

Delivered.

THE GLOBAL LOGISTICS MAGAZINE

ISSUE 03/2018

BUSINESS

WINDS OF CHANGE

Discover what social reforms mean for business in Saudi Arabia

SOLUTIONS

ONLINE CHECKOUT

Understand the top trends shaping global e-commerce

VIEWPOINTS

POWER TO THE PEOPLE

Learn about a young Rwandan entrepreneur's green energy business

The background of the entire page is a complex molecular structure. It features a central, glowing blue rectangular prism with rounded edges. A double helix structure, resembling a DNA molecule, is wrapped around the prism. The background is dark blue with various hexagonal and circular patterns, some containing the letter 'H' and others containing chemical formulas like 'C8H11' and '2C2H11'.

GOOD FOR YOUR HEALTH

How digital innovation is transforming healthcare provision



DEAR READER,

Technological innovation is always extraordinary – but perhaps its best, most important application has been to help us live longer, healthier lives. Take digitalization. This is a process that has disrupted many industries and now offers a range of attractive solutions for the life sciences & healthcare sector, such as the quest for new approaches to healthcare delivery. Our focus article **The transformation of healthcare** dives deep into an industry on the threshold of change.

For Alessandro De Luca, Chief Information Officer of Merck Healthcare, digital transformation has one simple quest: improving the life of the patient through digital solutions – and he sees the supply chain as central to this effort, as he explains in our **Executive view**.

Online fashion innovator Farfetch meanwhile has been at the forefront of a digital revolution in luxury retail, connecting major fashion houses and niche boutiques with fashionistas all over the world. **The logistics of luxury** explains its growing success.

Huge transformation is taking place on virtually every level in Saudi Arabia. From the digital to the social realm, the conservative kingdom is seeking to open up its society and diversify its economy through a raft of reforms and strategic investments on an unprecedented scale. Our country focus **Driving change** explores the changes and gives you an inside view.

I hope you enjoy our latest issue!

Sincerely,

Katja Busch
Chief Commercial Officer, DHL

Cover photo: Lev Dolgachov/colourbox



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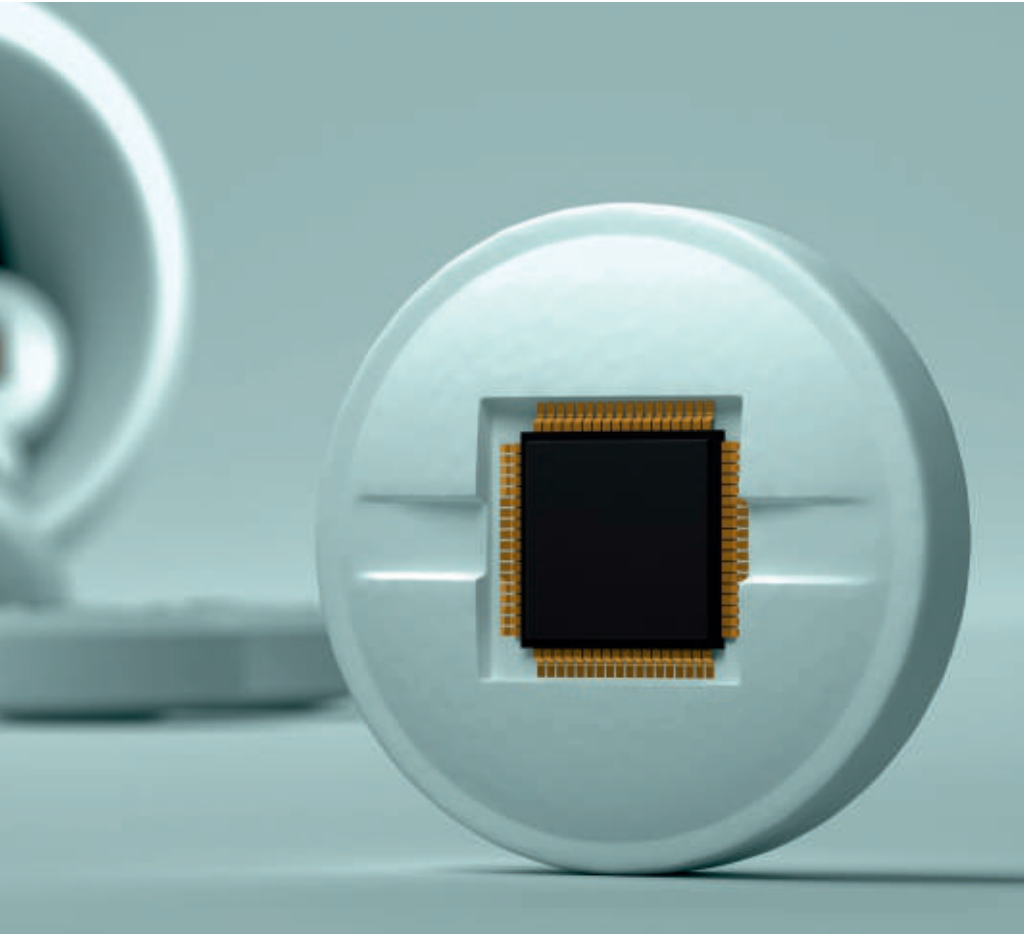
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www.delivered.dhl.com





BREAKING NEW GROUND

DHL has begun construction of its newest Innovation Center, its third worldwide, in Chicago. Joining locations in Germany and Singapore, the U.S. site will serve as a stage for the development of future supply chain and logistics technology across the Americas region. "With our third Innovation Center worldwide, we will be able to create a platform for research and collaborative innovation between DHL customers, startups, academia, industry partners and innovation experts in the Americas," said Matthias Heutger, Senior Vice President, DHL Customer Solutions & Innovation, while at the building's groundbreaking. "Our new Americas

Innovation Center – in close proximity to some of the world's most dynamic technology and innovation hubs – will help us to shape the future of logistics." The flagship Americas facility will offer visions of how transport infrastructure might look in 2050, as well as leading designs in fields such as robotics, virtual reality and the internet of things – all of which will already be implemented or in testing by the Deutsche Post DHL Group. Set to open in summer 2019, DHL's Americas Innovation Center will total 24,000 square feet and be open to the public and industry alike.



CHARGING AHEAD

Sweden has launched the world's first electrified road capable of charging vehicles as they drive along it. The two-kilometer stretch of highway, which links Stockholm's Arlanda airport with a nearby logistics site, uses rails in two sunken tracks to transfer charge to vehicles that have a flexible arm on their underside, much like trams are powered by overhead cables.



www.eroadarlanda.com

IN THE DRIVING SEAT

A Middle Eastern taxi app has signed up more than 1,000 women in Saudi Arabia. The drivers, or captains, as they are called, have been hired by ride-hailing app Careem, which is based in the United Arab Emirates. All have undergone its 90-minute training sessions in Riyadh, Jeddah and Al Khobar, having acquired valid licenses while driving abroad. Careem has plans to sign up more than 10,000 female captains eventually. Rival app Uber is also recruiting and plans to open “one-stop shops” dedicated to taking on female drivers. Many Saudi women currently do not use ride-hailing apps, as all drivers are male. Careem says its female drivers will only drive women or families.



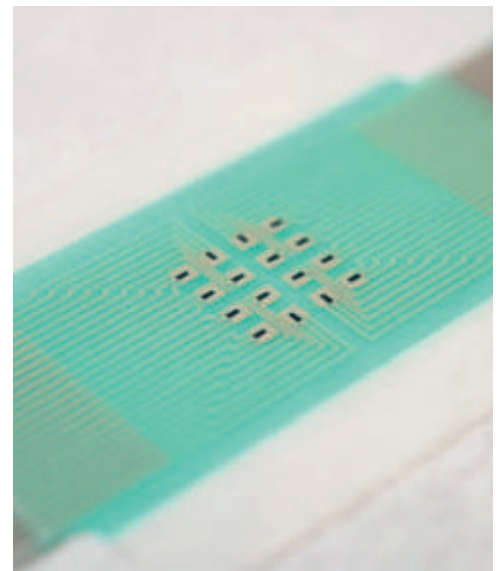
VIENNESE WHIRL

Plans are underway for a new DHL logistics hub in Vienna to serve as a central gateway into Eastern Europe for DHL Global Forwarding and DHL Freight. The two have jointly signed a deal to buy 60,000 square meters near Vienna Airport for the development of a DHL Campus, thereby streamlining the two businesses and offering greater efficiencies.



TRAINING TAKES A VIRTUAL LEAP FORWARD

Virtual reality (VR) continues to provide innovations in many areas of business – now it’s helping new employees undergo faster training. DHL Global Forwarding is using virtual reality headsets to train new employees in Chile. The pilot scheme, created in partnership with Chilean tech startup Imova, uses Samsung Gear VR headsets and the Santiago-based company’s own training tools to help new starters get acquainted with their new workplace much more quickly. The process uses games and augmented reality tours that allow the workers to learn new processes and get feedback on where they may be making recurring errors.



DIABETES BREAKTHROUGH IS A BLOODLESS COUP

Researchers at Bath University have developed a new adhesive patch that uses an array of sensors to measure glucose levels in fluid across hair follicles on the skin. Crucially, the patch doesn’t need calibration with a blood sample. The team at Bath hopes the patch – already tested on healthy human volunteers – can eventually become a low-cost, wearable sensor that can send data to a user’s phone or smartwatch.



\$319
BILLION

The volume that mobile commerce is predicted to reach by 2020. (source: Javelin Research)

 bit.ly/mobile-commerce-javelin



MAKING WAY

StreetScooter GmbH is speeding ahead in the world of electric transport technology – and Ford Motor Company is joining the ride. In an effort to assist the green automobile manufacturer meet widespread customer demand for its line of carbon-friendly transport vehicles, Ford Motor Company will leverage participating Ford Transit Centers across Germany to handle the sale and service of the same StreetScooter delivery vans already in use by Deutsche Post DHL Group to third parties. “Ford’s commercial vehicle expertise, together with certified training courses in handling and servicing electric vehicles, provides an excellent basis for the further market success of our e-van portfolio,” said Achim Kampker, Business Unit Manager for Electromobility, Deutsche Post DHL Group and CEO of StreetScooter GmbH. “Together with the existing dealer network, the StreetScooter is now available at over 80 sales locations nationwide.” Currently there are more than 5,500 WORK and WORK L StreetScooter models in operation at Deutsche Post DHL Group, and it is estimated that the green fleet has traveled more than 20 million kilometers to date on deliveries while preventing, on average, 18,000 metric tons of carbon dioxide annually.

The Logistics Trend Radar



ON THE RADAR

DHL's 2018 Logistics Trend Radar, the fourth in its pioneering series, reveals 28 key trends that could impact the logistics industry in the next five to ten years. The 2018 report reveals in depth what sectors will be affected by developments and the corresponding time frames for their potential impact over the next decade. Notably, the 2018 Trend Radar spotlights artificial intelligence and robotics/automation as potentially game-changing technologies for supply chain management in the coming years. Additionally, the aging workforce, e-commerce and sustainability are behind three other top trends, digital work, green energy and omnichannel logistics, which are set to have a large impact on industry professionals in the future. The trend radar is a dynamic tool for future scenario planning, strategy development and innovation.



Download the white paper at:



www.logistics.dhl/innovation

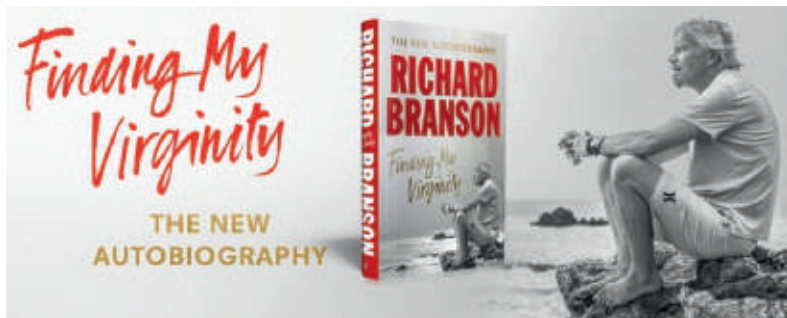
HELPING E-TAILERS GROW IN EUROPE AND BEYOND

DHL Parcel and DHL eCommerce have launched a new platform to enable retailers to pursue their European e-commerce strategy and expansion into new B2C markets. With the newly launched fulfillment platform, retailers can benefit from DHL's European and worldwide footprint to add a depth and expanded network to their businesses that many would not be able to afford on their own. It provides seamless access to a network of fulfillment centers in Europe and across the globe, all closely integrated with DHL's shipping capabilities.



www.dhl.de/en/fulfillment





WIN!

