Making Confident, Fact-Based Decisions:
Use of Propensity Analysis to Demonstrate the Effects of Business Strategies
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The Challenge of Making Evidence-Based Business Decisions

Suppose you're the COO of a company that has outsourced various back office processes to enhance efficiencies and reduce costs. While these initiatives have been successful, you're starting to wonder if you can leverage outsourcing relationships for business objectives beyond cost savings. In fact, you've read reports of companies that have worked with their outsourcing partners to introduce new or enhanced products more quickly. Perhaps you can do the same, driving better financial performance as a result.

It's plausible, certainly – but can you be sure? We're all familiar with the potential circularity of cause and effect. Maybe the direction here is reversed. Might businesses that outsource also vary in other ways that predispose them to better financial performance? For example, if companies outsourcing for innovation also have more employees and a higher proportion of STEM employees, higher revenues, more business locations, and a greater concentration of locations in growth markets, they may generate more robust financial performance than other companies for reasons quite distinct from their outsourcing strategy. Perhaps better financial performance provides companies with the flexibility to test new outsourcing approaches in the first place. What tools can managers rely on to guide confident, evidence-based decisions when a tangled web of intercorrelations obscures the straight line between cause and effect?

Regression Not Always Up to the Challenge

Well-established statistical techniques can, to some extent, control for confounding factors in statistical relationships, but they have notable limitations – above all, their limited ability to control for covariance when the groups being compared differ on many factors. You might assume, as most people do, that this situation sounds exactly like what regression is intended to address. True — but only up to a point. Regression has been shown to produce erroneous results (i.e., overstatement of single factor cause-and-effect) when used to control for a large number of significant differences between groups (a circumstance typically encountered with individuals and complex organizations). How, then, should we isolate the effect of outsourcing from other differences between companies? *This is not an academic or purely statistical problem. Strategic resource allocation decisions and important outcomes can hang in the balance*.

Using Propensity Analysis to Make More Confident Decisions

An innovative technique known as Propensity Analysis is proving effective in situations where many variables are potentially correlated with either the variable whose effect we seek to measure or with the outcome we wish to predict. These common scenarios can include everything from gauging the effects of operational decisions to measuring the impact of a TV commercial. Building, in part, on segmentation, propensity analysis uses elegant matching techniques to estimate the effect of an event on an outcome by controlling for the confounding factors that regression alone cannot so effectively handle.

Propensity Analysis has already shown great promise in healthcare and policy research, and is now making an impressive debut as a problem-solving tool in commercial environments. In a recent engagement with a leading technology provider, NA Worldwide used data from a global survey of over 1300 large enterprises to demonstrate the value of Propensity Analysis in determining the impact of outsourcing activities on business performance. Having discovered that "innovative outsourcers" also differed from other enterprises on many other characteristics, we used the matching tools of Propensity Analysis to correct for confounding variables and proved that outsourcing approach was, in itself, a driver of better business performance. In this scenario, we would have rejected regression analysis based on the very large number of variables to account for, or felt obliged to limit the number in the model so as to avoid the risk of "over-fitting."

Big Implications for Big Data

Business decision-makers are hoping to ride the wave of Big Data to new insight, on an assumption that the sheer volume of bits and bytes will lead to better, evidence-based decisions, using algorithms tailored by data scientists to wring patterns from chaos. Although huge datasets with thousands of variables may be more likely than smaller datasets to contain pertinent predictive information, the availability of exponentially more data brings with it exponentially more confounding relationships. Indeed, the massive size of Big Data sets may actually *exacerbate,* rather than correct for, certain limitations of regression, and in turn, increase the risk of arriving at incorrect conclusions. The opportunities for evidence-based decisions are broadening with Big Data – so long as the right tools are used to find meaning in the maelstrom. Propensity Analysis will become an increasingly important technique for interpreting the myriad relationships observed in Big Data.

Application in a Wide Range of Business Situations

Propensity Analysis is a powerful and flexible tool that can provide evidence-based support for a wide variety of business decisions involving allocation of resources for optimal effect. Among the applications we see are customer targeting, calculation of leverage associated with mobile touch points, evaluation of employee training programs, and other investment decisions involving different levels of investment or various types of customer "treatment." Making better decisions is not just about acquiring more information. At a time when there is lower tolerance for missteps and vastly more data to guide decisions than before, we need to evolve standard statistical techniques so that they are "up to" the formidable task of making decisions that are not only "data-based," but also trustworthy.

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Mike is a Senior Group Director in our firm's Information Technology Practice who designs, oversees, and manages major engagements for clients seeking to develop B2B and B2C business strategies based on customer insight and advanced market analytics. Noted for his skill in devising new modeling techniques and creating innovative applications, Mike is able to integrate multiple data streams and sources of insight in support of varied business applications, including development of new service portfolios and new lines of business, as well as life cycle management. The marketing problems he routinely addresses include price sensitivity, forecasting, brand equity measurement, customer experience and customer retention.

Mike has particular depth in the Information Technology sector, where he has played a pivotal role in helping clients pursue business opportunities in Cloud computing, Big Data, mobile technologies, strategic outsourcing, and systems optimization. An adept qualitative interviewer as well as a technology subject expert, he has personally conducted many hundreds of interviews with CIOs and other senior IT executives around the globe, and his uncanny ear for the "voice of the customer" has made him a trusted partner in the design and implementation of a broad range of technology initiatives. Other industries in which Mike has significant experience include energy, consumer electronics, manufacturing, and healthcare.

Prior to joining the firm, Mike was a tenured faculty member of the University of Pennsylvania. A widely published author with over 30 peer-reviewed papers to his credit, Mike's academic experience in the fields of psychology and psycholinguistics have been a platform for innovative work on behalf of clients, while building the firm's own intellectual capital in advanced methodologies. Mike received his BA from Bucknell University, where he graduated *summa cum laude* with honors in Psychology and English. He earned his Ph.D. in Psychology from Cornell University.

As Vice President of our Methods & Analytics function, Elaine Zanutto leads a talented department of statistical programmers and statisticians who advise project teams throughout the Analytics group. **NA**XION has a well-deserved reputation as one of the most inventive and experienced teams of methodologists in the industry, noted for their authoritative understanding of theory and their skilled, pragmatic application. Elaine oversees the training and operation of the methods function in the firm while also providing counsel to project management staff on challenging design questions. She is particularly adept at crafting and implementing complex sample designs, and skilled at developing choice models that accommodate new marketing paradigms and complicated decision processes.

Elaine's areas of specialized expertise include Hierarchical Bayesian (HB) modeling for estimating individual-level preferences in complex choice situations, segmentation analysis for a broad range of audiences and industry sectors, and the design of highly customized forecasting models that rely on a variety of choice modeling platforms, including dynamic models that account for market evolution in the post-launch environment. She is an expert on structural equation modeling and other tools for driver analysis in challenging markets where it is difficult to disentangle the impact of specific sources of influence.

Elaine has published many articles in peer-reviewed academic journals in the fields of market research methods, statistics, and survey research methods. She is also an Editor for *Statistics, Politics, and Policy* and an Associate Editor for the *Journal of Official Statistics*. Before joining the firm, Elaine was an Assistant Professor of Statistics at The Wharton School of the University of Pennsylvania. Elaine received a Ph.D. in Statistics from Harvard University, and a M.Sc. in Statistics and a B.A. in Mathematics and Statistics from Carleton University (Ottawa, Ontario, Canada).