Delivered.

THE GLOBAL LOGISTICS MAGAZINE

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COVER STORY

NEW FORMULA FOR PHARMA

Life sciences and healthcare looks beyond its traditional strengths

Dear reader,

Regulation, cost pressures, new growth markets – these are just a few of the topics we will discuss with industry leaders at DHL's 14th annual Life Sciences and Healthcare conference in Shanghai this month.

In our industry focus, *Delivered.* takes you up close to what occupies the minds of senior executives in the sector.

Dr. K. Anji Reddy, the founder of Dr. Reddy's Laboratories, was one of the architects of the modern drug industry in India, and Dr. Ravi Prakash Mathur, Dr. Reddy's SCM Director – Head of Logistics, shares with us how the company drives success in the ever-evolving pharmaceutical sector.

Sir Richard Branson is considered to be one of the world's most successful entrepreneurs, and perhaps one of the most envied too as he manages to run his international businesses, innovative ventures, and social responsibility projects from the comfort of his own Caribbean island. Busy or not, Sir Richard found time to share with *Delivered.* what spurs him on and what is next on his agenda.

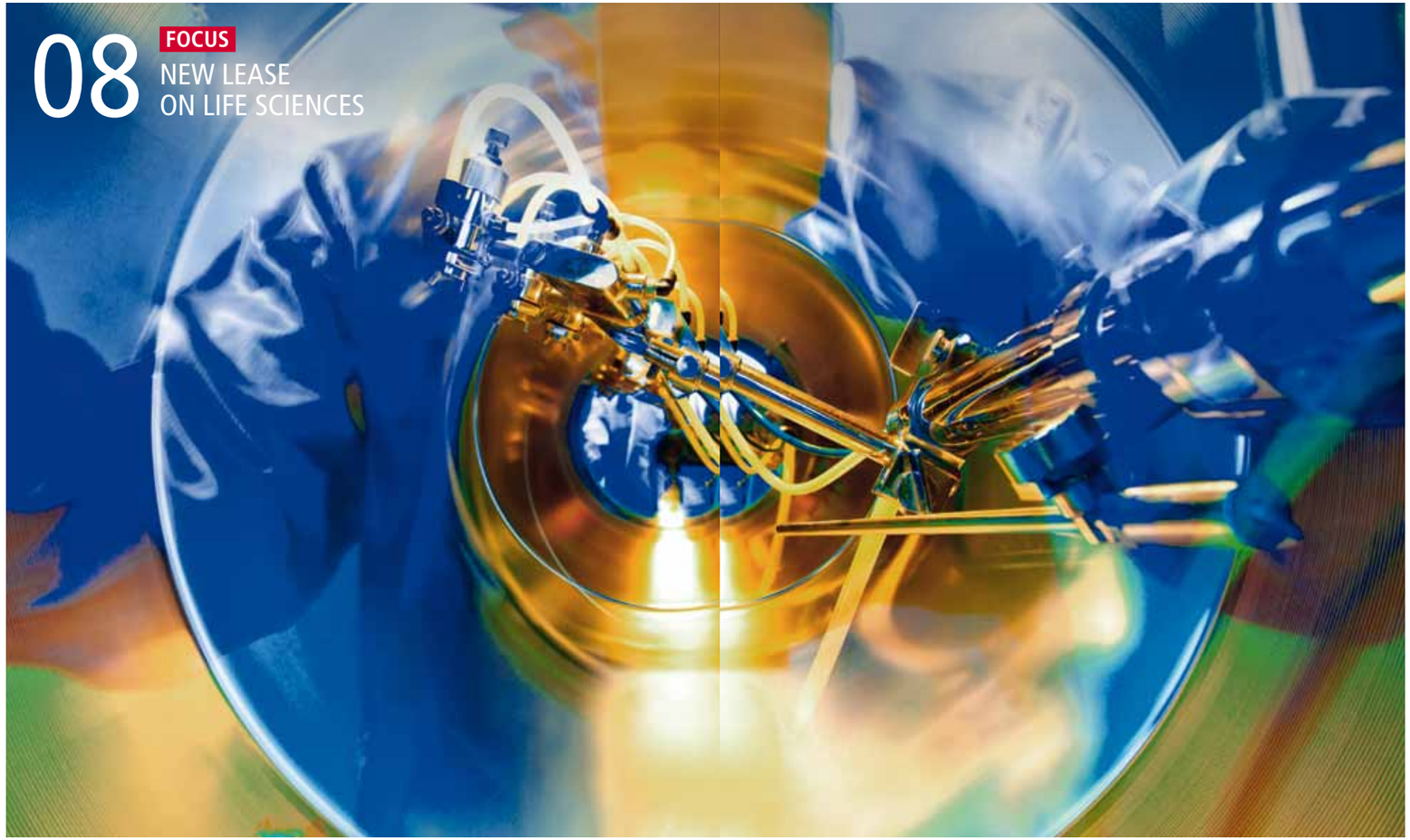
As Virgin Galactic is about to introduce us to the concept of space tourism, futurists and thought leaders believe planetary living is also within our reach – and MIT has even planned an interplanetary supply chain. *Delivered.* gives you a glimpse of what these supply chains may look like, and what it takes to transport supplies in this most challenging of environments.

