What AI analysis of 100 million social media interactions can teach product managers

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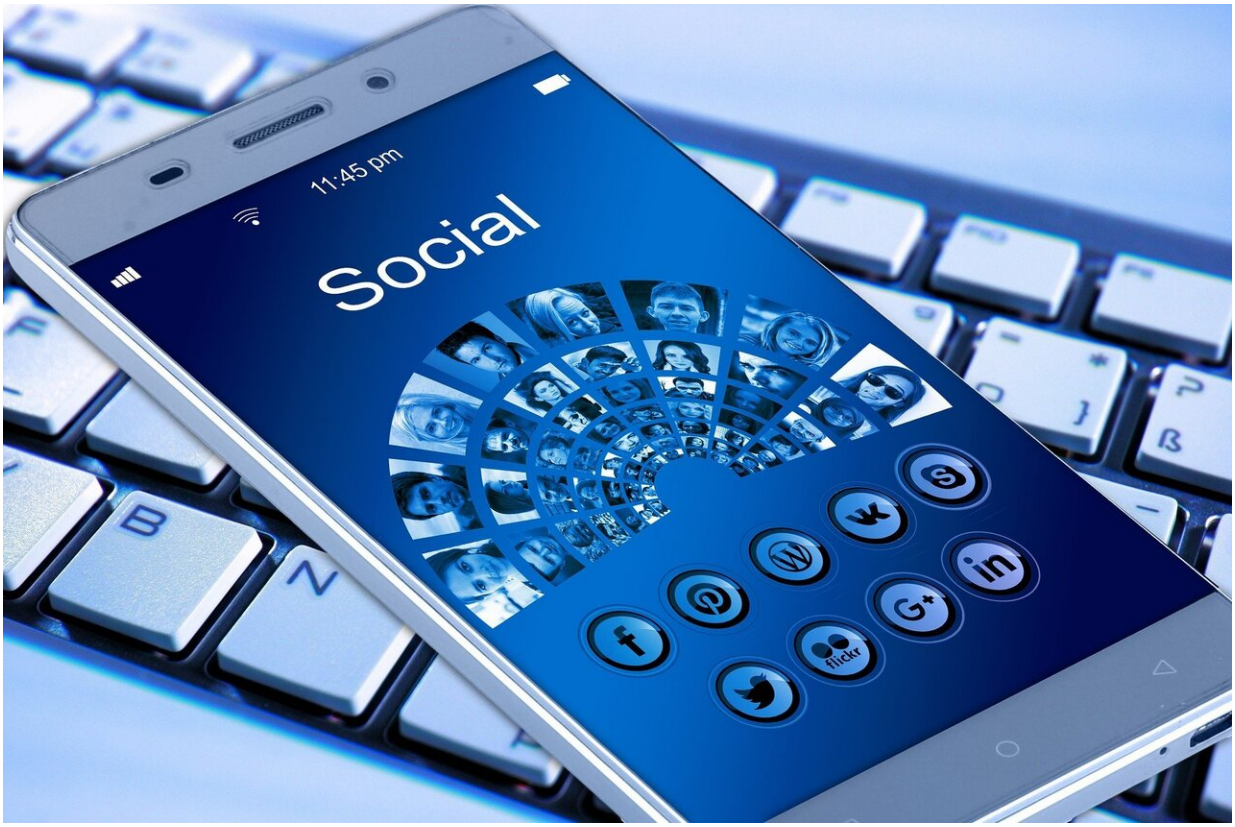


Credit: Pixabay/CC0 Public Domain

Researchers from Hong Kong University of Science and Technology and University of Maryland at College Park published a new paper in the *Journal of Marketing* that examines product-markets from the

perspective of consumers' perceptions of brands instead of from purchase data.

Firms compete to satisfy consumers' specific needs. The market and the competing products comprise a "product-market" with a boundary. Identifying the product-market boundary and examining the strength of competition among brands within the product-market have long been important issues for managers. It has implications for product design, product positioning, new customer acquisition, and pricing and promotion decisions.

Rapid changes to the competitive environment, however, have made identifying product-market boundaries increasingly challenging. The traditionally defined SIC and NAICS classification codes may not be adequate, and especially not for capturing consumers' perceptions of and preferences for brands.

Technological advances change product-market boundaries. For example, film cameras gave way to digital cameras, then the digital camera product-market was upended by technological developments in smartphones. Similarly, Ford recently introduced its F-150 Lightening electric pick-up truck at a low price of $40,000 to remove a major barrier for customers thinking about making a switch from gasoline engines and Tesla introduced its electric Model 3 starting of $39,500 to broaden its appeal to mass-market car buyers.

Both moves thereby changed competition within these lower-end vehicle product-markets. Companies also increasingly enter product-markets they previously did not compete in. For example, Amazon, hitherto an online platform, essentially crossed product-market boundaries when it acquired Whole Foods, thus presenting traditional grocery brands with a new and innovative competitor. Similarly, Whirlpool Corporation, the world's largest home appliance maker, acquired Yummly, a recipe

search engine with 20 million users, getting itself closer to how its potential consumers cook.

