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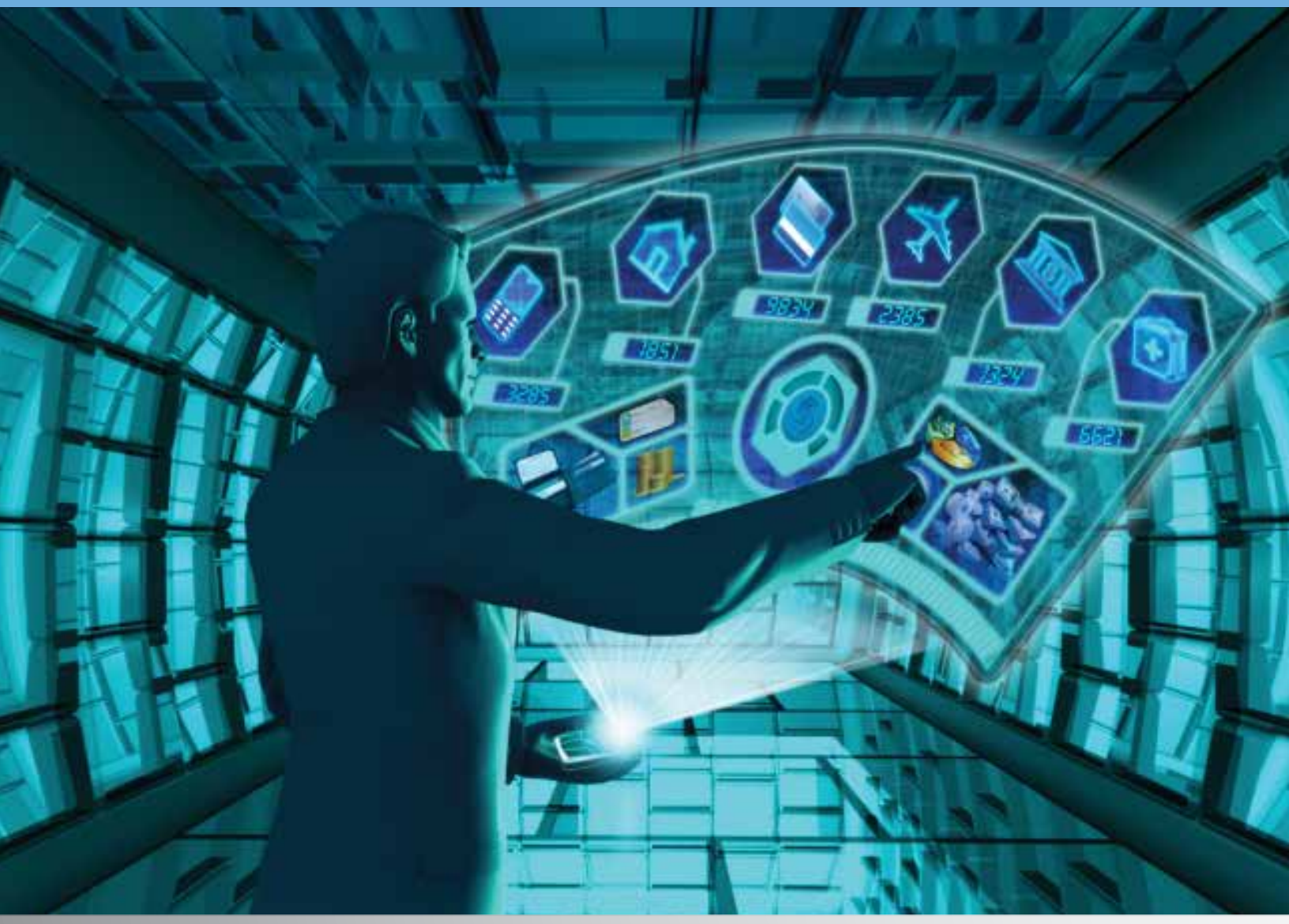
Knowledge@Wharton-Wipro Future of Industry Series: Technology Innovation

Assessing the Bounties and Boundaries in Big Data Analytics



Knowledge@Wharton-Wipro Future of Industry Series: Technology Innovation

Assessing the Bounties and Boundaries in Big Data Analytics

Companies of all hues are finding huge upside potential in data analytics to grow revenues and profits, and cut costs. Sharper analysis of rich data from an expanding range of sources is enabling more cost-effective marketing and improved customer engagement. Accordingly, companies are investing in the attendant information management infrastructure to fully extract the gains of advanced analytics. Yet, data analytics cannot be effective beyond a point, and companies need to keep their approaches grounded in reality, say Peter Fader, Wharton marketing professor, and K. R. Sanjiv, senior vice president and global head for analytics and information management at Wipro Technologies. In this white paper, part of a "Future of Industry" series produced jointly by Knowledge@Wharton and Wipro Technologies, Fader and Sanjiv explore the opportunities and challenges ahead as businesses evolve in their use of data analytics.

