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July 28, 2015 By [Ana Swanson](#) [1 Comment](#)

Big data promises to revolutionize the work of business and government, and China's largest internet companies are leading the way

One of China's biggest box office surprises in recent years was *Tiny Times*, a 2013 film which took in \$11.9 million in the box office on its first day alone and spawned a series of sequels. Yet this movie was as much a result of market research and data analysis as it was artistry. The filmmakers tapped into Chinese social media networks to help determine the stars, director and marketing campaign that would most appeal to China's younger generation. And the payout for this research was substantial.

This is one original example of the use of big data in China. Big data is an often vague term that means harnessing the huge amount of information that is created through online activities and transactions to discover trends and make predictions. Big data is too big, too fast or too diverse to be analyzed with traditional databases and software?instead, data scientists use advanced techniques and computing to build models that can process a huge amount of information.

?We can deal with hundreds of billions or trillions of data [points],? says Zhang Tong, the head of the Big Data Lab at Baidu, China's largest search engine. ?This potential is very large, so for billions of dimensions, we can build very big models.? Big data technologies are often used alongside other high-tech innovations like cloud computing and artificial intelligence.

Though big data has blossomed only in the last five years, it is already being used in China in fascinating new ways. For example, Baidu is using big data to track and project patterns in disease, which can help hospital administrators make vaccines or schedule staff. Tencent, the tech giant that runs China's largest mobile chat network, WeChat, is using social data to identify the trendsetters among groups of friends, and target marketing spending on those people. Alibaba, China's largest e-commerce company, is using a wealth of financial information from its Taobao and Alipay programs to figure out which small businesses are worthy of a loan.

Some critics say big data is over-hyped, and that may be true. **Li Yang**, Assistant Professor of Marketing at the Cheung Kong Graduate School of Business, says companies in China today are more into using big data to attract media and investors. ?This industry is full of bubbles, and there's hot money flowing around. People are trying to get money and get funded and move to the next round and then IPO? The question is whether this data is different from something we had five years ago, before we had big data. I don't think so. I think it's just bigger volume data.?

Many companies are eager to harness big data, but don't know how to do it. Some companies appear to be collecting tons of data with no specific plan of how to use it, while others are letting valuable data slip between their fingers. But while some Chinese data projects are bound to fail, overall the industry promises to disrupt the way companies do business?starting with the tech sector, then rippling out to traditional industries more slowly.

The government has pledged its support, laying out in March an Internet Plus strategy to integrate mobile internet, cloud computing, big data and the Internet of Things with manufacturing.

“In the big picture, I would say big data and all of what that entails is being massively embraced by China, by the Chinese government, by the internet companies,” says David Sullivan, an analyst at Alliance Development Group (ADG), which assists technology companies expanding in China. “They were and probably are a little behind Google and Amazon, but they started a little bit later. Right now, they’re starting to establish more R&D centers, they’re putting more dollars behind it.”

Alibaba, Baidu and Tencent, China’s three internet giants, are unquestionably the largest players in the big data field. Their wildly successful internet services give them a wealth of data to analyze and plenty of customers to try out the results on. While these three companies compete across a range of sectors, they each tend to have their own specialty—Baidu in search, Alibaba in e-commerce and Tencent in social media—though all three are partnering with other companies in an effort to fill in any gaps.

These internet giants are roughly on par with Western technology companies in their ability to use big data, says Zhang of Baidu, though China’s other industries lag farther behind. Industries like telecom, banks, the government and medical institutions have yet to harness big data, but there is a huge potential.

Big Data for a Big Country

China is one of the most exciting markets in the world for new technologies, and big data is no exception. China has 1.3 billion customers, who are seeing their disposable incomes rapidly increase, and high rates of penetration for mobile internet. According to the China Internet Network Information Center, the country had 649 million internet users by the end of 2014, more than 557 million of whom used mobile phones to go online. And companies, the government and research institutions all have a keen interest in harnessing and analyzing the massive amounts of data that internet users are producing as a result.

Big data began in China much as it did in the West: as an effort to use the information that websites were gathering about customers to sell more products. Advertising and e-commerce are still the largest uses for big data. One of the earliest examples was Baidu’s use of big data in its search engine. “Search engines have been doing what is now called big data since the very beginning,” says Baidu spokesperson Kaiser Kuo. “In order to have a good search engine, what you’re doing is massive data management.”