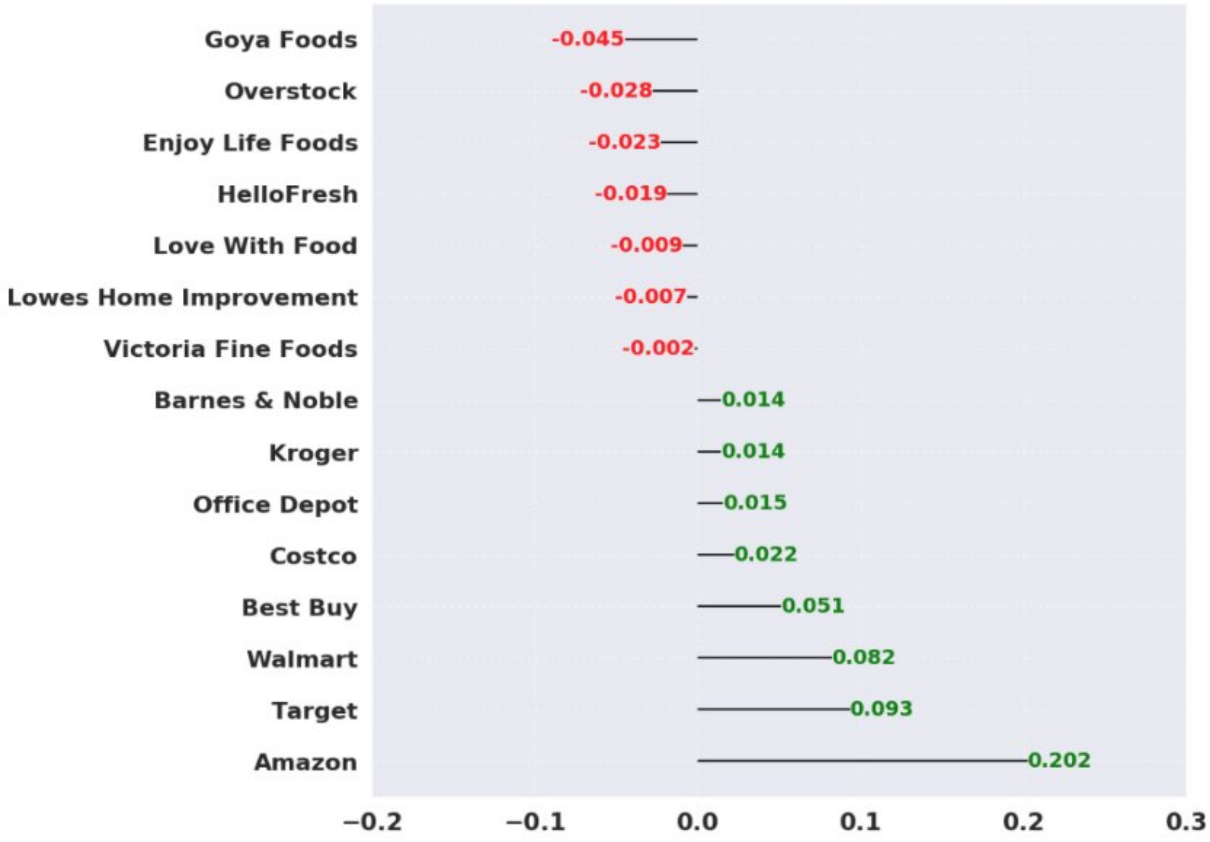
The reality is that produce-markets are more fluid than ever. Given the potential for new and unforeseen relationships between brands, managers need deeper insights into the fluid product-market boundaries. How can managers accurately identify potential threats and opportunities, especially those in different product-markets? How can managers derive these insights using easy-to-obtain and publicly available data? A new study in the *Journal of Marketing* addresses these questions and derives marketing insights using big data (over a hundred million social media user engagement "likes" and "comments") spanning several thousands of brands in different product/service categories.

This research looks at product-markets from a different perspective by focusing on consumers' perceptions of brands based on social media engagement data, which unveils more of the dynamics at play, rather than using purchase data that are locked within pre-specified product-market boundaries. "We can show that two brands are very close to each other, even though they are in completely different SIC categories. In other words, by examining brand-user relationships, we generate a more inclusive and current representation of brands and the competitive/complementary relationships among them," says Yang.

Using brand engagement data involving millions of social media users, the researchers capture latent relationships among thousands of brands and across many categories to reveal a highly precise market structure. They build a brand-user network using the data and then compress the network into a market structure map that visually represents the brands.

