

The Next Normal

# The future of parcel delivery: Drones and disruption

Everybody likes to get a package. In 2020, we'll send more than 100 billion of them—and that number could double by 2030. Who will deliver all those packages, and how? In this edition, *The Next Normal* explores what's ahead in last-mile parcel delivery.

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# Last-mile package delivery in 2030

Four McKinsey partners talk drones and disruption.

## Drones, droids, and more

**Ludwig Hausmann:** There are a lot of machines that are being talked about. There are drones. There are droids: small robots walking the streets. Then there could be parcel lockers—not stationary ones, but ones that are mounted on top of autonomous vehicles and circulate 24/7 in residential areas.

**John Murnane:** I think you will see drones. Maybe not drones flying from a warehouse in the suburbs, over the city, and into your home. But I think you'll see, within residential-delivery networks, a truck pull up with ten drones that go out and deliver to each of the locations, just to get scale in the economics of delivery.

**Neelesh Mundra:** One of the biggest technology advancements for delivery by 2030, potentially, is going to be drones extending reach in India, which has always been a struggle for typical parcel-delivery players.

**Florian Neuhaus:** What parcel delivery could look like is that you have a central place—maybe for all communities—and there's a street, and you have one drop-off place. There will be robots that basically pick up the stuff from there, bring it to our homes, and put it in our fridges, because we'll all own robots that make our bed, do the laundry, whatever.

**Ludwig Hausmann:** In China, people are talking about tunnels where parcels will shoot up to the basement of big apartment buildings, so they don't even congest or hit the roads at all.

## Delivery from local stores

**Neelesh Mundra:** Can I actually deliver offline from the local mom-and-pop store? That mom-and-pop store then becomes the delivery agent for that particular locality. The beauty of that is, the efficiencies are so high because that mom-and-pop store owner individually knows the people in the locality, so the chance of a delivery attempt being a failure is almost nil. So I think that the disruption of using online to offline is probably going to be one of the big things for Indian companies in the next four or five years.

**Ludwig Hausmann:** You enable stock that's out there in the store and behind the storefront in the city; you make that available for online shopping and get it delivered same day. This is something parcel companies need to find a solution for—that they have dual sourcing, both from distribution centers and also from local stores, but in an economical, consolidated, milk-run-type fashion. And that's what a lot of smart people are working on these days.

## Tomorrow's workforce

**John Murnane:** The core employee at a major integrator or parcel company is going to look more like a data and analytics hound than, you know, customer-service oriented—getting out in the field, working in the sun. And so I think these companies do need to figure out how to change the culture of their organization because it's going to be more analytically driven.

**Neelesh Mundra:** India's got a large population and a large young population. What I see is that this population is going to want to do freelance work. What that's going to mean is that even if you are going to college from 9:00 a.m. to 5:00 p.m., from 5:00 p.m. to 8:00 p.m., you may decide to be a delivery person for your locality, which you know better than anyone else.

## Shocks and disruptions

**John Murnane:** I think there's a chance for one of the incumbents or one of the new entrants to emerge and really create a distinctive enough offering that is personal, that is trusted, that is customized, where a consumer's loyalty becomes to that logistics provider. The customer says, "Look, I have a weekly delivery by my logistics provider, and so the retailers, the grocers, the whatever—you're going to fit into that." That would be disruptive. And I think there's the potential for that to happen.

**Florian Neuhaus:** I could think about 3-D printing, right? If you could locally produce, in your house, anything that you need, it would change the entire landscape of last-mile delivery, the entire landscape of supply-chain warehousing right now. Now, current predictions, I think, are that up to 30 percent or 35 percent of items can be 3-D printed. But, I mean, if you think about a "black-swan event," yes, maybe we could go further with that. And that would change everything.

**Ludwig Hausmann** and **Florian Neuhaus** are both partners in McKinsey's Munich office, **Neelesh Mundra** is a partner in the Mumbai office, and **John Murnane** is a senior partner in the Atlanta office.

