Alibaba *and*

## Lessons from China's innovative digital giant

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Art by *Harry Campbell*

Alibaba hit the headlines with the world's biggest IPO in September 2014. Today, the company has a market cap among the global top 10, has surpassed Walmart in global sales, and has expanded into all the major markets in the world. Founder Jack Ma has become a household name.

From its inception, in 1999, Alibaba experienced great growth on its e-commerce platform. However, it still didn't look like a world-beater in 2007 when the management team, which I had joined full-time the year before, met for a strategy off-site at a drab seaside hotel in Ningbo, Zhejiang province. Over the course of the meeting,
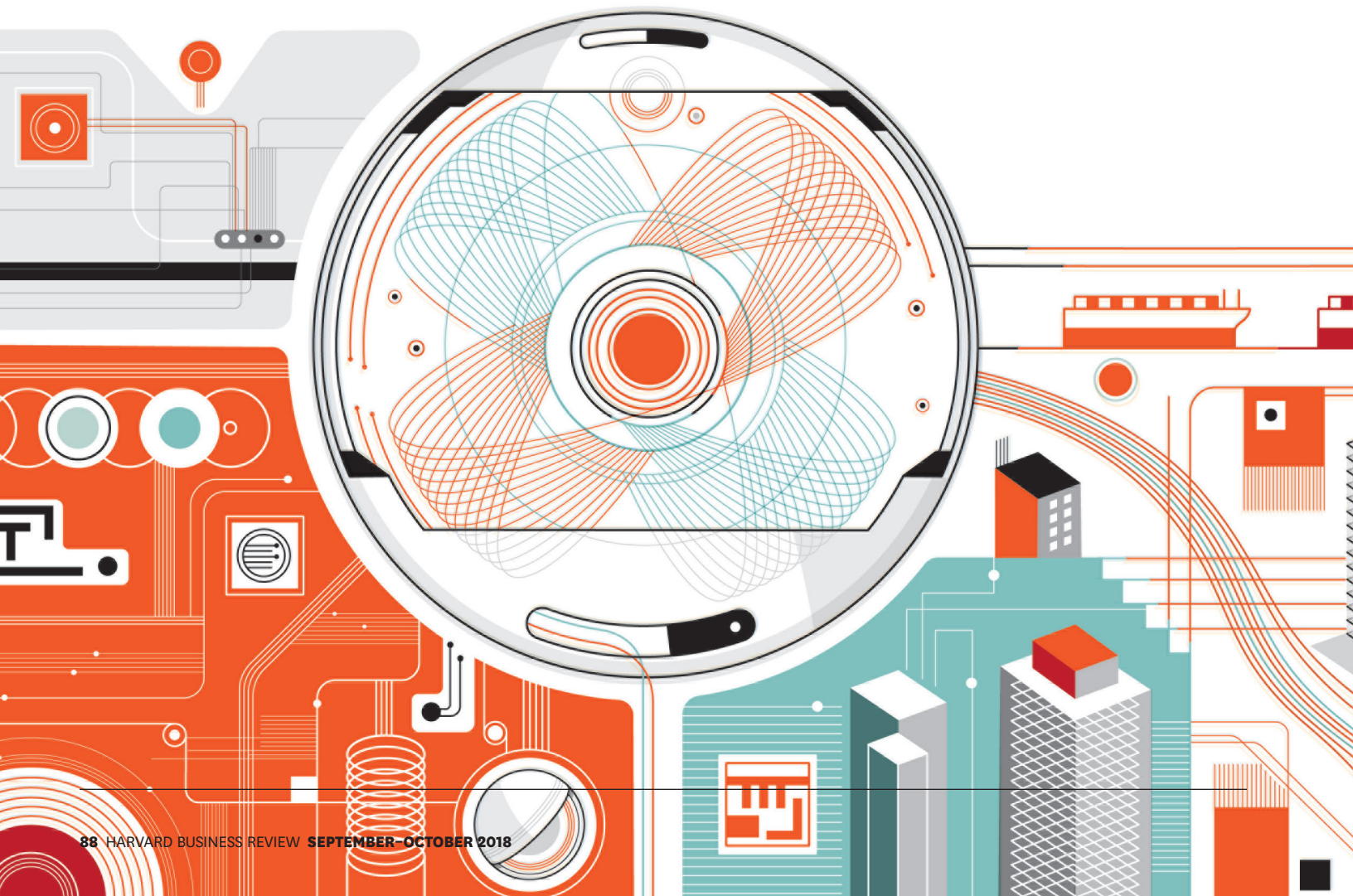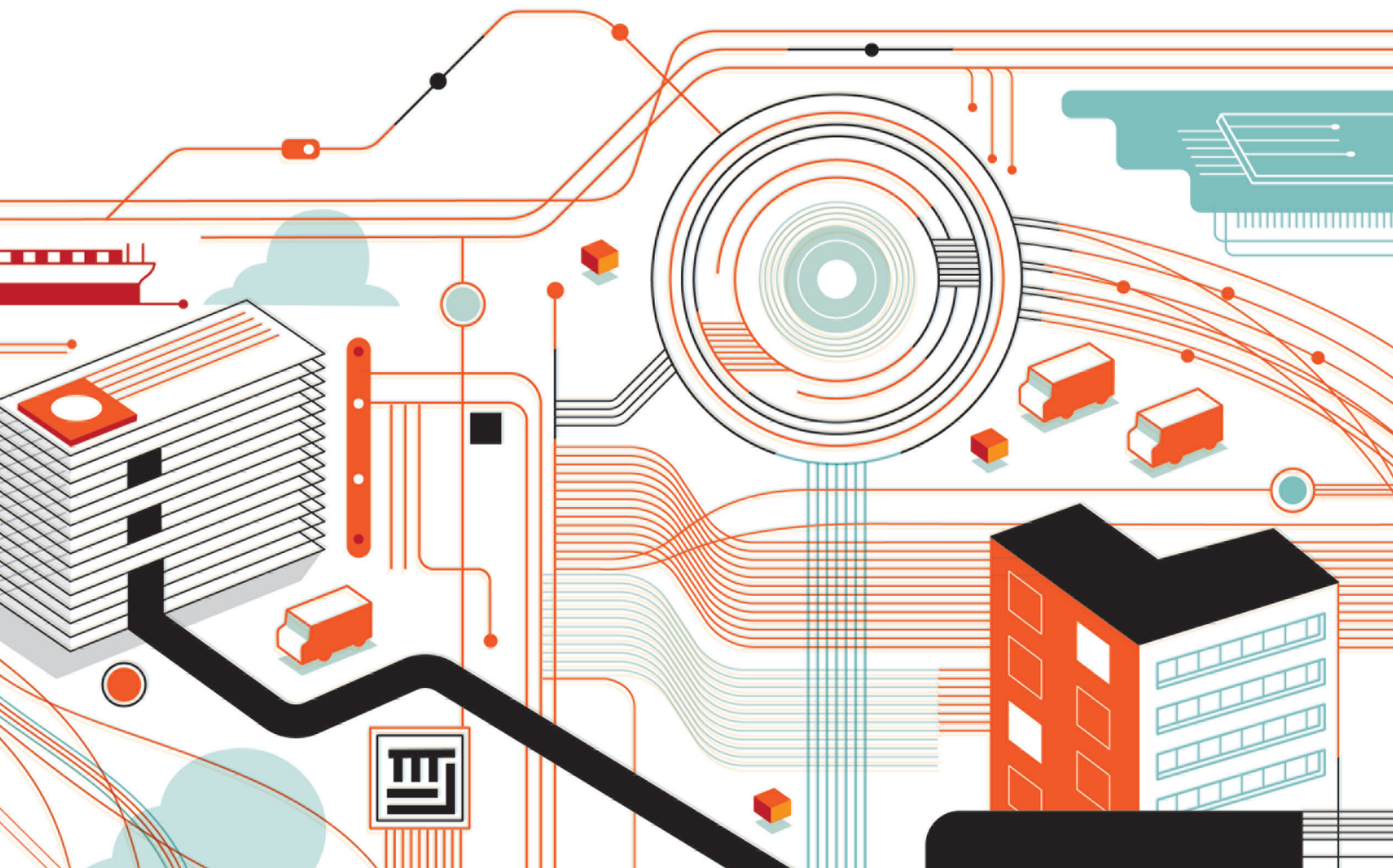
the Future *of* Business