In addition to providing search results, Baidu made its money by selling ads alongside them. Baidu would monitor what its users were searching for, and then charge companies for ads that were tailored to that activity. And, as the company’s big data capacities improved, it found it could tailor advertisements further. Says Kuo, “You can use that massive set of data and analyze it and figure out what advertisements are likely to be clicked on more. If we display more of those, the click through rate will go up and our revenues will reflect that.”

Since then, Baidu has expanded its big data efforts into other areas, including opening a Beijing Big Data lab under its Baidu Research arm. To demonstrate its big data capabilities, Baidu has developed predictive programs for monitoring diseases like hepatitis, Lunar New Year travel, earthquakes, FIFA World Cup victories and movie box office successes. The company also has an open platform that allows developers to use Baidu's algorithms to make predictions.

Zhang and Kuo argue that Baidu is the leader in big data in China because of its massive amount of data and its strength in technology. There are even some aspects in which Baidu's big data efforts are more advanced than US companies, like building large sophisticated models and infrastructure, says Zhang.

But while Baidu is perhaps the original big data company, Alibaba occupies a valuable niche in the big data market. Given its position as China's largest e-commerce company, Alibaba has a wealth of data on consumer spending and business income that it gathers from buyer and seller accounts. The company provides data to sellers to help them understand the industry and target new customers. It also uses data to personalize search results and shopping recommendations for customers.

For example, Alibaba's data management platform recently helped Mercedes-Benz launch a targeted online-to-offline promotion for its new compact car brand, Alibaba spokesperson Beckie Wang says. In addition, the company uses data intelligence and deep learning to improve its marketplace design, search, logistics, location-based services and financial services.

Compared with Baidu and Alibaba, Tencent is sometimes seen as lagging behind in technology, with it focused more on spinning out new products than on cutting-edge research. However, ADG's Sullivan says that Tencent could have the most valuable big data resources of all three companies because of its massive WeChat social networking app's resources that Alibaba and Baidu lack. WeChat gives Tencent extensive data on people's personal connections and allows the company to chart who the "influencers" are in each social group, he says. That can help advertisers maximize their market spending by targeting those individuals.

"It's possible in many cases Baidu is not going to know who the user is" and without that, it's a lot less value to the advertisers. If you look at Alibaba and Tencent, they've got so much more understanding of who you are because you're signed into your account. With WeChat, they know who your friends are," Sullivan says.

While each company has their unique traditional specialty—Baidu in search, Alibaba in e-commerce, and Tencent in social networking—all three companies are aggressively trying to expand into each others' turf to ensure their long-run viability. To do so, the three internet giants are making investments, acquisitions and partnerships with smaller companies. For example, Tencent has partnered with JD.com, China's second-largest e-commerce site, to integrate e-commerce into the Tencent WeChat app. That allows Tencent to know what a user is buying and looking at in JD.com and send them coupons in real time.

Market size and growth of big data in China

Steps Beyond

Beyond sales and marketing, big data has an important role to play in operations. New big data technologies are helping companies more efficiently analyze and coordinate their warehousing, supply chain management and delivery, which is essential as Chinese e-commerce companies fiercely compete to shorten delivery times.

Another use is monitoring massive amounts of content online. Social networking and video sites, such as Sina Weibo, WeChat and Baidu video site iQiyi, use big data technologies to sort through and delete posts or videos that involve pornography, are politically controversial or infringe copyrights. A similar use is sniffing out fraud?tech companies can use big data to find and eliminate counterfeit products, or advertising clients that commit click fraud.

Still another use going forward will be transportation. Like Google, Baidu is looking into self-driving cars, a technology that requires a lot of data from maps, cameras, tracking devices and other real-time data analytics.

Another promising area for tech companies is using big data to offer financial services. China still lacks a strong credit monitoring system, and its state-owned banks have been slow to evolve. So Alibaba, Tencent, Baidu, and even online-to-offline retailers such as Guomei have stepped into the gap, offering easy-to-use mobile financial and investment services.

Alibaba is probably the most advanced player in this area due to its wealth of data on sales and payments. Alibaba's Open Data Processing Service, for example, allows it to analyze millions of transactions on its e-commerce sites and payment tool, and extend loans to small online businesses at a cheaper rate than traditional banks.

In the future, big data will also be useful and disruptive for companies outside of the tech sector. Banks can use big data to analyze consumer creditworthiness, while insurance companies can use it to find more secure investments for their funds. Brokers can analyze how the stock market responds to social media activity and news reports. Automotive manufacturers can use big data to manage supply chains, ensuring they produce the right number of components and ship cars to the right markets.