"For example," explains Zhang, "consider Amazon's acquisition of Whole Foods. In the chart below, the green lines show that Whole Foods' proximity to other retail brands such as Target and Walmart increases,

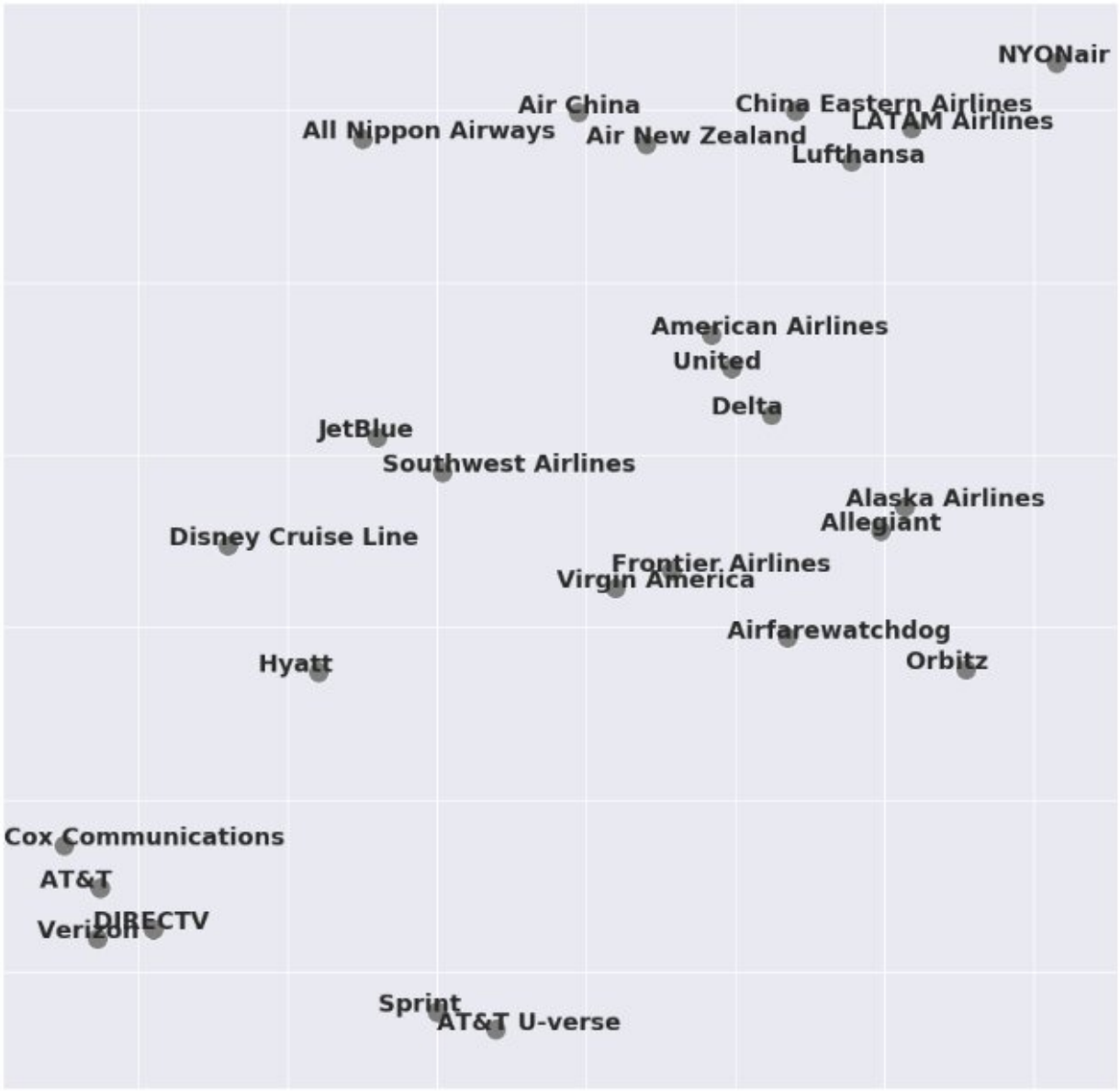
while the red lines shows its proximity to supermarket brands such as Goya Foods and HelloFresh decreases."



Brand Relationship Chart. Credit: Yi Yang, Kunpeng Zhang, P.K. Kannan

Our market structure map helps managers identify brands outside of the product-market that are close to a specific brand. For example, Disney Cruise Line and Hyatt are two brands outside the airline product-market, but are identified as proximal brands to Southwest but not for United. Such findings can provide opportunities for Southwest to target users who like Disney Cruise and Hyatt in social media. Southwest can cross-promote with Disney Cruise and/or Hyatt on each other's websites or

launch coalition loyalty programs. From the viewpoint of other hotel chains competing with Hyatt, gleaning such insights early on may help them take proactive actions. The figure below depicts these relationships.



Market Structure Map. Credit: Yi Yang, Kunpeng Zhang, P.K. Kannan

This research reveals that managers can obtain very useful insights from user engagement data on social media platforms at a scale and scope that cannot be easily matched by any other source. Kannan says "The power of our method lies in its ability to capture the dynamic changes in market structure. Since the maps are based on the analysis of big data that can be collected in a relatively short time, our methodology can track changes in brands' relative position when firms introduce new products, new promotions, and new marketing initiatives. Firms can deploy our method to enhance their social network-based marketing efforts by better targeting specific potential customers."

More information: Yi Yang et al, EXPRESS: Identifying Market Structure: A Deep Network Representation Learning of Social Engagement, *Journal of Marketing* (2021). DOI: 10.1177/00222429211033585

Market Structure Map: market-structure.github.io/index.html

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