

(IJ-10) Stay Ahead of the Puck: The Value of Applying a Data Driven Paradigm in Disrupted Marketplaces to Improve ROI Through an Evaluation of Amazon Purchaser Sentiment Before and During a Global Pandemic

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ABSTRACT

Organizations that could not pivot quickly throughout the initial waves of COVID-19 found themselves in Bankruptcy courts. Businesses that proactively pivoted based on their disrupted shifting marketplace environments were able to succeed. Organizations that utilize a data-driven approach through competitive and generic benchmarking may yet uncover new innovative ways to stay ahead of the puck through behavioral influencers insights and predictive modeling. A targeted evaluation of Amazon consumers' behavioral (e.g., customer satisfaction) factor of "frustration" both before and during the global pandemic may provide critical insights in helping organizations navigate through the ongoing pandemic and all its forthcoming variant mutations which continue to disrupt organizations.

Ice hockey legend, Wayne Gretzky, was once asked what his secret was to being so successful in the sport. His response was simple and poignant, "a good hockey player plays where the puck is. A great hockey player plays where the puck is going to be." (Lang, 2022). Having the foresight to

be where the next play will occur based on the trajectory of that moving object enabled this mighty athlete to be a formidable force against his opponents. He found valuable pockets of space to occupy in close enough proximity to where the puck was going. The bottom line, he got to the mark and in position proactively while others scrambled reactively to catch up. Not an easy feat to say the least given the trajectory was not a simple straight path. Instead, multiple course corrections were required to pivot accordingly to be in just the right place at just the right time. For Gretzky this approach led to an astonishing career accomplishment of being the leading goal scorer, assist producer and point scorer in National Hockey League (NHL) history (Stubbs, 2017).

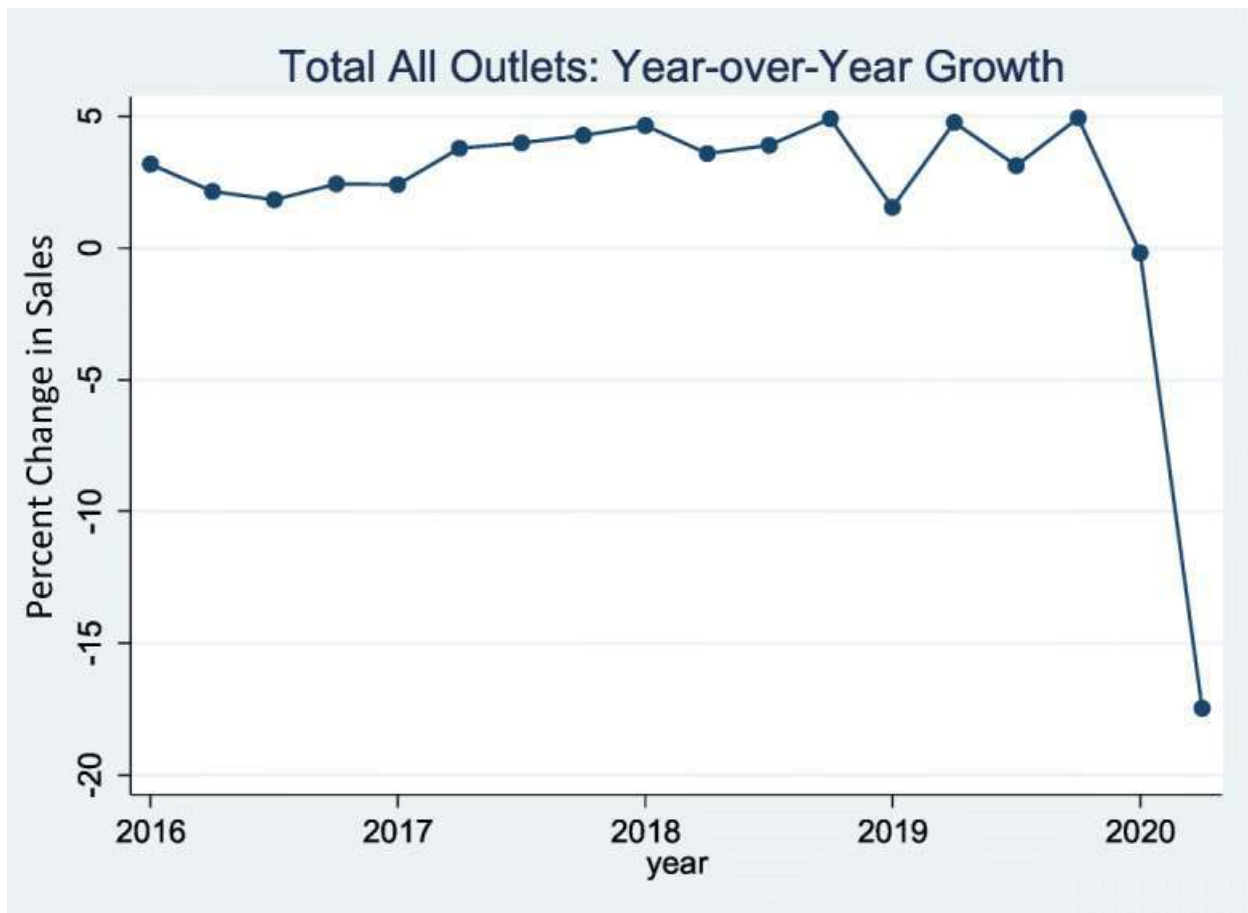
Across industries, businesses can accomplish a similar feat from a Return-on-Investment perspective. More particularly, organizations may shift their paradigm to a data-first approach through a utilization of data-driven modeling including behavioral influencers evaluations and predictive probability modeling to pivot directionally as needed. One area of disruption that has affected almost all businesses trans-nationally has been COVID-19, a global pandemic that is still ongoing at the time of this study. Organizations have had to navigate through the unpredictable spread of an aggressive deadly virus that has disrupted supply chains, offline and online sales completions, worldwide distributions, and inventory availability among other essential factors leading to sustainable sales revenues. Some companies have perished and gone the route of Chapter 11 Bankruptcy due in part to an inability to weather the disruptive storm and stay ahead of the puck. Companies such as Hertz, Neiman Marcus, Dean & DeLuca, J.C. Penney, J. Crew, GNC, Cirque du Soleil, Pier 1 Imports, Brooks Brothers, Century 21, Stein Mart, California Pizza Kitchen, Gold's Gym, ALDO, Helios, and Matheson (remember "MoviePass"?), Cosi, and Sizzler just to name a few (Goldfine, 2020).