"Finding my Virginity," a new autobiography by Sir Richard Branson, offers a direct look into the adventures of the world-famous entrepreneur and philanthropist. If you'd like to win one of five copies of this book, go to delivered.magazine@dhl.com and tell us about someone who inspires you to make the world a better place.



POINT A TO POINT B

A new program from DeepMind, Google's AI research group, has bested expert humans in a navigation skills challenge with brain-like cognitive methods. DeepMind's AI mapped optimal routes using layers of artificial neurons modeled to function like "grid cells"—the very cells relied upon for direction by humans and mammals. Neuroscientists believe this breakthrough in AI will lead to more effective ways of charting the mind-body relationship.



www.deepmind.com

TURN ON, PLUG IN, SHOP OUT

Three plug-ins – Shopify, WooCommerce and Magento – are allowing DHL customers to ship with ease using features such as simple label generation and tracking IDs. The plug-ins are available for the world's most ubiquitous e-commerce platforms.



The percentage of tech giant Apple's retail outlets, data centers and corporate offices – including its new \$5 billion headquarters in California – that now run on clean energy



bit.ly/apple-renewable

OCTOBER

15-17

The date of DHL's 2018 Global Engineering and Manufacturing Conference – this year in Dallas, Texas – with the theme "Supply Chains for a New Industrial Age."

It's a chance to learn from expert insights and best practice examples in manufacturing supply chains, through engaging speeches and interactive workshop sessions.

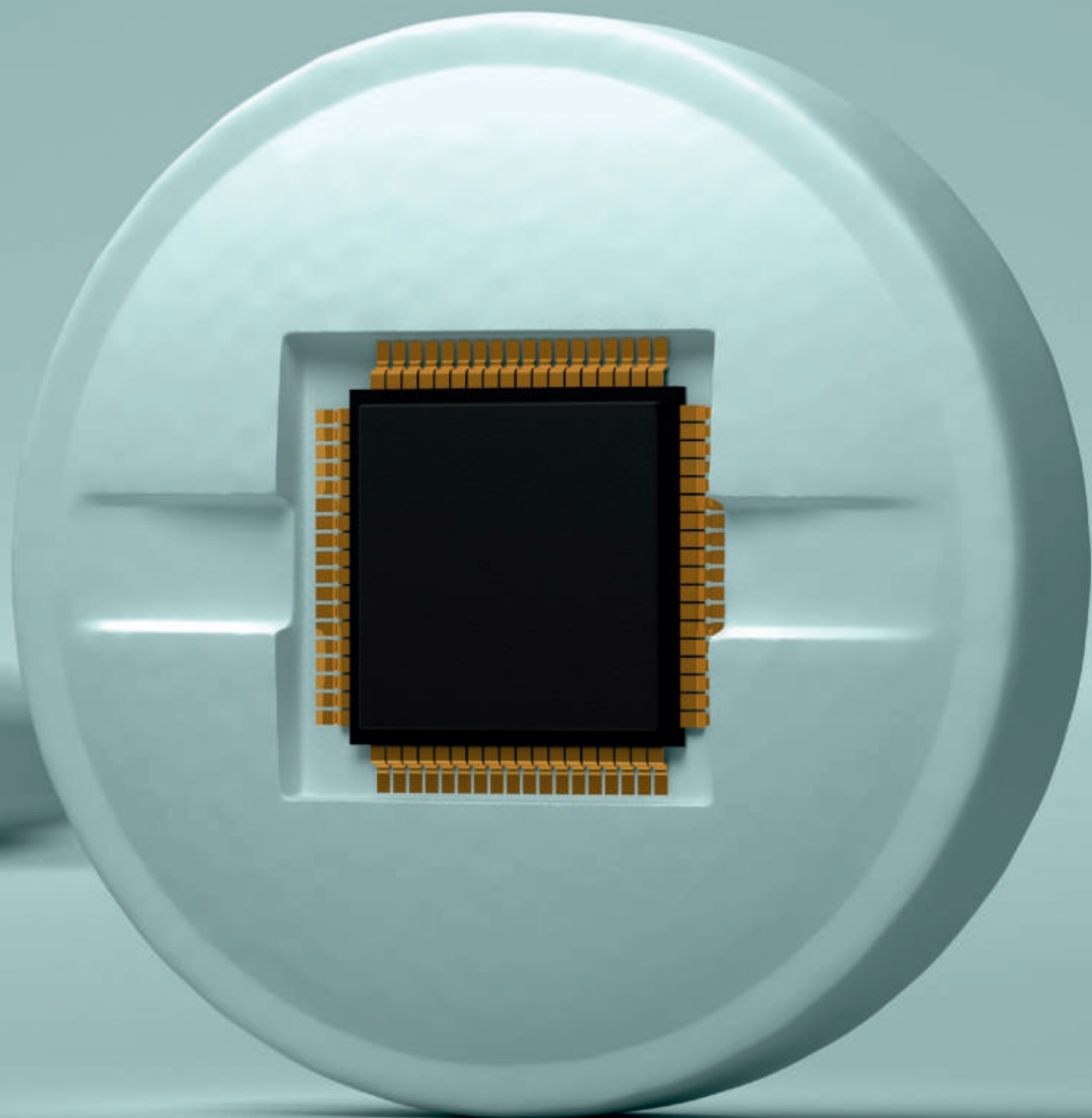
NOVEMBER

1

The 6th DHL Global Energy Conference will take place in Houston, Texas. Since 2013, industry leaders have gathered in Houston to meet and reconnect, share knowledge, exchange ideas, and hear from challenging and thought-provoking experts.

THE TRANSFORMATION OF HEALTHCARE

Healthcare provision is on the verge of a technology-driven transformation. It promises lower costs, better outcomes and a more personalized experience for patients.





TAKING THE TABLETS:

Digital pills allow the safe delivery of precisely controlled doses of medicine.



\$2.6 BILLION

The predicted value of the 3D bioprinting market by 2024

Around the world, healthcare systems are struggling in the face of rising demand and spiraling costs. And the reasons are complex and varied. Partly, it's because healthcare providers have so much more to do. The populations of rich countries are aging inexorably. That means millions of older patients, who tend to have more frequent and more complex healthcare needs. Partly, it's because providers can do so much more. The life sciences sector continues to make strides in its ability to treat and manage a broad range of diseases and conditions, but many of those new treatments are extremely expensive to deliver. Partly, it's because people expect much more from their healthcare providers. In emerging economies, millions of people are demanding better access to healthcare provision. And as people from the wealthy baby boom generation enter old age, they aren't willing to sacrifice the convenience and high levels of service they have come to expect in other parts of their lives.

These pressures are raising difficult economic and ethical questions for the sector, and for society as a whole. How should healthcare resources be allocated? Who is going to pay the bills? They are also forcing the sector to explore entirely new approaches to healthcare delivery.

And when it comes to problems that combine scale, complexity and tight cost constraints, there's one obvious place to look for solutions. Digitalization has already shown that it can disrupt industries and define new service paradigms, offering people cheaper, more

compelling and more personalized services in sectors from transportation to entertainment.

"The potential for digital technologies to help reduce the cost of healthcare services, while also improving outcomes for patients, is phenomenal," says Scott Allison, President, Life Sciences & Healthcare, DHL. In particular, he highlights four major trends that show how digital or digitally enabled processes have the potential to transform healthcare delivery.

The internet of things

First, there's the internet of things (IoT). Robust, accurate, low-cost sensors and secure communication technologies allow people to collect and store unprecedented amounts of health-related data. These technologies are already common in consumer products. Accelerometers in smartphones track activity throughout the day. Watches measure heart rate, body temperature and sleep patterns. More specialized devices can measure and record a host of other attributes, from glucose to blood oxygen levels.

The availability of this data, collected non-invasively and in real time, is transforming the management of long-term medical conditions. It is also rewriting the traditional contract between doctor and patient. IoT technologies can reduce the need for patients to visit their doctors for tests, while also providing new insights into symptoms that vary over time. Continual monitoring can help to pick up potentially dangerous changes in the patient's condition faster, allowing timely intervention. And perhaps most significantly, monitoring helps patients to help themselves, giving them the data they

need to manage their own health more easily and more effectively.

In November 2017, the U.S. Food and Drug Administration granted approval for the first drug that uses an ingestible tracking system. Abilify MyCite tablets, a treatment for schizophrenia and bipolar disorder, each contain a tiny sensor that is activated by contact with digestive juices in the stomach. A patch on the patient's skin picks up signals from the sensor and communicates with a smartphone app. The system helps patients track their own use of the medication, and they can also allow care providers to monitor their use through a web-based portal.

"This sort of technology could eventually have a big impact on treatment outcomes," says Allison. "Even the best drugs only work if patients use them, and non-compliance with treatment plans, especially for long-term conditions, can be a major contributor to poor outcomes."

Big data and AI

The second major area of digital opportunity is big data. Modern medicine has always been data-driven. Doctors make clinical decisions informed by the results of large-scale studies and trials. And recent advances in the study of the human genome are revealing how genetic differences affect both an individual's susceptibility to particular diseases and their response to different treatments.

When it comes to picking the right treatment options for each patient, however, medical professionals need to know they are basing their decisions on the most relevant research. As medical databases contain millions of separate references, that can be a formidable task.

This is where artificial intelligence (AI) can help. Advanced AI technologies are accelerating the process of searching medical literature and matching the symptoms and attributes of individuals with previously documented cases, treatments and outcomes.

"Combining 3D printing with smart monitoring, advanced analytics and AI could create an entirely new paradigm."

Andrew Mitchell, Vice President Life Sciences and Healthcare EMEA, DHL

In a 2015 proof-of-concept study, researchers at the New York Genome Center sequenced the DNA of a tumor in one patient, along with the DNA of normal healthy cells. Then they used a beta version of IBM's Watson for Genomics AI system to search for information on the specific mutations identified in the tumor, while their own team of experienced oncologists did the same thing manually.

The machine won the race with ease. After searching its database of more than 27 million citations, the IBM system produced a report of "potential clinically actionable insights" in less than 10 minutes. The human researchers took 160 hours to reach a similar set of conclusions.

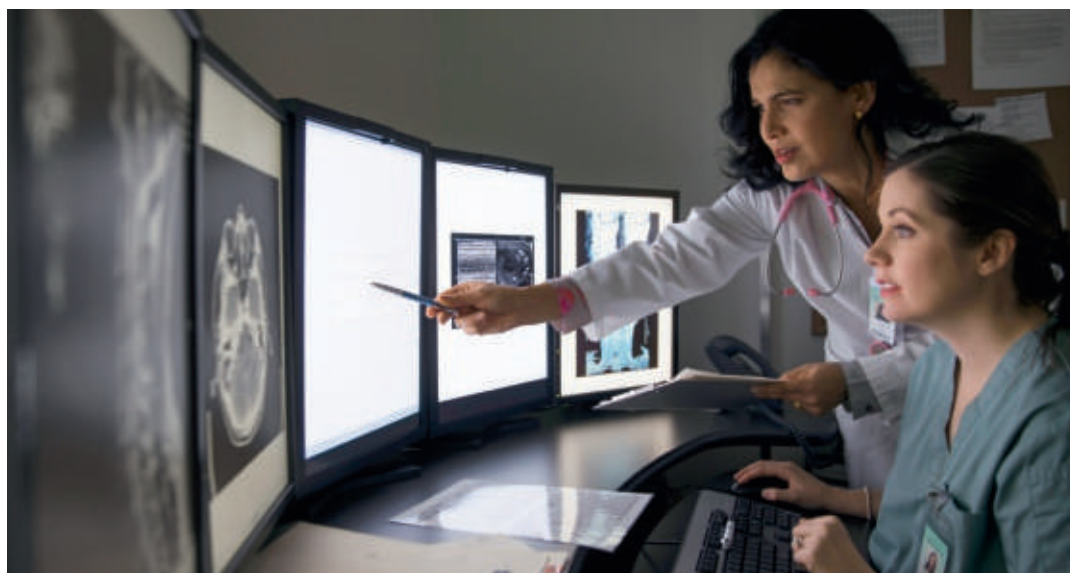
Elsewhere, drug manufacturers and researchers are using an array of new data sources, from climate models to internet search results, to improve their ability to predict disease outbreaks and spikes in demand. As these approaches become more sophisticated, and their results more accurate, they are helping companies and health-care providers to take a more proactive approach, for example by ramping up production of specific products or shifting inventories to affected regions.

