Stock running low? Consumers want to know

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Retailers can reduce the number of incidents where they run out of certain products—known as stockouts—by telling shoppers supply is low, a strategy that can help retain customers over the long term, according to new research by Boston College Assistant Professor of Business Analytics Dmitry Mitrofanov.

Traditionally, retailers have been reluctant to communicate low product availability. As a result, unfulfilled orders frustrate customers and damage customer relationships, as well as short- and long-term earnings from shoppers who otherwise might have remained loyal customers.

"We wanted to find out what happens if we are more transparent with customers in terms of which products are low in stock or which products have a higher probability of being unavailable," said Mitrofanov, who presented the findings at the recent INFORMS 2022 conference. The report is slated to be published in the journal *Management Science*.

The COVID-19 pandemic shone a spotlight on the global supply chain and the interconnectedness of products and shoppers around the world. As the flow of goods slowed, stalled, or stopped, buyers—particularly those making purchases online—experienced increasing frustration.

Traditional strategies to resolve stockouts can be expensive and, in the case of widespread global slowdown in production, hard to find. But providing additional information to consumers, Mitrofanov found, offers an almost zero-cost solution with surprisingly positive results.

Mitrofanov and study co-author Benjamin Knight, a senior data scientist at e-commerce grocery Instacart, provided product availability information to a random sample of more than 840,000 Instacart customers and found that they were 25 percent less likely to purchase low availability items when told supply was low. Similarly, providing low product availability information resulted in a 5.3 percent increase in revenue per customer and a 4.9 percent increase in order frequency over time, Mitrofanov said.

Online shoppers, Mitrofanov said, are particularly vulnerable to stockouts.

"For instance, suppose it is 8 a.m. in the morning and you go on the website of an online grocery retailer to order a fresh steak for your dinner and luckily enough you found that steak is listed as an item available on the website and placed a delivery order in a few clicks. This way you build an expectation that the item will arrive in a few hours right by the time you are planning to have dinner. However, by the time delivery was supposed to happen, the stock of steaks had run out and thus they were not delivered to you by dinner which ruined your evening. In contrast, customers' experience in a brick-and-mortar setting could be less dramatic because a customer could just as quickly realize that steaks are out of stock after not seeing them on the shelf and find a good replacement after looking around or asking a store manager for help."

As a result, online retailers face the disruption of what was once a valued customer relationship, he added.

"If something is not delivered, then customers can get very upset and that results in significantly lower customer lifetime value and that impacts revenue," said Mitrofanov.

Interestingly, psychology research has shown that a sense of a shortage of a good might in fact influence a customer to purchase this item and possibly in larger quantities because of "scarcity" or "herding" effects, outcomes online retailers can avoid by sharing information on low availability products, Mitrofanov said. Therefore, in principle, a reluctance to share information could potentially exacerbate the stockout problem for the retailer and customers.

That being said, Instacart customers' shopping behavior was not impacted much by "scarcity" or "herding" effects when they received low product availability warnings. Instead, customers switched their attention to plentifully stocked items, which indicates that customers' preference for the reliable service was the driving force, Mitrofanov said.

"After conducting this field experiment, we are able to better understand the customer response to sharing this important information," Mitrofanov said. "We see that the outcome of sharing low availability information with customers not only reduces the number of stockouts, as people tend to shift from low stock items to high stock items, but also improves the customers' sentiment when stockouts do occur," he said. "More specifically, even if customers decide to purchase low stock items after the warning and consequently experience a stockout they are less dissatisfied because of the reference effect—by sharing low item availability information we reset customer's expectations with respect to the probability that their order will be successfully fulfilled. It is very interesting that managing customers' expectations and improving their decision making by sharing extra information is as important in online retail as making the right proactive operational decisions on the online platform."

Even though the current study largely focuses on the online retailers or online retail platforms, Mitrofanov said brick-and-mortar retailers can benefit from the lessons from the study as well: "Many online marketplaces—including Instacart—fulfill orders through 'warehouse' stores, so the issue affects a range of retailers," he said. "I think there is a lesson here for any retailer that consumers don't like surprises, particularly disappointments, and thus managing their expectations and providing them with tools to make a better decision about what to purchase is a key."

Provided by Boston College

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