which 20 retailers and 9 suppliers answered our survey.[37] The survey is the first step in our effort to develop an industry-wide benchmarking

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[34]https://consumergoods.com/cgts-top-100-consumer-goods-companies-2016.

[35]Our estimate is conservative as it ignores smaller consumer goods firms that are not in the Top 100 publicly listed firms. On the other hand, we do not account for substitution effects and it is unlikely that 100 per cent of OLA is achievable.

[36]IRI (2017): E-commerce: Build, Drive and Earn E-commerce Growth for Retail Success

[37]We want to thank the Co-Chairs of the ECR Shrink and Availability Group and the participating retailers, manufacturers, and service providers for their valuable contributions.

database on OLA Extent, Causes and Countermeasures. The OLA Scorecard is in the Appendix. For more details, please see www.availabilitylab.com.

Measurement and Extent

Overall, the problem of OLA is multi-faceted and not well understood, neither by retailers nor by suppliers. Surprisingly, even global consumer goods firms treat OLA with a low level of priority, interest, and even awareness. When questioned about their extent of OLA, most brands had only a vague, often erroneous, notion of the extent to which their products were unavailable. The OLA extent brands recalled generally ignored the fact that voids represent an additional class of NOLA from the shopper perspective. When we confronted retailers and suppliers with the extent figures from our study, the response was typically surprise and disbelief. Few brands track the daily changes of availability regularly or proactively, even those that subscribe to retail analytics services that provide daily measures. Many times, brands reviewed the data only weekly or bi-weekly. We found very few brands that proactively managed OLA using alerting features for low availability. We also saw brands in which marketing and salespeople had access to OLA data from service providers but supply chain colleagues did not. We discuss the lack of clear accountability below in detail.

The responses to our capability survey (three items shown below in Exhibit 53) support our impression. Retailers and suppliers find it somewhat difficult to maintain a high level of online availability for their products. However, while retailers agree with the statement that they regularly measure the extent to which their assortment is out-of-stock online and product pages are not accessible, suppliers tend to disagree.

Exhibit 53: Measurement and Extent of OLA

Measurement and Extent	Retailer	Supplier	Delta
We regularly measure the extent to which our assortment is out-of-stock online.	5.1	2.3	2.8
We regularly measure the extent to which product detail pages are not accesible online i.e. 'void'.	4.1	2.2	1.9
We find it very difficult to maintain a high level of online availability for our products.	5.3	4.0	-0.5

Providers of online retail analytics services play an important role for suppliers seeking to monitor and manage OLA. While they all build their services on the same data harvested from retailer websites, their capabilities differ considerably. We identified the following important selection criteria: global footprint, additional KPI, customized reporting options, industry expertise and consulting capability.

However, several things create considerable ambiguity regarding the correct measurement of OLA. Some brands mentioned that their retail trading partners report better OLA figures for their categories then they would. One reason is that the numbers provided by retailers to their trading partners often do not include voids. In addition, many retailers measure OLA by counting the page views when a product is available and dividing it by the total page views during the day. Sometimes, retailers weigh this number with the volume or value of the products all of which leads to ambiguity as to the true OLA level. Occasionally, retailers report the period-specific fill-rate before or after substitution. Many retailers propose a default substitution policy, which means that if a shopper does not opt out for all or specific products, the retailer will substitute missing items. Therefore, the online fill-rate after substitution will be higher than before substitution. These measures are very different from the OLA measure we propose (which is a momentary binary measure of the DLO – Days Lost Online). Finally, analytics service providers can only provide reliable measures if the data provided by suppliers and retailers is synchronized and accurate.

Trading partners need to agree on a common definition on OLA. We have witnessed situations in which misunderstandings regarding the OLA definition led to unnecessary commercial conflicts between consumer goods firms, retailers, and their analytics service providers. In summary, our measure of OLA provides a valid and reliable complement to retailer-specific measures of online fill-rates.