Digitally enabled manufacturing

Digital technologies are reshaping the drug manufacturing process too. In 2016, U.S.-based Aprelia Pharmaceuticals was the first company to gain regulator

SCREENING PROCESS:

Big data is a major area of opportunity for the healthcare sector.



14 PERCENT

The forecast annual growth of the European e-commerce pharma market

approval for tablets manufactured using 3D printing technology. The company's ZipDose system uses a proprietary printing technique to create pills with a porous structure that dissolve rapidly in the mouth. The technology is designed to allow the safe delivery of precisely controlled doses of medicine to patients who have difficulty swallowing a normal solid-dose tablet.

Research teams across the world have other ambitions for 3D printing technologies, however. They hope such technologies will allow the creation of highly personalized medicines, with doses and release characteristics tuned to the needs of individual patients or multiple products combined into a single pill. And 3D printing technologies that allow drug ingredients to be transported separately and combined only when the fi-



GOOD MEDICINE:

The manufacture of pharmaceutical products is set to become a much more decentralized activity.

nal tablet is manufactured may help to simplify the distribution of sensitive pharmaceutical products. FabRX, a spinoff from University College London, for example, is using a range of 3D printing technologies, including fused deposition modeling, selective laser sintering and stereolithography, to create "Printlets": pills or chewable formulations containing various drugs. Other researchers are exploring the use of 3D printing techniques to create custom medical devices, tissue for transplantation and even complete replacement organs. According to a recent report by Grand View Research, the global 3D bioprinting market will reach \$2.6 billion by 2024.

"Combining 3D printing with smart monitoring, advanced analytics and AI could create an entirely new paradigm," says Andrew Mitchell, Vice President Life Sciences and Healthcare EMEA, DHL. "Today, getting the medication right for somebody with a long-term health condition is often a matter of trial and error. "That involves significant time, effort and expense, not

to mention the impact on the patient's quality of life. In the future, we will be able to use data from the patient's genome to identify the combination of drugs that is going to work for them, and then we will be able to manufacture a personalized medication that contains the right products in precisely the right dosages."

Going directly to the patient

The fourth big opportunity is in the supply chain. In the retail world, e-commerce technology has driven a large-scale switch to self-service, direct-to-consumer delivery. The healthcare sector, by contrast, remains largely a bricks-and-mortar operation. It's an unusually labor-intensive one too. Even for straightforward conditions, patients may have to visit their doctor to pick up a prescription, then go to a pharmacy, which could be several miles away, hand over the script and wait in line for their medication to be prepared.

The disadvantages of this approach are obvious, especially for patients for whom travel is difficult or expensive, such as the elderly and people in remote rural areas. It's no wonder that interest in internet-enabled ordering and direct fulfillment of drugs and other healthcare products is rising rapidly.

The U.K.'s National Health Service (NHS) introduced its Electronic Prescription Service in 2013. The system is designed to streamline a number of stages in the prescription supply chain, allowing doctors to send prescription information to pharmacies electronically, and patients to manage repeat prescriptions for long-term conditions online. The system also allows patients to order their medicines online from approved pharmacies and have them delivered directly to their home.

The NHS says the new approach has cut the costs associated with prescription management and fulfillment by £130 million (\$176 million) a year since its introduction, and that the reduction in paperwork saves pharmacies around an hour and a half every day. In March this year, the NHS announced that it was extending the use of electronic prescriptions to urgent care settings, such as hospital minor injuries units and out-of-hours medical services. Healthcare providers are embracing other forms of internet-enabled service delivery too, allowing patients to consult their doctor via video link, for example.

Scaling up the digital transformation

These digital innovations clearly have the potential to transform the individual patient's experience. It is now possible to envisage healthcare systems where every doctor has access to artificial intelligence systems to aid diagnoses and recommend treatment options. The chosen treatment might be completely personalized, manufactured using 3D printing technologies and delivered direct to the patient in their home. And once treatment begins, its effectiveness will be monitored

by internet-connected devices, with doses and drug combinations continually adjusted depending on the patient's response.

The transition to such a world will have implications for the entire healthcare value chain, however. The manufacture of pharmaceutical products may become a much more decentralized, distributed activity, for example, with pharmacies taking on new roles as miniature drug factories. Other services may be more distributed too, with patients receiving consultation, diagnostic tests and treatment at their homes and workplaces.

That shift will challenge the industry. Regulatory barriers to the direct distribution of drugs and other medical products will have to come down. The industry will need to find new ways to ensure product quality, safety and data security. Supply chains and logistics processes will need new structures, new processes and new management approaches.

“The life sciences and healthcare sector has always been bold in its application of cutting-edge science to meet the needs of its patients,” concludes Allison. “But now the sector needs to be bold in other ways too. Digitalization is going to transform the way healthcare products and services are designed and delivered. The successful application of these approaches at scale will depend on the availability of the right infrastructure to support them. Companies need to start experimenting now with new technologies and new approaches in their supply chains and logistics processes, as well as in their products.” ■ *Jonathan Ward*

OFF THE SHELF:

Warehouse automation will improve the productivity of pharma operations in future.



1. What is driving the digital transformation of the life sciences and healthcare sector?

The industry is tackling some extremely complex challenges. It needs to provide better, more personalized care to more people at lower cost. Digital technologies have the potential to help it do all those things. And while that potential has existed for some time, it is only today that some of the most exciting digital technologies are becoming sufficiently capable, robust and reliable to work in the healthcare context.

2. Where do you see digitalization having the biggest impact in the coming years?

I believe that the impact of digitalization is going to be universal. You only have to look at the extraordinary range of technologies that leading players are adopting today, from artificial intelligence and advanced analytics in diagnostics to 3D printing and sophisticated automation in manufacturing. The industry is only just beginning to explore some exciting new ideas, like the use of blockchain technologies to improve product identification and maintain security in the supply chain. And in the logistics space, there's huge potential for companies to use technologies, from advanced track and trace systems to warehouse automation, to improve the productivity, reliability and responsiveness of their operations.

3. Are there still barriers that the industry needs to overcome in order for digitalization to deliver its full potential?

Of course. New technologies always create new risks, and the healthcare sector will need to adapt and develop new ways of working to accommodate these new approaches. In such a tightly controlled industry, it's also important that the regulatory environment evolves along with the technology. But ultimately, I believe that the biggest challenge is a cultural one; stakeholders across the sector will need to be far-sighted enough to recognize the potential, and bold enough to reinvent their processes in order to capture it.



ALESSANDRO DE LUCA,
Chief Information
Officer, Merck Healthcare,
Merck Group

BUILDING THE SELF-DRIVING SUPPLY CHAIN

A long-established pharmaceutical player aims to become a leader in supply chain technology.

The year 1668 was an important one for far-sighted individuals. In London, architect Christopher Wren was trying to persuade King Charles II to adopt his plans for the reconstruction of the city, much of which had been destroyed by fire two years earlier. Isaac Newton built his first reflecting telescope. And in Germany, when Friedrich Jacob Merck received a license to open a pharmacy in the city of Darmstadt, he founded an organization that is now the oldest chemical and pharmaceutical company in the world.

Today, 350 years and 13 generations later, the Merck family is still the majority owner of the company that bears the founder's name. Over that time, Merck has been through many transformations. It has grown from a local pharmacy into a global manufacturer of chemicals and pharmaceutical products. It has acquired other major businesses and divested parts of itself.

Merck Group now employs 52,000 people in 66 countries. Its operations are divided into three divisions, each addressing different markets. Performance Materials is a leading producer of liquid crystals and organic light emitting diode (OLED) materials for the electronics industry. Merck's Life Science division, meanwhile, creates tools and materials for the scientific research community.

Alessandro De Luca is Chief Information Officer (CIO) of the company's Healthcare division, which produces a broad range of prescription and over-the-counter medicines and supplements, including cancer drugs, fertility treatments and products for the treatment of multiple sclerosis. He has been in his current role for 18 months, and ran the division's supply chain function for six years before that.

A digital transformation

Today, De Luca is spearheading a new transformation in Merck Healthcare. Its aim, he says, is to "leverage digital solutions to improve the life of the patient." Given his background, it is no surprise that De Luca sees digitalization of the supply chain as a central part of that effort. "For us, supply chain digitalization has two elements," he

says. "The primary objective is to gain real-time information on customer demand, and to be able to predict future demand so we can produce what patients need in a proactive manner. Our goal is 100 percent on-time delivery of all our products. And secondly, we want to maximize the overall productivity of our supply chain."

The vision, he says, is the creation of a "self-driving supply chain," in which production and distribution adapt automatically to meet changing demand. That's an ambitious plan, however, and De Luca emphasizes that Merck is taking a phased approach to its digitalization plan.

"Our first step, starting about two years ago, was the creation of a supply chain control tower," he says. The control tower brought all the division's supply chain data together in a single digital dashboard, providing a centralized, real-time view of its end-to-end supply chain operations. The project was "very successful," De Luca says, helping the company to boost its service levels "from very good to almost perfect."

A year ago, Merck embarked on the second phase of its digitalization effort. This focused on improving the accuracy of its forecasts through the introduction of machine learning algorithms to automate the demand forecasting process. The impact of that effort has also been significant. De Luca notes that, while the overall accuracy of the automated forecasting system is similar to its previous processes, forecast variability has been cut by more than a third.

That matters, because in the healthcare business spiky demand is expensive. High service level requirements mean companies like Merck must manufacture and store costly additional inventory to cover likely peaks in demand. The smoother forecasts generated by its new system have allowed it to cut overall inventory levels by between 5 and 10 percent, with no negative impact on service.

Testing the autopilot

Work is now underway to make the vision of a truly self-driving supply chain a reality. "Forecasting is nearly all automated right now, and we are making

€2.1
BILLION

The amount of Merck's investment in research and development (R&D) in 2017

“Patient expectations are going to be very high, and it will be up to us to create the supply chains that can meet those expectations.”

Alessandro De Luca

good progress in the introduction of digital tools to automate our supply planning,” says De Luca. “Now we are piloting the use of artificial intelligence to balance supply and demand.” Eventually, he says, the AI system will be smart enough to recommend adjustments to purchasing, production and distribution plans, or even to execute those changes automatically without human intervention.

For now, however, that level of autonomy remains an ambition. Merck plans to pilot a fully integrated forecasting and supply planning process later this year, something that De Luca believes will be a first for the life sciences sector.

Being at the cutting edge of digitalization brings its own challenges, he adds. And the challenges are changing with each step the company takes. “When we built the supply chain tower, the technology was the easy part. There were several good options already on the market,” he says. “The main difficulties came from ensuring that our master data was all correct and consistent.”

As Merck has brought greater automation into its forecasting and planning processes, the human element has become more significant, says De Luca. “There is

a significant change management challenge. It’s about how people embrace a supply chain that is driven by AI. Are they willing to rely on a machine for business-critical decisions?”

Merck has addressed change management systematically. “We made it our policy that all digitalization projects are driven by business requirements, not just because the technology is there,” he says. “And we’ve tried to learn fast, with lots of pilot projects, early failures and quick restarts.” There has also been a significant communications effort to ensure people across the business understand the goals of its digitalization efforts, and its progress toward those goals.

