



Delivered.

THE GLOBAL LOGISTICS MAGAZINE

ISSUE 02/2017

MISSION 2050

DOWN TO ZERO

Deutsche Post DHL Group's new
logistics emissions target





The United Nations set a courageous target to limit global warming to less than two degrees Celsius above pre-industrial times. It's an extremely ambitious goal – one that Deutsche Post DHL Group stands firmly behind. And now we are on a new mission to help the world achieve it: We intend to reduce our transport-related emissions to zero by 2050.

This target is, indeed, a bold one. But after achieving a significant improvement in our carbon efficiency in recent years, I'm confident we will reach it.

In 2008, we were the first global logistics company with a specific target to improve our carbon efficiency by 30 percent over 2007 levels by the year 2020 – a target we hit in 2016, four years ahead of schedule. In less than a decade, we have created a multidimensional GoGreen environmental protection program that includes everything from intelligent warehouse lighting systems to carbon free first and last mile solutions. Our new mission builds on this solid GoGreen foundation.

We have set four specific milestones for the year 2025 to help guide our path and track our progress. We will increase our carbon efficiency by 50 percent over 2007 levels. We will use clean solutions for 70 percent of our first and last mile services to improve the lives of people where they live and work. We want more than 50 percent of our sales to incorporate Green Solutions, making our customers' supply chains greener.

And we will train 80 percent of our workforce to be certified GoGreen specialists to mobilize them for the task at hand.

Zero emissions logistics is not an impossible task. And I believe our efforts to achieve it will not only be good for the environment, they will also be good for business.

A handwritten signature in black ink, which appears to read 'Frank Appel'. The signature is stylized and fluid.

Dr Frank Appel
CEO Deutsche Post DHL Group

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ISSUE 02/2017

BUSINESS

SOUTH OF THE BORDER

Where next for Mexico?

SOLUTIONS

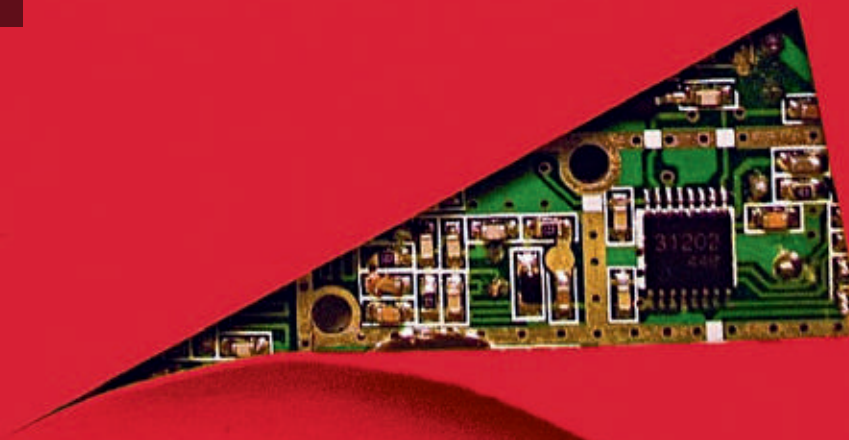
CATCHING CURVEBALLS

How to respond to off-the-wall interview questions

VIEWPOINTS

I, ROBOT

Meet humanoid robotics pioneer Professor Gordon Cheng



FOCUS

UNCOVERING INNOVATION

The technology sector responds to powerful disruptive forces



DEAR READER,

Let me welcome you to this issue with some impressive numbers. Since the launch of NAFTA in 1994, U.S. direct investment in Mexico has risen more than sixfold to \$92.8 billion in 2015. Over the same period, Mexican exports to the U.S. have surged more than sevenfold to \$294.6 billion. The numbers speak for themselves – under NAFTA, Mexico has become a key manufacturing hub for foreign companies supplying the U.S. During these times of political headwinds, will it stay the same in the coming years? We'll give you an insight in **Mexico at the crossroads**.

Continuing with impressive numbers: PwC predicts that by 2025, the global turnover of the sharing economy will be worth \$335 billion a year. Already today it is evident how this insurgent business model is rewriting the rules in sector after sector and transforming the economic landscape. **People power** looks at the implications for logistics and deliveries.

In our main focus piece we discover how technology companies are **Staying ahead of the game** in a competitive and challenging business environment. Tony O'Brien, Managing Director, Panasonic System Solutions Europe, knows well that one way to do so is transforming business. He shares with us how a traditionally product-focused technology company has transformed into a provider of high-value solutions and services. How? Read more in our Executive View: **Switched on for change**.

Enjoy your read!
Sincerely,

Bill Meahl
Chief Commercial Officer, DHL

Cover photo: Rafael Graf/EyeEm/Getty Images



04 NEWS

FOCUS: TECHNOLOGY

- 08 Staying ahead of the game**
As technological change speeds up, companies are shifting gears and collaborating to stay ahead of the game
- 14 Switched on for change**
Panasonic is transforming a product-focused tech business into a provider of high-value solutions and services
- 17 Logic and logistics**
Semiconductor supply chains are complex, dynamic and demanding – and need an increasingly integrated approach

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BUSINESS

- 19 Filling Nigeria's fintech gap**
Tech entrepreneur Tayo Oviolu has built a business to financially empower ordinary people in Nigeria
- 22 Mexico at the crossroads**
Mexico has become a manufacturing hub for companies supplying the U.S., and despite headwinds, the outlook is bright
- 26 People power**
The concept of sharing goods and services has become a potent business model
- 28 China's tech dragons fire up innovation**
China is fast becoming a nation of innovators, with tech entrepreneurs set to take the world by storm

SOLUTIONS

- 30 Mission to the moon**
A new space vehicle is set to deliver cargo to the moon in 2019
- 32 Challenging job interviews**
How do you put a giraffe in a fridge? It's not a Christmas cracker joke – it's a Google job interview question

VIEWPOINTS

- 34 Delivered. talks to...**
Professor Gordon Cheng, the creator of mind-controlled robots, tells us why we have nothing to fear from humanoids
- 36 Inclusive leadership**
An essay by Denise Pirrotti Hummel
- 38 What's the story, Mr Hartikainen?**
Tuomas Hartikainen, a Finnish truck driver with a luxuriously customized rig, on why cool design is a driving force in his life

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www.delivered.dhl.com



NEWS



SPICE UP YOUR (BUSINESS) LIFE

E-commerce retailers can tap into huge growth potential by opening their order books to an international market, says "The 21st Century Spice Trade: A Guide to the Cross-Border E-Commerce Opportunity," a new report by DHL Express. Just as the ancient spice routes created a new era in global trading, so online retailing is reshaping the face of business today. The report reveals that cross-border e-commerce retail volumes are set to rise at an average annual rate of 25 percent until 2020, twice the pace of domestic growth, creating a marketplace worth \$900 billion (€836 billion). Online retailers can boost sales by 10 to 15 percent on average by extending their market to international customers. The role and opportunities offered by premium products and services, such as faster shipping, are also explored, offering insights to online retailers wishing to enter the international marketplace. "Shipping cross-border is much, much easier than many retailers believe," says Ken Allen, Chief Executive, DHL Express.



 bit.ly/dhl-spice-trade

FARE MILES

Taxi passengers in Dubai are about to go up in the world: this summer will see the launch of an airborne drone taxi service. The service will use the Ehang 184, which has eight propellers on four arms and can take one passenger plus bag, flying autonomously on a journey of up to 27 minutes long – about 31 miles (50 kilometers). Passengers will be able to hail their airborne ride via an app, and the drone taxi will "hop" to its destination via a series of set landing spots.

 bit.ly/drone-taxi



The amount of bookings that Airbnb estimates are now for work rather than pleasure. San Francisco, London and New York are the top three cities for Airbnb business travel, according to travel and expenses solutions provider Concur.

ONLINE WIZARDS OF OZ

DHL eCommerce is helping international retailers reach Australia's growing army of online shoppers with the opening of a new fulfillment center in Sydney. The center will provide overseas merchants with fast, flexible shipping that integrates inbound freight, inventory and last-mile delivery into a single service. "Australian shoppers are the second most likely in the world to buy overseas from online merchants," says Damien Sheehan, Managing Director, DHL eCommerce Australia, adding that the new center gives customers "immediate access to one of the world's most mature and fastest-growing e-commerce markets."



FAST-FOOD MOOD

China has opened its first smart restaurant. The Jinrong Street branch of KFC in Beijing's financial district now features a machine that uses facial recognition software to predict what kind of meal you're likely to order. If you like its choice, you can pay using your phone at the machine before collecting your food at the counter. If you think the software has served up the wrong suggestion, it does also offer a few other menu options. KFC hopes that the system, developed with search engine company Baidu, will be able to remember repeat customers. Wu Zhongqin, deputy director of the Institute of Deep Learning of Baidu, told China Daily that the technology would primarily be used as an order history database and wouldn't be able to detect customers' moods perfectly. KFC plans to roll out the system to its 5,000 other outlets around China.



GET SMART

The internet of things (IoT) – the connected network of smart devices in our homes, offices, transport systems and other applications that brings intelligent and useful changes to our daily lives – is also a key cornerstone for the future of logistics. With this in mind, global information and communications technology solutions provider Huawei Technologies and Deutsche Post DHL Group have signed a "Memorandum of Understanding" to develop supply chain solutions for customers using industrial-grade IoT hardware

and infrastructure. The aim is to offer greater supply chain visibility, from warehousing to freight to last-mile delivery. Huawei will make its IoT devices, connectivity experts and network infrastructure available to Deutsche Post DHL Group and both will also collaborate on efforts to market the results of their innovations.

SPACE ODYSSEY

No one wants to be sitting on vacant warehouse space, and customers don't want to be spending fruitless hours searching for where it's available. A new app from DHL Supply Chain means an end to both frustrations. The DHL Spaces app – which has been successfully trialed in the Mainland Europe, Middle East and Africa regions – allows customers to search easily for vacant space by location on their smartphones or desktop computers, using their existing DHL accounts rather than the traditional method of going through a broker or real estate agency.

 bit.ly/dhl-spaces



EVONIK BUILDS IN RESILIENCE

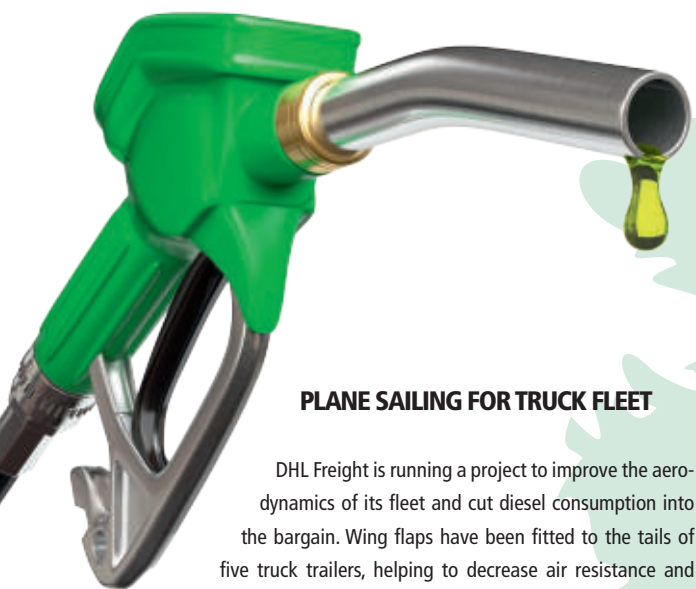
Supply chains – and a company's reputation – can often be at risk in a globalized market, be it from problems in the factory, natural disasters or closures on the supply route. The logistics arm of chemicals sector giant Evonik has signed a deal to use DHL's Resilience360 program to help avoid such pitfalls and will use the software primarily along its road transport routes around the world. The deal was signed at the Marl Chemical Park in North Rhine-Westphalia, Germany, from where four million tonnes of products start their journey each year.

 www.resilience360.com

JUNE
20-22
The 17th DHL Global Life Sciences and Healthcare Conference will take place in Singapore, offering the chance to engage with industry peers, leading suppliers and DHL experts.

Find out more here:

 bit.ly/global-lsh-2017



PLANE SAILING FOR TRUCK FLEET

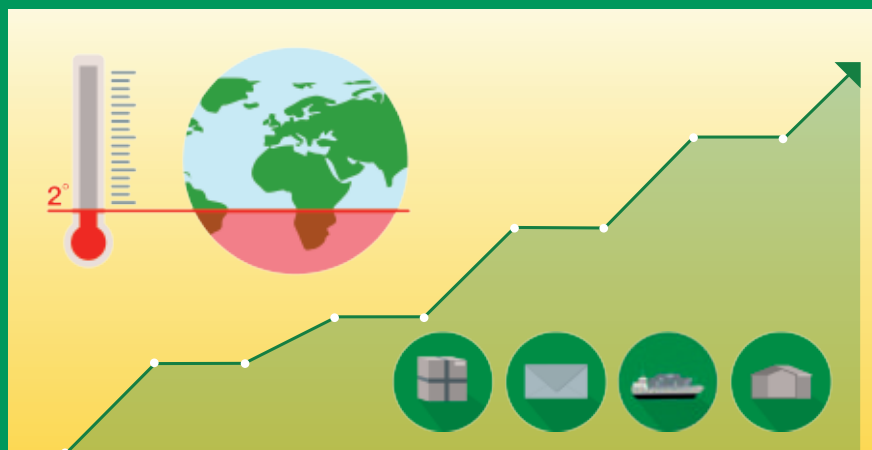
DHL Freight is running a project to improve the aerodynamics of its fleet and cut diesel consumption into the bargain. Wing flaps have been fitted to the tails of five truck trailers, helping to decrease air resistance and thereby use less fuel. The “boat tails” act similarly to winglets on the wing tips of aircraft, says Christoph Schoenwandt, Head of GoGreen, DHL Freight. A study by the Delft University of Technology found that trucks traveling at 80 kilometers per hour can save a liter of diesel fuel per 100 kilometers if they employ boat tails. And since many heavy trucks can clock up 100,000 kilometers a year, that’s an annual saving of at least 1,000 liters of fuel.