To put initial pandemic related business losses in perspective, the following graph (fig. 1) exhibits the impact to California businesses. A majority of businesses in the state of California experienced an aggregate loss of nearly 91% of their sales when mandatory lockdowns were put into place at the onset of the global pandemic. At the same time, online sales increased a shocking 180% (Fairlie & Fossen, 2021). Consumers accustomed to in-store shopping experiences had to pivot to shopping from home computers through digital means. Companies that had an online presence and

the means to accept e-commerce sales not only saw their sales volumes increase, but also saw high levels of frustration from consumers.

Figure 1

Total All Outlets: Year-Over-Year Growth in California

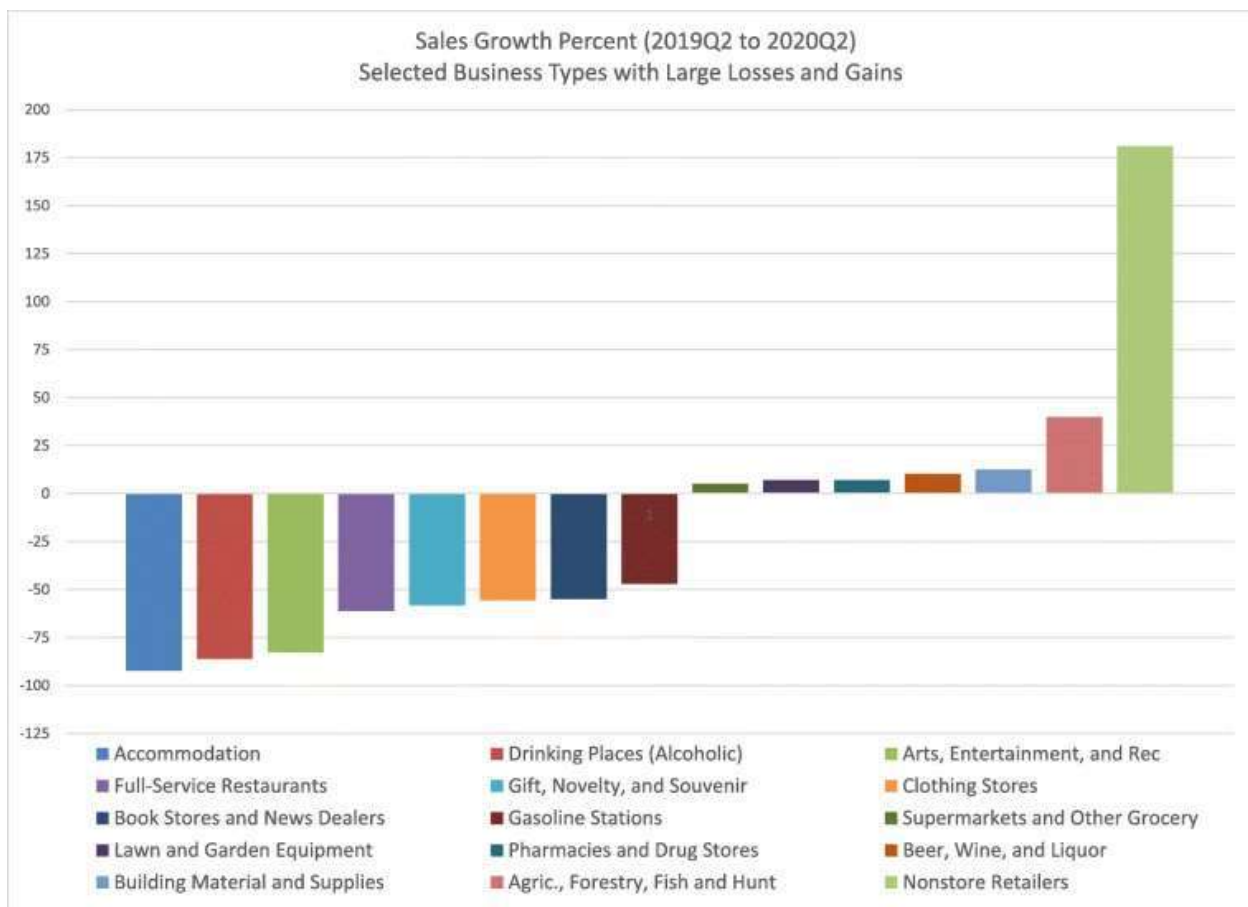


One organization that has found a valuable space to occupy through the pandemic while staying ahead of the pack is Amazon. COVID-19 shifted sales from offline to online. In 2021, Amazon reported \$8.1 billion in profit, an increase of 220 percent over the same period the previous year (Weise, 2021). While the organization performed exceptionally well during this critical period in human history, humans being humans, tended to have strongly correlated emotions tied to their purchases. Most companies struggled through the pandemic. They were not able to anticipate

consumer needs or wants as clearly as they hoped. For instance, anybody with the foresight to stock up on toilet paper at the early onset of the pandemic would have seen their sales of this product type spike exponentially. Figure 2 exhibits sales growth percentage from Q2 2019 to Q2 2020 for selected business types with most significant losses and gain. The category of Accommodation is reflective of retail sales including Children and Home, while Clothing falls within the category of Clothing Stores in the chart (Fig. 2). Further, Amazon sales fell under the category of Nonstore Retailers which showed a 181% increase over the same period.

Figure 2

Sales growth percent for Q2 2019 to Q2 2020: Selected business types with large losses and gains.