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November 2019 | Interview

# A vision for China's parcel-delivery industry



Eddie Huang is second-in-command at SF Express, one of the world's largest providers of delivery services. He sees a future of double-digit growth and ever-faster delivery times—as well as challenges related to technology and talent.

SF Express went public in 2017. Today, it is China's largest express-delivery company, offering customers a full range of logistics services in the world's biggest, busiest, and most complicated market. Assistant CEO Eddie Huang met with McKinsey's Monica Toriello and Richard Wang to discuss his company's—and the industry's—dynamic present and intriguing future.

**McKinsey:** How much do you think China's parcel-delivery market will grow between now and 2030?

**Eddie Huang:** Today, SF Express already handles a daily volume of about 20,000 tons in parcel delivery, and that's only domestically. Looking at a ten-year time horizon, I think the overall market will grow by 15 percent per annum at least.

On the B2C side, customer demand is driven by both the technology and convenience of e-commerce. So if 5G, new mobile tools, and other technologies make it easier for consumers to make decisions and place orders, then the B2C parcel-delivery market will continue to grow by 15 to 30 percent per annum in China.

Then there's the B2B market, where demand will be affected by 3-D technology. Take an example from the fashion industry: in the past, fashion companies changed their seasonal collections every three months, but now, with new technology, they can do monthly changes. They place new orders every month. The design phase—and the order cycle—is much shorter. So, on the one hand, that increases demand for parcel services to send samples. On the other hand, 3-D printing enables

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## Eddie Huang biography

### ***Vital statistics***

Born in 1972 in Shanghai

Married, with 1 daughter

### ***Education***

Holds an MBA from China Europe International Business School and a bachelor's degree in mechanical engineering from the Shanghai Jiao Tong University

### ***Career highlights***

**SF Express**  
(2016–present)  
Assistant CEO

**McKinsey & Company**  
(2004–16)  
Partner

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Member of the Aspen Global Leadership Network

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companies to produce samples on-site instead of relying on express services to deliver samples from the factory. So 3-D printing is both a plus and minus in B2B parcel delivery. I think the B2B market may slow down a little bit but still continue to grow by 10 to 15 percent per annum.

**McKinsey:** That means your company will need to deliver many more packages—and will need to do it even faster than you do today, because consumer expectations for speed of delivery keep increasing. In 2030, will same-day delivery be standard in all Chinese cities?

**Eddie Huang:** I believe 12-hour delivery will be a standardized service, pan-China, in five years. By pan-China, I mean most of the customers in China's 600 cities. I would say that's actually a conservative assumption: in 2020, SF Express will be opening a new hub airport in central China, with 100 aircraft flying from everywhere to this hub. That will enable a very fast exchange of goods. So, for a majority of products and for most customers in most cities, six- to 12-hour delivery will be possible in China much sooner than 2030.

**McKinsey:** Will SF Express also be able to do same-day delivery to suburban and rural areas?

**Eddie Huang:** That business is actually becoming more attractive for us because the infrastructure in those areas is easier to build than in cities. Land-acquisition costs are lower; unmanned vehicles, like drones, are easier to deploy. And the costs of unmanned vehicles are starting to get to a range that we can accept.

**McKinsey:** What about outside China? How do you see your international business evolving over the next decade?

**Eddie Huang:** Frankly, we don't have a global footprint at this moment; we are in only about 20 percent of the countries that DHL and FedEx are in. In ten years, I believe we will have at least comparable capability to the big three [DHL, FedEx, and UPS]. For example, we probably will expand our cooperation with Flexport, a US-based freight forwarder.

# “I believe 12-hour delivery will be a standardized service, pan-China, in five years.”

But the international business is more complex than our domestic business. There's already a lot of established structure in the industry, which will take time to change. Some supplier–customer relationships in international markets—relationships between carriers, freight forwarders, and shippers—have existed for more than 100 years; it will take longer than ten years to break into some of those relationships. Also, we have to deal with cross-border operations and customs issues, which add complexity.