PLASTIC FANTASTIC

We know we have to reduce our reliance on plastic bags: In India it’s a 15 million-tons-a-year problem. The country has one of the highest plastic consumption figures in the world, which is set to rise by a further five million tons a year by 2020 as urbanization increases. Indian entrepreneur Ashwath Hegde has created a biodegradable, non-toxic plastic bag made from tapioca and vegetable starches that can be safely eaten, burned or dissolved in water.



MISSION 2050: ZERO EMISSIONS



HOW LOW CAN YOU GO?

Deutsche Post DHL Group has a big ambition for a small number: to cut net emissions for all of its logistics activities to zero by the year 2050. The group has already hit its previous climate target – to improve carbon efficiency by 30 percent over a 2007 baseline – and is now setting its sights even higher. The

group wants to become the market leader in green logistics and make its contribution to the goal of limiting global warming to two degrees Celsius as established at the COP 21 climate conference in Paris two years ago. DHL’s GoGreen initiative will also aim to achieve four interim milestones: firstly, to increase the carbon efficiency of its own operations and those of its transport subcontractors by 50 percent compared

to the 2007 baseline; secondly, to operate 70 percent of first- and last-mile deliveries by “clean” methods, such as electric bikes and vehicles to help improve the lives of people where they live and work; thirdly, to incorporate Green Solutions into more than 50 percent of sales, thereby making customers’ supply chains greener; and lastly, to train and certify 80 percent of its employees as GoGreen specialists by 2025. DHL’s GoGreen program is built on two principles: “burn less” and “burn clean” – reducing energy consumption and using greener energy sources and fuels. The company also plans to plant a million trees every year, and is supporting the United Nations’ 2030 Agenda for Sustainable Development, which aims to achieve global economic progress within the Earth’s ecological limits and in harmony with social justice. “The decisions we make today will determine how our children live 30 years down the line,” said Frank Appel, Chief Executive, Deutsche Post DHL Group.



bit.ly/dpdhl-zero-emissions



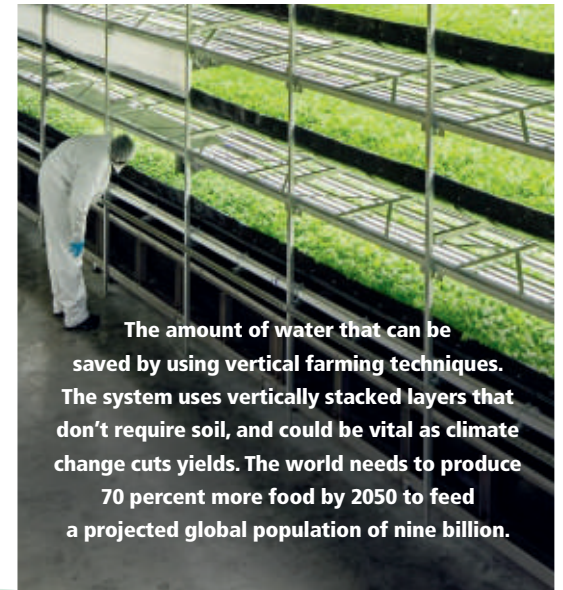
bit.ly/dpdhl-mission-2050



FAIRTRADE FIRST FOR CLIMATE PROJECT

Deutsche Post DHL Group's climate protection project in Lesotho is the first initiative to meet the Fairtrade Climate Standard, which recognizes both the reduction in greenhouse gases and the social value of a project. The use of firewood is a major environmental problem in Lesotho, as many of its people still cook over open fires. One of the smallest and poorest African nations, it has already lost two-thirds of its forests over the past 25 years and faces complete deforestation in the next decade and a half. Deutsche Post DHL Group has helped finance the purchase of 10,000 "Save80" stoves for Lesotho villages.

70%



The amount of water that can be saved by using vertical farming techniques. The system uses vertically stacked layers that don't require soil, and could be vital as climate change cuts yields. The world needs to produce 70 percent more food by 2050 to feed a projected global population of nine billion.



PEDAL POWER

DHL Express is piloting a new City Hub concept, which will allow greater use of cargo bicycles for inner-city deliveries. A DHL van towing a special City Hub trailer will deliver up to four containers to a city center location, where they can be loaded onto two Cubicycles for last-mile, inner-city delivery. The bikes can make up to two times as many stops per hour than a van, bypass traffic congestion and, of course, generate zero emissions. Each one can carry one container at a time with a load of up to 125 kilograms and has electric pedal assistance for the rider. The containers are self-powered using solar panels and can also be fitted with GPS or internet of things technology to enable real-time tracking of shipments. Each City Hub replaces two standard vans, saving more than 16 tons of carbon emissions a year. The City Hub concept is being piloted in two cities, Frankfurt in Germany and Utrecht in the Netherlands, which is aiming to become carbon-neutral by 2030.

bit.ly/dhl-city-hub

STAYING AHEAD OF THE GAME

As the pace of technological change advances exponentially, companies are shifting gears, towards greater collaboration on product and service offerings in a bid to stay ahead of the game.



010101010101010101

The Consumer Electronics Show (CES), the technology world's January jamboree in Las Vegas, provides an annual snapshot of the industry.

Every year, established players and new market entrants vie with each other to grab the attention of the media and the public, showing off the ideas they hope will become the next generation of blockbuster products.

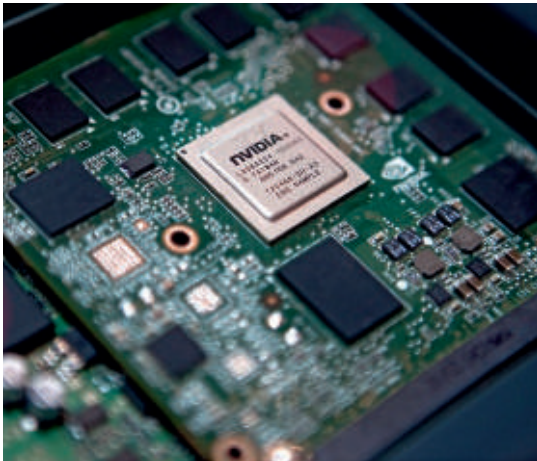
Four years ago, the opportunities seemed remarkably straightforward. The laptop computer, once a key consumer technology product, had been replaced by a new king: the smartphone. Sales were booming around the world, and manufacturers were vying for their own niches in the exploding market. High-end handsets competed to outdo each other with brighter screens or fancier cameras. Low-cost models aimed to tempt the middle classes in developing economies. Niche designs were focused on business users or teenagers.

More recently, the picture has become far more complex. Annual growth in smartphone sales has slowed from more than 10 percent in 2014 to an estimated 1.6 percent in 2016. Visitors to this year's CES event were faced with a bewildering diversity of offerings: drones that fold up and fit in the pocket, ready to film that impromptu remote selfie; hairbrushes and toothbrushes that provide digital feedback on the user's technique or the condition of their hair; virtual reality headsets and robots designed to entertain children or monitor the wellbeing of elderly people living alone.

Some of the items on show were barely products at all, merely minimalist interfaces to sprawling service offerings delivered from the cloud. Analysts estimate that sales of devices designed to interact with Amazon's voice-controlled, artificially intelligent assistant Alexa reached 10 million last Christmas, for example. The internet retail giant is investing heavily in the service, recruiting hundreds of extra staff this year to work on the project. Forecasters predict that the installed base of "home assistant" devices using services like Alexa could pass 150 million by 2022.

**10
MILLION**

The number of sales last Christmas of devices designed to work with Amazon's voice-controlled assistant Alexa



CHIPPING IN:
The Nvidia chip powering Audi AG's in-car systems.

"Our high-tech customers are facing a huge strategic challenge as they think about their future direction."

Thomas Dammann, VP Strategy, DHL Technology

Other notable participants in the CES show came from outside the traditional technology sphere. Automotive companies were there in force, for example, both newcomers like Tesla and Faraday Future, together with established players showing off home-grown autonomous driving technologies or the results of partnerships with technology players. Luxury carmaker Audi used the event to announce a partnership with visual computing company Nvidia that it says will produce a fully autonomous vehicle by 2020. The two companies even had a working prototype at the show.

Waves of change

This complex, even confused, explosion in novel types of product and service is the industry's response to a powerful trio of disruptive forces. The first of these is widespread digitization. Almost every part of society, from agriculture and manufacturing to medicine and transportation, is now being transformed by new digital technologies. That's being driven by low-cost, ubiquitous sensors and networked devices at one end of the scale, and huge increases in data storage, communication and processing power at the other. Large-scale digitization fundamentally changes the scope of the high-tech sector. Increasingly, rather than producing standalone items for its end customers, high-tech companies are seeing their work incorporated ever more seamlessly into the products and services of other industries.

Then there is competition. The barriers to entry in many parts of the technology sector are coming down fast. Increasingly modular hardware and software technologies can be combined quickly in innovative ways to create new products. Small companies and startups now have cheap, easy access to the components, development tools and manufacturing capabilities that were once the preserve of a small number of large, wealthy organizations. If their ideas prove successful, they can take advantage of shared infrastructure to scale up rapidly in the face of rising demand.

The third disruption is acceleration. The technology sector has always been a fast-moving environment, but the exponential nature of that acceleration, especially in areas such as artificial intelligence and "deep learning," means some technologies that were confined to the laboratory just a few years ago are already seeing widespread commercial use. Some observers believe



LOOKING FORWARD:
Virtual reality
headsets are growing
in popularity.

that computers will achieve human levels of intelligence some time this century, potentially triggering a further explosion in technological advancement, along with unprecedented economic and social change.

Where next?

Such a dynamic and uncertain environment creates huge strategic challenges for technology companies. Many are facing difficult decisions about which industry sectors, product categories and markets they want to enter. And in the absence of any single “blockbuster” category, the quest for growth may mean increased diversity and complexity.

A review of the growth forecasts in a handful of consumer product sectors shows why. The \$300 billion global mobile phone market is forecast to grow a further \$4.8 billion by 2019. The much smaller consumer drones market is likely to see similar absolute growth over the same period. The market for wearable electronic devices, like smart watches, fitness trackers and head-mounted displays, is worth less than \$30 billion today, but is expected to double in size by 2019.

Companies also need to decide what role they want to play in future markets. As early adopters of internet-connected lightbulbs and other domestic IoT technologies have discovered, the utility of such products is determined not just by the capabilities of the hardware, but by how well they work with wider ecosystems of products and services, from home security systems to



INTELLIGENT DESIGN:
The Amy robotic
assistant for business
and personal use.

intelligent assistants that can manage your calendar and your shopping list.

Building your own successful ecosystem is hugely difficult, and many players are sidestepping the challenge by positioning themselves as providers of the underlying technologies rather than complete systems. Nvidia’s work with Audi, for example, is part of a wider strategy to offer “off-the-shelf” self-driving technologies to carmakers. Intel has developed a credit-card sized computer designed to slot into TVs and other products to provide upgradeable “smart” capabilities.

It isn’t just consumer products where the software and service offerings that surround a product are becoming at least as important as the hardware itself. Once, companies would have bought dedicated servers to run their enterprise systems, websites and online software offerings. Today, they are increasingly likely to rent capacity from organizations that provide computing power as a service.

Those providers, in turn, use smart software to share storage and processing power between their customers according to demand. That trend has slowed the growth of server sales, as providers are meeting growing demand with higher efficiency and better utilization. It has also pushed prices down. There is less need to pay a premium price for a computer that claims to offer a high level of availability if you can make do with a cheaper model and switch seamlessly to another machine in the event of a breakdown.

Hardware still matters

Hardware still matters, of course. Digital services must interact with the end user in some way, whether that's through the TV in the living room or a microphone concealed in a brooch. And the cloud isn't really a cloud, it is thousands of servers and network switches racked in data centers around the world. In fact, the pressure on hardware design, production and distribution is increasing, as innovative products have an ever-shorter window in the market before competitors catch up or supersede their latest offerings.

Building the supply chains that work in this complex, fast-moving and volatile environment requires companies to take a highly segmented and agile approach, says Rob Siegers, President, DHL Technology. "There is no single best supply chain model. Companies need to tailor their supply chains for particular products, specific markets and different stages of the product life cycle."