Getting the technology right

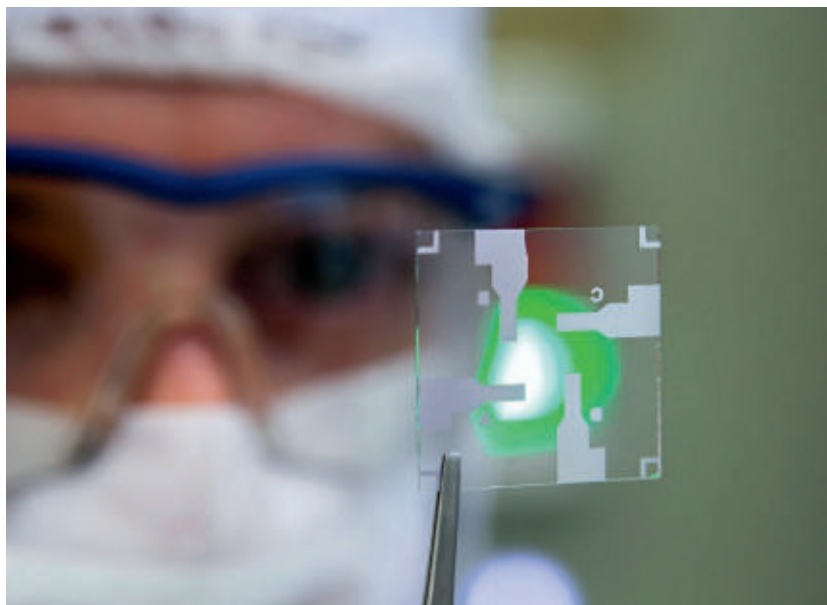
In the current phase of its program, De Luca notes that the technology itself has become a more significant challenge. Merck is partnering with specialist AI companies, including Palantir and Aera Technology, to develop its integrated supply chain management systems, but the technology to do everything it wants to do is “not yet there,” he notes. “We are not far off, however, and I believe there will be a real first-mover advantage for the companies that do manage to integrate artificial intelligence into their supply chains successfully.”

Ultimately, De Luca thinks artificial intelligence in the healthcare supply chain won’t just be a benefit, it will become a necessity. “The whole world is going to be changed by digitalization. We will see more people using digital tools and deeper integration of sensors everywhere. In healthcare, that’s going to trigger a shift to patient-driven demand. Rather than the hospital or the pharmacy, you will have the patient at the center of the supply chain.”

Creating systems that can predict and respond to demand from millions of individual patients will mean a step change in complexity, says De Luca, and it will bring new challenges in a host of areas, from technology to regulations and the control of data privacy. It will also require healthcare companies like Merck to bring unprecedented levels of agility and flexibility to their supply chains. “Patient expectations are going to be very high, and it will be up to us to create the supply chains that can meet those expectations.” ■ *Jonathan Ward*



www.merckgroup.com



BRIGHT IDEA:

Merck is a leading producer of organic light-emitting diodes.

MANAGING THE LAST MILE

Smarter inventory management cuts costs for medical device makers, while ensuring patients get the products they need, when they need them.

Managing medical device inventories is challenging for everyone concerned. These products have a host of characteristics seemingly designed to add supply chain cost and complexity. Large product portfolios? Yes. Devices such as the implants used in joint replacement surgery may be manufactured in hundreds of variants. Stringent storage and handling requirements? Yes.

Devices can be delicate, requiring tight control of temperature, shocks and vibrations, as well as protection from contamination. Complex regulations? Yes. Device makers must comply with rules governing good manufacturing and logistics practices, and Unique Device Identification (UDI) markings will be required on many devices by the end of the decade. A limited shelf life? Yes. Many devices have strict use-by dates, after which they have to be reconditioned or destroyed. Short delivery lead times? Absolutely. Medical teams embarking on life-saving or life-changing interventions need to ensure that the right devices are ready and waiting when they're needed.

The traditional approach used by manufacturers to meet these challenges is expensive, and often unsatisfactory. Large consignment stocks are held close to the point of use, either in hospitals or under the control of the manufacturer's field staff. Clinical teams request what they need from those inventories, which should then trigger the process of billing and replenishment.

Stock options

This model solves part of the availability challenge but creates plenty of other issues along the way. It requires manufacturers to tie up cash by making and storing products that might not be used for months or years. And if they don't forecast demand accurately enough, they may be forced to writeoff obsolete stock. Dispersed inventories are hard to manage, leading to lost or damaged products, or shortages caused by insufficient awareness of true inventory levels. It most certainly leads to inefficient use of valuable resources.

Over the past three years, DHL has been working with major global medical device manufacturers to

develop an alternative approach. The new solution combines DHL's Service Logistics infrastructure and expertise with its knowledge of the unique requirements of life sciences and healthcare supply chains.

Instead of holding consignment stocks at hospitals or in the sales rep's "trunk," the manufacturer now stores its inventories at a network of nearby forward stock locations. These locations sit within existing DHL Service Logistics facilities, but are built and operated in compliance with stringent healthcare regulations and guidelines.

The manufacturer's field service personnel still works closely with hospital staff to identify the correct products for each patient, and once the choice is made, an order is transmitted electronically to the appropriate holding location. From there, the devices are selected, prepared and shipped to the hospital in as little as two hours.

Speed and transparency

Its new last-mile solution has been a big success, allowing the medical device companies to reduce inventory costs while improving product availability for patients. The digitally enabled system has also eliminated a lot of slow, labor-intensive and error-prone paperwork for hospitals, and the company now has a much clearer view of its entire supply chain, as well as better control over the order-to-payment cycle.

Since 2016, the partnership has built a network of forward stock locations across Europe, and the rollout is continuing at a rate of around one new facility a month. Work has begun on the development of similar networks in Asia and Latin America, with special focus on Mexico and Brazil. This new supply chain approach is also helping the DHL customer in other ways. It is already using the network to deliver other devices from its range directly to the homes of patients living with long-term medical conditions, for example.

"DHL is working on the integration of a number of other technologies and approaches to address last-mile challenges in the healthcare sector," says Richard Dunn, Global Product Director, Life Sciences & Healthcare Sector. "We are looking at the whole information flow through the supply chain, exploring technology such as RFID that allows us to link replenishment directly to consumption."

Alongside these digital developments, Leonard Aerts, Chief Customer Officer, DHL Service Logistics, suggests that medical device companies can benefit from other new services in their physical supply chains. "In some markets, we are already playing a more direct role inside the hospital," he notes. "We are helping in the management of on-site inventories or even delivering products directly to operating theaters." ■

Jonathan Ward



\$5 BILLION

The annual cost to the healthcare industry from lack of visibility and control over medical device inventories

TRIALS AND TRIBULATIONS

Clinical trials are critical to drug development and the future success of pharmaceutical companies. However, it is a complex, time-consuming process and hugely expensive. A new, integrated logistics approach means companies will have one less thing to worry about.

Rigorous clinical trials are the foundation of modern medicine. Before any new drug is approved by regulators, its makers have to prove the efficacy and safety of the product through carefully controlled tests on representative samples of patients.

Prior to sale, a new drug will undergo three or four phases of trials. These involve gradually increasing numbers of test subjects, from less than 100 in early tests to investigate the safety and efficacy of the product, to several thousand in “Phase 3 and 4” trials designed to confirm its safety and effectiveness in a diverse patient population.

Globally, the pharmaceutical industry spends around \$40 billion a year on clinical trials, and the cost is rising by more than 5 percent a year. That’s due to the increasing complexity of modern pharmaceuticals, the need to test with multiple patient groups in different parts of the world, and the difficulty involved in finding and recruiting participants for trials of drugs targeting rarer conditions. Companies have to get clinical trials right. There’s a lot riding on them: the safety of trial participants, the treatment outcomes of future patients, and the \$2.8 billion or so of investment required to identify, develop and prove a new drug.

Logistics are both a significant cost driver and a key pain point in all clinical trials. Running a trial requires the coordinated distribution and delivery of numerous items to multiple sites. That can involve everything from sensitive, high-value biopharmaceutical products that require specialized temperature-controlled transport, to computers, diagnostic equipment and clinical supplies. Today, those logistics activities are highly fragmented, involving multiple suppliers and service providers. Ensuring everything is in the right place at the right time

ready for trial participants is difficult, time-consuming and error-prone. No wonder the top 20 global pharmaceutical companies spend around €2.6 billion (\$3.2 billion) a year on research & development logistics.

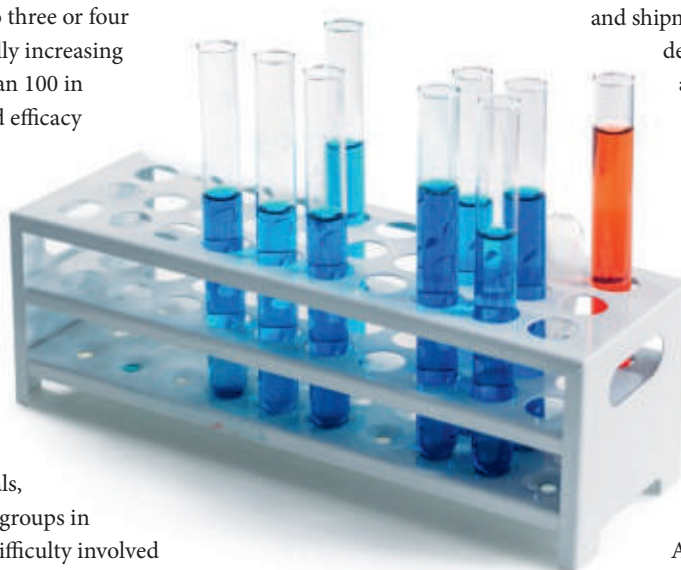
Recognizing the challenges faced by the industry, a team at DHL’s Start-up Lab is working on an innovative new approach designed to simplify and streamline the complete clinical trials logistics process, putting the patient first. DHL calls its new system iNebu. The name is inspired by biblical king Nebuchadnezzar, who presided over the first recorded “clinical trial” when asked to compare the effects of a 10-day diet of water and vegetables to his own richer fare of meat and wine.

“DHL understands how critical clinical trials are to the industry and recognizes that the logistics of managing a trial need to be improved,” explains Claudia Roa, VP Life Science & Healthcare, Customer Solutions & Innovation Americas, DHL. “Our goal is to partner with our customers to improve the process for them, their investigational sites and other clinical trials stakeholders. By digitalizing our services, we can simplify the process and create better visibility for both inventory

and shipments. In the end it’s about ensuring delivery is done in a timely, compliant and cost-effective manner.”

The project required some clever integration behind the scenes, linking DHL Global Forwarding’s existing 21 CFR 11-compliant, cloud-based LifeTrack ecosystem with systems operated by DHL Express and DHL Supply Chain. It has a human element too, with control towers staffed by specialists in clinical trials logistics working to coordinate deliveries, and to handle problems and exceptions if they occur.

All of this is largely invisible to the end user, however, who gains complete visibility of all shipments related to a specific trial or patient through a single interface or on a secure mobile app. iNebu is currently being used by two pilot customers and a wider rollout is planned for later in the year. ■ *Jonathan Ward*



\$40 BILLION

The amount the pharmaceutical industry spends on clinical trials every year



THE LOGISTICS OF LUXURY

Online fashion innovator Farfetch is shaking up the luxury retail sector while also enabling it to thrive anew.

The biggest revolution in fashion retailing holds no inventory. It delivers all over the world, in some cities within 90 minutes, yet employs no drivers and owns no transport planes. It connects boutiques in Australia with fashionistas in Brazil, all at the click of a mouse.

At the same time, using proprietary groundbreaking technology, it entices the most iconic of heritage fashion houses to partner on innovations that could change the way they do business forever.

Making connections

London-based Farfetch calls itself a global platform for luxury. At its core, the Farfetch platform connects: desire and product; buyer and seller; order and delivery. It's in the right place at the right time – the global market for personal luxury goods reached a record high of €262 billion (\$296 billion) last year, according to a report from Bain & Company.

Farfetch is the creation of José Neves, a Portuguese fashion fan who's been programming computers since he was eight years old, and launched his first software company at the age of 19. Neves has also worked as a shoe designer, boutique owner, and trade show organizer, acquiring an affection for the fashion industry in the process. He realized that technology was boosting many industries, but not the one he loved. So he set about merging his interests, and launched Farfetch in 2008.

Now, Farfetch is a platform for approximately 880 brand and boutique partners in over 40 countries, from historic brands like Burberry to up-and-coming designers like Eckhaus Latta. Farfetch's 2 million



registered customers can purchase goods from around the world – with seamless delivery guaranteed.

Seamless on the surface requires seriously complex planning behind the scenes. “The biggest challenge we have in our supply chain – as we don’t fully control pick & pack or ship – is consistency,” says Luis Teixeira, Farfetch’s Chief Supply Chain Officer.