For most of 2013, groups of academic researchers around the world will pore over energy usage patterns over a three-year period of 30,000 residential customers in Northern California of Pacific Gas & Electric (PG&E). They will look for all manner of insights that will help PG&E better engage with its customers, reduce energy consumption and fine tune its pricing mechanisms. PG&E, based in San Francisco, has collected that data through its SmartMeters installed at customer residences. It has partnered with the Wharton Customer Analytics Initiative (WCAI) to oversee that effort to extract business intelligence from that data. "We will use the data to figure out which message to send to which household at which time in order to get them to conserve energy," says Peter Fader, Wharton professor of marketing and co-director of WCAI, referring to a mandate to that effect from the state of California to PG&E.

Like PG&E, more and more companies have embraced the idea of tracking, collecting and analyzing data relating to customers, operations, manufacturing and other functions to make better informed decisions that eventually show up in revenues, profits and market shares. They need to invest in the attendant information management infrastructure to fully extract the gains of advanced analytics, says K. R. Sanjiv, senior vice president and global head for analytics and information management at Wipro Technologies.

EARLY ADAPTERS ... AND SOME UNLIKELY GAINERS

E-commerce and technology firms run businesses that naturally lend themselves to data analytics, and they have been among the earliest adapters of such advances in information management.

"Companies are finally starting to realize that the data and the analytics can not only be a way to help sell products more efficiently, but also to completely tip the strategy in favor of customers," says Fader, noting that the focus is now more on customer value rather than product profitability.

But companies one wouldn't immediately associate with data analytics are also catching on to the trend and benefitting with dramatic gains, he observes. Merial, the animal health products subsidiary of pharmaceutical company Sanofi, spotted the opportunity more than three years ago. Using some of the analytical models Fader has developed and published, Steven Lerner, the U.S. head of Merial's large animal and equine operations, recast marketing strategies aimed at distributors of veterinary products.

In 2009, Lerner utilized analytical models to capture buying patterns for Merial's products and redirected sales forces to focus on the most valuable distributors, or those who bring the most business. He used the concept of "customer lifetime value" to launch a "stepwise reduction" in essential customers from more than 61,000 in 2009 to 9,700 in 2010 and 2,400 in 2011. "Yet the division achieved healthy growth during this period," says Lerner in a paper documenting the effort he wrote with Fader and Bruce Hardie of the London Business School. Merial moved from a model of broadly defined "territory managers" with more than 1,900 customers each to much more focused "key account managers" with 70 designated customers each. Fader says Merial's use of data analytics shows that there exist "amazingly generalized patterns across industries" and that "companies can learn and leverage quite a bit without having to do too much that is domain specific."

MORE DATA, ENABLING TECHNOLOGIES, LOWER COSTS

Not using advanced data analytics is no longer an option for many companies if they have to compete effectively, according to Sanjiv. The last couple of years have seen an infusion of new technologies in devices and appliances, big data management, in-memory processing (as with TV set-top boxes) and so forth. "These are transformational technologies becoming mainstream. Secondly, the pressure to use data analytics and the pressure to do more with less [resources] has never been higher because of the market environment." He expects to see companies innovating to make the best use of all the data they have to get all the business intelligence they can for decision-making.

Sanjiv also sees two helpful factors at work in promoting the use of big data and analytics. First, the types, sources and volumes of data now available have dramatically changed. In earlier days, companies segmented customers with mostly a combination of internal data and syndicated third-party information from providers like Nielsen. But now, the physical interaction companies have with their customers is much stronger than earlier. Customers leave trails of rich information as their touch points cover physical stores, digital channels including company websites, e-commerce portals and social media platforms, and customer support call centers. In addition, the ability to leverage and monetize large amounts of data cost-effectively is no longer the monumental task it was in earlier years, Sanjiv points out. "Today, cheaper platforms are available that can process terabytes of data at great speeds, and they open up the potential of doing a lot of things that were hitherto not possible."

Emboldened by the new possibilities in analytics, Sanjiv says many companies are investing "phenomenal amounts" to collect more data and better understand customer behavior. They have gone much beyond conventional tools such as coupons, surveys and demographics to track

customer locations, preferences and buying patterns. Cell phone service providers may not easily share subscriber call data because of privacy issues, but other sources are available for such data. Customers leave footprints in telecom networks at shopping malls, or in the satellite navigation tools in their cars as they drive, says Sanjiv. "If you are near a retail store, it might tell you: 'We know you have been looking for a TV based on your Internet browsing history. We are a few blocks down the street and we can make you a good offer.'"