Consequences of NOLA

In our interviews, we identified multiple short and long-term consequences due to lack of OLA. Of interest, none of our interview partners were aware of all the negative effects of low OLA. As shown in Exhibit 54, the survey items address multiple effects separately.[38] These include lost sales, short and long-term substitution losses for brands and retailers, basket abandonment, search rank impact, and buy box losses, and we explain each in more detail.

Exhibit 54: Consequences of NOLA

Consequences	Retailer	Supplier	Delta
We regularly assess the cost of lost sales due to lack of online availability	4.2	2.0	2.2
We understand how shoppers to missing products on our product detail page	4.2	2.0	2.2
We know exactly how online availability influences our ranking in product searches	3.9	2.0	1.9
We track how often we lose the top position on the product detail page (i.e. 'Buy Box') due to online availability	3.9	2.0	1.9

Lost Sales: Our survey shows that in contrast to suppliers, retailers regularly assess the cost of lost sales due to lack of online availability. Some retailers have developed very fine-grained measures considering conversion and sales velocity. We are aware that our OLA measure DLO (Days Lost Online) is a crude binary measure of availability (usually harvested in the morning hours). However, multiplying the DLO with the retail or wholesale price of a SKU provides a useful approximation of lost sales for the online retailer.

Substitution Effects: Our shopper survey shows that brands and retailers lose equally when shoppers encounter missing products. Our interviews have shown that retailers and suppliers lack the data on how shoppers react to missing products and inaccessible product pages. Instead, they often assume wrongly that online reactions were no different from offline. Often overlooked are the indirect effects of stock-outs. Sales figures for products that are available show the true demand for those items, but when products are not available, the true demand for these items is unknown. When this occurs, the sales figures for this product suggest a lower demand than it is. Worse, if consumers switch to another product, the demand for the other product is inflated as it benefits from the stock-out of the original product. Our research supports that stock-out based substitution distorts the true demand for a product. As an additional consideration, online retailers often replace NOLA items with a higher priced substitute product, absorbing considerable additional cost when fulfilling customer orders.

Basket Abandonment: When a shopper decides to switch stores to substitute an item, she can replace only the missing item or she can abandon the whole basket she filled and intended to purchase online. This phenomenon is known as 'shopping cart abandonment' and is a major concern for retailers. While industry studies typically show very high numbers of shopping cart abandonment, a high percentage of this is because shoppers often open a basket for browsing without ever intending to purchase items. Somewhat counter intuitively, our shopper research shows that when a shopper

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[38]Our scale is 1 (Strongly Disagree) to 6 (Strongly Agree). Thus, scores can range from 1.0-6.0. In the "Consequences" table, all the retailer composite scores are above the center (3.5) while the supplier composite scores are all below the center (3.5).

encounters a non-available item early in the shopping trip, she is likely to substitute a similar item, but when she encounters a non-available item later in the shopping trip, she is more likely to switch stores (see the chapter on shopper reactions for additional details).

Search Rank Impact: Although online retailers such as Amazon and Walmart do not publish the details of the algorithms of their search engines, one major factor in their ranking of search results for product pages is product availability. Therefore, low OLA reduces search ranks, which in turn reduces page views and eventually reduces sales. Again, our survey shows very optimistic answers by retailers and a quite sobering assessment by suppliers.

Buy Box Losses: This cost of non-availability occurs when retailers (such as Amazon and Walmart) have marketplace options to fulfill online orders for the same SKU. Amazon usually awards the top-spot on a product page to the brand owner. However, when a product is not available the brand owner can lose the 'buy box' to a marketplace reseller offering the same SKU. Although this loss might still result in the sales of the original SKU (by a different seller) losing the 'buy box' is not desirable to either the retailer (who loses the margin on the sale and only gets a small commission), or the supplier (who loses control over the sale and risks poor product or service quality). It is also worth noting that the shopper may also bear a cost due to increased shipping from multiple sources.

Causes Out-of-Stocks and Voids

In our interviews, many retailers relied on a set list of root causes that they use in daily operations to assign error codes to resolve incidents of NOLA. However, of the brands that we interviewed, two had developed similar methods, one had developed it for their direct-to-consumer business, and only one brand had had created 'loss trees' in joint workshops with their trading partners (simplified example shown in Exhibit 55).