To illustrate this point, look at the mobile phone markets and the U.S. and India respectively. The U.S. market is five times larger than the Indian market today, but sells 25 percent fewer units. Sales in the saturated U.S. market are expected to decline by around 3 percent annually in the coming years. In India, sales are growing by 10 percent. The average retail price for a smartphone in the U.S. is \$455. In India, it is only \$215. In terms of units sold, the Indian phone market is already bigger than that of the U.S. "Serving the Indian market requires a completely different approach from one that would work in the U.S.," says Siegers, noting that four of the five top handset players in India are local companies.

Market challenges

Entering new markets is challenging for other reasons, too. Companies need to navigate complex local tax and customs regulations, for example, and there is an

increasing chance that they will be required to include locally sourced components or labor inputs. In its latest report on the outlook for the global technology market, consultancy Deloitte cites "increasingly burdensome global regulation" as a key challenge for the sector.

"Each local market has its own rules governing privacy, security and the handling of data crossing or within borders," the report's authors note. "There are also competing regional and country views regarding how an enterprise ought to be taxed and how it ought to treat incentive programs."

A high-speed supply chain is critical during the days and weeks after a product launch, when companies must be ready to push large numbers of products through their retail channels to meet early customer demand. That calls for fast transportation and strong inventory control capabilities. Increasingly, says Siegers, companies are making use of advanced concepts such as dynamic routing, allowing them to switch the final destination of products already moving through their supply chains so as to maintain availability in markets facing unexpectedly strong demand.

As products reach maturity, prices and volumes both tend to come down. The supply chain needs to react as well, with a shift to lower cost transportation, perhaps replacing air freight with rail or sea transport. Other techniques can help companies meet multiple supply chain objectives. Postponement, for example, allows the final assembly, packaging or even programming of products to be completed in downstream facilities or distribution centers. The approach can help companies balance speed, inventory costs and demand volatility by allowing products to be prepared for their final customer only when needed.

Technology companies are enthusiastic about adopting their own innovations too, says Thomas



ALMOST HUMAN:
A video-enabled humanoid robot with Amazon Alexa technology.

STRONG SIGNAL:
The Indian phone market is already bigger than that of the U.S.





TECH SPECS:
A PogoCam camera that attaches magnetically to eyewear.



STACKING UP:
A high-speed supply chain needs good inventory control capabilities.

Dammann, VP Strategy, DHL Technology, with many at the forefront of robotics, IoT and big data in supply chain applications. “These kinds of technologies are equally applicable for any industry, but the technology sector has a high affinity for them,” he notes. “Increasingly, technology players are teaming up with logistics companies like DHL to develop and roll out innovative supply chain technologies. Ultimately, they want to take technologies they have refined in their own supply chains and sell them to their customers.”

Partnerships matter too. Just as modern high-tech products are an intensely collaborative effort, so are supply chains. “Our high-tech customers are facing a huge strategic challenge as they think about their future direction of development. There are many new opportunities, but there’s always the threat that by trying to do too much they lose their focus,” concludes Dammann. “As a logistics partner, DHL can’t simplify that business environment, but we can help them by taking on some of the supply chain complexity, so our customers can focus on their strengths. Today, we are having a lot of conversations along those lines, looking at outsourced supply chains, logistics partnership arrangements and other innovative models.” ■ *Jonathan Ward*



1. What is the effect of today’s disruptive forces on the technology industry?

The whole sector is grappling with major strategic challenges. Big data, ubiquitous connectivity and advances in artificial intelligence are driving an explosion in new opportunities for technology companies, but capturing those opportunities is becoming increasingly challenging. Competition is intensifying and customer expectations are evolving rapidly, too. You can see the latter effect, for example, in the shift from business models based on product sales to service models where customers only pay for what they use.

2. How are companies responding to the changing environment?

We are seeing significant structural shifts across the sector. Companies are entering new markets and new product categories, but they are also exploring organizational changes and new business and operating models. We are seeing new partnerships, collaborations and acquisitions. And more divestments as companies seek to focus more intensely on their chosen target markets.

3. What role do logistics and supply chain capabilities play in helping technology companies meet their strategic challenges?

Technology supply chains have always been demanding, but the changing environment is forcing companies to strengthen their existing capabilities like speed and agility as they seek to capture emerging opportunities more quickly. It is also forcing them to develop new ones. The closer relationships with end customers enabled by service- and subscription-based business models are placing new demands on aftermarket and service supply chains, for example. At a more fundamental level, the increasing complexity and the high rate of change are forcing companies to focus on their core competencies. That creates opportunities for specialists like DHL to provide innovative solutions and a higher level of support for our partners in the technology sector.

Panasonic House

TONY O'BRIEN:

Managing Director,
Panasonic System Solutions
Europe

SWITCHED ON FOR CHANGE

Tony O'Brien, Managing Director, Panasonic System Solutions Europe, talks about transforming a traditionally product-focused technology business into a provider of high-value solutions and services.

Ninety-nine years ago, Kōnosuke Matsushita established a small electrical components business in Daikai-cho near Osaka, Japan.

Over the next century, that business grew to become one of the largest electronics companies in the world.

Today, Panasonic is a group of 475 businesses with a quarter of a million employees worldwide. Its products range from televisions and domestic appliances to industrial devices and equipment for communications networks. In the U.S., the company is partnering with Tesla to build the \$5 billion Gigafactory 1 lithium-ion battery plant that will underpin the electric carmaker's ambitions to dramatically reduce costs as it moves into large-volume production.

The Tesla relationship is one manifestation of a broader strategy to shift the company's focus away from increasingly commoditized consumer product categories and towards business-to-business applications. As it makes that shift, the company recognizes that it will have to rethink the way it engages with its customers.

In 2016, it established a dedicated business unit – Panasonic System Solutions Europe (PSSEU) – that straddles its traditionally product-focused businesses. The aim of that unit, says Managing Director Tony O'Brien, is "to deliver full turnkey solutions to our B2B customers."

"Panasonic's strength as a consumer brand is a big part of our DNA," he says, "But as we move more into B2B, we recognize that our customers want us to play a different role. They want us to take more responsibility and accountability for the end-to-end delivery of complete solutions."

Part of the role of the System Solutions unit is resolving customer challenges by creating bespoke technology solutions that may combine products from any of Panasonic's businesses or from external suppliers. Another part is offering a range of other services, including software development, installation and commissioning, and ongoing support. "It's a very different business model," says O'Brien.

One of the key differences in a solutions business, he adds, is the starting point. "We aren't creating a

product and pushing it into the market, we need to start by understanding what the customer's real challenges are. What do they need to achieve?"

Getting under the customer's skin like that is difficult. That's why PSSEU has chosen to target its offerings at three specific vertical markets: utilities, transportation and logistics. Those are industries where the company has a head start thanks to the strength of its existing product offerings. "We are already very strong in avionics and very strong in automotive," says O'Brien. "And we see the rail and airports sectors as the next big transportation opportunities."

The company's own longstanding experience in the consumer space also helps it understand its B2B customers' real requirements, he adds. "You need to be able to define not just your customer's needs, but also the needs of their end customer. Because Panasonic is so active in so many consumer markets, we know what matters for our clients' ultimate customers."

As examples of the kinds of solution the company can bring to those markets, PSSEU has developed an automated trespass detection and warning system for the U.K. rail network, and a stock management system for airlines' in-flight services. The latter offering provides a good illustration of the way the company can combine hardware and software into a complete solution, says O'Brien.

It combines networked hand-held devices to track and record stock levels with back-end analytical technology designed to ensure that companies load the right combination of food and beverages depending on the length of the flight and consumption habits of passengers from different parts of the world.

The combination of deep hardware and software expertise is helping Panasonic differentiate itself as a solutions provider, says O'Brien, allowing the company to offer complete and well-integrated solutions for its customers. "Lots of companies today are using different tools for different tasks. They may be using a scanner, a mobile phone and a Windows PC," he notes. "We can combine the software and the hardware into a single device that can walk a driver through his day-to-day tasks, as well as routine safety and security they might be required to do to ensure compliance."

475

The number of businesses that make up the Panasonic group

Panasonic is also using its expertise in analytics to solve specific challenges for logistics operations. “For example, we developed MediaTrak, which uses a scanning device to track stock or fixed assets through the entire logistics journey. By taking regular scans and tracking the GPS coordinates we are able to stop businesses losing assets such as cages, trolleys and carts. We’ve been able to combine this system with wireless beacon technology so that, in a closed envi-



UPWARDLY MOBILE: Panasonic’s driver technology combines multiple tools into a single device.

ronment, we can use the solution to track the assets in real time,” he explains. It has also developed a package called “Gateway,” which aids in the management of delivery schedules for locations that may receive multiple shipments from different suppliers every day. Think stores that offer “click and collect” services or clusters of retailers in airports and shopping malls. “Our solution can improve transport efficiency, as well as improving accuracy and on-time delivery performance,” says O’Brien. “That’s essential in environments where next-day delivery is the minimum acceptable service level.”

Building a solutions supply chain

Deploying and supporting solutions that customers rely on to run their businesses has created new challenges for Panasonic’s own supply chain. Those challenges start at the installation and commissioning stage. “In the solutions business, we have to manage not only our own products but also a host of other components, which may be low in value themselves but are critical to the total solution,” says O’Brien. “That makes the logistics of the solutions business far more complicated. Time becomes a far more important issue.”

PSSEU uses Panasonic’s existing European distribution infrastructure to handle basic product distribu-

tion, but it has also developed a second supply chain operated and controlled at a local level to manage the complexities of those lower value, lower quantity but critical components. “That’s a whole new dynamic for our business,” says O’Brien.

The demands don’t stop once the solution is up and running. “Most customers ask us to provide a managed service, where we take responsibility for ensuring the solution is available where and when they need it,” explains O’Brien. That requires the company to move away from the traditional “break-fix” model to a more proactive approach. “Our customers are paying for uptime, not service interventions.”

Panasonic is making “significant investments” to acquire the right support capabilities, he adds. “That’s happening both organically and via acquisition.” In 2013, for example, Panasonic bought a Netherlands-based software company with expertise in the provision of cloud services. And last year it boosted its system integration capabilities in the U.K. with the purchase of a provider of field engineering services in the transport sector.

Technology helps in product support, too. “Because we are embedding more intelligence within our devices, we can predict failures before they occur,” notes O’Brien. Monitoring internal temperatures and other device characteristics remotely, he says, provides an early warning of developing problems, allowing Panasonic to act to fix the problem before the customer experiences service disruption.

A deeper understanding

For the future, O’Brien says that PSSEU will be focused on deepening its customer relationships and its understanding of the challenges facing its chosen vertical sectors. “We see our organization becoming increasingly vertically integrated into the industries we serve. We believe that to answer the challenges our customers have, we need a really deep knowledge of how each of those industries works,” he says.

“That’s why we have a long-term plan to focus and invest to serve the full value chain in those markets, from software to hardware to systems integration, maintenance, services and consultancy. We’ll be growing that capability over the coming years.”

It’s a challenge that O’Brien clearly relishes. “What I enjoy most about this role is the variety,” he says. “Every day I work with different customers to understand their challenges, and every challenge I bring back to our people sparks new ideas within our organization. We have so much technology within the business, and our people are passionate about bringing together different technologies from different parts of the business to solve tough customer issues.” ■ Jonathan Ward

LOGIC AND LOGISTICS

Semiconductor supply chains are complex, dynamic and demanding. That calls for an increasingly integrated approach.

The digital world is built on silicon foundations. The fundamental enabling technology for today's smart products, connected businesses and advanced services is the transmission of signals through countless nanometer-scale transistors etched into the surface of silicon wafers.

It is testament to the success of the global semiconductor industry that end users rarely give a thought to the complexity and sophistication of the manufacturing processes and supply chains used to create its products.

Yet semiconductor production requires a carefully orchestrated sequence of processes that stretches from mines in some of the most remote regions of the world to the heart of its largest cities.

Every link in that chain comes with its own demands. The materials, chemicals and intermediate products used in semiconductor production are costly and often fragile. The finished products are highly valuable and sensitive to shock, extremes of temperature and electrostatic discharge. That calls for extremely careful handling during transportation and storage, with logistics and supply chain processes that support the industry's goal of zero defects and relentless quality improvement.

There's volatility, too. Rapid technological development, unpredictable markets and short product life cycles mean semiconductor supply chains need to be highly agile, with volumes, product mix and end customer location changing all the time. And the increasing use of e-commerce and other digital procurement tools is making it ever easier for customers to switch supplier at short notice.

Product supply chains are only part of the story, however. Semiconductor manufacturing is a tremen-

dously capital-intensive business. Capital depreciation accounts for around half the cost of a finished silicon wafer, for example. And as manufacturers continually adjust and reconfigure their manufacturing footprints to accommodate new products and changes in demand, that high-value manufacturing equipment must be moved from place to place.

That's an activity that comes with its own formidable logistics challenges.