**McKinsey:** You mentioned your investment in Flexport. What other kinds of acquisitions or partnerships do you foresee for SF Express in the coming years?

**Eddie Huang:** Given our position in the market, acquisition—not partnership—will continue to be the best solution for us when it comes to working with our competitors and peers. But we could partner with AI [artificial intelligence] companies, technology companies, or maybe companies that own large fleets.

For us, partnership hinges on two things. The first is data exchange: for any partner that joins our ecosystem, we want to enable the integration of data—including operational, financial, and risk-management data. The other is the financial system: our partners should share the same financial system so that we can, for example, provide loans to help each other on short-term cash-flow issues.

The financial system will be a big value driver for us in the future. Our long-term aspiration is to make the logistics service almost zero-cost for our customers; financial services will provide the profits. I'm not sure whether that's a ten-year dream or whether it will take longer, but we're working on that. Right now, our financial-services income is already 50 percent of our profit.

**McKinsey:** What about partnering with the dominant ecosystems like Alibaba or JD?

**Eddie Huang:** We're open to that. But I think sooner or later the trade side of the market will be less consolidated; it will be more fragmented. So, for us, a partnership with a big trading platform would be more of a tactical move—not a strategic one.

**McKinsey:** What shocks or disruptions is SF Express preparing for, if any?

**Eddie Huang:** We are expecting unexpected things every day, particularly in this fast-changing industry. Right now, I'm paying close attention to new vehicles. In ground transportation, there

are many new models coming to the market with much higher engine efficiency and lower costs than our existing vehicles. Every newcomer to the industry is investing in the latest equipment and new kinds of vehicles. So, as an incumbent player, we feel the challenge: no matter how good our network is, there's always a market-entry opportunity for new investors because the equipment-acquisition costs and utilization costs are much lower for these new vehicles. That's really a big uncertainty for us.

Another big, big challenge for us is labor. The numbers are actually quite scary. For example, eight years ago the average age of construction workers in China was about 40. Now it's 46. In ten years, the average age could be over 50, right? Also, today's young people don't want to work long hours. They want to have more freedom. And even if you offer to pay more, they will say no, because they want to have more freedom.

**McKinsey:** What do you think are some of the solutions to the talent challenge?

**Eddie Huang:** No doubt, technology is a huge area we have to invest in. Technology can help us improve efficiency and build the right infrastructure. The airport we are building in central China is not a traditional airport; it's a "smart" airport. We are thinking about how to make the whole network—including all our sorting centers—more digitized. Everything needs to be an IoT [Internet of Things] type of operation; IoT will help us become more efficient and will help us make better decisions than we do today.

Investments in technology and smart equipment is one part of the solution. Of course, another important part is thinking about our employees' needs. We have about a half-million couriers in China now. We have to provide a more flexible compensation system so that our employees can choose how long they want to work and how much they want to make every day. Then they will enjoy their work and they will stay with SF Express. Even in 2030, the best service will still come from people, not technology—so it's important that we try to keep the best employees.

This interview was conducted by **Monica Toriello**, a member of McKinsey Publishing who is based in New York, and **Richard Wang**, an associate partner in McKinsey's Shanghai office.

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December 2019 | Interview

# Bulky is beautiful: How Wayfair is poised to meet massive new demand for home goods— and home delivery



The e-commerce giant's supply-chain leader explains how delivery is done today and how things might change tomorrow.

Wayfair has come a long way from its humble origins in (you guessed it) a college dorm room. Today, the company sells \$8.6 billion in furniture and home goods to 19 million active customers in Europe and North America. In 2019, the company and its logistics partners expect to ship more than 30 million parcels; many will pass through its network of 15 warehouses (12 in the United States, 1 in Canada, and 2 in Europe), 7 cross-docking facilities, and 40 last-mile delivery depots. Connecting these millions of dots is the job of Sascha Hower, Wayfair's head of supply chain, Europe. In November 2019, Mark Staples of McKinsey Publishing spoke with Hower in McKinsey's Boston office. The following is an edited version of their discussion.

