

IT HAS TRANSFORMED ONLINE
COMMERCE. NOW MIDDLE-MARKET
COMPANIES AND STARTUPS ARE MINING
BIG DATA FOR BUSINESS GROWTH

BY GLENN JEFFERS ILLUSTRATION BY THIRST



Think you're too small for big data?

**THINK
AGAIN.**



Every time a finger presses down on a mouse button or a track pad or the surface of a smart phone; every time a link is highlighted and a processor whirls in compliance; every time a new page opens containing an ad or a product, maybe both — that click is recorded.

Imagine that click, which indicates likes, dislikes, preferences and partialities, grouped together with personal information from your social media page, your tweets and posts, keywords in your web-based email, and your phone's GPS sensor (hey, you're the one who posted on Foursquare). Now, imagine all that information grouped together with that of every person with a Facebook or Twitter page, Amazon account or on a Groupon mailing list.

If you can, you're beginning to understand the exponentially growing ball of empirical information now commonly known as "big data."

At its core, big data is the raw information people provide every day via sensor information, digital media, transaction purchases and even web searches, says **Florian Zettelmeyer**, the Nancy L. Ertle Professor of Marketing at the Kellogg School of Management. That information gets parsed out to data centers and stored in digital warehouses, where it waits to be used in targeting consumer audiences and predicting behavior. "There's a lot of it," Zettelmeyer says. "And it has all of these implications for computing."

But as big as you think big data is, it's actually bigger.

According to ViaWest, a Colorado-based data center and managed services provider, we create 2.5 quintillion (or 2.5×10^{18}) bytes of data daily. That's "we" as in Earthlings. By comparison, that's like filling up 57.5 billion 32GB iPads every day.

Many have seen big data impact their everyday lives, from targeted ads in Gmail to a list of suggested items on Amazon. But now, smaller companies are beginning to apply this model, lopping off small chunks of this amorphous data.

Sharon Herd was fed up. A native of Georgia, Herd spent years training new owners on how to run franchises such as Carvel Ice Cream, Schlotzsky's and Cinnabon. It was her turn. In 2007, she left the corporate world and opened Tropic Tan, a tanning salon in Kennesaw, Ga. about 25 miles north of Atlanta. For years, Herd saw steady growth in her business. And in February 2012, she saw an opportunity to move to a bigger location, buy more tanning beds and upgrade her website.

First, she went to her local bank. But despite her job experience, a strong credit score and a husband with a landscaping business, Herd was denied. Next, she tried for a merchant cash advance, which provides small businesses with a lump-sum advance that's repaid through future credit card sales. But the interest was too high, Herd says, and the application process was tedious to a fault. "They wanted 12 months of history," says Herd, 43. "I had to pull all of my records. They wanted me to change credit card companies. I had this sickening feeling that I was making the worst decision of my life." →

⇒ On her computer late one night, Herd looked up On Deck Capital, a New York-based lending company, which specializes in small-business loans. She had used On Deck before and received a \$5,000 loan to help with startup costs. And rather than use her personal credit score or submit her to a lengthy application process, Herd knew On Deck used big data.

To qualify for an On Deck loan, business owners must first log onto the company's website and create a business profile. That profile links to data sources including online banking, accounting and merchant processing. On Deck then combines that information with social, tax, industry and firmographic (location, number of employees, etc.) data to create what it calls the "On Deck Score."

With that score, On Deck can determine within days not only if a business is eligible for a loan, but also how much it can receive. Part of the expediency comes from the fact that On Deck supplies short-term loans of up to 18 months that range between \$5,000 and \$150,000. Another factor: Most banks lack an effective way to analyze small businesses for loans and fall back to treating them like individual borrowers, says **Andrea Gellert '96**, senior vice president of marketing for On Deck. "They treat a loan application for \$30,000 the same way they would treat a loan application for \$2 million," she says. "Because they can't put the same kind of resources into a smaller loan as they would a larger loan, they've started to use personal credit as a proxy for business credit."

With a more accurate way to determine a business's viability, On Deck has become a go-to lender for small businesses in need of quick cash. The company, started in 2006 by entrepreneur Mitch Jacobs, has grown as well, providing more than \$400 million in small-business loans at a time when banks are still leery about lending. Last year, Inc. Magazine added On Deck to its list of the 500 fastest-growing companies in the country. As for Herd, she received a loan of \$14,000, moved to the larger location, bought the additional tanning beds and upgraded her website. Within a month, she had nearly 100 new customers. "They have done everything they said they were going to do," Herd says. "When I'm looking to expand again, I'll call them."