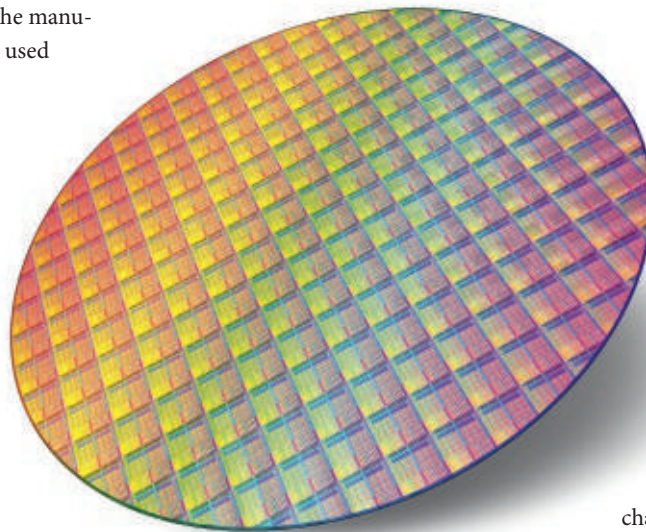
Semiconductor machinery must operate with an accuracy that can be counted in atoms. It is large, extremely delicate and eye-wateringly expensive. The cost of a machine for a single process step in a wafer fabrication plant can run into the tens of millions of dollars, and a complete plant can cost \$10 billion to build and equip.

Diversity adds complexity

As if managing their existing supply chains wasn't difficult enough, semiconductor players are now facing a host of additional complexities. While communication and data processing applications remain the largest segments of the overall market, automotive applications, which currently account for 16 percent of total semiconductor sales, are expected to grow more than twice as fast over the next few years.

Growth in industrial applications, meanwhile, is expected to be three or four times faster, at 8 percent a year. And between 2015 and 2018, the value of products based on internet of things technologies is expected to reach more than \$470 billion, an annual growth rate of around 18 percent.

Today's fastest-growing product categories, from wearable consumer devices to the networks of sensors and distributed controllers embedded in cars or industrial machinery, require new generations of



\$470 BILLION

The expected value of products based on internet of things technologies between 2015-18, a growth rate of 18 percent

Semiconductor players are having to revisit the way they design their products and engage with their customers.

simpler, cheaper but more specialized chips. For an industry more familiar with the supply of high volumes of standardized components, this new world is highly disruptive.

Semiconductor players are having to revisit the way they design their products and engage with their customers. And they are reconfiguring their manufacturing and supply networks.

The search for the right capabilities, technologies and production footprint has also driven significant structural changes in the industry. Semiconductor companies spent around \$100 billion a year on mergers and acquisitions (M&A) in 2015 and 2016, for example. The average level of M&A expenditure in the previous five years, by contrast, was just under \$13 billion.



CENTRAL INTELLIGENCE:
Managing movement
of capital equipment
globally.

New specialized services

As growing number of semiconductor companies are responding to the industry's pressures by driving a revaluation of logistics processes. Developed in response to this demand, DHL Semiconductor Logistics is a new suite of solutions designed to improve the control of material and equipment flows through the industry's supply chains.

A lighthouse example of a DHL semiconductor logistics solution is a new Global Capital Support Center (GCSC) in Shannon, Ireland, with regional support centers in Tokyo and Atlanta, developed in partnership with one of the world's leading semiconductor players. The center is designed to centralize, simplify and improve the performance of the logistics operations required to move semiconductor production and test equipment around the world.

Staffed by a dedicated DHL team with extensive experience of complex capital equipment logistics, the GCSC serves as a 24/7 center of excellence and a single point of contact for semiconductor plants and facilities as they plan, schedule and execute equipment transportation. It has responsibility for the procurement of transport services, including supplier and carrier selection, qualification and performance management. To drive quality and process standardization, the unit has developed a comprehensive set of standard operating procedures, along with detailed training materials to facilitate their application.

The GCSC brings all the data related to customers' planned and ongoing equipment logistics activities together in a single platform. That greatly improves visibility across the supply chain, aiding the coordination of complex moves involving multiple sites, and allows the earlier identification of issues or improvement opportunities. The center's dynamic routing capabilities, for example, allow the right transport routes and modes to be chosen for each move, optimizing logistics costs and allowing shipments to be consolidated where possible.

The center also works as a real-life demonstration of the application of advanced technologies in the supply chain. Internet of things technologies will deliver track-and-trace capabilities as shipments move around the world. And DHL's Resilience360 supply chain risk management platform provides real-time alerts about emerging issues that could affect planned or ongoing operations, from transport disruption to severe weather events.

For the semiconductor industry, rising supply chain complexity is a fact of life. For the industry's strongest players, mastering that complexity is increasingly seen as a significant source of competitive advantage. ■ **Jonathan Ward**

For more information on DHL's Semiconductor logistics, please contact Doug.Whaley@dhl.com



FILLING NIGERIA'S FINTECH GAP

Tech entrepreneur Tayo Oviosu returned to Nigeria from the U.S. with a mission to build a business that would help financially empower ordinary people.

The golden coastline of California wasn't enough to keep Tayo Oviosu from returning to Nigeria to found Paga – a secure payment system that has become one of the country's most widely used platforms.

Built on the principle of “appropriate technology” able to operate in any environment and on the most basic mobile phone, Paga addresses an issue that is critical to Africa's development: the availability of financial services to all. “The opportunity I saw is one that exists across the continent,” says Oviosu. “Traditional banks don't have the reach to the mass market and so these economies are inevitably cash driven, and it's difficult

**39.5
PERCENT**

The number of Nigerians with no access to financial services in 2014

to make payments and effect commerce. So if Nigeria is to be the economic juggernaut it really could be, you have to solve payments and make it easy for people to pay or get paid; and it has to be easy for people to access finance.”

Paga's six million customers can make such payments through options ranging from smart-phone-supported apps to simple codes punched into basic phones, or through Paga's nationwide network of 11,000 agents – set to double within a year.

At the same time, more than 5,000 merchants and businesses use Paga to facilitate transactions, including one large Western company you might have heard of – Uber.

“Uber is still very focused on card payments, so we will give them a path to the mass market – including those who don’t have cards or who aren’t comfortable with using them,” says Ovosu. One of Paga’s goals has been to balance ease of use with the security of its platform.

Payment systems

Out of Nigeria’s 180 million population, only 25 million people have a bank account, and most account holders have very little in those accounts. Meanwhile, the country’s 21 banking chains have a total of 5,000 bank branches, while only 900 ATMs are available outside those branches.

“So the opportunity we have is to leverage connectivity and access the internet to drive electronic transitions,” says Ovosu.

While currently the main means to achieve this is the mobile phone, it won’t necessarily stay that way. When Paga started, almost all its agents conducted business on mobile phones; now only about 30 percent do so, as agents find laptops easier to use for entering data and customer information.

“I’m wearing a smartwatch connected to the internet, and that can do transactions,” Ovosu says. “There’s too much emphasis on mobile phones. [Most importantly] it’s about connectivity and the form factor will change over time. Most Africans connect via phone today, yes, but it’s important not to overemphasize it as the channel.”

Ovosu puts Paga’s success in becoming one of Nigeria’s most widely used payment platforms down to three key factors.

“Firstly we’ve been fortunate to have fantastic



“The Africa story is the Nigeria story – Africa will go where Nigeria goes.”

Tayo Oviosu, founder of Paga

people around the table; we have a great team that is very focused on the vision of what we're trying to achieve – we wake up every day and this is what we do and think about.”

Next, he says, is having a great group of investors providing the required backing while allowing the company to do the work it needs to do. The final factor is how the company has focused on building its agent network to facilitate payments – a process that continues with an eye to the future.

“Our strategy for further growth is to continue building that agent network and to roll out digital financial services such as savings and loans to the mass market, which will really drive financial inclusion in Nigeria.”

Currently about 39 percent of Nigeria's population are financially excluded, a figure the Central Bank of Nigeria aims to reduce to around 20 percent by 2020.

“The channel that we provide around our agent network and the distribution there will be key to making that happen,” says Oviosu.

E-commerce niche

One of Paga's merchant partners is Jumia, Nigeria's largest e-commerce platform. But despite this, e-commerce actually plays a relatively small role in Paga's affairs.

“The bulk of people on Paga use it to send money to others or to pay for utilities; the market's just not ready for e-commerce in Nigeria, it's still very young,” says Oviosu.

Hence, while much digital ink has been spilt on the potential of e-commerce taking over the high street, Oviosu doesn't see that happening any time soon in Nigeria.

“In places like the U.K. they're still purchasing offline in big numbers, as they want the experience of going out to the store with friends, or with their boyfriend or girlfriend, and Nigerians are no different,” he says. “The malls in Nigeria are packed; building stores and malls – that's where the market is today.”

At the same time, he acknowledges that e-commerce is taking more of a hold in specific segments of the market.

“It's more services such as travel, booking air tickets and social media that people are ready to be online for. It's not yet the heavy-lifting Amazon.com-type of business.”

Misplaced stereotypes

During the past few years, global business has resonated with talk of Africa as a tantalizing final frontier, but Oviosu is one of those less than satisfied with such a narrative.

“I don't subscribe to talking of Africa as one entity – every country has different dynamics, so you have to look at each market,” says Oviosu. “Now when I look at each market on its own, my view is it's not about Africa being the next frontier, rather it's about Nigeria [being it]; the Africa story is the Nigeria story – Africa will go where Nigeria goes, and that story is still being told and has a long way to go.”

He bases this on Nigeria's colossal scale in economic terms, noting how the state of Lagos is Africa's fifth biggest economy with a GDP estimated at \$131 billion in 2015.

Nigeria's huge potential played a large part in his decision to move back from the U.S. “I want to be part of the development of that story, and I want to see Nigeria become the giant of Africa again,” he says. “I know it has the potential, so it's about us building the foundations to help it achieve that potential.”

For those who harbor similar intentions of getting involved in Nigeria or Africa, Oviosu has the following advice: “You have to be very clear about why you are doing what you are doing, and you have to be really dogged, because you'll face lots of challenges – ones you wouldn't face in the West,” he says. “And you have to pay attention, even more so, to non-market forces.”

This means the likes of regulators and outside groups interested in, or influencing, your sector, while making sure you are plugged into the related conversations.

“Non-market strategy in Africa is as important as market strategy,” Oviosu says.

Finally, he advises that anyone doing business in Africa has to be patient. And that applies to interacting with both governments and the private sector to get things done.

“If I'd had a more acute awareness of that at the beginning, I'd have changed how we executed things,” Oviosu says. “It takes a lot longer here.” ■ James Jeffrey



www.mypaga.com



MEXICO AT THE CROSSROADS

Strategically located between North and South America, Mexico has become a manufacturing hub for foreign companies supplying the U.S., and despite political headwinds, the outlook remains bright.

For more than two decades, foreign investment in Mexico has been gaining ground as firms with an eye to the U.S. market seize the opportunity to set up a manufacturing base next door.

Since the launch of the North American Free Trade Agreement (NAFTA) in 1994, U.S. direct investment in Mexico has risen more than sixfold to \$92.8 billion in 2015, led by carmakers and other manufacturers, according to the U.S. Bureau of Economic Analysis.

Over the same period, Mexican exports to the U.S. have surged more than sevenfold to \$294.6 billion, U.S. Department of Commerce and the U.S. International Trade Commission (ITC) data show.

The increases make sense. Mexican labor costs are lower than in America, trade is tariff-free, and it's a short distance to move goods to the U.S., the world's biggest consumer market.

But could this change if the new U.S. administration pursues a proposal to review the NAFTA free trade agreement between its country, Canada and Mexico or to implement a border adjustment tax of up to 20 percent on Mexican goods in an effort to protect American factory jobs and narrow the U.S. trade deficit?

This poses obvious concerns for companies, and as a result foreign investment has dropped by up to a quarter in Mexico this year from 2016, says John Price, Managing Director of Americas Market Intelligence.

Since the changeover in the U.S. government, General Motors has said it would move production of pickup axles from Mexico, creating 450 jobs in its home state of Michigan. Other firms have said they would create new jobs in the U.S. without necessarily downsizing in Mexico. Walmart, for one, plans to ramp up investments in Mexico by 19 percent in 2017, including building new retail stores.

The biggest concern is the border tax, which the analyst believes could hit U.S. consumers with higher prices by triggering a trade war.

"For the average car built in the U.S. or Canada for example, the average part crosses the border seven times before that car is sold," he says. "If one of those countries

imposes a border adjustment tax, it is pretty impossible for the other countries to not match that tax.”

Even so, over the longterm experts say the prospects for growth in Mexican manufacturing and trade is promising, thanks largely to the benefits NAFTA has brought U.S. companies.

“NAFTA was designed by U.S. corporations for U.S. corporations,” says Walter Molano, Chief Economist at BCP Securities, a Greenwich, Connecticut, investment advisor. “Most of the exports that come out of Mexico and into the U.S. are intracompany exports.”

Paul Ganster, a social scientist with a specialty in Latin America at San Diego State University, says many U.S. jobs depend on Mexico far more than on China, another hotspot for outsourcing manufacturing. Goods made in China contain 5 percent U.S. inputs, while those from Mexico contain 40 percent, he says.

“If we stop Mexican products from coming in, then we are killing a lot of U.S. jobs,” says Ganster.

Tough negotiations

Instead of doing away with NAFTA, the partners are likely to try to bring it up to date, says Duncan Wood, Director of the Mexico Institute at the Wilson Center, a nonpartisan policy forum in Washington D.C.