Providing not only luxury goods but also a consistent luxury experience to discerning shoppers requires finely orchestrated logistics.

“Factors related to speed of shipping, stock accuracy, or even quality of packing are very important when you’re talking about a customer like ours,” Teixeira says.

“So with time we have learned how to deal with the fact that we don’t touch the goods. And we had to put a lot of standard operating procedures into practice to control these metrics and be able to help our partners to scale their operations, and get better and better at them.”

The average Farfetch order is high value, and can be fulfilled from a variety of locations. The platform algorithm calculates the most efficient source and delivery route. Partner boutiques and brands pack the goods with care and often a personal note, an appealing bonus for the customer.

“Farfetch’s success is due to their technology enabling things that felt impossible or unrealistic from luxury retailers,” says Tom Gehani, Director of Client Strategy for digital-focused business intelligence and research firm L2.

He points out that nearly a quarter of global luxury spending comes courtesy of small and specialty re-

DRESSED FOR SUCCESS:

The rise of Farfetch is down to its use of ground-breaking technology.

tailers, who may not have the resources to push their prestige goods online.

“Farfetch enabled these brands to sell to the online customer without all the technical implementations of order management and shipping, and with a great customer experience,” Gehani explains.

L2’s research shows that traffic to Farfetch is largely driven by very specific keywords, including brand names, like “Gucci flip-flops,” rather than broad terms like “shoes” or “handbags.” These shoppers know exactly what they want, and Farfetch helps them find and receive it, no matter how far away it is, or how small the boutique is that holds it in stock.

The Farfetch platform has approximately 1,000 engineers working so that customer visits to the website go as smoothly and quickly as possible, aiming to turn visitors into repeat customers.

Moving at the speed of fashion

Farfetch works hard at meeting the luxury customer’s needs. It currently offers express delivery of goods from over 40 countries to 190 countries. There’s same-day service in 18 cities, plus click & collect for those who wish to pick up their package locally. Almost instant gratification is available for shoppers in 12 cities with 90 minute delivery from select retail partners.

Customs charges are precalculated and included in the original invoice, and returns are simple.

Teixeira sees this rapid response plan as an offshoot of some of the challenges posed by the company’s fully decentralized stock mode. He says they leverage that decentralized model to capitalize on the need for speed. At the same time, returns, which are an expensive part of doing business online, have not been a major problem.

The customer base is changing, he says, and the industry must develop with it. “Once speed is cracked, I think we and all the companies in the luxury market will want to tailor our services,” explains Teixeira.

“If you ask me, personalization is the next evolution.”

Bespoke innovation

Meanwhile, Farfetch is expanding its role as a service provider for the luxury industry. Its Black & White business unit operates discrete e-commerce flagship sites for specific brands.

Omnichannel is the new vogue in e-tail, and Farfetch too is taking its expertise to the streets. Its Store of the Future concept aims to bring the data advantages

190

The number of countries where Farfetch delivers goods, sourced from more than 40 nations

of digital commerce to the classic bricks-and-mortar approach.

According to a 2017 study from Bain & Company, only 9 percent of personal luxury goods are purchased online. At the same time, online luxury sales jumped 24 percent last year, while dipping slightly at traditional department stores. Chic boutiques, prestige locations and impeccable service are all intricately entwined in the luxury shopping experience, but the digital trend has legs. Analysts anticipate that online activity will account for a quarter of personal luxury sales by 2025.

Generally a protective industry, traditional fashion houses and luxury brands are not known for taking risks. Yet Farfetch has a compelling proposition in the form of tailor-made arrangements. Even iconic Chanel, which does not sell online, formed a partnership with Farfetch this year for in-store tech innovation. Termed “augmented retail,” it would integrate web-based methods, like using data about customer preferences to tailor customer experiences, in bricks-and-mortar stores.

It was a move that surprised many in the industry, and thrilled Teixeira and his colleagues.

“I think this is just showing that we are doing something right, that they have trust in our brand and what we are doing,” he says.

New markets, new methods

The Farfetch global vision includes bringing a large range of luxury, heritage brands to the newest markets and feeding their growing hunger for luxury goods. And again, the right partners are key, explains Teixeira.

90 MINUTES

The time it takes for Farfetch to deliver to customers from select boutiques in 12 global cities

“Logistics is absolutely critical. Each time we plan a market incursion either from the supply side or demand side, we do it jointly with the retail partners that will be supplying those markets,” he says.

In January, the company announced a joint venture agreement with the Chalhoub Group, the Middle East’s largest luxury goods provider. Meanwhile, Chinese online giant JD.com became one of the largest Farfetch shareholders last year, when it invested \$397 million in the company.

The partnership, says Liz Flora from L2’s Asia Pacific research team, gives Farfetch advantages their competitors can’t replicate, including access to JD.com’s data, digital marketing, and connection to WeChat, the dominant social media and messaging service in the region.

According to Flora, L2 research on China’s luxury goods industry found that Farfetch “had the widest range of luxury fashion brands available out of all international pure-play luxury e-tailers, with 83 percent of them sold on its Chinese-language site.”

Teixeira sees his company’s horizons as virtually limitless. “Like any business model there are challenges and limitations. I think we have been able to transform a lot of our challenges into opportunities,” he says.

“I would say that the only limitation we could have in the near future is if we stop thinking about our customers first. I think that’s the only limitation we can have, because the opportunity is huge.” ■ *Susanne Stein*

 www.farfetch.com



CHANEL STORE:

The iconic brand is partnering with Farfetch in “augmented retail.”

SHIFTING GEAR:

Like many women in the kingdom, Bashayir Al Barrak is now enjoying the freedom to drive.



DRIVING CHANGE

A raft of reforms, big investment plans and an upcoming IPO at oil giant Aramco signal major change in Saudi Arabia, opening the road for business and progress.

I now celebrate September 26 in the same way as my birthday,” says Bashayir Al Barrak. The marketing executive, based in Al Khobar in Saudi Arabia’s Eastern Province, was barely able to believe Saudi TV’s news bulletin on September 26, 2017, declaring that women would be allowed to drive in the kingdom from June 2018. “Even the following day my family and I still kept asking ourselves whether it was really true. Being able to drive had been a dream of mine, but it had always seemed a very distant one, and it therefore took some time to fully understand that it would now become a reality.”

For Al Barrak, being able to drive has a simple, pragmatic advantage: “I am able to become fully independent and take myself everywhere I need to be, without having to use a driver or ask one of my male relatives to take me,” she comments. For her and many of her fellow countrywomen, driving, and a host of other reforms, such as a partial end to the restrictive male guardianship system that puts restrictions on females traveling, taking a job or opening a business without male guardian permission, are now opening the gates to success on many levels – and businesses are taking note.

Thanks to generous education and scholarship programs, many Saudi females are highly educated and are now poised to prove their mettle in the marketplace and become a force to be reckoned with.

Previously, females represented a small portion of employees. However, in 2017, the Saudi Ministry of Labor and Social Development announced a 130 percent rise of women in the private sector workforce over four years, with women accounting for 30 percent.

"We Saudi women currently make up around a quarter of the local workforce; with the lift of the ban on women driving, we are sure to see this number increase exponentially," says Marriam Mossalli, owner of Niche Arabia, a luxury consulting firm that she started in Saudi Arabia in 2012. "These social changes are having real effects on our economy, and as a female entrepreneur, I'm excited to see how this injection of more women is going to shape policies going forward."

At DHL Express, Faysal El Hajjami, Country General Manager, is poised to double the number of female employees. "We started in 2008 with some five ladies, working in areas such as telesales and customer service," he comments. "The ladies proved to be very dedicated, skilled and highly productive, so we steadily increased numbers, and this year we have 100 ladies working for us. We intend to double that number before the end of the year, and we are already steadily moving Saudi women up the ranks. With all the support Saudi females are now getting through government reforms, coupled with the energy and drive many are displaying, we have seen a number of our female colleagues joining middle management, driving and shaping the business direction in many functions. I am confident that they will soon join the Senior Management Team at Express Saudi Arabia."

Entrepreneurship is another area where women are now steadily making their mark. A study by Arab daily Al Eqtisadiah revealed that in 2017, 39 percent of the total number of entrepreneurs in the kingdom were female, up 35 percent over the past 10 years thanks to government and private support.

Driver of change

Much of the current change in Saudi Arabia is accredited to "MBS," as many Saudis call their Crown Prince, Mohammed bin Salman Al Saud. Appointed by his father King Salman, Custodian of the Two Holy Mosques, the 32-year-old oversees Vision 2030, a roadmap designed to transform the conservative kingdom into a modern nation that diversifies away from its traditional revenue source, oil. In his quest to transform the country, MBS has curbed the powers of conservative Muslim clerics and Saudi's religious police, vowed to fight radical extremism, changed many laws restricting the freedom of women and announced a raft of megaprojects, such as

the \$500 billion megacity Neom, a 26,500-square-kilometer development by the Red Sea, intended to have its own laws and economic conditions.

If all this sounds rather dreamlike, that could be the intention: "We try to work only with the dreamers," the Crown Prince told investors at a conference in Riyadh, according to CNN Money. "This place is not for conventional people or companies."

To back its dreams, however, the kingdom needs funding. Low oil prices and three years of military involvement in Yemen have dented the wealth held in government coffers. Much is therefore being done to attract foreign investors, such as an anti-corruption drive that saw many Royal Princes and other officials put under "house arrest" and released only after relinquishing billions of their wealth that was supposedly gained from corrupt practices. However, funding is also set to come in the form of an IPO of 5 percent of the jewel in Saudi's crown, Saudi Aramco, the state-owned oil and gas company that has the world's second-largest proven crude oil reserves, more than 260 billion barrels.

The Saudi government expects the IPO to bring some \$100 billion into its coffers, though, despite much speculation, both the timing and location of the offering have not yet been confirmed. According to the Wall Street Journal, a timeline of 2019 and the Saudi

39 PERCENT

The total share of female entrepreneurs in the kingdom

NEOM

Focusing on nine specialized investment sectors (energy and water, mobility, biotech, food, technological & digital sciences, advanced manufacturing, media, and entertainment), Neom is a megacity project that will be backed by \$500 billion of investment by the Kingdom of Saudi Arabia. The focus on industry sectors is intended to stimulate economic growth and diversification, and drive local industry, job creation, and GDP growth in the kingdom. To be located in the northwestern region of Saudi Arabia, Neom will span 26,500 square kilometers, overlooking the waterfront of the Red Sea to the south and west and the Gulf of Aqaba, and boasting an uninterrupted coastline stretching over 468 kilometers.



www.discoverneom.com

SAUDI ARAMCO

Saudi Arabia's state-owned oil company is a fully integrated, global petroleum and chemicals enterprise. The world's largest crude oil exporter manages proven conventional crude oil and condensate reserves of 260.8 billion barrels. Aramco's average daily crude production is 10.5 million barrels per day (bpd), and the company has stewardship of natural gas reserves of 298.7 trillion standard cubic feet (scf). Analysts value Saudi Aramco at several trillion dollars, making it the most valuable company in the world.



www.saudiaramco.com

60 PERCENT

The share of Saudi Arabia's population under 30

SOCIAL CLIMBING:

Saudi Arabia is one of the Middle East's largest social media markets, thanks to the high rate of smartphone ownership.

stock exchange Tadawul, as its "home exchange," are likely options.

With the income from the IPO, plus the introduction of a host of measures such as the recent implementation of a 5 percent VAT levy, Mohammed bin Salman intends to create the world's largest sovereign wealth fund and use its funds to speed up the country's transformation and its reliance on income from fossil fuels.

On recent trips to Egypt, the U.K. and the U.S., Mohammed bin Salman turned to the business community to make the case for investments. U.K.-centered deals comprised some 18 economic agreements, to the tune of around £1.5 billion (\$2 billion), between Saudi and British entities. These include an MOU between health care giant AstraZeneca and Saudi Pharmaceutical Industries & Medical Appliances Corporation, for an \$80 million

investment to deliver local manufacturing of AstraZeneca pharmaceutical products to provide some 3 million Saudi patients with medication for diabetes, cardiovascular and gastrointestinal issues. In the U.S. meanwhile, MOUs were signed with companies such as Microsoft and Cisco, and a deal with Softbank was agreed to finance the world's largest solar development. Two solar plants with capacity for 3 gigawatts and 4.2 gigawatts are to be launched by 2019 and they will eventually have the capacity to produce 150 gigawatts and 200 gigawatts of solar power by 2030.