But using big data can become expensive quickly. Though advances in technology have helped drive down the cost of front-end tools including sensors and GPS tracking chips, storage and analytics can be pricey. "You have to have the storage space and the know-how," says **PJ Lamberson**, a senior lecturer in the management and organizations department at Kellogg. "The real challenge is to realize how much of an actual benefit you're going to get. You can go through a data-mining exercise and that may not be much better than using a simpler model."

A venture-backed company, On Deck offset its costs by partnering with credit-reporting agency Equifax to develop the On Deck Score. Gellert acknowledges that building this kind of technology and expertise can be daunting for some businesses, but whatever expense the company incurs is worth it to stay ahead of its competition. "We're light years ahead in terms of synthesizing and understanding this information," she says. "We're pioneers in this space."

It helps that On Deck models for business viability. Making big data operational, especially for marketing purposes, is tougher. While the speed of processing enormous chunks of data has greatly improved, businesses still struggle with analyzing that information and using it to predict consumer behavior. They can monitor an observed behavior — clicks leading to a purchase, for instance — but identifying why a consumer wanted that purchase in the first place is trickier to uncover, Zettelmeyer says.

Take, for example, Oreo. There's a model that can predict how many boxes of the popular cookie a store will sell given such variables as money spent on advertising, unit price, a competing store's price, etc. Now, turn to Oreo's official Facebook page, which has more than 32 million "likes." Can those "likes" translate into actual purchases? If so, how? Is that something you can model out?

"A lot of our psychological understanding of what makes consumers behave is not terribly well developed for measuring and predicting behaviors that we're not able to track," Zettelmeyer says.

The solution might be as easy as simplifying the model, says Lamberson, especially when it comes to small business. Rather than spend money tracking amorphous data that may or may not help, small businesses can use models that require a few well-established data points. "You can use a scaled-down model that's accessible to anyone with a laptop," he says. "If you are a mom-and-pop, you can easily keep track of sales and promotions and then run a regression and a relatively simple algorithm or model."

For Adaptly, a New York-based firm that manages ad campaigns over various social media platforms, the solution is using more accurate data. Adaptly uses first-party data, information generated directly from consumers (in this case, social media users), to design its cross-platform ad campaigns instead of third-party data, which comes from cookies across the Internet. That first-party information is about 98 percent accurate as opposed to about 15 percent from third-party data, says **Nikhil Sethi**, co-founder of Adaptly and a 2010 McCormick School of Engineering and Applied Science graduate.

Using analytics, Sethi can draw on that first-party data to custom-build a target audience that already has expressed interest in a specific product or pursuit via tweet, post or message. "There's no real guesswork going on," Sethi says. "If I have a brand and I realize ⇒

"THE REAL CHALLENGE IS TO REALIZE HOW MUCH OF AN ACTUAL BENEFIT YOU'RE GOING TO GET. YOU CAN GO THROUGH A DATA-MINING EXERCISE AND THAT MAY NOT BE MUCH BETTER THAN USING A SIMPLER MODEL."

PJ LAMBERSON

Senior Lecturer in Management and Organizations, Kellogg School of Management



Embracing a big data mindset

FLORIAN ZETTELMEYER DISCUSSES
HOW COMPANIES OF ANY SIZE
CAN GET MORE FROM THEIR DATA

When industry observers discuss big data, the focus is typically on the magnitude involved: the huge volumes of data being generated every day or the computing power required to turn information into insight. It's no wonder that some middle-market companies have determined that harnessing big data is beyond their reach.

As with many emerging business trends, technology is a vital component — but it's not the only factor.

Companies that seek to extract value from their data simply by investing in more computing power will be missing the opportunity, says Florian Zettelmeyer, professor of marketing and an expert in data analytics. Instead, executives must understand that the obstacles they face in generating more customer insights arise not from the increasing amount of data but from shortcomings in their approach to data analytics.

Before the big data era, companies such as Reader's Digest and Capital One developed successful business models by using data analytics to drive effective customer segmentation. What do these businesses have in common with the Amazons and Facebooks of the world?