Mexico, for example, wants to include energy in the deal and modernize the NAFTA visa categories so North Americans can work anywhere in the region, making it possible, for example, to attract Americans and Canadians to key sectors like technology “to move innovation forward,” says Wood.

This would feed a growing IT industry in cities like Guadalajara, where startups have created a sensor brace for the blind and cost-cutting technology for solar power. More than a dozen universities around there are supplying the brains for such ventures and the satellite offices of multinationals like Dell, Intel and Oracle.

As part of the negotiations, Mexico may have to accept short-term tariffs or voluntary export constraints on manufactured goods shipped to the U.S. If structured well by Mexico, these would have little impact on the economy.

A 25 percent weakening of the peso against the U.S. dollar during 2016 means exporters can handle a 10 percent tariff, for example. Or Mexico could play tough and say it wants to restrict shipments of auto parts to the U.S., a move that would push up car prices in the U.S., damping sales.

“Mexico could go that route as a way of saying, ‘Well, if you want to mess around with trade, then U.S. consumers are going to pay the price,’” Wood says.

Faster growth

NAFTA aside, Mexico may be poised for faster economic growth, in part thanks to U.S. President Donald Trump. His policies, such as heavy infrastructure

spending, are expected to fuel economic growth in the U.S., says Molano. While this could stoke inflation and higher interest rates there, investment should return to the U.S. from emerging markets, except Mexico. This is because about 80 percent of Mexico’s GDP growth is tied to its economic relations with the U.S., making it an attractive investment, he says.

To be sure, while investment has slowed in Mexico, Price says manufacturers there “are running their factories at full tilt and selling everything they produce” to meet U.S. consumer demand as U.S. factories run at high capacity utilization rates.

At the same time, Mexican consumer demand is growing as a shift to smaller, two-income families and improving access to credit increases purchasing power in spite of the weaker peso.

“Domestically, Mexico is still a growth story. And that is where you will see investment this year, in financial services, healthcare services, medical products and consumer goods,” Price says.

Lower costs

Geography is a big advantage for Mexico in trade.

A shipment from Shanghai to a U.S. port takes 31 days, whereas it takes three days overland from Mexico City to Dallas, sometimes less.

“Mexico can supply a reorder very quickly when products are missing or selling well,” says Eric Gantier, Managing Director, DHL Global Forwarding, Mexico.

The country also has cost advantages in production. A boom in shale oil and natural gas production in the U.S. has created a surplus that is being piped to Mexico, slashing energy costs there.

4.6
PERCENT

Projected wage rise in Mexico in 2017, compared with 6.1 percent in Asia



Logistics and transportation is also comparatively cheaper in Mexico, accounting for about 6 percent of COGS (cost of goods sold), compared with 15 percent in Brazil and 25 percent in Colombia and Peru, Price says.

These advances in competitiveness come at a time when the low-cost attractiveness of China and other Asian manufacturing nations is fading in labor terms. Real wages are poised to go up 6.1 percent in Asia in 2017, the highest globally, according to a study by consulting firm Korn Ferry Hay Group. In Mexico, they are set to rise 4.6 percent, helped in part because a large young workforce, while not growing as fast as in previous years, has kept a lid on pay increases.

Mexican labor productivity is also improving, surpassing China 1.8-fold in 2015 in terms of GDP per employee, according to the Organization for Economic Cooperation and Development. Mexico still lags behind the U.S. by 2.7 times in terms of overall productivity, but at cutting-edge manufacturing plants, productivity has been growing at 5.8 percent per year, according to a recent report by the McKinsey Global Institute. While overall manufacturing productivity in Mexico is just 24 percent of the U.S. level, the leading plants exceed the U.S. average, according to McKinsey.

“NAFTA pushed companies to train workers to produce high-quality products,” says Agustín Croche, CEO, DHL Supply Chain, Mexico. For carmakers, for example, “the quality of worker training is the same in Mexico as in the U.S. or Europe,” and labor productivity has got so good that it has helped to attract the German luxury brands Audi and BMW to make vehicles there, he says.

Croche expects Mexico to sustain its competitive advantage and continue luring foreign manufacturers as part of a national policy for growing the economy over the long term. “Mexico is still a young population, so a lot of young people will need those jobs,” he says.

Infrastructure

Infrastructure investments have brought world-class ports, highways and railroads as well as free trade zones, inland ports and industrial parks, thereby helping to provide an integrated supply chain and trade links to the world, and to keep up with economic growth. A new airport is scheduled to open in Mexico City in four years, and there are plans for more ports like in Tuxpan in Veracruz on the Gulf of Mexico.

More investment is planned, as the country pursues a goal of ranking in the top 20 percent of the World Economic Forums Infrastructure Competitiveness Index, according to a logistics report by PwC.

This has been helping to drive aerospace, electronics, food processing and other advanced manufacturing companies such as the U.S. aircraft makers Honeywell and Textron to set up in Mexico.

**\$92.8
BILLION**

The volume of direct U.S. investment in Mexico

PLANT LIFE:
Productivity in Mexican factories and plants is rising.

American manufacturers have also worked closely with logistics companies to slash costs for moving inputs and finished products between their factories in Mexico and their Canadian and U.S. customer and supplier bases. The result? “Crossborder logistics in Mexico today are arguably the most efficient anywhere in the world because of the scale of the manufacturing that was moved there,” Price says.

Encouraged, Mexican companies have also outsourced everything from trucking to inventory and supply chain management, he adds.

There is more to be done, of course. “At times of peak demand, there are constraints in getting goods to market,” says Croche. “Consumption is growing but the number of truckers on the road is not keeping pace.”

Improvements in trade logistics could come from building more east-west transport capacity to take advantage of access to the Atlantic and Pacific. This would make it easier to expand exports to the rest of Latin America, its second-biggest market, as well as to Asia and Africa.

“Mexico is very dependent on the U.S. economy, and so the NAFTA negotiations could be an opportunity to become less dependent,” Gantier says.

While the government could try to widen the country’s trade ties, it is down to companies to step up sales beyond NAFTA.

For cars, planes and white goods, that may not make sense. The added cost for long-distance shipping would



make it harder to compete with goods from markets closer to the customer.

For computer motherboards, mobile phones and other light products, however, a company can supply the world from one factory. Asia is the leader in these industries, and for Mexico to lure investment its infrastructure and logistics efficiency still needs to get better.

“Mexico will have to improve its competitiveness, in particular with better air infrastructure,” Price says. “The ability of Mexican airports to clear customs and move inventory in and around the airports is still a decade behind much of Asia,” he says. “Its port infrastructure is better, but its ability to move cargo domestically is not as competitive as it needs to be if you want to compete with Southeast Asia or China.”

The IT supplier base, too, would have to be convinced to move to Mexico from Taiwan, Thailand and Korea.

“This doesn’t happen overnight,” Price says. “If we have a resolution between Mexico and the U.S. [on NAFTA], we could see it happen. But not until then.”

While foreign investment in Mexico has increased over the past two decades, so have concerns about doing business there, such as a lack of well-trained engineers and steady reports of violent murders in states like Baja California, Chihuahua and Tamaulipas.

On security, Steven Dudley, co-director of InSight Crime, a Washington D.C.-based foundation that studies organized crime in Latin America, says Mexico is “relatively safe.”

The biggest risks are not from the big drug cartels, but the smaller criminal groups focused on contraband, kidnapping and theft. These groups, however, go after easy targets, not the larger companies with private security, he says.

Education-wise, graduation and literacy rates are reasonable in Mexico, Price says.

The problem is that universities “are not well equipped to produce graduates who are employable in the manufacturing sector,” he says.

To get around this, the automotive industry has banded together to form training centers for which the government is providing students with a subsidy for low-cost entry.

“Now Mexico produces a lot of mid-level technicians in the automotive industry as well as engineers, which is what they lacked in the past, and that was one of the greatest limitations of Mexico’s ability to grow in that sector,” Price says.

Could other sectors follow suit and bolster Mexico’s growth prospects for manufacturing?

Price thinks so.

“I suspect that as other industries gain critical mass they will repeat that model,” he says. “After aerospace, the first that could probably do this is medical equipment, and then the IT sector.” ■ *Charles Newbery*



**JOHN PRICE, MANAGING DIRECTOR,
AMERICAS MARKET INTELLIGENCE**

John Price, one of the founders of advisory group Americas Market Intelligence, has practiced market intelligence in emerging markets, notably Latin America, for the last 20 years. He is a recognized regional thought leader in the areas of Latin American business climate and business strategy best practices.

 www.americasmi.com

WHERE NOW FOR MEXICO?

Mexico may be poised for the first big changes in its economic model in two decades, but potential abounds for the country to grow as a manufacturing platform. We catch up with John Price, Managing Director of Americas Market Intelligence, to find out what the future has in store.

1. What is the potential for Mexico as a manufacturing platform?

Although the manufacturing strategy began as a U.S.-market servicing strategy, now most factories in Mexico are built to produce products that service not only the U.S. market but also the Mexican market. And in a few important cases, Mexico is also part of a manufacturing platform that is servicing markets beyond North America. Volkswagen, for example, has its global manufacturing platform for the Beetle in Mexico. For several European car producers, their main impetus is the Mexican market and secondarily the U.S. and other markets. Mexico has enough of a strong labor pool and enough logistics support to make it a globally competitive manufacturing base that serves not just the U.S. market but also the Mexican and Canadian markets, parts of the rest of Latin America and as far afield as Europe and even Asia.

2. What has Mexico done infrastructure-wise to attract foreign investment?

They’ve modernized their ports by bringing in international port operators like DP World and Hutchinson, and so they have some very efficient ports now on both coasts. Secondarily, there has been investment using both private and public funding to improve the arterial road structure deep into Mexico from the U.S. border. Starting back in the mid 1990s, they allowed foreign capital in a minority position to modernize the rail system, which had been used for minerals and is now also used by heavy manufacturing, in particular the automotive industry.

3. What is most needed in terms of infrastructure for trade?

Mexico’s infrastructure, as good as it is, is not as good as Asia’s. So they are not able to compete in true global manufacturing spaces like IT and medical equipment at this point. They are getting there, and little by little they are taking some of that business. But they are still a decade away. To make the country globally competitive as an IT manufacturer, Mexico will have to improve its competitiveness, in particular with better air infrastructure. In terms of their ability to clear customs and move inventory in and around airports, Mexican airports are still a decade behind much of Asia. The country’s port infrastructure is better, but its ability to move cargo domestically is not as competitive as it needs to be if you want to compete with Southeast Asia or China.

The full interview with John Price can be seen at:

 bit.ly/john-price-interview

PEOPLE POWER

The concept of sharing goods and services has become a potent business model and is transforming the economic landscape.

The sharing economy is booming, transforming business models in markets across the world.

From crowdfunding to peer-to-peer lending, from reselling and trading to co-working and talent sharing, collaborative creation and consumption are reinventing how business is done.

The ascent of this new economy is expected to be rapid. Sharing economy revenues in Europe and the U.S. stood at \$15 billion in 2014 and are expected to reach \$335 billion by 2025, according to a report by PricewaterhouseCoopers. Asia's largest sharing economy market is China, where think tank The National Information Center predicts that sharing economy revenues will grow at 40 percent a year over the next five years.

While awareness of the sharing economy is relatively low in Europe, there are high rates of awareness and participation in Asia and the U.S. Some 22 percent of American adults – some 45 million people – have offered some product or service in the sharing economy. In China, 50 million are people working in the country's sharing economy, which is used by around 500 million consumers.

This insurgent business model has significant implications for logistics and deliveries. In its latest trend report “Sharing Economy Logistics: Rethinking Logistics with Access over Ownership,” DHL explores the societal shift in consumption from owning goods and assets to sharing them, with a focus on the likely impact on the movement of goods and the last mile.

Drivers and bike riders are already using their own vehicles to make extra cash by dropping off goods and purchases to customers' homes. While in many countries crowdsourced and on-demand delivery is still largely focused on dining and takeout food, with companies such as Deliveroo in the U.K. recruiting armies of delivery drivers, in the U.S. Amazon, Postmates and others are paying the public to deliver goods in their local areas. Meanwhile, ride-sharing apps from BlaBlaCar, Uber and others are entering the delivery area.

Sharing economy platforms are making significant inroads into logistics. Some 41 percent of consumers in the U.S. have used same-day, expedited, or on-demand delivery services. Established logistics players need to respond to shifting consumer preferences and capture opportunities created by the sharing economy.

As Ben Gesing, Project Manager, DHL Trend Research, says: “The logistics industry has a huge

opportunity to support and help the sharing economy. We've seen a massive drop in transaction costs with the progression of mobile technology, but a hike in transportation costs of goods as they get purchased and shared many times over. Logistics can play a huge role in reducing the transportation costs and friction consumers face when shipping goods.”

The report examines the technological and social drivers of the sharing economy. It points out that until recently, businesses tended to run on linear logic. As Gesing puts it: “Manufacturers manufactured, distributors distributed and customers purchased goods and owned them for their useful life.” That consumption model is shifting to a situation where consumers are looking to have temporary access to goods rather than full ownership.