Exhibit 55: Causes of NOLA
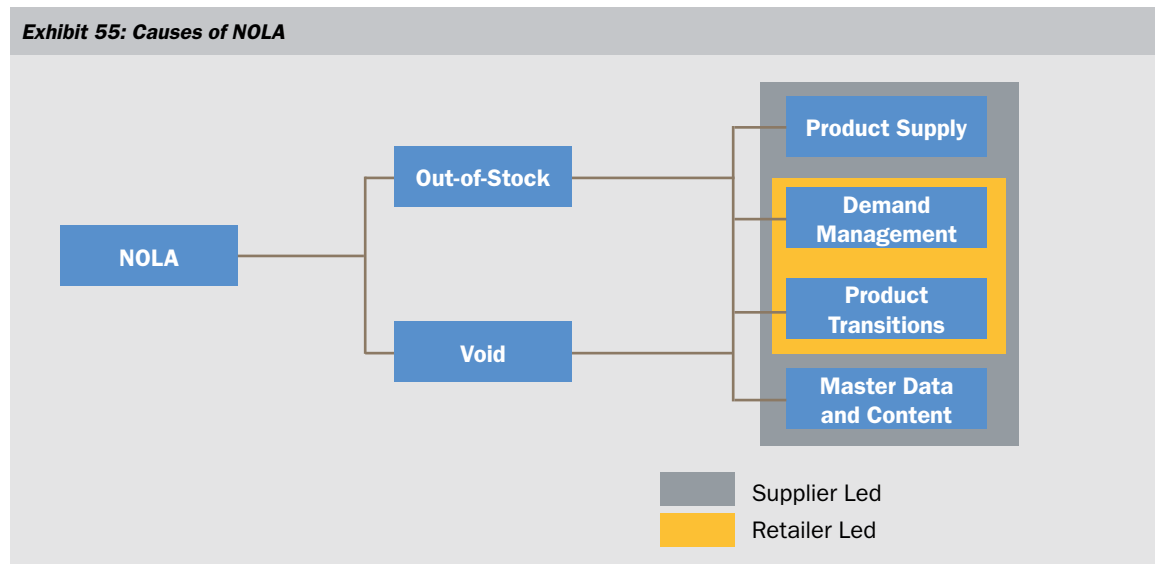
Broadly speaking, we find that demand management and product supply issues cause low OLA. Our survey (items shown below) suggests that suppliers find it much harder to estimate online demand for established products and special promotions. Suppliers prioritize offline channels over online channels and have trouble determining how store inventory can serve both online and offline shoppers. On product supply, suppliers struggle to fulfill orders quickly enough to ensure online availability.

Causes of Out-of-Stocks	Retailer	Supplier	Delta
We find it hard to estimate online demand for established products	3.2	4.5	-1.3
We find it hard to estimate online demand for special promotion (e.g. Black Friday)	3.7	4.4	-0.7
We often struggle to determine how store inventory can serve both online and offline shoppers	3.5	4.7	-1.2
We often do not order quickly enough to ensure online availability	3.1	3.5	-0.4
We find it hard to maintain the production capacity to meet online demand	3.2	3.2	0.0
We often give other channels (e.g. physical stores, other customers) priority over our online channel when we are	3.4	4.5	-1.1
We cannot fill orders quickly enough to ensure online availability	2.8	4.1	-1.4

On the other hand, data errors surrounding product transitions and master data issues lead to more voids. In general, the more product transitions retailers or suppliers manage, the more likely they are to experience data inconsistency, and consequently, retailers will either delay publishing a product page or void it. This includes wrong master data, missing images, or erroneous product descriptions. Our interviews show that suppliers must provide up to 700 different types of data and content to online retailers. Despite efforts to create industry-wide data repositories, the process of data preparation is lengthy and cumbersome. When the data cannot be obtained or the data of both parties do not match, the retailer does not activate the product page. The necessity to provide and coordinate new and innovative digital content exacerbates this issue since most trading partners do not have robust processes to coordinate product content within and across their organizations. Process improvement and content management systems can be of help to ensure a seamless product experience across the shopper journey.

