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COVID-19: Impacts of Economic Shutdown on Enterprise Analytics

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The COVID-19 Analytics Problem

The COVID-19 crisis presents a unique and extraordinary challenge for businesses: not only has there been a major (but temporary) disruption to revenue, but every customers' daily routine, shopping habits, needs and buying power has been upended by stay-at-home orders.

This creates a major challenge for those businesses leaders who rely on enterprise analytics teams and models to drive critical strategic decisions. Using pre-COVID-19 analytics and predictive models assumes no change in customer bases, which - simply put - is inaccurate. Maintaining an analytics status-quo will drastically over or under predict targeted customer behavior. In other words, your current model is no longer accurate.

COVID-19 invalidates statistical models that were being used to predict future customer behavior.

So, how can enterprise leaders still create personalized targeting that support key growth strategies without accurate predicative modeling? How can they avoid even more revenue loss from missed opportunities or incorrectly targeting customers?

To build an effective model, you have to start thinking and acting differently. It is essential that underlying data accurately reflects the current population's perspectives and behaviors. And even in those cases where purchase behavior has not drastically changed, the magnitude of COVID-19 and its impact on our broader society and culture still need to be taken into account when trying to predict future buying behaviors.

This paper will help identify how to think differently about data, predictive modeling and analytics in a way that accounts for the unprecedented situation brought on by COVID-19 and ensure business leaders can still make critical data-driven decisions that deliver positive business impact.

Data

With the rapidly changing environment during this crisis and continuing into recovery, make sure to bring in external data to help contextualize, predict, and forecast. This may include new data sets, but don't overlook existing datasets that are suddenly now much more relevant than they may have been in the past. We've identified three key areas of external data to explore.

COVID-19 Case Data

There have been several new data sources compiled related to COVID-19 cases. In the most notable example, Johns Hopkins University compiled the available case data released by official government sources around the world into a consistent and usable data format that is updated daily.

Unfortunately, this data does have limitations in its predictive usefulness. Testing prerequisites, methods, reporting, and availability all vary dramatically by region. Much has been written about the inconsistencies and lack of sufficient testing in the United States. It is also now being reported that asymptomatic cases in China may not have been included in the infection counts, while death totals in Italy do not seem to be including those who were unable to be tested, nor the increased number of people who are dying from otherwise preventable/treatable ailments due to the increased strain on the healthcare system. While this dataset has inconsistencies and messiness, it can still be an important input to help tease out differences and the timing of macro-trends.

When using case data in modeling or visualizations, one must use it responsibly.

Don't engage in armchair epidemiology—leave the science to the experts and be cautious about what conclusions your audience may draw from your analysis. And remember to be empathetic in your communications about it. This data is literally life and death.

Demographic and Third-Party Data

While you are likely already using demographic elements in some ways, it is also likely that the relationships in your model have changed and will continue for some time. So, be sure to revisit your independent variables, as some you passed on before may suddenly be relevant. Geography is one key dimension that is likely to be more relevant now.

The varied timing of outbreaks, combined with varying local responses, has led to different experiences across countries, regions, states, and even down to the county and city level.

Keeping an eye on the differences this causes specific to your business will be critical in the near-term, post-crisis modeling.

Consumer Perception

Ensure you are analyzing through various lenses to compare observations. Even if this data does not go into a predictive model, it can help you triangulate issues or opportunities.

Pay close attention to consumer confidence measures, which have already dropped significantly, of course. The key to watch for will be how quickly it rebounds. This will be closely tied to employment. Even if you are a B2B company, the consumer spending that makes up 70% of the U.S. economy will be something you'll want to keep an eye on.

To understand consumer perception more deeply, consider subscribing to an existing omnibus consumer tracker, or run your own for more custom insight.

Perceptions are changing weekly, if not daily, so having an up-to-date pulse on consumers will be a critical piece of many big decisions in the next weeks and months.

If you are not already doing it, this could also be an ideal time to start utilizing consumer survey tools to get a pulse on how your consumers are feeling and reacting to this crisis and how you can best serve them. You may be able to find out additional useful information that could lead to valuable new strategies, products, or processes. Here, again, practice empathy in soliciting responses. If this is not grounded in a genuine desire to understand your customers and help them, you run the risk of damaging the relationship.

Predictive Modeling

Now more than ever, the need for robust model management has arrived. If you already have some form of model management software or tool developed, you may already be seeing the direct impacts that COVID-19 is having on predictions, model health, scoring distributions, and performance testing. If not, now is the time to seek help in understanding what is happening with your models, so you can better understand what actions you can take to continue delivering impact for your business. The goal is not to eliminate errors completely, but rather to manage them wisely through the crisis.

Rethink How Models are Rebuilt

In most cases, where a model starts to poorly predict the current customer base, you can simply refit the model using recent data and it will adapt to the behavior of the current customer base. Unfortunately, with COVID-19 the answer won't be so easy, because models will either rely too much on older historical data (if you are using years of data), become too narrowed-in on the outbreak period (by only utilizing recent data), or lack enough data from the outbreak period to be able to build and test on.