This is fueled by the new breed of digitally native companies that sit on top of the vast supply systems and make use of the digital user interface – predominantly on mobile devices – to help customers access goods and services.

The report points out that there has always been sharing – from lending friends records and books to borrowing the neighbor's lawnmower. But with smartphones and the web, sharing can occur on a global scale with people you have never met before, rather than being limited to direct social networks in dense communities.

Many different technologies have driven this new economic model, such as mobile apps, digital payment, communications infrastructure, location services, GPS and soon the internet of things, driverless cars and better connected infrastructure. These transformative technologies began to appear just as the world entered the 2008 global recession and people were looking for ways of “sweating” their own assets and making some extra cash. That gave a huge boost to the likes of Airbnb (founded weeks before the financial crash occurred), Etsy and other sharing economy companies. But the trend has outlasted the recession and established a new way of doing business.

\$335
BILLION

The global turnover of the sharing economy by 2025

“The concept of being able to share business-critical assets is potentially a huge cost-saving opportunity.”

Ben Gesing, Project Manager, DHL Trend Research

This represents a profound change, as Gesing explains. “If you look at things that define sharing economy companies, they are network based. Traditional businesses are asset heavy – they own physical hotels, they own machinery, trucks, and cars. Sharing economy businesses are asset light. They make it easier for people’s existing stuff to be found by others. They typically only own the mobile and web user interface and are organizationally focused on the customer experience.”

This new approach also redefines employment. The existing model has fixed labor costs with low-wage workers, specifically in logistics. In sharing economy companies such as Postmates or Shift, workers tend to be very technology oriented, are supplemented by a flexible, on-demand army of ordinary people doing the deliveries at any time of their choosing.

Businesses can take advantage of the opportunity that contingent labor can offer. Crowdsourced and on-demand labor can allow companies a staffing hedge against demand spikes and seasonality. For employees in both low- and high-skilled jobs, sharing platforms such as UpWork or Jodoh make it easier to find supplementary or even primary on-demand or project-based employment.

Regulatory challenges

One of the great challenges created by asset-light sharing economy companies is in legislation and regulation. Business innovation has outstripped the ability of

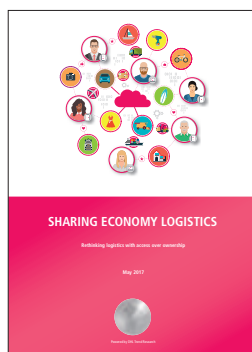
regulators to keep up. There needs to be innovation not just in technology but in regulation as well.

The report also discusses what it calls “cooperative competition.” For instance, farms have been sharing business-critical assets such as combines and harvesting equipment for some time. Now the FarmLink platform has more than 1,200 users, digitally booking, sharing and transporting farming equipment between farms that are in competition with each other.

A similar pattern is emerging in construction, with earth movers, cranes, digging equipment and dump trucks. Most construction assets are unused about 70 percent of the time, so with platforms such as Munirent or Yard Club, construction companies can rent out their assets, maximizing asset utilization and earning new revenue in the form of rental fees.

In asset-intensive industries, would-be competitors are all sharing fixed costs. “The concept of shareable business assets is a really important development. Logistics companies always want to be as asset lean as possible, and so the concept of being able to share business-critical assets is potentially a huge cost-saving opportunity,” says Gesing.

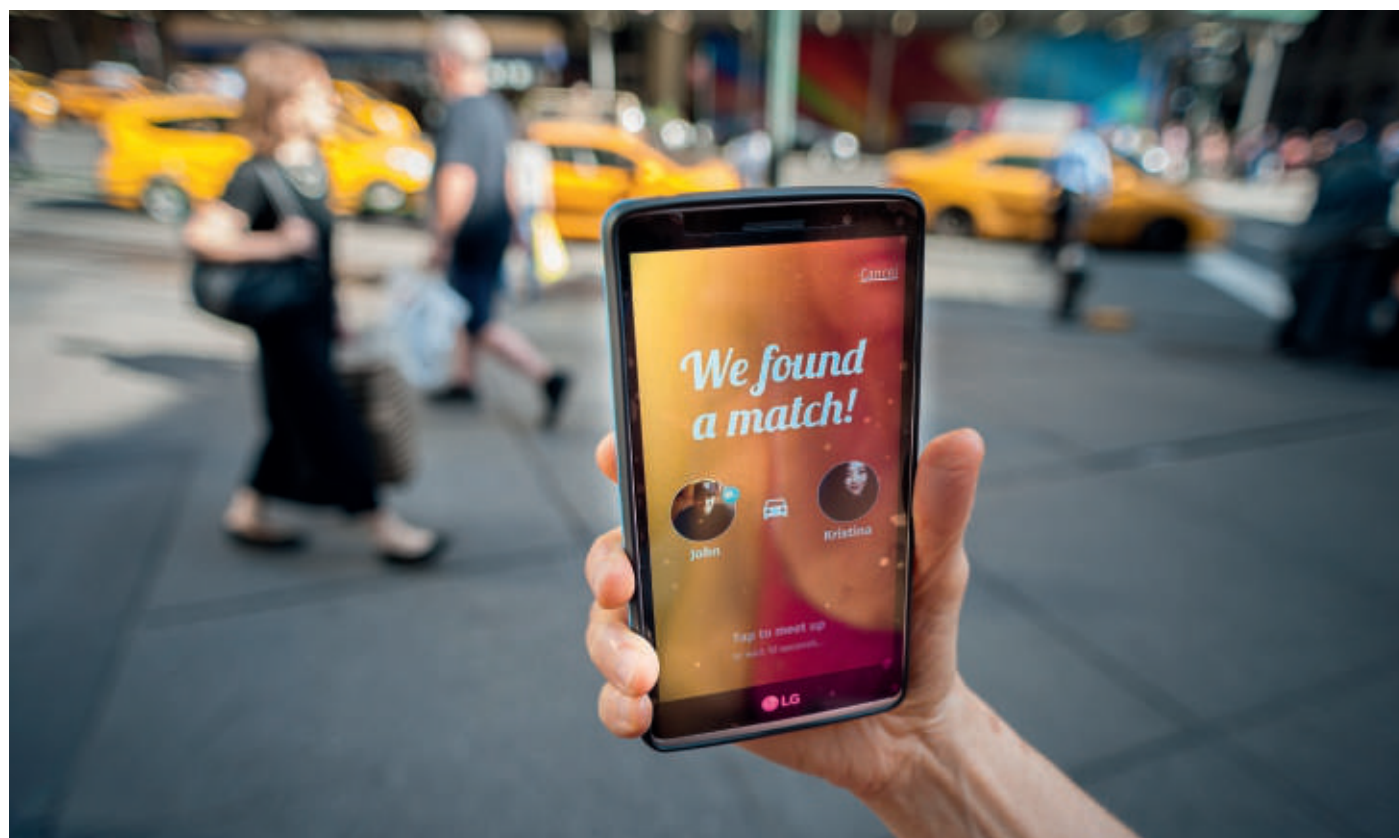
Machinery manufacturer Caterpillar is also an investor in Yard Club, taking a front seat in responding to customers and disrupting their own business in the process. Logistics professionals have a huge opportunity to do the same in their industry. ■ David Benady



To download the report, please visit:



www.dhl.com/sharingeconomy





CHINESE TECH DRAGONS FIRE UP INNOVATION

China is shrugging off its reputation for copying Western technology and is fast becoming a nation of innovators, with a new generation of tech entrepreneurs set to take the world by storm.

China may be the world's second-largest economy, but when it comes to technology it has long been accused of simply taking Western designs, reproducing them and flooding the market with cheap copies.

All that is changing, however, with a new generation of tech entrepreneurs – many based in Shenzhen, dubbed China's "Silicon Valley" – producing genuine innovation and market-leading products.

Perhaps it's not surprising that a nation that has made some of the most disruptive inventions in history, including paper, printing and gunpowder, is once again focusing its greatest minds on radical new concepts.

But greater innovation is a necessity too. Research by the McKinsey Global Institute suggests that, to meet its forecasts of 5.5 to 6.5 percent a year over the next decade, innovation must contribute two to three percentage points of China's annual GDP growth.

The country's leaders acknowledge the economic importance of new ideas. In the latest five-year development plan (2016 to 2020) issued by China's state council, innovation has been identified as a core factor in leading the country's drive for sustainable growth. The country has been working hard to put the foundations in place. China already spends \$200 billion a year on research and development, produces almost 30,000 science and engineering PhDs annually and applies for more than 900,000 patents – the most of any country in the world.

Innovation is all about turning research into profitable products, however, and it is here where the most exciting changes may be happening.

The front line of mobile commerce

Chinese companies are already shifting the way the world thinks about technology products and services. The fact that it has taken the West so long to notice has more to do with the size of China's internal markets than any lack of ideas. A Xiaomi mobile phone may look and work like its Western rivals, but the company has developed a manufacturing and business model that lets it sell at a price that many more Chinese customers can afford.

That capability is becoming an increasingly powerful competitive weapon: the major growth markets for many technology products are the billions of middle-income consumers in the world's emerging markets.

Then there are services. In e-commerce, and especially mobile commerce, China's big technology companies have developed offerings that Western players are scrambling to match. Alibaba, the giant electronic marketplace, offers online payment facilities that overcome trust issues between buyers and sellers by holding cash in escrow until goods are delivered. The company is pioneering the use of "big data" techniques and financial technology ("fintech") with a range of new services, from targeted marketing to credit scoring, loans and credit cards.

Other players, like the "microblogging" site Weibo and messaging service WeChat, have integrated mobile payment platforms and a wide range of new commercial offerings into their services. WeChat, owned by Chinese internet giant Tencent, provides a mobile payment platform that can be used for online commerce or in-store purchases. The service also allows users to buy plane tickets, order taxis or pay their utility bills. It's now used on a regular basis by almost three-quarters of the country's internet users. The company has global ambitions too: it has translated the WeChat app into more than 20 different languages.

Chinese companies are also positioning themselves at the forefront of many emerging technology sectors, with a slew of innovative products. Arashi, for example, is pushing the boundaries of immersive video technology with its Insta360 Pro, the first product capable of streaming 360-degree panoramic videos seamlessly in 4K quality.

Another Shenzhen company, DJI, has become the market leader in drones, capturing 70 percent of the global consumer drone market according to Frost & Sullivan. The company is also addressing the needs of professional aerial filmmakers and a variety of business applications with its high-end products. The Inspire 2 professional model, for example, is capable of flying for 27 minutes on a single charge at speeds of up to 94 kilometers per hour, and uses advanced visual tracking algorithms to lock onto a subject, regardless of flight direction.

Rival dronemaker Ehang, based in Guangzhou, meanwhile, is developing an autonomous, electrically-operated aircraft designed to carry a single passenger. Trials of an airborne taxi service using the machine are planned to begin in Dubai this July.

A new generation of entrepreneurs

A thriving culture of innovation requires more than a few big success stories, however, and China is also working hard to build its grass-roots ecosystems of

"I think right now we are getting to the peak of innovation again."

Airel Liu, Head of International Growth at The One

startups and entrepreneurs. Recent policy changes have been designed to encourage more people to seek commercial reward for their ideas. In 2016, for example, the country's Ministry of Science and Technology announced that half the money arising from technologies developed at state-linked institutions would be handed directly to the teams themselves, rather than their employers.

As elsewhere in the world, however, it is often down to individuals to put in the hard work that turns an idea into an innovation. The One is a Beijing-based startup that makes smart pianos. Founded in 2013, the company approaches learning piano in a radical new way. Learning classical piano – popular among Chinese children with "tiger" parents – is a notoriously tedious experience, but The One is trying to make it more fun. With a smart piano and an app from the company, users with iOS and Android devices can not only take online lessons, but also receive personalized lessons designed to cater for different levels of experience.

"I think innovation means new solutions that can solve existing problems better," says Airel Liu, Head of International Growth at The One. Her definition of innovation is exactly what The One is doing, and Liu expects to see more innovation from China.

"I think right now we are getting to the peak of innovation again, especially with mobile popularity and consumption upgrade in China," she says. Thanks to fast-developing mobile payment systems, she sees Chinese innovation poised to boom – particularly in finance, retail and education.

Still work to do

Important challenges remain, however. Not least among them is the risk that successful new ideas are rapidly copied by rival firms. It's a significant concern, says Wang Yupeng, partner of Beijing-based Adfaith, which advises venture capital firms looking to put money into China. "Homogenous competition is still very common in each industry," he says. "One major reason is that China still lacks serious intellectual property protection."

China does have IP protection laws, but poor enforcement is a widely known issue. That is why in November, China's state council issued guidance on improving law enforcement for IP protection in a bid to "motivate innovation."

