

How people react to the ‘also recommended’ section of online stores

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Online shopping with touchscreen ultrabook, by Intel Free Press, under a [CC BY 2.0](https://creativecommons.org/licenses/by/2.0/) licence, via Wikimedia Commons

The “diaper and beer” product placement practice has been a great marketing strategy in traditional retail stores. As e-commerce gains popularity in recent years, online retailers have attempted to replicate this practice in e-commerce.

Is there any website feature that online retailers can exploit to achieve this? The answer is yes. On most e-commerce sites, each product is featured on its own designated webpage. On each of these product pages, retailers can utilize some recommender systems to explicitly recommend additional relevant products that might be of interest to consumers, either to help them find the most suitable products or to cross-sell other goods.

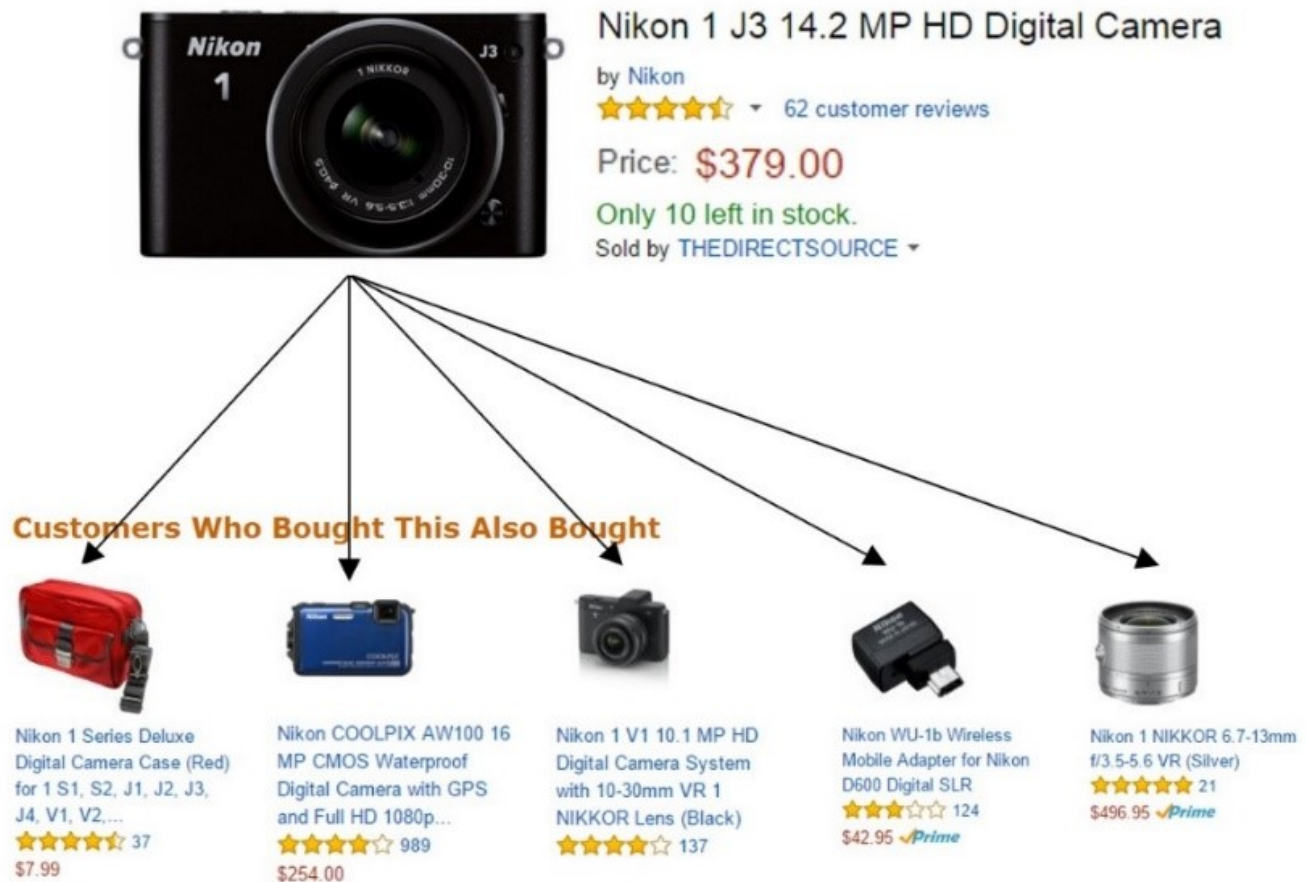
Thus, a visible directed product network is created whereby products (i.e., network nodes) are explicitly connected by hyperlinks (i.e., network ties). If one analogizes the process of browsing an e-commerce website to walking the aisles of a physical store, the “aisle structure” of the e-commerce website will be defined by this graph of interconnected products, whereas recommending additional products on a webpage is likened to placing additional products on a neighbouring shelf.