our disjointed observations and ideas about e-commerce trends began to coalesce into a larger view of the future, and by the end, we had agreed on a vision. We would "foster the development of an open, coordinated, prosperous e-commerce ecosystem." That's when Alibaba's journey really began.

Alibaba's special innovation, we realized, was that we were truly building an ecosystem: a community of organisms (businesses and consumers of many types) interacting with one another and the environment (the online platform and the larger off-line physical elements). Our strategic imperative was to make sure that the platform provided all the resources, or access to the resources, that an online business would need to succeed, and hence supported the evolution of the ecosystem.

The ecosystem we built was simple at first: We linked buyers and sellers of goods. As technology advanced, more business functions moved online—including established
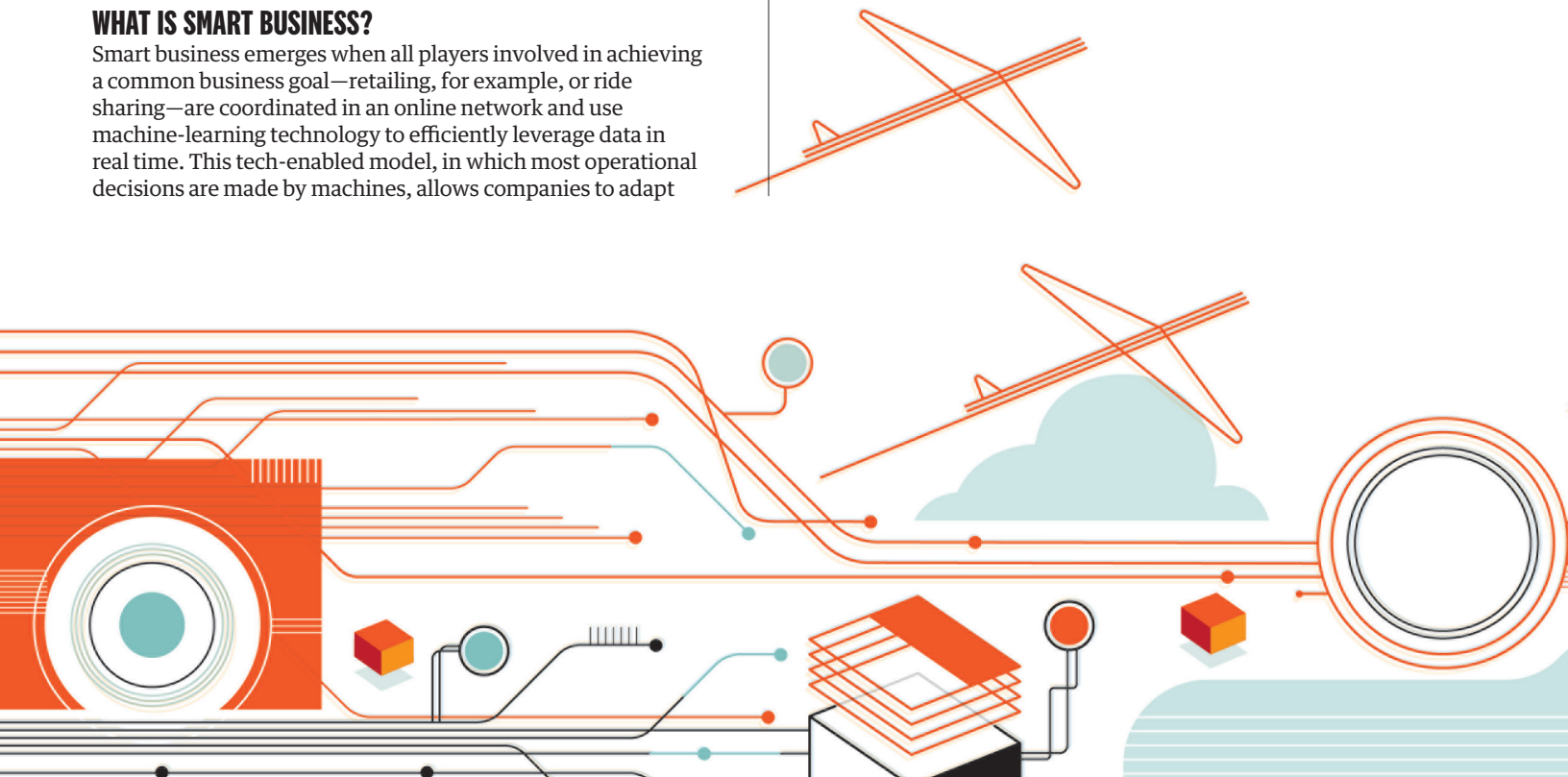
ones, such as advertising, marketing, logistics, and finance, and emerging ones, such as affiliate marketing, product recommenders, and social media influencers. And as we expanded our ecosystem to accommodate these innovations, we helped create new types of online businesses, completely reinventing China's retail sector along the way.

Alibaba today is not just an online commerce company. It is what you get if you take all functions associated with retail and coordinate them online into a sprawling, data-driven network of sellers, marketers, service providers, logistics companies, and manufacturers. In other words, Alibaba does what Amazon, eBay, PayPal, Google, FedEx, wholesalers, and a good portion of manufacturers do in the United States, with a healthy helping of financial services for garnish.

Of the world's 10 most highly valued companies today, seven are internet companies with business models similar to ours. Five of them—Amazon, Google, and Facebook in the United States and Alibaba and Tencent in China—have been around barely 20 years. Why has so much value and market power emerged so quickly? Because of new capabilities in network coordination and data intelligence that all these companies put to use. The ecosystems they steward are vastly more economically efficient and customer-centric than traditional industries. These firms follow an approach I call smart business, and I believe it represents the dominant business logic of the future.

WHAT IS SMART BUSINESS?

Smart business emerges when all players involved in achieving a common business goal—retailing, for example, or ride sharing—are coordinated in an online network and use machine-learning technology to efficiently leverage data in real time. This tech-enabled model, in which most operational decisions are made by machines, allows companies to adapt

▶ *Idea in Brief*

▶ **A NEW BUSINESS MODEL**
Alibaba is an example of tomorrow's "smart business": a tech-enabled platform that coordinates multiple business players in an ecosystem.

▶ **HOW IT WORKS**
Players in the ecosystem share data and apply machine-learning technology to identify and better fulfill consumer needs.