Another source of voids is infrequent or incomplete synchronization of product listings. Retailers and suppliers should regularly prune product pages and agree which ones to keep or delete. When retailers stop selling products their pages should be shut down (unless there are post-sales obligations such as warranties). However, many times they continue to be operational but inaccessible to shoppers. These 'phantom pages' inflate the count of void product pages.

Causes of Voids	Retailer	Supplier	Delta
Our product detail pages are frequently inaccesible because the master data is not correct	2.9	3.7	-0.8
Our product detail pages are frequently inaccesible because the right images are missing	2.6	4.0	-1.4
Our product detail pages are frequently inaccesible because the product descriptions are erroneous	2.8	4.0	-1.2
We do not synchronize changes in out product listing frequently enough with our trading partner	3.2	4.2	-1.0
Our general policy is not to show product pages with stocked-out products	3.0	4.0	-1.0
We often find that product codes have been changed without informing us	2.8	4.0	-1.3
We often find that product pages are maintained even for discountinued products	3.3	4.0	-0.7
We often find that product pages are unilaterally discountinued due to profitability concerns by the trading partner	2.7	4.0	-1.3

Retailers also void product pages for commercial reasons sometimes without informing their trading partners. With fresh produce, many retailers prefer to void a product page rather than show the product as out-of-stock. This 'misnomer' is not only inflating the number of voids (e.g. as we see in France) but it is irritating to shoppers that may now assume that the retailer no longer carries the product. Finally, one brand reported that a major online retailer had voided up to 20 items per month without informing the supplier because the items had become unprofitable. Overall, our survey shows that suppliers tend to struggle more with issues of voids than retailers do (Exhibit 57).

Strategy and Countermeasures

Unless it is a strategic priority, we cannot expect retailers and suppliers to work together to achieve a high OLA. As the results below indicate, both groups agree that OLA is a high priority, with the retailers giving it more importance than suppliers do. Both retailers and suppliers have similar opportunities when achieving higher OLA, thus each should have similar levels of motivation.

We have identified many specific countermeasures to reduce NOLA, and we cannot list them all in this report. However, most importantly, few suppliers have appointed a dedicated manager for OLA. At most brands, the job of OLA is with a customer logistics manager who often is also responsible for deliveries to the retail warehouses and/or on-shelf availability. Even among the brands with a responsible OLA manager, the person usually resides within the physical supply chain and has no or little influence on the digital side of voids. The difficulties of improving OLA when combined with limited access to OLA data for supply chain managers are obvious. Among retailers, there seems to be a higher organizational awareness of the need for a dedicated OLA position.

Our results suggest that retailers already have better capabilities to improve OLA than suppliers do (Exhibit 58). The later seem to have neither a systematic process for collaboratively managing OLA internally across functions nor externally with their trading partners. External discussions about OLA with trading partners are somewhat more common, although differences in measurement and perceived importance can lead to conflicts. Finally, suppliers trail retailers in the systematic way they have identified root causes of low OLA and the countermeasures to alleviate it.

Overall, we recommend that companies establish cross-functional processes and teams with brand managers, sales manager and a dedicated OLA manager to resolve OLA issues.

Exhibit 58: Strategy and Countermeasures

Strategy and Countermeasures	Retailer	Supplier	Delta
Having a high level of online availability of our products is a strategic priority for our company	5.2	4.3	1.0
We have a dedicated manager responsible for ensuring online availability	3.2	2.0	1.2
We regularly discuss online availability issues with colleagues from other functions in our company	4.2	2.7	1.5
We regularly discuss online availability issues with our trading partners	4.3	3.1	1.1
We have identified a comprehensive set of root causes of lack of online availability	4.1	2.2	1.9
We have defined specific countermeasures to resolve internal issues that affect online availability	4.3	2.7	1.6
We have defined specific countermeasures with our trading partner to resolve online availability issues	3.8	2.2	1.7

A final observation concerns the responsiveness to OLA data. Many brands still decide and execute at a clock speed of weeks rather than days or hours. We found that many brands do not use the OLA data that is harvested daily to react proactively at the same speed. Unlike syndicated historical market data used in traditional retail, online retail data is instantaneous and requires instantaneous reactions. We therefore urge brands to accelerate their process to match the speed of online retailers and the expectations of modern shoppers. On the other hand, retailers should start collaborating seriously with suppliers to develop robust and fast processes that guarantee high OLA.