Companies are using such strategies elsewhere too, such as in manufacturing, supply chains and operations, says Sanjiv. Like closed circuit TVs in ATM kiosks, they are installing "smart meters" and other gadgets across their processes to ensure each activity is recorded and rendered in a framework that can be analyzed for business intelligence.

The confidence levels and usage of big-data is high in the banking, financial services and insurance industries (BFSI) as well as retail and telecom companies, says Sanjiv. The use of machine-generated data is high among medical devices and pharmaceutical companies while that of in-memory processing (like energy smart meters) is high among utilities providers and BFSI companies. However, firms in many other industries are on a slower track in using analytics.

REFRESHING NEW WAYS OF VIEWING CUSTOMERS

The new kinds of data and the capabilities available are persuading businesses to view their customers differently. "It used to be that the focus was entirely around the product or the service that was delivered," says Fader. The customer was a faceless and nameless entity, and companies that claimed to put the customer first really meant they put demand first, he explains. "But now, not only can we really start to see the customer in a much more granular light, we realize the customer is also an asset that can be managed and measured, and put at the core of a strategy."

Fader says data analytics helps companies see not just the customer, but a range of individual customers. They get more clarity on their customers' different habits, tastes and propensities to buy and react, and that helps them sharpen marketing efforts. "We are starting to see a lot more customer-centric strategies where the products and services are just a means to an end to find the right customers, make them as valuable as possible, and find the most efficient ways to extract that value," Fader says. "And that is just because of all the data and the analytics that are now coming into fruition."

The new ways in which analytics helps companies engage with their customers is an extension of the conventional B-to-B (business-to-business) channel, according to Fader. In B-to-B settings, companies with relatively smaller groups of customers know who their most valuable customers are and how to prioritize them. Examples include airplane manufacturers or private wealth management firms, says Fader. Data analytics now helps companies replicate that "B-to-B mindset on a B-to-C (business-to-consumer) scale, where you have tens of millions of customers versus tens of customers," he adds.

USING DATA ANALYTICS TO CUT LOSSES, SAVE COSTS

Data analytics also helps companies prevent and combat fraud. In real-time surveillance of things like stock market activity or credit card transactions, a company may have no more than a second to respond to a situation. Data analytics could help in some of those situations, but it would be more effective in prevention, according to Sanjiv. In fraud detection scenarios, the ability

to correlate disparate sets of information offers new opportunities, he says, citing the case of an individual who had submitted disability insurance claims while posting pictures of himself skiing in Canadian mountain resorts on his Facebook page. The insurance company discovered those Facebook pictures and decided he clearly didn't qualify for disability insurance. Similarly, some U.S. retailers are using non-traditional sources of information to track employees who have a track record of stealing as a way to combat internal theft.

One retailing company Sanjiv is acquainted with used analytics to improve workforce management. While the conventional approach to increasing sales volumes is to proportionately increase staff levels, analytics demonstrated a different logic. "If your footfalls are more between 2 p.m. and 5 p.m., you need more people at that time," he says. "You could do such optimization of sales forces if you conduct a deeper analysis." The retailer found it could gain "hundreds of millions of dollars" each year if it redeployed its staff along the lines the analytics suggested. Labor-related issues didn't allow it to fully exploit that opportunity, but it did manage to save a quarter of the projected savings, or about $30 million annually.

PREPARING FOR THE NEW DATA FLOWS

Companies that want to use analytics have to reorient themselves in the types, sources and periodicity of customer data they need, says Fader. No longer are they content with old methods like studying sales trends before and after price changes, seasonal demand shifts or along demographic clusters, he notes. Today, they want customer data that is as granular as possible, and sorted along behavioral patterns.

"We no longer want to talk about the average customer; there is no average customer," Fader says. "There is a vast array of customers. It is more important for us to understand the range of their behaviors and the underlying propensities as it is to understand the average behavior. We need to celebrate their heterogeneity." In short, they need granular data of customer sets that can be observed over a period of time, focused primarily on behavioral trends.

In preparing for unprecedented volumes of data flows and the subsequent analytics, companies need to create the infrastructure to aggregate it for processing, says Sanjiv. They also have to pay attention to the integrity of the data in terms of its expiry and other qualitative factors, and privacy issues. "You need very mature processes for governing this data," he says, pointing out a prerequisite before it is ready for analytics. "You have to learn to walk before you run."