Zettelmeyer says it's the "big data mindset" — essentially, the pursuit of a deeper understanding of customer behavior through data analytics. The big data mindset encompasses four elements:

1. **DESIGN MARKETING PROCESSES WITH DATA IN MIND.** By designing all marketing processes with measurement in mind, companies can ensure they have access to relevant information when they need it.
2. **ENGAGE IN RESEARCH AND DEVELOPMENT EVERYWHERE.** Companies that promote a culture of testing throughout the organization can gain tremendous insight into consumer trends and user behavior.
3. **USE PREDICTIVE ANALYTICS.** Businesses are increasingly able to identify customer patterns and generate targeted offers, often before customers are even aware they have a need.
4. **CHALLENGE CONVENTIONAL WISDOM.** Since data analytics can provide definitive answers, there's no excuse for using the status quo as a default.

Companies such as Amazon and Facebook are high-profile examples of companies reimagining what's possible with big data. However, Zettelmeyer is quick to point out that having access to hundreds of millions of customer records isn't a prerequisite for companies. The big data mindset can drive insight whether a company tracks information on tens of millions of customers or has just a few hard drives of data.

⇒ that my consumer set is related to people who like rock music, if I were in advertising, I would design a campaign that would target groups of people who like rock music.”

“But with social [media], with integrations to applications like Spotify,” he says, “I can get first-person data not just on what genre they listen to but specific titles and specific artists, a specific type of data, and build a much better analysis of who that person is and what they’re doing and the best way to reach them.”

That formula has worked for Adaptly. What started as an NUvention course project, an interdisciplinary partnership between Northwestern schools including Kellogg, has grown to a 70-employee company that’s amassed more than \$13 million in venture capital and clients ranging from Showtime Networks to Kraft Foods Group. Sethi still contends with problems like storage and analytics — “I can’t take a Facebook data set and use it for ESPN,” he says — but he believes first-person data is key to filtering out the vital information from the glut. “It creates an identity that’s more reflective of who you are.”

The technology will catch up with the data, Zettelmeyer says, rendering issues like analytics and shortage moot and bringing down its expense. It will make big data more accessible to businesses of all sizes. κ



The Application of Data

KELLOGG EXPANDS ANALYTICS COURSES AND TRAINS MANAGERS TO INTERPRET BIG DATA

Kellogg has established a strong reputation in data analytics — a recognition of the importance of analytics to the next wave of executives in the 21st century business environment. But according to Florian Zettelmeyer, professor of marketing, there is still work to be done in figuring out how to diffuse analytics competence across all areas of an organization.

“We’re moving into a world where managers have to be conversant in analytics and in information technology, he said. “We at Kellogg have thought very hard about how to train the next generation of managers in analytics.”

The Kellogg curriculum is constantly developing to keep pace with the marketplace. Here, we preview a sampling of courses Kellogg offers around the ever-evolving subject of data analytics.

COURSE: Customer Analytics

PROFESSOR: Florian Zettelmeyer

DETAILS: Firms are increasingly obtaining data not just about purchase decisions, but also about individual consumers’ pre- and post-purchase behavior. But few firms have the managerial and data analytics expertise to act intelligently on such data. For the key marketing problems in customer acquisition, development and retention, Zettelmeyer’s hands-on course introduces sophisticated data analytics techniques tailored to those problems, including predictive analytics and large-scale testing. Students apply each technique to a large consumer-level database, learning how to target consumers individually and how to derive customer insights.

COURSE: Digital Marketing and Commerce

PROFESSOR: Richard E. Wilson

DETAILS: Students gain hands-on experience in digital marketing and e-commerce by developing competing business strategies around brand position, product mix, user experience, store design, and pricing and promotion optimization. Real-world enterprise technology is used to build live online stores shopped by real consumers. Online customer analytics and data reporting are used to adjust strategies across shopping cycles. Senior e-commerce professionals from companies such as Target, IBM, Sears, OfficeMax, Google and Walgreens provide mentoring and coaching.

COURSE: Retail Analytics, Pricing and Promotion

PROFESSOR: Eric Anderson

DETAILS: How does a “sale” sign change customer behavior? How has the Internet changed customer price sensitivity? How has expansion of retail stores, factory stores and the Internet changed customer behavior? Eric Anderson’s data-driven course seeks to answer these questions and provides a cohesive framework for studying consumer behavior. Most of the data is from real-world managerial problems, and students learn how to make informed pricing and retailing decisions using data.

COURSE: Social Dynamics and Network Analytics (Social-DNA)

PROFESSOR: PJ Lamberson

DETAILS: To help students meet the challenges presented by a world of unparalleled connectedness, Social-DNA provides an in-depth introduction to the emerging fields of social dynamics, network science and big data analytics. PJ Lamberson covers both theory and applications of social dynamics using hands-on interactive models, data collection and analysis. The course tackles subjects including: social networks, tipping points, crowdsourcing and open innovation.