Five-Step Approach to Addressing OLA

This report contains the necessary information to get the process started including the OLA Scorecard (see Appendix 3) that can serve as a guide. For additional assistance, please contact the authors of this study.

APPENDIX SECTION

Appendix 1: List of Retailers

US	China	Japan	Germany	UK	France
Amazon AmazonPrimePantry BJs CVS Freshamazon* Jet Peapod SamsClub Soap Target Walgreens Walmart	Amazon Beibei JD Jumei Suning Tmall_Braun Tmall_Gillette Tmall_Olay Tmall_OralB Tmall_P&G Tmall_Pampers Tmall_PGHK Tmall_SKII Tmall_Supermarket Tmall_VS Yihaodian	Amazon Lohaco Rakuten Edion Rakuten Kenkocom Rakuten Soukai Rakuten 24	Amazon MediaMarkt Otto Saturn Windeln	Amazon AmazonPrime Argos* Asda* Boots Ocado Sainsburys Superdrug Tesco	Amazon AuchanDrive Carrefour* Cdiscount Chronodrive* Intermarche Leclercdrive

The retailers with an asterisk did not report any out-of-stocks during the data collection period although products were occasionally unavailable.

Appendix 2: Factor Analysis Online Shopper Types

Factor Loadings of Online Shopping Indicators (USA)

	Component	
	1	2
I often look for information online, but tend to make more purchases in a retail store than online	-.086	**.786**
I often make purchases online to pick up in the store	.210	**.649**
I only make purchases online as a last resort when I cannot make them in a retail store	-.100	**.774**
I make most online purchases using my mobile device	**.766**	.121
I have my favorite store apps set up on my mobile device so I can make purchases from them easily	**.800**	.075
As much as possible, I prefer to shop and make purchases online, going to retail stores only when necessary	**.710**	-.210

Factor Loadings of Online Shopping Indicators (5 Country Study)

	Component	
	1	2
I often look for information online, but tend to make more purchases in a retail store than online	.136	**.807**
I often make purchases online to pick up in the store	.486	**.696**
I only make purchases online as a last resort when I cannot make them in a retail store	.150	**.821**
I make most online purchases using my mobile device	**.811**	.406
I have my favorite store apps set up on my mobile device so I can make purchases from them easily	**.816**	.282
As much as possible, I prefer to shop and make purchases online, going to retail stores only when necessary	**.720**	-.010
Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.[a]		

Appendix 3: OLA Capability Scorecard

Strategy and Measurement	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable
Having a high level of online availability of our products is a strategic priority for our company.							
We regularly measure the extent to which our assortment is out-of-stock online.							
We regularly measure the extent to which product detail pages are not accessible online i.e. 'void'.							
We agree with our trading partners on the best definition to measure online availability.							
We find it very difficult to maintain a high level of online availability for our products.							

Causes and Countermeasures	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable
We have a dedicated manager responsible for ensuring online availability (i.e. stock-outs and voids)							
We regularly discuss online availability issues with colleagues from other functions in our company.							
We regularly discuss online availability issues with our trading partners.							
We have identified a comprehensive set of root causes of lack of online availability.							
We have defined specific countermeasures to resolve internal issues that affect online availability.							
We have defined specific countermeasures with our trading partner to resolve online availability issues.							