There are signs that cultural attitudes to piracy and copying are changing too, as evidenced by the emergence of successful commercial music and video streaming services. "Before, Chinese expected to have everything digital for free. But these days, young people are willing to pay. It will encourage innovation," says Wang. ■ Wang Fangqing

SOLUTIONS

\$1.2
MILLION

The cost per kilogram of
sending cargo to the moon

-270
CELSIUS

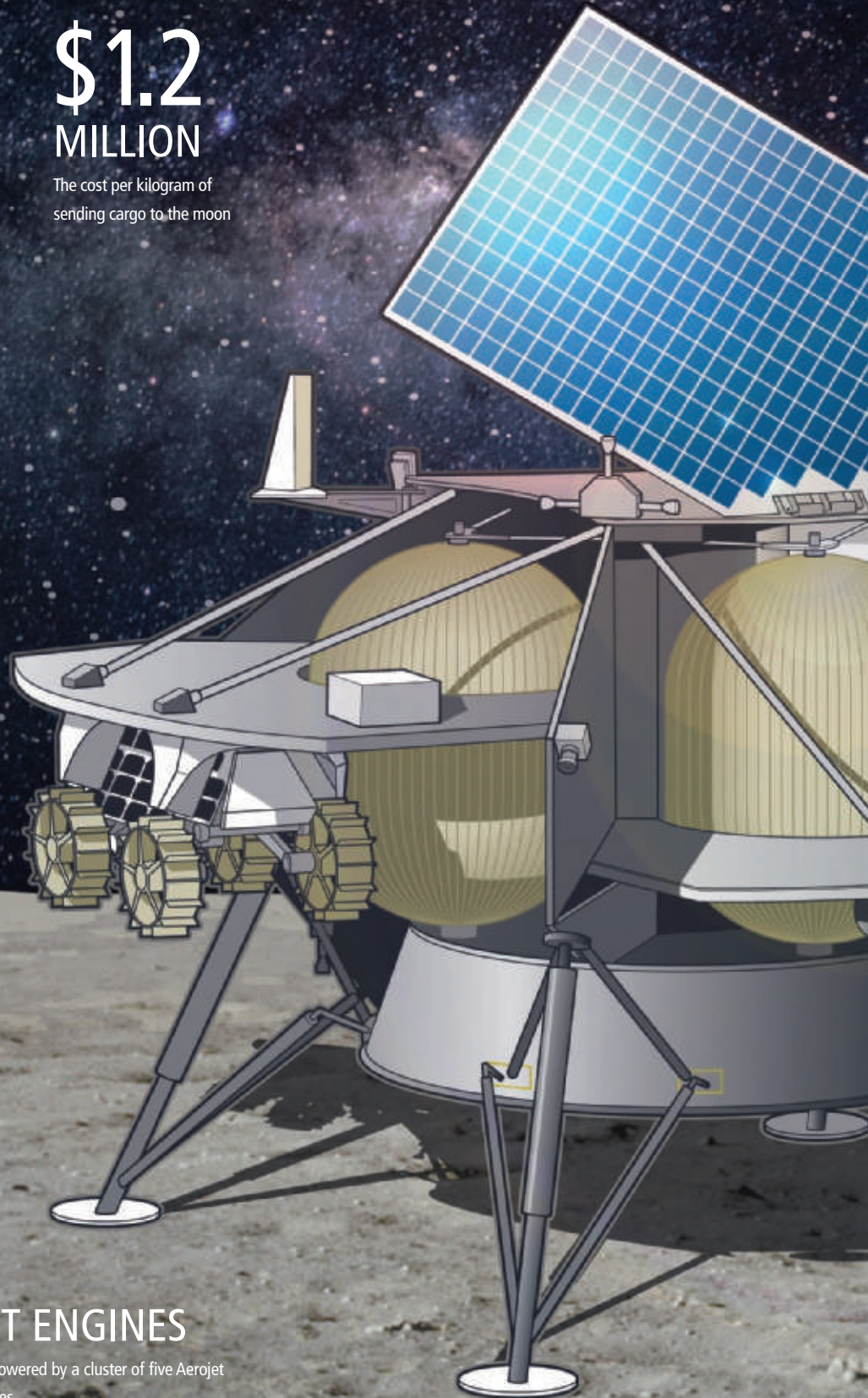
The temperature near the
moon's poles, which Astrobotic
plans to explore in the future

100

The number of customers
lined up for cargo contracts

5
ROCKET ENGINES

The Peregrine is powered by a cluster of five Aerojet
Rocketdyne engines



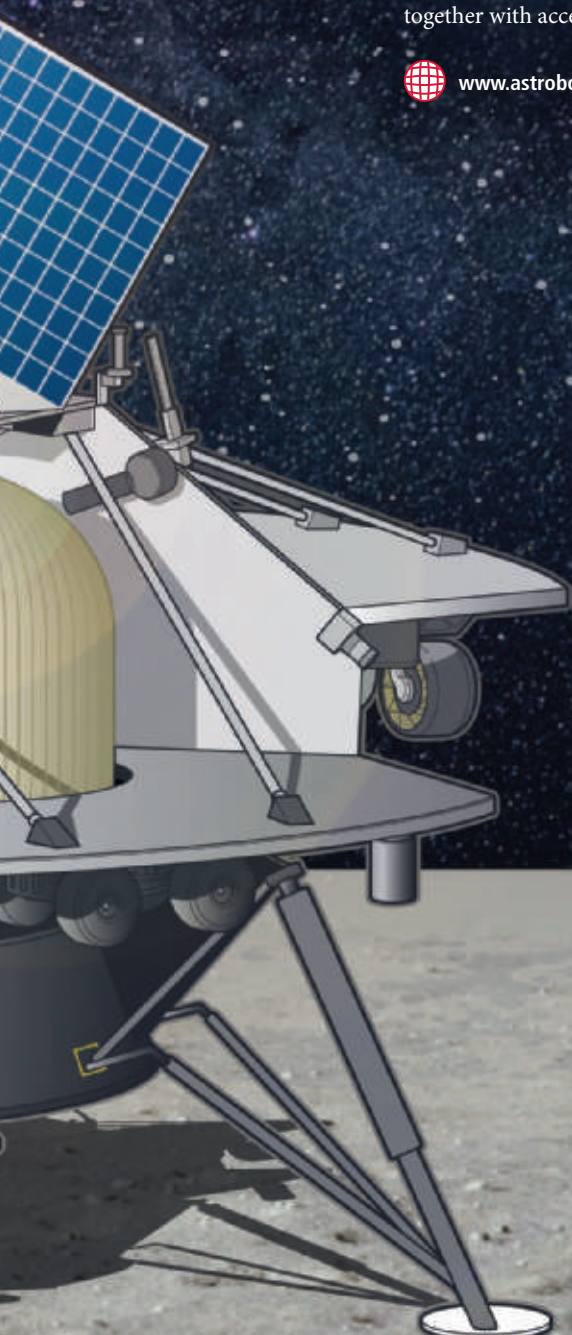
MISSION TO THE MOON

M eet the Peregrine Lander, a new spacecraft vehicle set to deliver cargo to the moon in 2019. Astrobotic's new lunar lander is designed to carry payloads for governments, companies, universities, nonprofits and individuals. Roughly the size of a compact car, it is powered by a cluster of five next-generation Aerojet Rocketdyne engines and can carry up to 260 kilograms of cargo at a rate of \$1.2 million per kilogram.

There is also a DHL MoonBox service that allows people to send keepsakes to the lunar surface, with prices starting at \$460. Peregrine will use the latest autonomous technology, together with accelerometers and on-board cameras, to carry out an automated landing. ■



www.astrobotic.com/lunar-delivery



80 CELSIUS

The max temperature the
Peregrine Lander will encounter
on the lunar surface

9 PAYLOADS

The number of cargo contracts
already signed up for the first mission



THE RISE OF THE CHALLENGING JOB INTERVIEW

How do you put a giraffe in a fridge? It sounds like a Christmas cracker joke – but it’s actually a Google job interview question.

Bend it sideways, fold its neck or chop it up are some of the usual responses. But the answer is more simple: open the door and lead it in...

Tech giants such as Google and Microsoft have a reputation for difficult job interviews, but now it seems that companies of all sizes and across many industries are using “curveball” questions to find the best cultural fit.

Most candidates expect the old standards at interview, such as “What are your strengths and weaknesses?” and “What makes you the most qualified candidate for this job?” But what is the correct response to off-beat questions such as “Who would win a fight between Batman and Spiderman?” The answer is, there is no right or wrong answer.

Known as “curveballs” (baseball terminology) for their ability to catch the candidate completely off guard, these questions are designed to see how fast someone can think on their feet, showcase their creativity and demonstrate how well they would respond in an unexpected situation.

By asking questions like the one at Google, the interviewer is trying to establish whether the candidate would overcomplicate procedures in their working life.

But do these off-the-wall questions actually pay off? According to a survey by recruitment company Glassdoor, they do. In fact, it found that more difficult job interviews are statistically linked to higher employ-

ee satisfaction across the six countries examined: U.S., U.K., Canada, Australia, Germany and France.

Overall, the survey found a job interview that is 10 percent more difficult is associated with 2.6 percent higher employee satisfaction later on.

This is due to the fact that tougher interviews help single out candidates that would be a better cultural match for the company. A good match leads to more productive work, which in turn creates higher job satisfaction.

Psychometric testing

Cultural fit is a critical factor for UKFast CEO Lawrence Jones, who looks for a specific set of characteristics in potential employees. He is a great believer in psychometric testing – the science of analyzing an individual’s character profile by asking a series of sometimes apparently random questions that unveil your motivations, strengths and weaknesses. “A good test asks a candidate questions allowing us to merely read what they say about themselves. There is no real right or wrong answer to the test, however, as we employ certain traits right across the business.”

The U.K.-based technology firm receives more than 10,000 applications a year, employing just 1 percent of applicants.

A popular aspect of psychometric testing is the Personality Test, which asks candidates questions to

10,000

The number of job applications received by tech firm UKFast each year

see which answer is most like them. In answer to “I like to react to things on the spur of the moment” or “I feel uneasy if I am center of attention,” candidates can select from five possible answers ranging from “strongly disagree” to “strongly agree.”

Creative agencies and the more entrepreneurial consumer, tech and media firms often include challenging questions that are designed to catch candidates off guard, according to Jules Shelley of global recruitment firm Ellwood Atfield, whose clients include eBay, English National Opera, the U.K. Financial Conduct Authority and Barclays Bank.

“They will combine this with lengthy interview processes, sometimes of 7-9 interview stages, to engage as many people in the decision making process as possible,” says Jules. Her favorite curveball questions include “what dinosaur would you have been” and “what chocolate bar would you be and why?”

“Clearly there isn’t a right answer to these,” says Jules. “A left-of-field question can catch people off guard so the interviewer is trying to assess how well people cope under pressure and how they deal with uncertainty.”

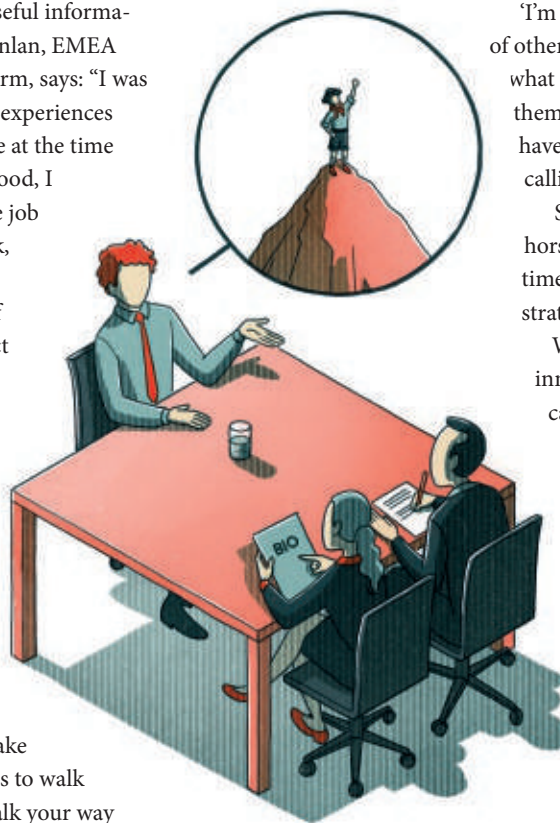
Childhood experiences

Even childhood experiences provide useful information for a potential employer. Tom Quinlan, EMEA Solutions Architect for a US software firm, says: “I was once asked out of the blue to detail my experiences as a Boy Scout. While it seemed strange at the time to bring up something from my childhood, I later found out that the reason I got the job was because I reached Eagle Scout rank, the highest position in the Boy Scouts of America program. Only 4 percent of scouts achieve this rank and it is subject to a lengthy review process. I suppose it proved that I was resourceful, determined and could get a difficult job done, even at a young age.”

Business coach Peggy McKee, CEO of Texas-based Career Confidential, and author of “How To Answer Interview Questions: 101 Tough Interview Questions” has advice for dealing with seemingly tough questions:

“If you get asked one of these, just take a deep breath and roll with it. The key is to walk them through your thought process. Talk your way through it, showing how you would approach, think about, or strategize about whatever situation they throw at you.

“So if I were asked what I would do if an airplane landed in the parking lot, I would say something like:



CURVEBALL QUESTIONS:

GOLDMAN SACHS:

How many square feet of pizza is eaten in the U.S. each year?

APPLE:

Are you smart?
Talk tech to me.

TRANSFERWISE:

Pick a color and describe it to a blind person.

RICHARD BRANSON:

What didn't you get a chance to include on your résumé?

TONY HSIEH, CEO OF ZAPPOS:

On a scale of one to 10, how weird are you?