Two methods to gain competitive advantage during a period of chaotic disruption is through customer satisfaction and sentiment analysis. More particularly, Amazon data associated with the

consumer purchase sentiment type of “frustration” is a valuable dataset commodity that can provide significant satisfaction context on consumer behavior. If tensions run high during a global pandemic, then consumer frustrations may increase which disrupt the shopping experience leading to higher churn volume, higher product returns, diminished brand loyalty, and ultimately fewer sales. Through behavioral statistical analysis of Amazon reviews before and during the pandemic comparatively, disrupted companies may better find an open space to occupy. Companies can then benefit from where the puck is heading, thus improving their sales and customer relationships.

Three key shopping categories on Amazon.com were selected for this inferential study within the targeted geographic region of the United States. The categories selected included Children’s Category (e.g., Toys & Games Department), Home Category (e.g., Home & Kitchen Department), and Clothes Category (e.g., Clothing, Shoes, & Jewelry Department). Our hypothesis was as follows:

H.: Consumers did not experience a statistically significant increase in the level of frustration in their shopping experience during COVID-19 global pandemic when compared to previous years.

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Ratings data was scraped from Amazon.com department-specific products pages by targeting 100 Best Seller products per each department within the selected categories. A Date range for the data extraction was set to Jan 2008 through March 2021, including 1 year prior to COVID-19 and 1 year during Covid-19. The data was scraped using ParseHub, through the Amazon Web API via Amazon Affiliates access, and JungleScout. Variables included “StarRating”, “TimeStamp”, “Location”, “TypeProduct”, “TypeCustomer”, and “HowManyFoundUseful”. Best Seller product data for 116 products across the three categories of Children’s Category (e.g., Toys & Games Department), Home Category (e.g., Home & Kitchen Department), and Clothes Category (e.g., Clothing, Shoes, & Jewelry Department) provided n=500 reviews spanning a period of 2008 through 2021.