Consequences	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable
We regularly assess the cost of lost sales due to lack of online availability.							
We understand how shoppers react to missing products on our product detail pages (e.g. substitute brand or online retailer).							
We know to what extent shopper abandon their shopping cart when don't find what they are looking for.							
We know exactly how online availability influences our ranking in product searches.							
We track how often we lose the top position on the product detail page (i.e. 'Buy Box') due to online availability issues.							
We discuss with our trading partner how to best substitute missing our products in a customer order when our products are not available.							

Causes of Out-of-Stocks	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable
We find it hard to estimate online demand for established products.							
We find it hard to estimate online demand for special promotions (e.g. Black Friday).							
We often struggle to understand how store inventory serves both online and offline shoppers.							
We often give other channels (e.g. physical stores, other customers) priority over our online channel when we are short on stock.							
We often do not order quickly enough to ensure online availability.							
We often fail to fulfil orders quickly enough to ensure online availability.							
We find it hard to maintain the production capacity to meet online demand.							

| Causes of Voids	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree	Not Applicable
Our product detail pages are frequently inaccessible because:							
the master data is not correct							
the right images are missing							
the product descriptions are erroneous.							
We do not synchronize changes in our product listing frequently enough with our trading partner.							
Our general policy is not to show product pages with stocked-out products.							
We often find that product codes have been changed without informing us.							
We often find that product pages are maintained even for discontinued products.							
We often find that product pages are unilaterally discontinued due to profitability concerns by the trading partner.							
We often struggle to manage product transitions error-free and on time.							

Appendix 4: OLA Assessment Methodology

Step 1: Assess OLA Environment
- We worked with key executives from retailers and manufacturers to understand the digital environment.

Step 2: Measure OLA Extent
- We partnered with online retail analytics firms to measure the extent of OLA and NOLA for the categories under scrutiny and for the SKUs in the shopper's consideration set.
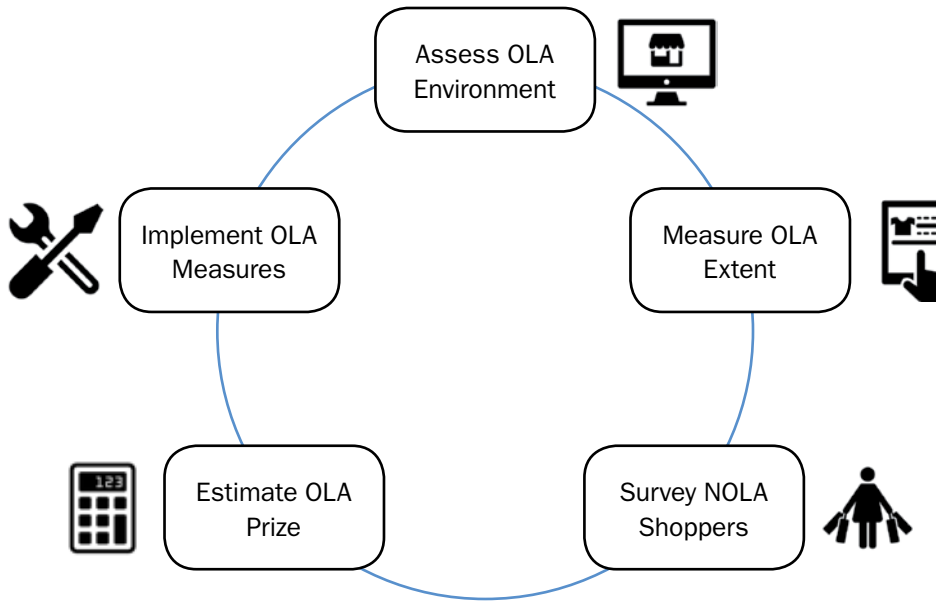
Step 3: Survey NOLA Shopper Reactions
- We partnered with shopper panel providers to survey reactions of the shoppers to NOLA.

Step 4: Estimate OLA Prize
- We analyzed the collected data on OLA extent and NOLA reaction to calculate the retailer and brand loss and the online lost sales opportunity.

Step 5: Implement OLA Countermeasures
- We surveyed key executives from retailers and manufacturers to identify the causes and countermeasures towards a better OLA.

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