Perhaps the best-known examples of recommendation networks on Amazon.com are the **co-view networks** (“Customers who viewed this item also viewed”) and **co-purchase networks** (“Customers who bought this item also bought”).

As network ties are directed, each product has four networks: **incoming** co-view network and incoming co-purchase network (when the product is recommended to customers who viewed or purchased other items); and **outgoing** co-view network and outgoing co-purchase network (when customers who view or buy the product see recommendations for other items).

The figure below illustrates how a directed product network is formed.

Figure 1. Amazon's product recommendation network



Note: Edited screenshot from Amazon.com taken in December 2014

To investigate how marketers can manipulate these networks to drive product demand, we conduct a study to examine:

1. how the demand of a product is influenced by product network attributes in terms of **network diversity** (i.e., the diversity of product categories connected in the network) and **network stability** (i.e., when products connected in the network don't vary),
2. whether the demand of a product is influenced by both the incoming network and the outgoing network, and
3. if the effects differ between co-view and co-purchase recommendation networks.

We apply multiple econometric models and estimation methods to analyse a rich data set from Tmall.com for four product categories (i.e., digital cameras, personal computers, mobile phones, and cosmetic products), and identify several interesting findings.

First, a 1 per cent increase in the category diversity of a product's *incoming* co-purchase network is associated with a 0.011 per cent *increase* in the product's demand. Conversely, a 1 per cent increase in the category diversity of a product's *outgoing* co-purchase network is associated with a 0.012 per cent decrease in the product's demand.

Second, a 1 per cent increase in the stability of the outgoing co-purchase network is associated with a 0.012 per cent decrease in demand.

Third, the demand effects of network diversity and stability are both stronger in the co-purchase network, compared to their insignificant effects in the co-view network.

Guidance for e-commerce retailers

These notable findings provide important insights and guidance for e-commerce retailers to drive product demand using recommendation systems.

First, retailers can take advantage of the diversity effect to drive product demand. According to our results, the category diversity in the incoming co-purchase network of a product can increase the product's demand. Retailers could thus configure co-purchase recommendation systems to have more diverse incoming links for a product in terms of more heterogeneous product categories.

Conversely, the category diversity in the outgoing co-purchase network has a negative relationship with product demand. This suggests that retailers should not blindly follow their intuition to recommend as many categories as possible on a product's webpage in order to drive consumers' cross-buying behaviour.

On the other hand, retailers are also advised against limiting the recommendations to just one product category as this might impede consumers' product search and discovery. In essence, retailers should maintain the category diversity of outgoing links in the co-purchase network at a strategic level. In fact, we think there may exist a potential trade-off between cross-selling opportunities and consumers' product search experience.

Second, e-commerce retailers can also capitalise on the network stability effect to influence product demand. Specifically, the negative stability effect of the outgoing co-purchase network suggests that retailers should periodically change or refresh the constituent items in the outgoing co-purchase recommendation list in order to positively influence the demand of the focal product.

Third, comparing the effects between co-view and co-purchase recommendation systems, only co-purchase recommendation systems exhibit a significant effect in driving product demand. Accordingly, retailers could allocate a higher percentage of the limited webpage space to more saliently display co-purchase recommendations to achieve better sales performance on e-commerce websites.

Finally, these findings also provide implications for the design of product recommendation systems. As existing product recommendation systems are mainly automated (i.e., automated algorithm execution to generate recommendations), e-commerce platform or retail site operators may provide interfaces and access to individual brand owners to facilitate implementations of the aforementioned strategies to drive product demand.

In sum, e-commerce recommender systems are critical to replicating the "diaper and beer" practice, but delicate differences do prevail!

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Notes:

- *This blog post is based on the authors' paper [The Demand Effects of Product Recommendation Networks: An Empirical Analysis of Network Diversity and Stability](#), in *MIS Quarterly*, Forthcoming*
- *The post gives the views of the author, not the position of LSE Business Review or the London School of Economics.*
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