‘I’m not sure I would do anything. If there are a lot of other people around and they look like they know what they’re doing, I think I would stay back and let them handle it. If no one’s hurt, I don’t see that I have to get involved in that at all, except for maybe calling 911.’”

She adds: “Immediate, ‘charge-in-on-a-white-horse’ action is not always the best move. Sometimes it’s more important to stop and create a strategy first.”

While most employers are on the lookout for innovative thinker, another top sellingpoint in a candidate is honesty. However, research from TPP Recruitment shows that as many as one in five jobseekers admits to lying on their CV by embellishing their achievements.

Safeera Sarjoo, an editor at Hotcourses, which lists education programs around the world, says: “I’ve had a couple of bizarre questions during interviews but one really stands out to me. During an interview at a local newspaper, the editor asked me what I had lied about on my CV. It was definitely a curveball, but I looked straight at him, holding his gaze firmly and simply replied ‘Nothing.’

“I don’t know if he was trying to see if I would falter,” says Safeera, “but I think these more creative approaches are ways that interviewers can get a much better sense of what a candidate is really like.” ■ Angela Singleton

VIEWPOINTS



DELIVERED. BUILDS A BETTER ROBOT WITH ...

GORDON CHENG

The pioneering creator of mind-controlled robots tells us why society and business have everything to gain and nothing to fear from the development of humanoids.

Professor Gordon Cheng has been interested in robots for as long as he can remember. “I’ve never completely analyzed why,” he says. “I’ve always been fascinated by things that move and the idea that you can construct something that can come to life, be mobile and communicate with people. It fits with my personality, too. I take apart every machine I get to find out how it works.”

Cheng is founder and director of the Institute of Cognitive Systems (ICS) at the Technical University of Munich (TUM) in Germany, and during his career he has been attributed with pioneering breakthroughs in the field of humanoid robotics. For example, Cheng has given robots the sense of touch via an artificial robotic “skin” – hundreds of small hexagonal cells loaded with microprocessors and sensors that can, for example, recognise changes in temperature, pressure and proximity to other objects. After all, skin is an important sensory organ for humans, he points out. It makes sense that it should be for robots, too.

Plus, under a collaborative initiative called the Walk Again Project with U.S.-based Professor Miguel Nicolelis, he co-created a mind-controlled robotic suit – an exoskeleton made of titanium, aluminum and steel – that helped a paraplegic man, Juliano Pinto, kick a ball at the 2014 World Cup opening ceremony in Brazil. “I felt that moment was the beginning of something beautiful,” remembers Cheng. “At the time, many people didn’t believe that the exoskeleton would work; but it did and clearly showed benefit to Juliano.”

Born in Macau and raised in Australia, Cheng initially worked in logistics as national IT manager for a transport company. On completing his Ph.D, however, he moved into robotics research, learning about the science of the brain and founding the department of humanoid robotics and computational neuroscience at the Advanced Telecommunications Research Institute in Kyoto, Japan. He has been conducting research into, among other things, brain-controlled robotics at the Institute for Cognitive Systems since 2010.

Cheng’s real passion is for creating humanoids – robots that take human form. “Robots come in many shapes and sizes,” he says. “They can be industrial machines, or come with wheels, for example. But the robots I like to build are the ones that have human form. It’s one of the most challenging things to do.”

Tell us more about the work you do at the Institute for Cognitive Systems.

When I started my work here I wanted to achieve two things: create better technology through new understanding of the brain; and understand the brain better through the creation of new technology. So there’s a scientific element and an engineering element to our work. In the end, though,

7

The number of years, on average, that it takes Professor Cheng to build one humanoid robot

6

MILLION

The number of sensory receptors on the human body. There are 600 of the artificial skin cells developed by Professor Cheng (each equipped with nine sensors, making 5,400 sensors altogether) on one robot arm

what I’m most interested in is using robotics to create a societal impact. That’s why I want to make mind-controlled exoskeletons that could benefit spinal cord injury patients, for example, and those with neurological conditions. If what we do here could have a positive effect on 20 million people around the world, then that would be the most wonderful thing.

Why are you so focused on creating humanoid robots?

It occurred to me years ago that a humanoid robot would be able to interact with humans more easily. The environment in which we live is constructed for humans, so we wouldn’t have to adapt it; and, by studying this technology, it’s possible to take our findings and make life better for human beings. The exoskeleton came from our work on humanoid development, for example.

Why have you created artificial skin for robots?

In most industrial environments, robots are kept behind barriers and humans don’t make close contact with them because it’s not safe to do so: there’s risk of collision. I think skin is the missing component because its sensors will help detect collisions and so make robots safer and more interactive.

Will robots ever be indistinguishable from humans?

I think that will happen in the far, far future. Appearance-wise we can do it now: a dummy that doesn’t move can look just like a human, but functionality is still very difficult. Robots with human cognitive capacity would also require a substantial breakthrough. And it probably wouldn’t involve the technology we are currently using. So I wouldn’t want to bet on that one! I think all the interest surrounding AI is great, though: it’s pushing technology forward.

Do you have any concerns about how robots could affect employment?

Look at the initial reaction people had to computers. They thought their jobs were under threat but, in the end, the computer revolution has been more positive than negative for society. In fact, it has created more jobs. It’ll be the same with robots. Once the robot becomes more functional and more reliable, it will be able to assist us in our daily lives and do the things we don’t want to do any more, or complete tasks that are damaging to us. Humans will still be able to do the tasks that require emotional thought and decision-making. Robots will come. It’s just that they haven’t found their niche yet.

How do you think robots will develop in the logistics industry?

I recently saw a last-mile case study where robots were carrying goods down the road and delivering them to households. That makes a lot of sense because the technology is mature enough for it to be reliably deployed. People will get used to robots like these and treat them like any other device. There are other demanding areas of logistics where robots help, such as lifting heavy objects for example. That will develop further. ■ Tony Greenway



How Inclusive Leadership Can Accelerate Innovation

It is well known that organizations with a diverse workforce outperform more homogenous organizations. According to McKinsey's 2015 study "Diversity Matters," companies in the top quartile for gender or racial and ethnic diversity are more likely to have financial returns above their national industry medians. Companies in the bottom quartile in these areas are statistically less likely to achieve above-average returns.



AN ESSAY BY DENISE PIRROTTI HUMMEL, J.D.

Denise Pirrotti Hummel is the Chief Innovation Officer of Lead Inclusively, Inc., a firm that provides professionals with a road map to inclusive leadership as a means to support tangible business results.

The correlation between a diverse workforce and improved financial returns does not equate to causation (in other words, greater gender and ethnic diversity in corporate leadership doesn't automatically translate into more profit) – but it does indicate that when companies commit themselves to diverse leadership, they can be more successful.

What makes diverse organizations perform well, however, is not just the number of women and minorities they employ. It's about how included these diverse individuals are in key decision-making activities and how organizations value their contributions. It's also to what extent they rise to senior leadership so that their voices are more likely to translate into meaningful organizational

transformation and provide inspiration to others in the diversity talent pipeline.

According to a 2013 Corporate Executive Board and Center for Talent Innovation study, the "inclusion" part of the "diversity and inclusion" equation is a key enabling or limiting factor. Inclusive leadership behaviors effectively unlock the innovative potential of an inherently diverse workforce and increase the likelihood (by as much as 158 percent) of innovating effectively.

Organizational leaders must ask themselves if they provide an environment that encourages diverse people to express their ideas so the motivation to share different ideas thrives. When individuals on a team feel their opinions are valuable and sought after by their leader, they allow themselves the luxury and the discipline of

sharing ideas without creating a self-induced filter regarding ideas that aren't in sync with prevailing thought or the historic ways of doing things.

In the absence of inclusive leadership, employees will often do the minimum necessary to achieve their own individual performance goals, rather than see themselves as instrumental to organizational performance and growth.

So how should organizational leaders practice inclusion? The three "Rs" of inclusive leadership provide a framework to move the needle on the connection between inclusion and innovation:

1. Receptive: Seek out opinions and viewpoints on a regular basis.

Most leaders consider themselves receptive. The reality is that if we do not seek out diverse opinions on a regular basis and make that part of the structure of our meetings – as well as the way our team is evaluated – then our self-perception does not always align with the reality of our day-to-day team interaction.

Encourage sharing different opinions and viewpoints during team meetings by incorporating the concept into every team agenda. Incorporate formal KPIs or performance goals that reflect the importance, accountability and appreciation of new ideas about products, services and internal process. Consider using interactive technology such as gamification to challenge the team to share ideas. In the absence of direct and discernible goals, "group-think" and reliance on the historical way of doing things will be the norm.

If team members know their performance evaluation will be, in part, dependent upon their contribution, even in the face of a less-than-popular point of view, the chance of hearing diverse ideation increases dramatically.

2. Revitalizing: Listen for the silence.

Find ways for the quieter voices in the team to be heard. Look around the room. When was the last time you heard each team member's voice? Are there some team members who manage to be heard, no matter what? Are there some that seem to have nothing to say?

Assuming that your organization chooses its talent carefully, the chances are pretty good that silence does not mean there is no point of view. Rather, it may be a personality or cultural style that does not easily permit contribution without that voice actively being requested. Ask, "Is there anything you'd like to share about this subject?"

For especially shy or introverted team members, consider giving them advanced notice that you'd like to hear from them at the next team meeting. You may be amazed.

3. Reflective: Keep decision-making honest and transparent.

When an idea offered by a team member is not acted upon, or a decision is made that could result in the appearance that a certain team member is being favored over others, inclusive leaders explain the "why" of their decision to their team, honestly and transparently. Nature abhors a vacuum. In the absence of direct information about why a decision is made, team members are left to speculate about the "why" and will freely attribute a decision to cronyism, or to the fact that the person chosen happens to share the same viewpoint as the leader. In the age of technology, the final decisions are often transmitted virtually and announced by email or newsletter, leaving a team without personal interaction with their leader regarding the nuances of the decision.

If all factors have been included, especially those related to diverse thought that goes against the mainstream, then call that out before the decision is announced. If not, then reconsider the basis of the decision before announcing it.

The outcome of inclusion

While every organization is different, small changes in inclusivity seem to have exponential results. For example, I recently challenged a client to take one singular action in each of the categories above and to survey the outcome, including asking an open-ended question relative to how team members felt about the changes that were instituted.

One of the actions they took was that a cloud-based receptacle for ideas was established. Entries were coded in such a way that ideas could remain anonymous or could be revealed by the idea donor. Team members could anonymously vote and they could also comment or clarify an idea. A gaming component was added whereby digital badges could be collected. When a certain number of badges were obtained (regardless of the identity of the donors), the team was rewarded with a team dinner, courtesy of the company.

In addition to the fact that many process improvements took place and several new service ideas moved forward to be vetted, the overwhelming majority of the comments reflected a feeling of excitement, optimism and engagement, including one team member who exclaimed, "Can we please shut down the portal over the weekend? My husband is getting really annoyed because I keep getting up in the middle of the day to input an idea that I dreamt about that night!" To which the team leader responded, "All our teams should all have such problems!" ■



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WHAT'S THE STORY, MR. HARTIKAINEN?

TRUCKING IN STYLE

Tuomas Hartikainen, a Finnish truck driver with a luxuriously customized rig, on why cool design is a driving force in his life...

Truck driving is not a job. It's a lifestyle – the perfect mix of challenge and freedom. I've been driving trucks since 2000 and I've worked for DHL since 2005.

There are always issues to overcome in this business – the weather, difficult traffic or problems with equipment – and only long-distance truckers really know what it's like to be lonely, because Finland is a sparsely populated country. The upside is you can meet and make some very good friends on the road. When I'm driving, country music and good old rock 'n' roll always get me in a good mood. My vehicle, usually with a 48-ton DHL semitrailer, is easy to spot. I've got lights

plastered across the front of the rig and there are scenes from the Pixar movie Cars on the doors, designed by Finnish artist Simo Riikonen. Why Cars? Well, I'm a big fan of movies and autoracing and the story of McQueen, the main character in the movie, is a like a carbon copy of my life!

I like comfort, too, so I've turned the interior into a luxury living room, with leather seats, soft lighting, a table, curtains on the windows and decorative stitched leatherwork on the floor and walls. I did the design myself. I haven't customized my rig to "stand out" because the "showtruck" scene is so big in Scandinavia and there are lots of cool trucks on the roads. But, of course, it's nice to go in style! ■

5.5 million

The entire population of Finland, where Tuomas makes most of his long-distance deliveries

82 feet

The total length of Tuomas' vehicle combination when an additional "b-link" trailer is attached to it





20,000

The amount of environmentally-friendly new StreetScooter electric delivery vans that can be produced annually as of the end of this year. The pioneering vehicle was designed and developed by Deutsche Post DHL Group together with its subsidiary StreetScooter GmbH to cope with up to 300 stops and starts each day for mail and parcel deliveries. StreetScooter has an electric motor, powered by a lithiumion battery and reaches a

maximum speed of 80kph (50mph) and a range of 80 kilometers. In response to a large number of market inquiries, DPDHL has now decided to sell its own electric vehicles – which have so far been optimized for postal operations and delivery purposes – to third parties.



www.streetscooter.eu

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