Rapid reforms

Changes and reforms are moving at a rapid pace, especially given the very conservative nature of the kingdom. And yet many Saudis appear keen to follow their government's lead and embrace change.

Mohammed Al Awadhi, CEO of real estate investment group Maban and Saudi partner of Microsoft, regards the progress in the country as much needed, even when it comes to the introduction of VAT.

"The drive to stamp out corruption, bring on reforms and also introduce international financial instruments such as VAT, is important, as it elevates Saudi Arabia internationally. In order to move the country forward, we need solid control over what businesses produce and sell, which VAT will help with. In addition, dynamic and transparent business practices in line with global standards, and reforms that open up the labor market and help businesses attract more Saudi talent, especially by tapping into the pool of keen and well-educated women, will without doubt allow business in the kingdom to thrive."

El Hajjami also sees many opportunities for businesses: "At DHL we're seeing an upturn in business, for example in the area of e-commerce, with a lot of trade in international goods by young Saudi entrepreneurs and SMEs, but also through online platforms such as Souq, which was recently purchased by Amazon. Going forward, I believe that there are opportunities out there for businesses from all sectors. The automotive industry should experience a real boost, with many women drivers wanting to purchase cars, and investment in large infrastructure projects will present a boon to the construction industry and manufacturing."

Logistics performance

Logistics will play a key role in Saudi's move to diversify. Vision 2030 aims to raise the kingdom's global ranking in the Logistics Performance Index from 49 to 25, and ensure the country is a regional leader and builds a

SUN POWER:

Two big solar plants will be launched in 2019 and, combined, should produce 350 gigawatts by 2030.



TOWERING AMBITION:

Saudi capital Riyadh is a magnet for international businesses from all sectors.



position as a regional logistics hub connecting three continents. To enable this, Saudi plans to “work with the private sector and enter into a new series of international partnerships to complete, improve and link our infrastructure internally and across borders.”

Sabine Mueller, CEO, DHL Consulting, believes the opportunities are there for the kingdom: “Saudi Arabia has a strategic location on the Red Sea and a substantial consumption base. With significant investments in Special Economic Zones, global partnerships in logistics infrastructure and easing customs regulations, I believe that the country is well positioned to develop as a regional logistics hub to serve the Middle East and Africa.”

With some 60 percent of Saudi Arabia’s population under 30, it is the young generation that Mohammed bin Salman looks to when it comes to bringing the government’s Vision 2030 to life. He terms it Generation 2030 – young women and men who are embracing change with open arms, keen to grab the opportunities that are now opening up for them everywhere. From cheering teams at the sports stadium to setting up businesses and excelling in industries such as technology and medicine, young Saudis are eager to move ahead.

For Bashayir Al Barrak, the road ahead is all clear: “I have always been proud of my country, but now, as

so much is changing for me and all other women in the kingdom, and as our country opens up in so many ways, I am very excited and optimistic about the progress that we in Saudi Arabia will make. I for one am ready to step out into the world and show what Saudi women can achieve.” ■ *Michelle Bach*



www.vision2030.gov.sa/en

SAUDI ARABIA

Population:

28,571,770 (July 2017 est.)

GDP:

\$678.5 billion (2017 est.)

World Economic Forum’s Global Competitiveness

Index 2017-2018: 30th out of 137

World Bank Group’s Ease of Doing Business

Index: 92nd out of 190

DHL Global Connectedness Index 2016:

39th out of 140



LOW MAINTENANCE:

Truckmaker MAN leases equipment under contracts that provide performance guarantees.



SERVICE CALL

Engineering and manufacturing companies are increasing the scope and complexity of the services they offer. What does that mean for their supply chains?

**\$25
BILLION**

The estimated market-wide opportunity for capability-based service propositions, according to GE

In 1946, British agricultural engineer Harry Ferguson entered a partnership with the Standard Motor Company to produce a new model of tractor, the TE20. Over the next decade, more than 500,000 units of the “Little Grey Fergie” were manufactured and exported around the world. The low price, versatility and capability of the machine made it the perfect solution for farmers looking to take their first steps into mechanization.

For owners, simplicity and ease of maintenance were another key reason for the model’s enduring appeal. The TE20 was designed so that a single wrench could be used for all common maintenance tasks. That wrench even had inch markings along its shaft, so it could be dipped into the tractor’s tank as a fuel level gauge. The basic

owner’s tool kit contained only two additional items: a grease gun and a socket wrench for the spark plugs.

Many thousands of Ferguson TE20s are still running today, mainly in the hands of enthusiasts. Few of them will have had any direct contact with their manufacturer since the day they left the factory. But that “sell and forget” manufacturing model has largely been consigned to history. For modern manufacturers, the day a product passes into the hands of the user generally marks the beginning of a relationship, not the end of one.

Together for the long haul

In recent years, the significance and value of services provided alongside engineered products has risen dramatically. There are many reasons for that shift. Products have become ever more complex and sophisticated, for example, making maintenance and support difficult even for owners who would like to do it themselves. Few of them do; faced with tight constraints on operating expenditure and shortages of skilled personnel, equipment owners often prefer to outsource such responsibilities to specialists.

For manufacturers, meanwhile, services offer the opportunity to increase profits and stabilize cash flow, turning “lumpy” one-off sales of high-value goods into long-term revenue streams. New technologies, especial-

ly the internet of things, are bringing down costs and enabling the development of new service offerings, such as remote monitoring and support of products in the field. Companies can use superior service offerings and support capabilities as defense against rivals and new market entrants, who may be able to offer products at lower prices.

Wider economic and social drivers are also encouraging companies to maintain close, long-term links with the things they make. Concern about the environmental impact of products means customers, regulators and other stakeholders are asking manufacturers to take more responsibility for their products throughout their lifecycle. And more manufacturers are embracing the principles of the “circular economy,” recognizing that, once products have fulfilled their usefulness for one customer, they can often be overhauled, upgraded or remanufactured to lead profitable second lives.

Ultimately, these trends are leading some customers to ask if they really need to own a product at all, given that its value to them comes from the utility it provides. And manufacturers are wondering if it makes sense to sell outright something that could go on making them money for years or decades.

The rise of servitization

Across sectors, companies have developed new business models and value propositions with these ideas at their heart. Aero-engine maker Rolls-Royce pioneered the concept with its “Power-by-the-Hour,” in which customers lease equipment under long-term contracts that provide availability and performance guarantees. Xerox offers similar arrangements for office printing and copying services. Truckmaker MAN will charge customers according to the distance vehicles are driven, while also providing tools to encourage safe, fuel-efficient driver behavior. GE has started to transform itself into a company that not only sells sophisticated machines but also solutions. To support its services, in 2016 it acquired ServiceMax, a cloud-based field service management company.

Delivering advanced services like these requires fundamental changes in a manufacturer’s operations, relationships and organizational structures. This process of transformation is known as servitization. Its opportunities, challenges and supply chain implications are the topic of a new white paper from DHL and the Advanced Services Group, part of Aston Business School in the U.K.

The paper’s authors emphasize that advanced services differ from simple ones (like field repair or the sale of spare parts) in some fundamental ways. In fact, manufacturers must alter their focus from a product-centric to a customer-centric perspective. This requires them to place an emphasis on finding innovative ways to help customers achieve their business goals, rather than on product features. Advanced services also mean manufacturers will bear more risk – they may be contractually responsible for the cost of customer downtime if

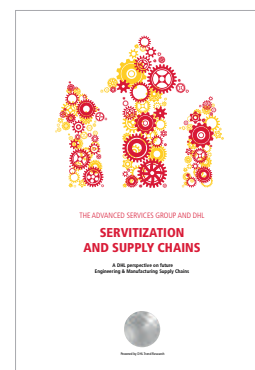
their products fail, for example. The payoff is significant opportunities for additional revenue and competitive advantage.

Supply chain redesign

Servitization has significant implications for the design and operation of the supply chain. Broadly, say the paper’s authors, this will involve deliberate streamlining in some areas and additional complexity in others. Manufacturers should seek to standardize their products as far as possible to reduce manufacturing costs, benefit from economies of scale, boost reliability and simplify maintenance and support activities. Service offerings, by contrast, should be highly customized and tailored as closely as possible to the end customer’s needs.

Service-based business models will place increased emphasis on the speed, agility and reliability of after-market supply chains, however. That’s going to require companies to think hard about the availability and distribution of spare parts and technical facilities. The white paper highlights a number of opportunities here, from co-locating service facilities with customer operations to the use of 3-D printing for the rapid, decentralized production of critical parts. Digital technologies will help companies balance inventory costs and service levels, for example through the use of conditional monitoring and advanced analytics techniques to predict demand. Workforce requirements are also likely to evolve, with the need for field service engineers with the skills to work closely alongside customers, and to identify new opportunities to solve problems or add value.

The report concludes with advice for organizations taking their first steps in the servitization journey. Transforming a manufacturing business to compete through advanced services is a long and complicated process. It is a transformation that many companies are set to undertake in years to come. ■ *Jonathan Ward*



Download the white paper
“Servitization and Supply Chains” at:

 bit.ly/dhl-servitization

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INDIA RAMPS UP

Economic corridors, infrastructure spending and logistics parks are being used to transform business in the world's fastest-expanding major economy, but challenges remain.

India is the world's second-most populous country and its fastest-growing major economy. Nonetheless, even with the World Bank predicting a growth rate of 7.3 percent this year, the country faces major challenges. A creaking infrastructure, including clogged roads and a painfully slow rail freight network, alongside one of the world's highest freight tariffs, have been a drag on businesses.

Ambitious plans are now underway, however, to bolster the infrastructure, which could slash transportation costs and enable the speedier movement of goods. The plans include multimodal logistics parks (MMLPs), a

program to build highways and ports, as well as the full utilization of Special Economic Zones (SEZs).

The MMLPs are aimed at providing modern warehousing, freight aggregation and distribution, customs clearances, value-added services such as labeling, and faster links to different modes of transport.

Last July Nitin Gadkari, India's minister for road transport and highways, announced the government aimed to develop 35 large MMLPs.

Gateway to Southeast Asia

One of the first will be located at Jogighopa, a nondescript town on the banks of the Brahmaputra River in

PORT OF CALL:

Ports – such as The Krishnapatnam Port Container Terminal – are key to India's economic success.



the northeastern state of Assam. It will have access to roads, rail lines and waterways with links to ports and airports.

The project, which could become operational in three years, is located 160 kilometers from the region's biggest city of Guwahati. It will offer a gateway to the North East of the country as well as to South East Asia. The park will also connect to the East Coast corridor – a string of port-linked industrial clusters stretching from Kolkata to Kanyakumari at the southern tip, a distance of 2,500 kilometers –, which is being developed in phases.

The eastern coast is relatively underdeveloped, a result of India's concentration of trade linkages with Europe, the Americas and the Middle East. This has changed over the last two decades, and this corridor is expected to leverage industrial growth riding on the back of closer integration with markets to India's east.

Challenges for MMLPs

Each MMLP costs about \$300 million to develop, with the funding coming from local state governments, the central government and private developers.

Location will be key to the success of MMLPs. If located near transport infrastructure, with easy access to main clusters of consumption and production, the MMLP would be a success. However, if the location becomes more of a function of where state government can make cheap land available, the park might find it difficult to attract business because of added costs to users in terms of proximity to markets and customers.

"The logistics sector (in India) is poised to grow by roughly 1.2 times the level of national GDP growth until 2032, by which time it is expected to generate \$360 billion in value-add, up from \$115 billion now," Hoe Yun Jeong, a principal economist at Asian Development Bank (ADB), wrote in a blog last September.

India's logistics costs almost doubled over 14 years to about 14 percent of GDP in 2014, he noted, because of clogged transport networks, a skewed mix of transport modes, insufficient storage and handling facilities for in-transit commodities, and regulatory hurdles. In developed economies such as the U.S. logistics costs account for only 8 to 10 percent of GDP.