▶ **HOW TO BUILD IT**
Automate decision making by:
- *making sure every interaction yields as much data as possible*
- *ensuring that all business activities are mediated by software*
- *using APIs and other interface protocols to ensure smooth interaction among software systems*
- *applying machine learning to make sense of data in real time*

dynamically and rapidly to changing market conditions and customer preferences, gaining tremendous competitive advantage over traditional businesses.

Ample computing power and digital data are the fuel for machine learning, of course. The more data and the more iterations the algorithmic engine goes through, the better its output gets. Data scientists come up with probabilistic prediction models for specific actions, and then the algorithm churns through loads of data to produce better decisions in real time with every iteration. These prediction models become the basis for most business decisions. Thus machine learning is more than a technological innovation; it will transform the way business is conducted as human decision making is increasingly replaced by algorithmic output.

Ant Microloans provides a striking example of what this future will look like. When Alibaba launched Ant, in 2012, the typical loan given by large banks in China was in the millions of dollars. The minimum loan amount—about 6 million RMB or just under $1 million—was well above the amounts needed by most small and medium-size enterprises (SMEs). Banks were reluctant to service companies that lacked any kind of credit history or even adequate documentation of their business activities. As a consequence, tens of millions of businesses in China were having real difficulties securing the money necessary to grow their operations.

At Alibaba, we realized we had the ingredient for creating a high functioning, scalable, and profitable SME lending business: the huge amount of transaction data generated by the many small businesses using our platform. So in 2010 we launched a pioneering data-driven microloan business to offer loans to businesses in amounts no larger than 1 million RMB (about $160,000). In seven years of operation, the business has lent more than 87 billion RMB $13.4 billion) to nearly three million SMEs. The average loan size is 8,000 RMB, or about

$1,200. In 2012, we bundled this lending operation together with Alipay, our very successful payments business, to create Ant Financial Services. We gave the new venture that name to capture the idea that we were empowering all the little but industrious, antlike companies.

Today, Ant can easily process loans as small as several hundred RMB (around $50) in a few minutes. How is this possible? When faced with potential borrowers, lending institutions need answer only three basic questions: Should we lend to them, how much should we lend, and at what interest rate? Once sellers on our platforms gave us authorization to analyze their data, we were well positioned to answer those questions. Our algorithms can look at transaction data to assess how well a business is doing, how competitive its offerings are in the market, whether its partners have high credit ratings, and so on.

Ant uses that data to compare good borrowers (those who repay on time) with bad ones (those who do not) to isolate traits common in both groups. Those traits are then used to calculate credit scores. All lending institutions do this in some fashion, of course, but at Ant the analysis is done automatically on all borrowers and on all their behavioral data in real time. Every transaction, every communication between seller and buyer, every connection with other services available at Alibaba, indeed every action taken on our platform, affects a business's credit score. At the same time, the algorithms that calculate the scores are themselves evolving in real time, improving the quality of decision making with each iteration.

Determining how much to lend and how much interest to charge requires analysis of many types of data generated inside the Alibaba network, such as gross profit margins and inventory turnover, along with less mathematically precise information such as product life cycles and the quality of a seller's social and business relationships. The algorithms

might, for example, analyze the frequency, length, and type of communications (instant messaging, e-mail, or other methods common in China) to assess relationship quality.

Alibaba's data scientists are essential in identifying and testing which data points provide the insights they seek and then engineering algorithms to mine the data. This work requires both a deep understanding of the business and expertise in machine-learning algorithms. Consider again Ant Financial. If a seller deemed to have poor credit pays back its loan on time or a seller with excellent credit catastrophically defaults, the algorithm clearly needs tweaking. Engineers can quickly and easily check their assumptions. Which parameters should be added or removed? Which kinds of user behavior should be given more weight?

As the recalibrated algorithms produce increasingly accurate predictions, Ant's risk and costs steadily decrease, and borrowers get the money they need, when they need it, at an interest rate they can afford. The result is a highly successful business: The microlending operation has a default rate of about 1%, far below the World Bank's 2016 estimate of an average of 4% worldwide.

So how do you create that kind of business?

AUTOMATE ALL OPERATING DECISIONS

To become a smart business, your firm must enable as many operating decisions as possible to be made by machines fueled by live data rather than by humans supported by their own data analysis. Transforming decision making in this way is a four-step process.

Step 1:
"Datafy" every customer exchange. Ant was fortunate to have access to plenty of data on potential borrowers to answer the questions inherent in its lending business. For many businesses, the data capture process will be more challenging. But live data is essential to creating the feedback loops that are the basis of machine learning.