The solution is to utilize model combination techniques such as ensembling, meta-learner stacking, and manual gradient boosting.

It's important to keep using our existing models, because they have years of insight about our customers and how they normally behave, but we need to also create new models utilizing outbreakonly data to predict behavior that is potentially different than the prior models.

1. **Model ensembling averages together the predictions from existing models with the new outbreak model to leverage insights from both. A test-and-learn approach is needed to determine the weight provided to each model; 50-50 split, 30-70, or something else.**
2. **Meta-learner stacking helps with this by building a third model that figures out exactly how to combine our existing model and new outbreak model in the best way.**
3. **Another technique, borrowing from gradient-boosting models, is to use the existing model for prediction but then build a second model using only recent data to predict the error from the existing model. This leverages the known power of our existing models, but corrects the predictions based solely on what is happening during the outbreak period.**

Refresh Often

How often models are refreshed with new data depends greatly upon the company and industry, but we recommend increasing the frequency of model refreshes to stay on top of the constantly changing scene.

Weekly rebuilds of models (existing and new outbreak models) may be necessary to make sure we have the most up-todate insights about customers.

This is especially true for the outbreak-specific models, as each new week allows us to train on even more data and understand the most recent trends. Once enough time goes by, the need for the two-model system should dissipate as customer behavior arrives at its new normal. Realistically, though, that may be more than a year out for most companies.

Member Re-Engagement + Stress Testing

Once this virus passes and the marketplace returns to some form of normal, it will be crucial for companies to re-engage their customer base. While the current market conditions are unique and unlikely to have an analogous event in your historical data, it might still be possible to identify members who used to be consistent customers who for some unknown reason stopped consuming for an extended period of time.

For these customers, the exact cause of their hiatus may be unknown, but the data can still offer insight into the purchasing behavior of customers who are likely to return after an extended absence.

Digital Analytics

Your digital analytics are sure to be affected as well. In addition to behavioral changes, there are some technical considerations unique to the way digital analytics data are collected and processed that should be taken into consideration when using data from this period when COVID-19 is causing so many changes in our lives.

Check Internal Traffic Filters

With so many employees suddenly shifting to a work-from-home model, ensure you are updating your internal IP address filters for your digital analytics tools to include your company's VPNs.

This connection method may have had a negligible effect in the past, but may now play an outsize role in internal traffic. Communicate to your internal teams that they should only access your site(s) via VPN, or they should use browser extensions that can block tracking beacons from analytics platforms.

Even after taking the above steps to allow for filtering internal company traffic, there may still be significant internal traffic slipping through that impacts your data and metrics. In this case, you may decide to either adjust reporting to reflect an estimated reduction in expected internal traffic (based on your unfiltered data) or simply caveat and document the issue for key date ranges.

This shift to working from home will likely also affect geographic data for your external site users. Many office networks route via connections that have the same geographic location (i.e., all company traffic mapped to the headquarter location via a central proxy/gateway). However, with the shift to home use we might expect geography reports to show changes, especially at the more granular DMA/city/ZIP level. While we expect that this data will be more accurate than in the past, it will cause issues when comparing or trending data by geography vs. periods before or after this event.

Avoid Unrelated Conclusions

Given the shifting priorities and needs of the public during this event, expect to see many changes in users' behavior on your sites that will create some anomalies in your performance metrics.

For example, users on one of our client's sites appear to be keeping new COVID-19 content pages open and refreshing them. This appears as "entries" to the page from an internal source without a referrer, skewing traffic source reporting and attribution analysis.

For another client, a new COVID-19 banner has dramatically reduced use of their recently updated navigation menu, dropping usage from 8% to 4% in just a few days. This client's website is suddenly serving a completely new purpose for many of their customers, so many conversion optimization testing initiatives are understandably inconclusive. We see this as an uncontrollable risk in any optimization testing and are recommending that clients limit or even suspend their site optimization experiments until this event has passed and metrics/behaviors have normalized.

Closing Thoughts

This COVID-19 period allows us a unique opportunity to analyze the impacts that such sudden disruption has on predictive models, consumer shopping behavior, and digital analytics. While this is a shared global event, and larger disruption than many businesses have ever seen, sudden disruptions are not entirely uncommon to any individual region or business.

Once everything gets back to a new normal (or at least a less volatile) state, it will be important to look back and collectively reflect on how models performed, what changes were necessary, and which mitigation strategies proved most valuable. As a final step, don't forget to document what was learned and spell out specific strategies that can be implemented in future model building to avoid potential issues or have contingency plans in place in the event your business experiences something similar again.

About the Authors

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Emily has 15 years of experience in leading and developing data strategies, advanced analytic solutions and data-driven insights that contribute to business growth for CRM and loyalty programs, marketing departments and financial institutions. She provides analytical and statistical modeling solutions to drive personalization, acquisition, reduce attrition, increase and optimize profitability, detect fraud, reduce company risk, and many other end-to-end solutions.