**McKinsey:** Let's start by talking about what you think the parcel-delivery landscape might look like in 2030. What do you see as the biggest changes between now and then?

**Sascha Hower:** E-commerce has recently seen double-digit growth in many categories, including home goods. As millennials and Gen Zers—people who are mobile and online all the time—start making homes for themselves, we expect the category's already tremendous growth to take off. We foresee the market tripling by 2030 as the new generations start buying new kinds of products and buying the things they need more frequently.

**McKinsey:** As they increase their purchases, are customers also going to expect to get their goods faster? Do you see one-day delivery as the emerging standard? Or even two-hour delivery?

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# Sascha Hower biography

## **Vital statistics**

Born in 1978 in Bernkastel-Kues, Germany  
Married, with 4 children

## **Education**

Holds a doctorate and a diploma in corporate finance, both from University of Bayreuth

## **Career highlights**

### **Wayfair (2018—present)**

Head of supply chain, Europe

### **McKinsey & Company (2016—18)**

Partner

### **Singapore Post (2012—16)**

Group COO; CEO Quantum Solutions

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**Sascha Hower:** Speed has been a major accelerator for e-commerce. I think that trend will continue, towards same-day delivery—not for all goods, but for many. Maybe even furniture; I wouldn't rule it out. There are different kinds of furniture, right? If you buy a wardrobe, you probably won't need it same day. But how about decor or some wall art or a guest bed, because you have visitors coming, maybe unexpected guests? There will be a few categories like this where you wouldn't expect same-day delivery, but with customers becoming used to it and even educated into it, why not?

It's not only speed—customers' service expectations will also rise by 2030. Take home furniture. These goods are bulky. They're heavy. They're prone to damage. And today, they're often delivered by transportation companies that have tended to do 100 percent of their business in B2B. That's very different from delivering not only to a retail customer, but going into somebody's home, their personal space.

That's why for beds, wardrobes, and other sorts of bulky furniture, which make up a good share of our business, 90 percent are moved through Wayfair's controlled transportation network and 70 percent are delivered through our own last-mile facilities. People like having bulky items delivered into their room of choice, and for some furniture, they want assembly. For the rest—and for what we call the small-parcels business—we rely on third parties.

Looking ahead, based on our historic growth and the rise in e-commerce, the portion of items that we deliver, both small and large parcels, will grow significantly.

**McKinsey:** That means you're going to need access to more customers' homes. But younger customers, especially, don't want to wait at home for a delivery. How are you thinking about that challenge?

**Sascha Hower:** That's why it's so important today to deliver a customer experience in which the customer feels taken care of. In the future, for small parcels, I think we'll see more of unattended delivery—more deliveries to neighbors, and new networks of parcel lockers—or alternatives to redirect your parcel to another store or even the trunk of your car. On large parcels, our in-home teams already have a lot of unusual skills. We're trying to create an ideal customer experience,

end to end—from first click, to selecting the product, down to the delivery. When our people go into homes, they're not delivery drivers. They are ambassadors for Wayfair, and we need to train our people accordingly to deliver that experience, to create that trust between us and the consumer. In the future, we're going to need even more of that.

**McKinsey:** That's a heady set of challenges for companies like Wayfair. It's going to be much harder to meet customer expectations for a broader range of products, delivered faster, in a way that makes customers feel valued and cared for. Do you see any technologies that are going to help?

**Sascha Hower:** We do. This could be things like machine-learning applications that help predict better when exactly the parcel gets delivered where. We have so many pieces of information on every parcel. At every single point in the delivery, we have all these events. Across our system, we have data on hundreds of millions of events every single day. Our job is to figure out how to best use them to offer a best-in-class customer experience, to be precise in predicting where the parcel goes, to be precise in knowing in case something might go wrong, to add flexibility for the customer.