Alibaba's Major Businesses at a Glance

CHINESE RETAIL MARKETPLACES

Taobao Marketplace

Tmall

Rural Taobao

CROSS-BORDER AND GLOBAL MARKETPLACES

AliExpress

Tmall Global

Lazada

WHOLESALE COMMERCE

1688.com
(China)

Alibaba.com
(global)

DIGITAL MEDIA AND ENTERTAINMENT*

Youku Tudou
(online video)

Alibaba Pictures

Alibaba Music

Alibaba Sports

UC (mobile browser)

OTHER SERVICES*

AutoNavi
(mapping and navigation)

Koubei
(local services)

Ele.me
(delivery)

FINANCE*

Ant Financial
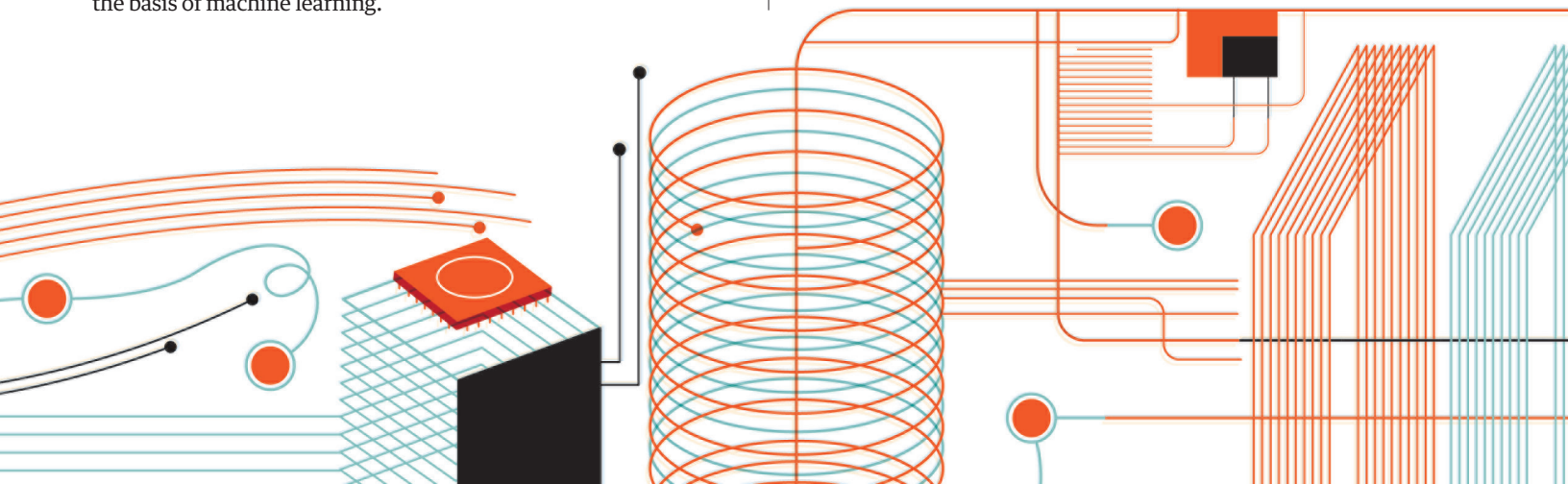(includes Alipay)

MYbank

LOGISTICS*

Cainiao Network

CLOUD COMPUTING*

Alibaba Cloud

* Major investee companies and cooperative partners of Alibaba Group

Consider the bike rental business. Start-ups in China have leveraged mobile telephony, the internet of things (in the form of smart bike locks), and existing mobile payment and credit systems to datafy the entire rental process.

Renting a bike traditionally involved going to a rental location, leaving a deposit, having someone give you a bike, using the bike, returning it, and then paying for the rental by cash or credit card. Several rival Chinese companies put all of this online by integrating various new technologies with existing ones. A crucial innovation was the combination of QR codes and electronic locks that cleverly automated the checkout process. By opening the bike-sharing app, a rider can see available bicycles and reserve one nearby. Once the rider arrives at the bicycle, he or she uses the app to scan a QR code on the bicycle. Assuming that the person has money in his or her account and meets the rental criteria, the QR code will open the electronic bike lock. The app can even verify the person's credit history through Sesame Credit, Ant Financial's new online product for consumer credit ratings, allowing the rider to skip paying a deposit, further expediting the process. When the bike is returned, closing the lock completes the transaction. The process is simple, intuitive, and usually takes only several seconds.

Datafying the rental process greatly improves the consumer experience. On the basis of live data, companies dispatch trucks to move bikes to where users want them. They can also alert regular users to the availability of bikes nearby. Thanks in large part to these innovations, the cost of bike rentals in China has fallen to just a few cents per hour.

Most businesses that seek to be more data-driven typically collect and analyze information in order to create a causal model. The model then isolates the critical data points from the mass of information available. That is not how smart businesses use data. Instead, they capture all information generated during exchanges and communications with customers and other network members as the business operates and then let the algorithms figure out what data is relevant.