Highways, ports

To address these issues India will build 34,000 kilometers of roads by March 2022, connecting 550 districts to national highways compared to about 300 districts today. Upon completion, India will have 50 national corridors compared to six at present, allowing for 70 to 80 percent of freight to move along national highways compared to 40 percent today.

Another program, which began in 2015, will boost the share of coastal shipping and inland navigation. Over a 20 year period, six new ports are to be devel-



HARD-HEADED:

India recognizes the business sense of building more ports and economic zones.

oped, alongside 14 coastal economic zones and a host of other infrastructure, at a cost of \$123 billion.

Special economic zones

Then there are the SEZs, which were launched in 2005 to emulate China's manufacturing success and built upon the free trade zones that had been established in the 1960s. Businesses operating within the SEZs enjoy fiscal and non-fiscal incentives to facilitate exports.

However, SEZs have had operational hurdles related to taxation and regulatory rules. The Indian government is actively examining these problems. Commerce Minister Suresh Prabhu has set up a panel to come up with policy measures to close these gaps.

Despite some of these regulatory issues, SEZs have proved a boon for manufacturing and New Delhi is pushing them as the engine for the government's "Make in India" campaign, especially for global companies looking to avail of the country's skilled workforce.

"Free Trade Warehousing Zones (FTWZs), which are part of the SEZ scheme, are a good proposition for inventory management for industries that have a lot of imported inputs," said Dr. Pritam Banerjee, Head of Corporate Public Policy, South Asia, Deutsche Post DHL Group. "One new growth area in this context is the renewable energy sector. FTWZs also offer a great value proposition for e-commerce."

Mumbai-based Vivek Kele, until recently president of the Association of Multimodal Transport Operators of India (AMTOI), said India's huge market, including a steadily growing middle class, stability in government and rapid growth rates, should be sufficient incentive to build manufacturing bases. "Big multinational companies will have to come to India out of compulsion, not choice." ■ *Ranjit Gangadharan*

7.3 PERCENT

The Indian GDP growth rate the World Bank predicts for 2018

SOLUTIONS

BLOCKCHAIN AND CRYPTOCURRENCY:

Major e-tailers are starting to flirt with Blockchain and cryptocurrency. The appeal? Secure transactions, easy order tracking and fulfillment.

MOBILE COMMERCE:

Superior mobile design is top priority for e-commerce players. Experts also predict advances in direct marketing through SMS.

OMNICHANNEL:

Online-to-offline shopping routes are being perfected as omnichannel strategies grow smarter.

ANIMATION:

Engrossing animation enlivens online shopping. With superior design tools on the market, expect slicker iconography to be common.

B2B EMBRACES E-COMMERCE:

E-commerce is rewriting old-school B2B sales approaches. In 2017, B2B e-commerce sales hit \$7.7 trillion – a figure dwarfing B2C's.

VOICE SEARCH:

With voice assistants like Alexa and Siri now commonplace, online stores are attuning themselves to voice-activated purchases.

SOCIAL SHOPPING:

Social media connects merchants to customers with incredible ease, and more retailers are selling directly on apps like Instagram and Pinterest.

MACHINE LEARNING:

More e-tailers are starting to use machine learning to analyze customer behavior and direct online sales strategies.

Illustration: Anton Hallmann/Sepia for Delivered.

*Trends courtesy of Shopify.com:

 bit.ly/shopify-ecom-trends-2018

MORE DELIVERY OPTIONS:

E-commerce's speed has made same-day delivery the golden standard. Watch as retailers push for even better.



AHEAD OF THE CURVE

Top trends for e-commerce success

Consumer expectations change at a fast pace – and it's essential for e-tailers to stay ahead of the curve in order to thrive in a competitive global environment. These are some of the top trends that experts predict will continue shaping the global e-commerce business.

EASIER CHECKOUT:

"One-click pay": Bank on the check-out process becoming leaner and simpler for mobile shoppers.



AR AND VR:

The technology is here and e-commerce is capitalizing on it. The movement to turn your living room into a fitting room is well underway.



AUTOMATION:

Virtual assistants capable of automating online marketing tasks are helping businesses grow while remaining lean – and with more e-commerce players targeting leads through social media, such digital aides will continue to cut costs and times.



BETTER PHOTOGRAPHY AND VIDEOS:

High-quality images and videos drive purchases. Shoppers want to see everything first, and the best retailers are pushing formats that let them.

VIEWPOINTS

A portrait of Jean Bosco Nzeyimana, a young Black man with short, dark, curly hair. He is smiling and looking slightly to the left of the camera. He is wearing a dark grey suit jacket over a white dress shirt and a dark red tie with thin, light-colored diagonal stripes. The background is a blurred indoor setting with warm lighting and architectural elements like columns.

DELIVERED. CREATES NEW ENERGY WITH...

JEAN BOSCO
NZEYIMANA

A young Rwandan entrepreneur has hit upon a winning business formula that turns organic trash into clean-burning briquettes and biofertilizers.

As a child, every morning before school, Jean Bosco Nzeyimana – who lived in a poor, rural village in Rwanda without electricity or decent infrastructure – would have to go into the forest to collect firewood. It was a tough job in a hard life; but it sparked an idea that, years later, would turn Nzeyimana into a budding businessman with a passion for sustainability and social enterprise. “My mother, a great teacher of mine, told me that to dream, I needed to go outside and look at my community and see how everything is going,” he told the Skoll World Forum in 2016. “I was so sad because during those few days I took to look around, I found that I was uncomfortable with the way I was living and the way my community was living.”

For example, as in so much of rural Africa, most of the people in his village were still relying on charcoal for cooking. In fact, around 80 percent of people in Rwanda still use wood as their main energy source, which means that millions of trees are being cut down to satisfy demand, causing devastating deforestation. Nzeyimana was concerned, too, about the waste he saw piling up in Rwandan landfill. “Cutting down trees is dangerous because it’s exploiting nature,” he says. “And taking waste to landfill is not a solution. It’s creating another problem.”

He was convinced that there must be another way and, as he grew, he kept thinking about what he could do to help his people find an environmentally friendly alternative fuel source.

Rwandans may not be rich in natural resources such as diamonds, platinum and gold, says Nzeyimana, but they are eager to learn and good at utilizing any opportunities available to them. So, aged 19, he hit upon the idea of turning organic waste materials into clean-burning briquettes, thus making an affordable and sustainable replacement for charcoal. With a startup loan from the African Entrepreneur Collective, and convincing his district to let him use a waste management facility for free, he has since created a business called Habona (which means “illumination”). Habona collects and sorts trash to make briquettes, biogas and organic fertilizers for its customers, which include restaurants, hotels, households, businesses, schools, farmers and government offices. The company is also a job creator, employing 26 people. “I wanted to generate a sustainable fuel that would have a positive impact on people’s lives – but I also wanted to generate employment,” Nzeyimana says.

Well, mission accomplished – although Nzeyimana has only just started. He now wants to roll out his idea across Rwanda and beyond. And he’s still only 25.

It’s no surprise to find that Nzeyimana has won numerous business awards. He was named Top Young

1,500

The number of Rwandan households currently using Habona’s biofuels

94 PERCENT

The share of Africa’s rural population using woodfuels as a main energy source

Entrepreneur of Rwanda 2014 and became a recipient of the African Innovation Prize and the Mandela Washington Fellowship for Young African Leaders, a program begun by former U.S. president Barack Obama. Plus he shared a stage at the 2016 Global Innovation Summit in California with Obama and Facebook founder Mark Zuckerberg. “They were really interested about what I’m doing in my little community,” he says. “That’s good motivation for me to keep working hard and moving the business forward.”

What challenges did you face when starting Habona?

To get ahead in business you need to be secure in terms of funding: you don’t want to have cash flow problems. So the main challenge I had was gaining trust from potential investors. I was 19 years old and, in my culture, young people find it difficult to gain trust from more experienced members of the community. Yet I needed investors to recognize that I had a good idea. So I kept pushing, trying to spread awareness of my plan. I also got involved with entrepreneurship competitions and various events and these attracted attention from potential partners in the U.K. and the U.S.

The other problem was that I was embarking on a business venture that was new, so I couldn’t expect to find ready-trained and experienced workers. Instead, I had to organize and train people myself. For those working on the waste collection side, training was easier; but it was more difficult on the processing side because many people had never even seen a briquette before. I couldn’t expect them to simply come in and make the product if they didn’t understand it. So a lot of money was spent on ensuring they knew what Habona is trying to do.

What’s the long-term potential for the business?

For the future, I want to see how we can scale down our processes in order to make our model franchizable, and then apply it to villages not just in Rwanda but outside the country, too.

Is enough being done in Rwanda to drive young entrepreneurship?

There are policies that need to be changed to ensure that entrepreneurship can flourish. I’m involved in different entrepreneurial chambers where like-minded people gather together to discuss what the country can do to be attractive for people who want to embark on new endeavors. We have a long way to go – but the progress we have already made is good enough to make me feel that the future is bright.

What advice would you give to companies that are looking to do business in Africa?

I say to them: “Africa is open for business.” We have so many opportunities here and so many areas that are untapped. Anyone who is interested in doing business here should certainly come; but even to those who are not interested I say: “Think about it!” I would look forward to providing guidance to anyone who wants to get started in Africa. ■

Tony Greenway



WHO CARES WINS

Something is changing in the boardroom. Where competitiveness used to be the byword for success, empathy and caring are starting to play an important role.

At Amazon's Seattle headquarters, people still talk fondly about Rufus, who used to drop in to the office from time to time to say hello.

He was entertaining and friendly, and whenever he appeared he made people feel better about themselves and their surroundings. Of course, Rufus didn't realize he was having such a positive effect because he was a dog: specifically, a Welsh corgi, owned by a husband-and-wife team who worked at the company.

But Amazon's managers did realize. Which is why, according to a blog on the Amazon website, as many as 6,000 dogs can now be found sharing a workspace with Amazon employees on any given day. Indeed, Lara Hirschfield, the company's "Woof Pack Manager," reveals that canines are ingrained in the corporate culture because they make people smile. "Our dogs add to the fun, dynamic energy of our workplace," she writes on the blog.

Feel good companies

Making every day a "bring your dog to work day" has been a good way for Amazon to demonstrate that it cares about its staff. Yet it's not the only business that has been showing a softer, human and more empathetic face. Some years ago, Netflix and certain parts of the Virgin Group shook up their annual leave policy to allow their people to have as much time off as they like. Others, such as global marketing and communications company Text100, introduced "duvet days" – a day off to be decided by individual staff members, at short or no notice, and with no questions asked.



Then there's the rise of the company "Feel Good Manager." For instance, Wooga, the German games designer, has an entire "Feelgood" team to arrange mystery lunches, run sports groups, quiz nights and more besides. Compassion doesn't always stop at a company's front door, either. Many organizations – such as San Francisco-based cloud computing specialist Salesforce.com and tech giant Cisco – give their staff time off to get involved with socially responsible activities outside of the workplace, such as beach cleanups and volunteering at refugee kitchens. They want to care for society as a whole, and have realized that employees value the opportunity to give back as well. At Deutsche Post DHL meanwhile, an annual "Global Volunteer Day" sees over 2,500 projects being completed by employees all over the world, from planting trees to helping out at food banks.

What's changing? Conventional wisdom suggests that big business can only succeed if it adopts a rational, IQ-driven ethos. In other words, it needs to be focused, hardworking, fiercely competitive and profit-driven. But increasing numbers of companies now adding an EQ-

12 PERCENT

The increase in productivity that occurs if workers are happy according to the University of Warwick



6,000

The number of dogs sharing a workspace with Amazon employees on any given day

and empathy-driven approach that treats employees in a more caring way. One that sees them as individuals with their own hopes and dreams, both inside and outside of work.

Creating a caring culture

They certainly are, says Helen Wright, Head of Marketing and Communications at the U.K. arm of Great Place to Work®, a global research, consulting and training consultancy that helps organizations identify, create and sustain great workplaces. “This has become a serious issue now,” she says. “Enlightened companies know that if they don’t demonstrate their caring side, staff will vote with their feet and go to rival organizations that do.”

“Some organizations care intuitively,” she explains. “Others go out of their way to foster a feeling of ‘family’ within their workforce and create an openly caring culture. That’s because employees are more likely to respond to a company that treats them with kindness, interest and respect. It’s an approach that drives greater staff retention, less absence through sickness, greater

motivation, greater commitment and greater productivity.” It’s a recipe for success.