Ecosystems for data flows also have to be created where multiple entities agree to pool information. True, some organizations are reluctant to share data because they feel they could monetize it or for some other reasons, but more and more companies are willing to cooperate with one another, says Sanjiv. "People used to hold on to their data possessively like an internal asset which they want to use to differentiate in the market. That attitude is loosening up. 'My data plus your data is much more valuable to us' is the attitude now." In any case, companies are realizing that a lot of internally available data can be had from the open environment and social media platforms.

In addition, Sanjiv maintains that new, digital age companies "have a different DNA" where they open up their data for several applications like Google and its Google Maps. Another example he offers is www.23andme.com, a website that stores personal genetic information, such as drug response and disease risk.

Companies can potentially leverage the insights from analytics for high RoI (returns on

investments), according to Sanjiv. He also has suggestions for what companies might do with "machine-generated data" from equipment like refrigerators, washing machines, TV set-top boxes, trucks with cargo, oil field rigs and building elevators. Elevator companies, for instance, could centrally monitor wear-and-tear and other safety parameters to improve performance substantially. They could also use it as "blended data" in combination with other information, and be proactive in inventory management or workforce issues, Sanjiv adds. He offers the example of an elevator company that may increase staffing at a hotel that is expected to host a big event on a weekend for optimal performance of its elevators.

Government agencies are also actively using data analytics in a variety of scenarios, says Sanjiv. Police and airport authorities combine video analytics with telecom data and other external data to generate fraud detection red flags. Video analytics in an airport can render facial recognition and also action recognition such as of suspicious movements like someone pulling out an instrument from a pocket that may seem like a gun. "These things become relevant when you [combine] it with multiple sources of information such as immigration data, email data and Internet traffic data," he says. "And you may able to catch somebody while he is about to board a flight."

HOPES, EXPECTATIONS AND COSTS: THE GROUND REALITIES

Data from social media is the most unstructured and difficult to tame — and a big unknown for many companies. Fader thinks too much is made of data from social media and mobile telecommunications. He disagrees with companies that are rejecting conventional models as too old, and heading for social media as their new source of data. "Instead of trying to invent something new, let's start with our old models and our well established understanding of how customers have traditionally behaved."

Fader is as much a fan as others of the new data sources like social media, but he wants to "bring them in the proper place." By ignoring time-tested models of customer behavior, companies risk reinventing the wheel, he adds. "Behavior is behavior. Knowing what people are doing is much more important than who they are doing it with. So start with the behavior and then bring in the social connections as an incremental effect."

Fader sees other limitations to what big data and analytics could achieve. For one, he doesn't see the highly granular data now available translating into companies doing one-to-one marketing with exactly "the right message to the exact individual that will be delivered through exactly the right channel at exactly the right moment." He finds that "at best very inefficient and at worst next to impossible."

Instead, Fader advises companies to focus their marketing not on specific individuals but on groups of individuals who are defined by behavioral terms and not by demographics. For example, he says companies could use the time-tested RFM method (recency, frequency and monetary value) to rank customer groups. "The real art and science is to find the most efficient way to create behavioral segments that can be very easy for a firm to work with and achieve extraordinary results," he says. "No matter how good the data gets and the technology gets, it will be hard to go beyond that."

One-to-one marketing is also not cost-effective because there's so much "inherent randomness" in what people do, Fader says. A cell phone company, for example, may have detailed data on a customer's calls. But when it is time for a service contract renewal, the customer may switch providers based on reasons that may be hard to pin down, including a tip from somebody

they may have chanced upon in the subway, he explains. "All the data in the world will never completely resolve that randomness," he says. "It will help to some extent, but one needs to build models that explicitly recognize the randomness in people's behavior."

To keep the costs of data collection and analytics at manageable levels, Fader says companies need to ask themselves: "What is the least amount of data that we need? What is the smallest number of segments that we need to roll it up into?" The dictum that "more is better" is not always right, he adds.

Sanjiv agrees that companies need to ensure their approach to data analytics and information management "is grounded and linked to short-term ROI." In fact, he advises companies to avoid giving data analytics programs a long leash. Those that don't yield gains in six to eight months after launch might best be reevaluated, he says. "It has to be a business-backward approach."

In the final analysis, Fader warns companies to expect data analytics to yield only incremental gains — not quantum gains. He senses many companies are "generally competent and are already making the best use of resources they have." Of course, things will get incrementally better as they start using more and better quality data. "If you are seeing really huge changes due to changes in the data quality, it means you weren't running the business very well in the first place."

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