Step 2:

"Software" every activity. In a smart business, all activities—not just knowledge management and customer relations—are configured using software so that decisions affecting them can be automated. This does not mean that a firm needs to buy or build ERP software or its equivalent to manage its business—quite the opposite. Traditional software makes processes and decision flows more rigid and often becomes a straitjacket. In contrast, the dominant logic for smart business is reactivity in real time. The first step is to build a model of how humans currently make decisions and find ways to replicate the simpler elements of that process using software—which is not always easy, given that many human decisions are built on common sense or even subconscious neurological activity.
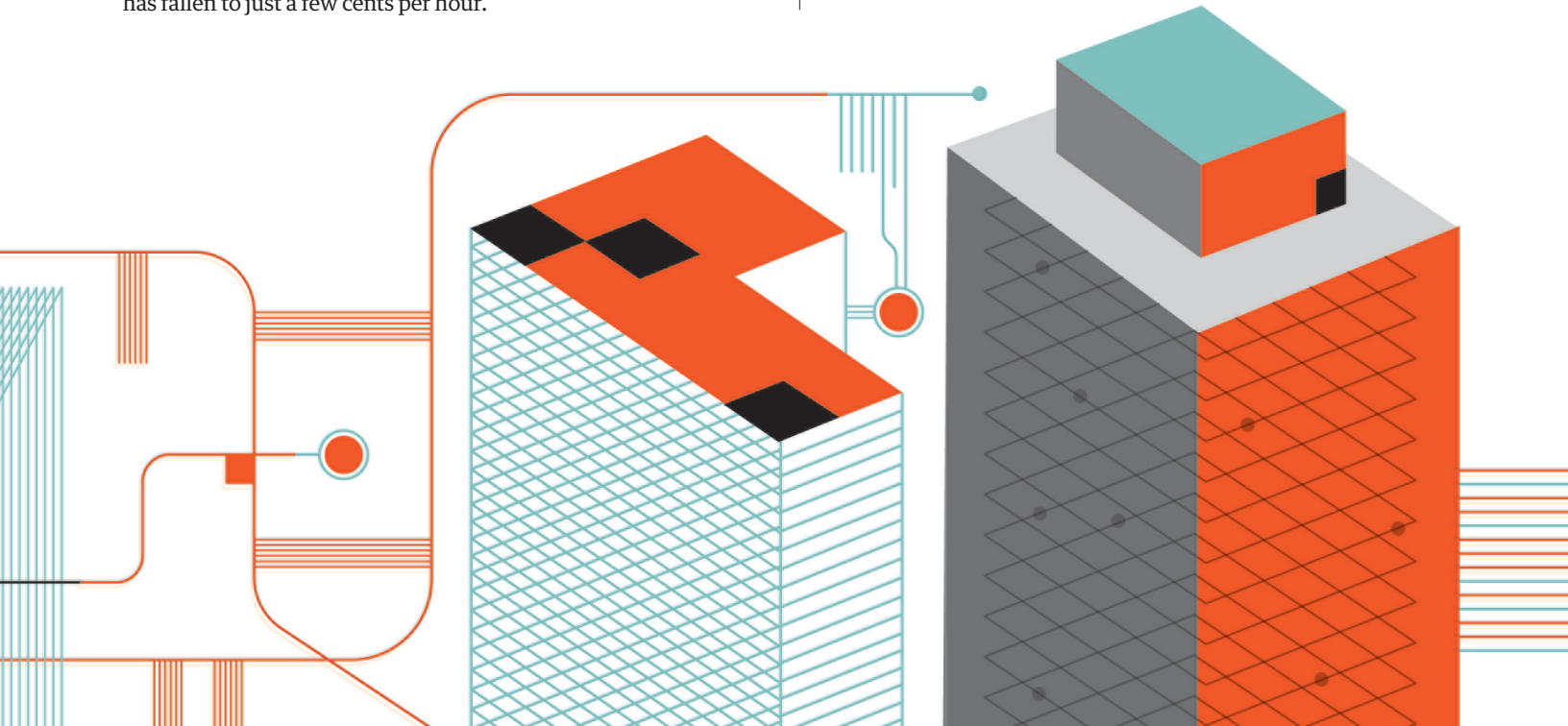
The growth of Taobao, the domestic retailing website of Alibaba Group, is driven by continuous softwaring of the retailing process. One of the first major software tools built on Taobao was an instant message tool called Wangwang, through which buyers and sellers can talk to each other easily. Using the tool, the sellers greet buyers, introduce products, negotiate prices, and so on, just as people do in a traditional retail shop. Alibaba also developed a set of software tools that help sellers design and launch a variety of sophisticated online shop fronts. Once online shops are up and running, sellers can access other software products to issue coupons, offer discounts, run loyalty programs, and conduct other customer relationship activities, all of which are coordinated with one another.

Because most software today is run online as a service, an important advantage of softwaring a business activity is that live data can be collected naturally as part of the business process, building the foundation for the application of machine-learning technologies.

Step 3:

Get data flowing. In ecosystems with many interconnected players, business decisions require complex coordination. Taobao's recommendation engines, for example, need to work with the inventory management systems of sellers and with the consumer-profiling systems of various social media platforms. Its transaction systems need to work with discount offers and loyalty programs, as well as feed into our logistics network.