The methodology selected to determine relevant statistical significance in results was to conduct a parametric univariate z-Test: Two Sample for Means test for a number of targeted product samples. Additionally, a Spearman Correlation Coefficients evaluation was applied to determine any relationships between the two groups of Ratings2008_2019 (e.g., prior to Covid-19) and Ratings2020_2021 (During Covid-19 Global Pandemic). Further, all $R^{\wedge}rho$ ranking correlation values needed to be normalized to subvert the mean average from being used in a correlation coefficient given multiple z-Tests were conducted to establish baseline averages. As a result, normalizing Z Fisher Transformations were added to increase validity and reliability in measurements. Multiple mean averages were multiplied by each respective product's sample population size to achieve a weighted population total, then divided by the total population parameter of all product samples aggregated. The null hypothesis was rejected when the probability value (e.g., p-value) exhibited a value less than the alpha of 0.05 at a 95% confidence interval. This represented the likelihood that if one more random sample were included, then 95% of the time, it would not align with the null hypothesis and instead exhibit the Central Limits Theorem principle of plotting towards the central tendency (e.g., mean average) in a statistically significant pattern rather than as an outlier by random happen-chance.

For the category of Children's (e.g., Toys & Games Department), across targeted products evaluated, the null hypothesis failed to be rejected in 18 product evaluations (representing a minority 45.0% of total for this category). Likewise, for 23 products, the null hypothesis was rejected and the alternative hypothesis was accepted (representing a majority 57.50% of total for this category). There was a statistically significant effect identified between a rise in consumer frustrations and the COVID-19 global pandemic. In the state of California, as an example, products from this category that would have otherwise been sold in on-ground stores fall under "Miscellaneous Store Retailers" and experienced a 17% loss in taxable sales from Q2 2019 to Q2 2020, while representing 2.9% of total sales across all business types (Fairlie & Fossen, 2021).

For the category of clothes (e.g., Clothing, Shoes, & Jewelry Department), across targeted products evaluated, the null hypothesis failed to be rejected in 19 product evaluations (representing a minority 47.50% of total for this category). Likewise, for 22 products, the null hypothesis was rejected and the alternate hypothesis was accepted (representing a majority 55.0% of total for this

category). There was a statistically significant effect identified between a rise in consumer frustrations and the COVID-19 global pandemic. In the state of California, as an example, products from this category that would have otherwise been sold in on-ground stores fall under “Clothing and Clothing Accessories Stores” and experienced a 54% loss in taxable sales from Q2 2019 to Q2 2020, while representing 3.1% of total sales across all business types (Fairlie & Fossen, 2021).

For the category of Home (e.g., Home & Kitchen Department), across targeted products evaluated, the null hypothesis failed to be rejected in 24 product evaluations (representing a majority 72.73% of total for this category). Likewise, for 10 products, the null hypothesis was rejected and the alternate hypothesis was accepted (representing a minority 30.3% of total for this category). There was no statistically significant association detected between consumer frustrations or the COVID-19 global pandemic. In the state of California, as an example, products from this category that would have otherwise been sold in on-ground stores fall under “Furniture and Home Furnishings Stores” and experienced an 18% loss in taxable sales from Q2 2019 to Q2 2020, while representing 1.7% of total sales across all business types (Fairlie & Fossen, 2021).

For organizations seeking to improve sales through the continuing epidemic, there are a number of tactics that might be used to optimize the user experience leading to higher customer satisfaction. The first step is recognizing there is indeed a statistically significant relationship between the pandemic and an alarming increase in customer purchase frustrations. Optimization tactics require drilling down to influential friction points such as the following pointed out by Incentivesmart (2022):

- I had to re-explain my problem multiple times
- I was transferred between multiple representatives
- I had to contact multiple times about the same query
- I couldn't find the information I needed

Resolving friction points like these, leading to an improvement in customer relations, may include ensuring alignment between customer needs and descriptive information and questions/answers provided on product pages. Second, organizations may focus on reducing wait times in the delivery process for back orders. Third, companies may enhance their communications with customers by hiring or outsourcing a dedicated customer service team who can help more rapidly resolve

concerns through various channels including email, chat, forums, messaging, dial-in number, automated internal search bot referrals, Peripheral smart device app referrals such as from Google Home, Amazon Alexa, or Apple Siri, or social media presence.

FIGURES

Figure 1. Total All Outlets: Year-Over-Year Growth. The early impacts of the COVID-19 pandemic on business sales. Retrieved from:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8009687/>

Figure 2. Sales Growth Percent (2019Q2 to 2020Q2): Selected Business Types with Large Losses and Gains. The early impacts of the COVID-19 pandemic on business sales. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8009687/>

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