Take Thermotex, a thermal engineering business based in Derbyshire in the U.K., with a global client list and a growing reputation as a firm that genuinely cares for its people. In January, 25-year-old Chloe Watmore, its managing director, challenged her staff to listen to 12 business audiobooks in 12 weeks, which the company paid for. Watmore hoped that those involved would find it a life-enriching experience that they could bond over and enjoy – which they did. “I was happy to invest in the audiobooks,” she says. “I think it’s really important to help staff develop their skills and awareness and to grow as people, not just as employees.”

Attracting staff and customers

Yet this wasn’t simply an altruistic exercise on her part. “I need my team to be improving all the time,” she admits. “Since they took on the challenge I’ve seen them thinking more broadly and applying the things they have learned to situations in the workplace.” Watmore has also introduced a new absenteeism policy at Thermotex. “I want to change management’s mindset so that they don’t view it as a problem,” she says. “We’re not a school. I believe people with illnesses need support and that we need to help them de-stress, diet, exercise and reduce their workload.”

Watmore’s young age may not be entirely unconnected to her benevolent way of working. The old model of an impersonal business that mainly cares about hitting deadlines and making money doesn’t appeal to the members of Generation Z, who are now beginning to join the workforce. “Younger people view the world differently,” agrees Helen Wright. “They want to work for organizations that care about their staff and their communities. They want to see them taking their responsibilities more seriously.” There’s another important reason for companies to show they care, says Wright. Customers are more likely to be attracted to any business that has a reputation for treating its people well because, by extension, they reason that they stand a decent chance of being treated well, too. “The caring side of an organization’s culture is a key area to get right,” she insists. “It’s not a fluffy trend that will disappear in a few years. It’s an integral part of doing business in today’s world – and it’s here to stay.” ■ *Tony Greenway*

Revolutionizing chains – the impact of blockchain on the supply chain

Browse virtually any media channel and you will likely run across something about the promise of blockchain.

From “Companies’ Stocks Are Skyrocketing When They Pivot to Blockchain” to “Blockchain: the Unchangeable Gamechanger,” headlines are rife with optimism about blockchain’s potential. Thanks to its best-known use case as the underlying technology of the cryptocurrency Bitcoin, early applications focused on financial services. But the technology has now gone far beyond these parameters to things like identity, healthcare, telecom and media. Virtually every industry will likely see some application of blockchain, including the logistics industry and the supply chain.

At its most basic level, blockchain is a new type of database system that maintains and records data in a way that allows multiple stakeholders to confidently and securely share access to the same data and information. Blockchain (sometimes also referred to as Distributed Ledger Technology, or DLT) is protected by cryptography, which allows a network of nodes to collectively maintain a shared ledger of information without the need for complete trust between the nodes. This mechanism guarantees that, as long as the majority of the network validates the entries (i.e., the “blocks”) posted to the “chain,” the information stored can be trusted as reliable. In many instances, the role of intermediaries as the means to verify, record and coordinate transactions could become obsolete when using DLT.

Allowing access to data via a blockchain leads to several benefits that apply to every node of the chain. Encryption of each block of data assures the shared data is secure. If anyone tries to tamper with, alter or

erase any of the information, all stakeholders will know. The result is a tamper-evident, single source of truth. Additionally, blockchain increases automation as the network self-validates all ledger entries and enables near real-time data and transaction processing. This can lead to reduced costs and higher efficiency in industries where there are still highly manual and paper-based transactions, because the use of blockchain releases trapped value. In terms of operationalization, transparent track and trace reduces auditability efforts and enforces mutual consensus through a decentralized system.

Blockchain within supply chains

Leveraging blockchain technology in the supply chain overcomes challenges with faster and leaner logistics in global trade, comprehensive transparency and traceability, and improved automated commercial processes backed up by smart contracts, which are agreements that are automatically executed by nodes once certain precoded conditions are fulfilled.

Global trade is highly complex and involves many parties with conflicting interests. A simple shipment with a cooling chain from East Africa to Europe involves more than 30 nodes including over 200 interactions and communications – many still paper based, and all in different systems where the data needs to be reconciled after every update. Storing the relevant data on a shared and secure database based on blockchain technology would allow records to be accessible by all stakeholders in near real time and would reduce mistrust and costs. On the other side, it increases efficiency and accelerates logistics as it enables direct communication between all parties without the need to rely on intermediaries.

Imagine a supply chain where the complete history of a product is available – from the source of origin of the raw material, to the procession within production until the arrival at its final point of consumption. This information, stored via blockchain technology, improves supply chain transparency and enables monitoring provenance, giving supply chain participants more comprehensive track-and-trace capabilities than ever before. Companies can use this information to provide proof of products’ legitimacy, for example, proof of the authenticity of consumer products and goods. Not only companies could profit from blockchain – consumers can learn about the products they are buying, for example, their ethically correct sourcing, their authenticity and the preservation of correct conditions.

AN ESSAY BY CAROLINA GONZALEZ ACES

Carolina Gonzalez Aces is a supply chain manager at Accenture. Based in Frankfurt, Carolina helps transportation and logistics companies to shape their digital supply chain strategy and unlock the potential of blockchain.



This type of transparency and verification to the point of origin could also save lives. According to Interpol, more than 1 million deaths each year are attributed to counterfeit pharmaceuticals entering the supply chain. It is estimated that 50 percent of pharmaceutical products sold via unauthorized websites are fake, and up to 30 percent of pharmaceutical products sold in developing countries contain ingredients that are ineffective. Besides the serious effects on people and their health, this can also have a negative impact on pharmaceutical companies' reputation and revenue flow. Capturing the complete history of a unit of medicine, via the blockchain, as it moves from the point of origin through warehouses and onto the shelves of authorized distributors, would reassure customers that the medicine they are taking is authentic.

DHL and Accenture have developed a solution to overcome this major challenge in the health and life sciences industry and help consumers verify the legitimacy of pharmaceutical products with a blockchain-based track-and-trace serialization prototype. In a lab simulation, the system monitored each step that a pharmaceutical product takes from the manufacturer to the end consumer.

Bureaucracy is another driver of supply chain complexity. This complexity can be reduced with the use of smart contracts. If conditional triggers are added, the contract is executed each time the conditions are met, e.g. when contract parties have fulfilled the required tasks written in an underlying contract. Automated processes could replace paperwork such as letters of credit, bill of lading and other functions, for example transportation management, route planning and delivery scheduling.

What is next?

To achieve success in a blockchain-based supply chain, you need to take a few factors into consideration.

First, collaboration is the key to success as the full potential of blockchain is best realized when all relevant stakeholders take part.



... AND MAGDALENA KLEEGER

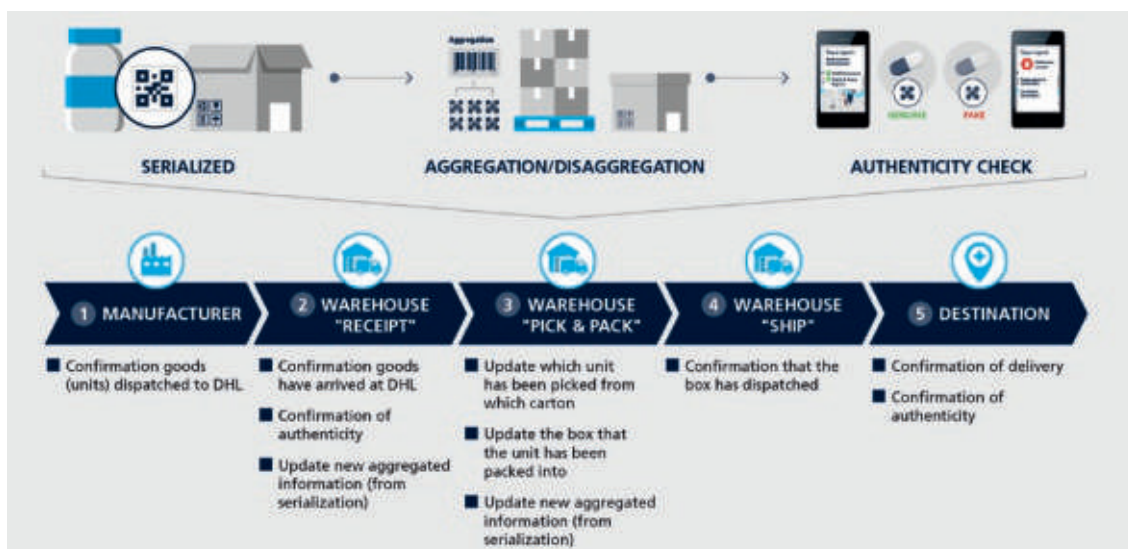
Magdalena Kleeberger is part of Accenture's Technology Consulting practice focusing on Industry X.0. Blockchain is currently her favorite technology.

That might sound daunting, but economies of scale increase the value of blockchain and explain why several blockchain consortia are on the rise in logistics.

Second, blockchain know-how and capabilities need to be built among the supply chain participants. That's not to suggest that you need a PhD in math to understand the potential of blockchain. On the contrary: Exploring the foundational aspects of the technology can go a long way in determining the best business cases, testing their feasibility and determining how they fit within your current business ecosystem to ultimately unlock real value.

Third, get started and engage with your stakeholders on blockchain opportunities and prototypes. While the technology is still in an early stage, it is gaining momentum quickly. But framing realistic expectations among all participants will nevertheless establish applications at scale and unlock the business value of blockchain, as well as open up new business models. ■

 bit.ly/accnture-dhl-blockchain



WHAT'S THE STORY, MR. KOMLAN?

BEATING THE DISEASE

When Edou Komlan contracted a devastating parasitic disease, he lost his job and saw his family driven into poverty. Now Edou is managing his condition and is back at work, thanks to the World Health Organization's lymphatic filariasis (LF) elimination programme.



I'm from Togo and for many years I suffered from a disease known as lymphatic filariasis.



Togo is one of 37 countries in Africa that have been affected by the serious parasitic condition – more commonly known as elephantiasis – which is transmitted through mosquito bites. I'm far from alone in having suffered from this debilitating disease. Lymphatic filariasis currently affects more than 36 million people worldwide and is a leading cause of disability and social stigma.

My condition began with the sudden onset of a mysterious fever, accompanied by heavy nausea. My wife quickly took me to the village hospital where I was treated with anti-malarial drugs and a tetanus vaccine. Despite this, my range of painful symptoms – including the chronic swelling of my arms, legs and genitals – continued to worsen, and I was ultimately forced to abandon my job as a driver and mechanic. The loss of my health was terrible; but the loss of my job was, in some ways, even worse. I desperately needed to continue to work, as my salary was just enough to support my wife and our seven children. It has been heartbreaking to watch my family go hungry.

I began hearing about the World Health Organization's lymphatic filariasis elimination programme, which was being rolled out across West Africa. The program eventually reached my village and I was given albendazole tablets, donated by GlaxoSmithKline (GSK), and Mectizan tablets, donated by Merck Sharp & Dohme (MSD). I also attended mobility management sessions, given by a local nurse; and it was at these classes that I learned about the importance of regular washing because it helps control the symptoms of LF. Then I underwent hydrocele surgery, which has improved my life dramatically.

In fact, thanks to the support I received, my ability to manage my condition has greatly improved, I've regained my confidence and I have been able to go back to work. I now farm pigs and – more importantly – can provide for my family once again, which means my children are able to go to school. Togo is the first African country to interrupt disease transmission and it is our hope that no future generations will ever have to suffer from lymphatic filariasis. ■ As told to Tony Greenway

 bit.ly/gsk-ntd

FACT: GSK is committed to the elimination of lymphatic filariasis and, as part of the WHO-led Global Programme, it has pledged to donate albendazole to every country in need until LF is no longer a public health problem

500 **MILLION**

The number of tablets shipped by DHL as part of GSK's NTD program

6.7 **BILLION**

The number of treatments delivered to stop the spread of LF infection since 2000

4

The annual releases of the DHL Global Trade Barometer, an indicator on the current state and future development of global trade. Launched in January 2018, the Barometer forecasts supply chain trends on a global and country-by-country level based on information derived by artificial intelligence.



bit.ly/dhl-trade-barometer

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