Communication standards, such as TCP/IP, and application programming interfaces (APIs) are critical in getting the data flowing among multiple players while ensuring strict control of who can access and edit data throughout the ecosystem. APIs, a set of tools that allow different software systems to "talk" and coordinate with one another online, have been central to Taobao's development. As the platform grew from a forum where buyers and sellers could meet and sell goods to become China's dominant e-commerce website, merchants on the site needed more and more support from third-party developers. New

software had to be broadly interoperable with all other software on the platform to be of any value. So in 2009, Taobao began developing APIs for use by independent software suppliers. Today, merchants on Taobao subscribe to more than 100 software modules, on average, and the live data services they enable drastically decrease the merchants' cost of doing business.

Getting the technical infrastructure right is just the beginning. It took tremendous effort for us to build a common standard so that data could be used and interpreted in the same way across all of Alibaba's business units. Additionally, figuring out the right incentive structures to persuade companies to share the data they have is an important and ongoing challenge. Much more work is needed. Of course, the degree to which companies can innovate in this area will depend in part on the rules governing data sharing in the countries they're operating in. But the direction is very clear: The more data flows across the network, the smarter the business becomes, and the more value the ecosystem creates.

Step 4:

Apply the algorithms. Once a business has all its operations online, it will experience a deluge of data. To assimilate, interpret, and use the data to its advantage, the firm must create models and algorithms that make explicit the underlying product logic or market dynamics that the business is trying to optimize. This is a huge creative undertaking that requires many new skills, hence the enormous demand for data scientists and economists. Their challenge is to specify what job they want the machine to do, and they have to be very clear about what constitutes a job well done in a particular business setting.

From very early on, our goal for Taobao was to tailor it to each individual's needs. This would have been impossible without advances in machine learning. Today, when customers log on, they see a customized webpage with a selection of products curated from the billions offered by our millions of sellers. The selection is generated automatically by Taobao's powerful recommendation engine. Its algorithms, which are designed to optimize the conversion rate of each

Alibaba by the Numbers

The Alibaba Group went public in the United States in September 2014 and has grown at a blistering pace, now boasting a market cap of more than $500 billion. The group's e-commerce platforms now have more than 550 million annual active consumers. These numbers don't include Ant Financial, which reports financial results separately.

In the fiscal year ending March 2017, Alibaba Group reported profits of more than $15 billion on nearly $40 billion in revenue. Ant reported profits of $814 million on revenue of $8.9 billion and is currently valued at over $100 billion. Ant pays Alibaba royalties, which amounted to $332 million in 2017.

$39.9
$15.5

Revenue (in US$ billions)
EBITDA

$8.4
$4.9

2014 2015 2016 2017 2018
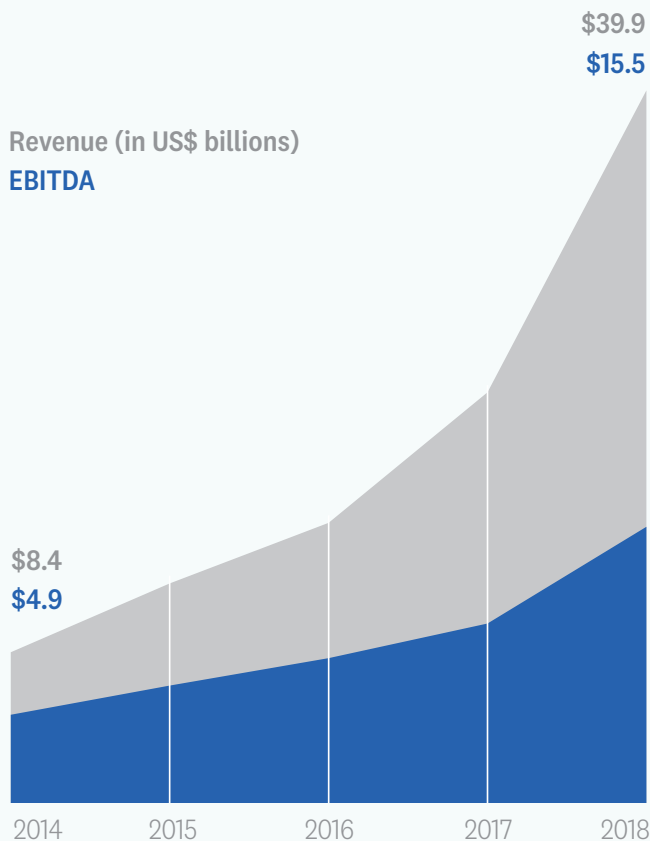
Source: Alibaba Group

visit, churn data generated across Taobao's platform, from operations to customer service to security.

A milestone in Taobao's growth, in 2009, was the upgrade from simple browsing, which worked reasonably well when the platform had many fewer visits and products to handle, to a search engine powered by machine-learning algorithms and capable of processing huge volumes of inquiries. Taobao has also been experimenting with optical-recognition search algorithms that can take a photo of a desired item supplied by the customer and match it to available products on the platform. While we are still in the early stages of using this technology to drive sales, the function has proved very popular with customers, boasting 10 million unique visits daily.