At ICF Next, Emily leads our global analytic team of engagement experts, data scientists, data visualization specialists and digital analysts. She's responsible for the development and implementation of analytic strategies for clients across multiple industries, from retail to hospitality to travel. She utilizes a mix of traditional analytics and advanced predictive modeling solutions to achieve client goals. She also manages the development of our analytic solutions and products within Tally®. Her client experience includes work with Subaru, Navistar International, Amtrak, Wyndham, and Ameriprise Financial.

Geoff Harper

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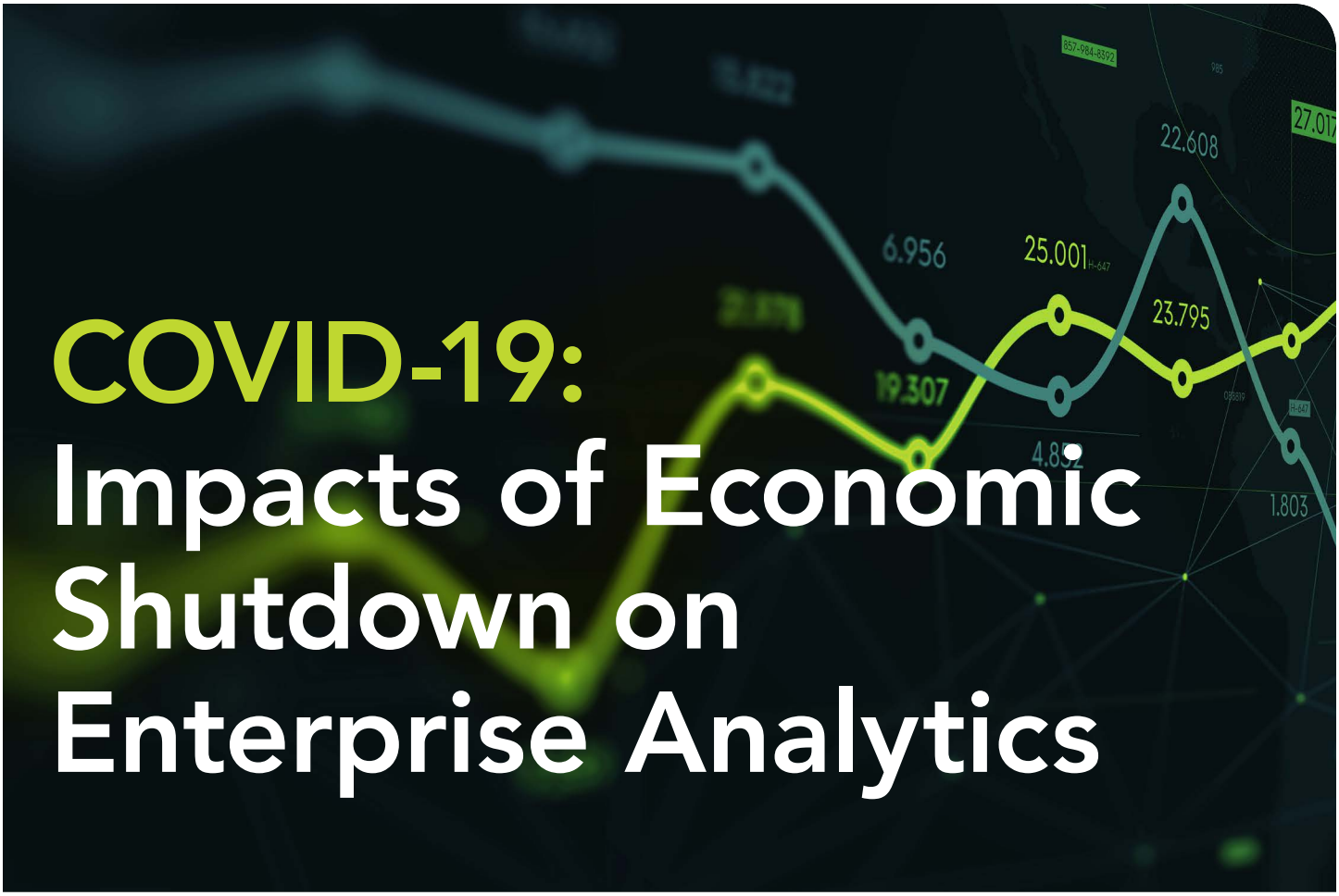
Geoff Harper has more than 15 years of experience in marketing, research, and digital analytics. He is an advocate for data-driven strategy and decision making and understands that having the right data and knowing what to do with it are both critical to a successful digital vision for any organization.

Mr. Harper's group focuses on providing clients with insights from both qualitative (focus groups, usability testing, VOC tools, social monitoring) and quantitative (surveys, web analytics, competitive intelligence) sources to support vision/strategy development, design, implementation, and optimization for digital marketing, search engine optimization (SEO), user experience, and mobile engagements. Recent clients include United Parcel Service (UPS), the International Monetary Fund (IMF), Scripps Networks Interactive, Genworth Financial, MVP Health Care, and the American Institute of Architecture (AIA).

Prior to joining ICF Ironworks, Mr. Harper led consumer insights programs for various companies, including CarMax Auto Superstores and Genworth Financial. In 2013, he earned an expert certification in Adobe Analytics.



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