Outside of industry, there are many potential uses for big data in government. For example, Beijing is working with IBM to model and manage the city's smog problem. The system provides warnings about pollution up to three days in advance, giving the city government time to regulate traffic volume. Scientific institutions can use the advanced computational ability to undertake previously unimaginable projects, like genome sequencing. Chinese companies BGI Shenzhen and BioMed Central have launched an online public database with life science resources such as the entire genomes of various plants and animals.

Muyueh Lee, a programmer in Taipei, worked with the China Standard Medical Information Research Center to develop one such big data program. Lee helped to build an interactive platform analyzing 30 million medical datasets from 750 hospitals in China. The project allows China's national medical service to analyze the prevalence of diseases, costs, average days in the hospital and mortality rate among men or women, and urban or rural residents.

Lee's explanation of the work shows just how much time big data shaves off traditional practices. "Previously, the research center had to turn the different requests into database queries, spending up to two to three weeks in the process. With the new system, users can conduct interactive analysis on a dataset of 5 GB with a response time of less than one second," he says.

The potential for big data outside of the tech industry is huge. But despite this opportunity, so far traditional industries lag behind. Most traditional industries tend to be more cautious than Chinese tech companies and lack the infrastructure and human resources necessary to carry out big data projects. "There are a lot of places that have data but not all of them are using it well," says Zhang of Baidu.

CKGSB's Li says that Chinese companies are competent in data acquisition and data management and integration, which he describes as the bottom two levels of a big data pyramid. But when it comes to discovering the useful information behind the data and using that to improve their businesses, Chinese companies are still falling short. "When it comes to data analytics, modeling, mining, I think few Chinese companies can do it well," he says.

In the near future, Baidu, Alibaba and Tencent will likely maintain a pivotal role in China's big data market. That's partly because these companies are already investing big in the necessary infrastructure and human capital, but it's also because of their entrepreneurial culture. China's privately owned tech companies are far more experimental and willing to wade into a new and unpredictable sector.

Sitting on a Data Goldmine?

The big data industry has benefited from generous government support. Next-generation information was named as one of the seven strategic "emerging industries" in the current Five-Year Plan, and the government is trying to develop the infrastructure necessary for the industry.

In a Work Report in March, Premier Li Keqiang introduced China's Internet Plus strategy, which aims to integrate advanced IT into traditional industry. "We will develop the Internet Plus action plan to integrate the mobile internet, cloud computing, big data, and the Internet of Things with modern manufacturing, to encourage the healthy development of e-commerce, industrial networks and internet banking, and to guide internet-based companies to increase their presence in the international market," Li said.

Zhang of Baidu says the government has provided significant support, including drafting supportive policies, providing research grants and opening up government data.

Baidu used its big data capabilities to create an interactive toll illustrating the journeys made over the Chinese New Year Period

China also fares well in terms of human resources for big data. The country lacks experts at the executive level, but it has a huge supply of low-level engineers that could do big data analysis with some on-the-job training. Beijing in particular has become a hub for the industry due to strong universities, an educated workforce and a preponderance of internet start-ups.

Yet the big data industry in China also faces some major obstacles. Security and privacy are major concerns. As in the US, data storehouses remain vulnerable to hacking, which could cause a loss in consumer confidence in the future.

In addition, the government's strict state secrets law places some restrictions on the kind of data that can be gathered and sold, says Sullivan of ADG. China tends to demand that data from companies operating in China is stored in a cloud in China. It also requires companies to give authorities surveillance access and prohibits banks from storing personal financial information offshore. In a report in April, the American Chamber of Commerce urged China to loosen these tough restrictions, saying the measures hurt foreign companies and the Chinese economy.

But the biggest challenge in China is sharing best practices for big data with traditional industries. Some traditional companies still aren't storing their data, and others that are storing some may not be focusing on the right metrics. Other companies have a lot of data, but don't effectively use it.

And experts say some of what is considered big data in China today is hype, rather than real development. Li notes how a CCTV broadcast spoke of an average they had calculated using their "big data technology". "This is a very trendy topic, and no one wants to be left behind," he says. "Can you really call this big data?"

China's big data industry remains behind the US for now, and companies, especially outside the tech industry, have a lot of learning to do about collecting data and making it valuable. Despite this, and the presence of some unfortunate hype, Chinese consumers are already embracing mobile internet and e-commerce faster than their counterparts in the West. And that creates huge opportunities for a big data revolution.

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