In 2016, Alibaba introduced an AI-powered chatbot to help field customer queries. It is different from the mechanical service providers familiar to most people that are programmed to match customer queries with answers in their repertoire. Alibaba's chatbots are "trained" by experienced representatives of Taobao merchants. They know all about the products in their categories and are well versed in the mechanics of Alibaba's platforms—return policies, delivery costs, how to make changes to an order—and other common questions customers ask. Using a variety of machine-learning technologies, such as semantic comprehension, context dialogues, knowledge graphs, data mining, and deep learning, the chatbots rapidly improve their ability to diagnose and fix customer issues automatically, rather than simply return static responses that prompt the consumer to take further action. They confirm with the customer that the solution presented is acceptable and then execute it. No human action by Alibaba or the merchant occurs.

Chatbots can also make a significant contribution to a seller's top line. Apparel brand Senma, for example, started using one a year ago and found that the bot's sales were 26 times higher than the merchant's top human sales associate.

There will always be a need for human customer representatives to deal with complicated or personal issues, but the ability to handle routine queries via a chatbot is very useful, especially on days of high volume or special promotions. Previously, most large sellers on our platform would hire temp workers to handle consumer inquiries during big events. Not anymore. During Alibaba's biggest sales day in 2017, the chatbot handled more than 95% of customer questions, responding to some 3.5 million consumers.

These four steps are the basis for creating a smart business: Engage in creative datafication to enrich the pool of data the business uses to become smarter; software the business to put workflows and essential actors online; institute standards and APIs to enable real-time data flow

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and coordination; and apply machine-learning algorithms to generate "smart" business decisions. All the activities involved in the four steps are important new competencies that require a new kind of leadership.

THE LEADER'S ROLE

In my course on smart business at Hupan School of Entrepreneurship, I show a slide of 10 business leaders and ask the students to identify them. They can easily pick out Jack Ma, Elon Musk, and Steve Jobs. But virtually no one can identify the CEO of CitiGroup or Toyota or General Electric.

There is a reason for this. Unlike GE, Toyota, and CitiGroup, which deliver products or services through optimized supply chains, digital companies must mobilize a network to realize their vision. To do that, their leaders have to inspire the employees, partners, and customers who make up that network. They must be visionaries and evangelists, outspoken in a way that the leaders of traditional companies do not have to be.

At the highest level, the digital evangelists must understand what the future will look like and how their industries will evolve in response to societal, economic, and technological changes. They cannot describe concrete steps to realize their companies' goals because the environment is too fluid and the capabilities they will require are unknowable. Instead, they must define what the firm seeks to achieve and create an environment in which workers can quickly string together experimental products and services, test the market, and scale the ideas that elicit a positive response. Digital leaders no longer manage; rather, they enable workers to innovate and facilitate the core feedback loop of user responses to firm decisions and execution.

In the smart business model, machine-learning algorithms take on much of the burden of incremental improvement by automatically making adjustments that increase systemwide efficiency. Thus, leaders' most important job is to cultivate creativity. Their mandate is to increase the success rate of innovation rather than improve the efficiency of the operation.

DIGITAL-NATIVE COMPANIES such as Alibaba have the advantage of being born online and data-ready, so their transformation to smart business is quite natural. Now that they have proven the model works and are transforming the old industrial economy, it is time for all companies to understand and apply this new business logic. That may look technologically intimidating, but it is becoming more and more feasible. The commercialization of cloud computing and artificial intelligence technologies has made large-scale computational power and analytic capabilities accessible to anyone. Indeed, the cost of storing and computing large quantities of data has dropped dramatically over the past decade. This means that

Further Reading

HBR ARTICLES ON STRATEGY FOR PLATFORM BUSINESSES

Finding the Platform in Your Product
Andrei Hagiu and Elizabeth J. Altman

Network Effects Aren't Enough
Andrei Hagiu and Simon Rothman

Strategies for Two-Sided Markets
Thomas R. Eisenmann, Geoffrey G. Parker, and Marshall W. Van Alstyne

Pipelines, Platforms, and the New Rules of Strategy
Marshall W. Van Alstyne, Geoffrey G. Parker, and Sangeet Paul Choudary

How to Launch Your Digital Platform
Benjamin Edelman

ON ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Algorithms Need Managers, Too
Michael Luca, Jon Kleinberg, and Sendhil Mullainathan

The Simple Economics of Machine Intelligence
Ajay Agrawal, Joshua Gans, and Avi Goldfarb

Deep Learning Will Radically Change the Ways We Interact with Technology
Aditya Singh

Fixing Discrimination in Online Marketplaces
Ray Fisman and Michael Luca

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real-time applications of machine learning are now possible and affordable in more and more environments. The rapid development of internet-of-things technology will further digitize our physical surroundings, providing ever more data. As these innovations accumulate in the coming decades, the winners will be companies that get smart faster than the competition. ⬡ **HBR Reprint** R1805F

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