Intelligent routing, a type of software that helps integrate returns or ad hoc collections into delivery schedules, will also become even more important. Returns are a well-known feature of e-commerce. A customer emails—"I have a return. Can you please pick it up?"—which was not planned into the delivery route. With new technologies, both machine learning and smart routing software, we will be able to. We can think a little bit ahead, even wait a little bit longer to make the pickup, which is easier for an insourced delivery company like Wayfair. For a classic third-party logistics transport company, this is just a cost. If you're thinking customer experience, it's a very different way of approaching the world. If the customers are happy, they will come back. They'll buy more.

**McKinsey:** We've talked a lot about the microeconomics of delivery. Let's step back and talk at the macro level about the industry. How do you see the ecosystem of parcel delivery developing over the next ten years? And how will Wayfair fit in?

**Sascha Hower:** Right now, there are a few players that basically own the market. With our size and our growth, we have an opportunity to take what we are doing for our large-parcel furniture items, fine-tune it for customers' expectations, and extend that service for more of our items. Only a few players have that size.

The market for B2C delivery has developed phenomenally. But any third-party logistics provider will have to take care of multiple customers. For these providers, it's about creating a standardized, cost-efficient product that serves the majority of their customers. To create a new service, it will need to serve a multitude of customers, a multitude of purposes. With growth, that will probably happen, which is why overall service levels and customer happiness will probably go up. But when you want very specific solutions, it's tough to get those from a third party.

**McKinsey:** Currently, there's a rural/urban divide in delivery services; cities have access to many more products for same-day or two-hour delivery. How do you see the industry evolving to address that gap?

**Sascha Hower:** If you look back at the short history of e-commerce, the density of urban areas was once similar to where the rural areas are today—it's not that rural areas are adding population, but rather rural customers are ordering more packages. That's also true in cities, but in the countryside especially, every additional parcel delivered actually helps a lot in the cost position.

So that just accelerates the availability of e-commerce everywhere. From a logistics perspective, the growing density of rural areas makes it much cheaper to deliver. So the coverage and also the speed of delivery in rural areas—maybe not same-day, but next-day—will clearly grow to be on par with where cities are today.

**McKinsey:** Does that affect your warehousing and footprint strategy?

**Sascha Hower:** The footprint strategy of warehouses goes hand in hand with delivery. Let's talk about same-day. If I want to deliver an item the same day, it's not only about being able to do the transportation to the customer within a few hours, but the item needs to be available. So I need a much denser footprint of items to sell same-day. I can do that with lots of owned infrastructure, or by going much further with omnichannel, to use retail outlets and integrate a classic offline-to-online setup.

**McKinsey:** To make omnichannel work, will you need stronger partnerships with traditional retailers? How are you thinking about that?

**Sascha Hower:** Home goods is an exciting but challenging category for e-commerce. They're big, they're awkwardly shaped, they're easy to break—and the ecosystem is not as developed as it is for the classic e-commerce categories such as books and fashion. Partnering with all players is essential, and Wayfair has been doing this since its start. We have a mighty supplier base of 11,000 companies, whom we work with closely, across countries. And, of course, we also have strong relationships with our transportation partners.

**McKinsey:** So far, it seems like a rosy picture. You expect tremendous growth in e-commerce and in your categories. New technologies are coming online to help you manage challenges. What concerns you about this scenario? Black swans are by definition impossible to predict, but could you have a go?

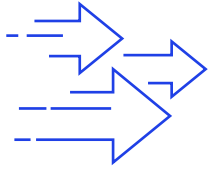
**Sascha Hower:** One thing that might have an impact on the future of delivery is congestion in cities. As e-commerce grows and more vans and trucks roll into cities to make deliveries, will that still be allowed? Or will there be levies or charges for that, which would make deliveries much more expensive? If it comes to that, will customers accept higher costs?

I think the answer will mostly come from better optimization of flows into cities to reduce congestion as much as possible. And that goes back to things like intelligent routing software, being very precise in planning with customers to know when they'll be home, so that you go there only once.

**Sascha Hower** is Wayfair's head of supply chain, Europe. **Mark Staples** is an executive editor in McKinsey's New York office.

[For more from Sascha Hower, see the videos accompanying this article on McKinsey.com.](#)

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