Please join us as we venture into space – quite possibly logistics' final frontier.

Sincerely,

Bill Meahl

Bill Meahl
Chief Commercial Officer, DHL



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The icons to the left indicate additional online resources. To get more information or view a video, type the link into your browser or scan the QR code.

www.delivered.dhl.com

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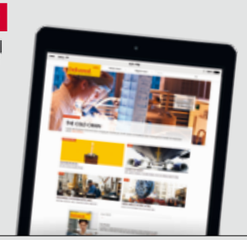


Our cover story, digitally delivered

www.delivered.dhl.com/ Life sciences and healthcare

NEWS

GROUND-BREAKING: New facility will speed up service, ensure earlier deliveries, enable late pick-ups, and help consolidate the global connectivity of the UAE.

A logistics milestone in the MENA region

Opening of the largest DHL Express ground operations facility in the Middle East gives MENA businesses a boost

With the economy of the United Arab Emirates growing from strength to strength, the need for world-class logistics solutions connecting the region with the rest of the world, is increasing. DHL Express's decision to build a new logistics center in Dubai will go a long way to meet that need.

The new ground operations facility is just minutes from the heart of Dubai in the Meydan Racecourse district, a prime business location. As it begins operations, it is the largest DHL Express center for ground operations in the Middle East and North Africa, connecting the region to DHL's global network and providing improved transit times and performance. Covering a land area of 17,265 square meters, the Dubai facility combines an indoor sorting and loading area as well as a new country office for DHL Express UAE. Worth an estimated $27 million and built in partnership with MGE Middle East General Enterprise L.L.C, it boasts state-of-the-art features, best-in-class handling processes using the latest automatic handling equipment, and the latest communications technology.

The new facility prides itself as an environmentally responsible development. In keeping with this concept, it is designed with energy efficient management systems and supply chain equipment. With its central location in Dubai, the new DHL Express UAE Country Office and ground operations facility will better connect to customers and will be able to offer faster transit times, earlier deliveries, later pick-ups, and faster access to international markets for companies doing business in the region.

6 MILLION

square meters is the area on which Meydan City is being developed centered around the Meydan Racecourse, home to the Dubai World Cup.

Learn more about DHL in the UAE at:

dhl.ae

SUB-SAHARAN SPIRIT: The future is looking bright for entrepreneurial Africa.

GREAT THINGS AHEAD FOR AFRICA

Africa's economies are developing fast. Commercial opportunities abound and more and more companies are looking to invest in its diverse markets. The International Monetary Fund predicts an economic growth rate of 2.8% in 2014 and IATA estimates that Africa will be the fastest growing region globally over the next four years.

While advancements in manufacturing, e-commerce, technology, construction, and services have contributed to the positive trade forecast, it is the entrepreneurial spirit of Africa's SMEs that is likely to be a major engine of future growth.

Some of the continent's fastest growing markets include Ethiopia, Ghana, and Nigeria. After rebasing its GDP to include previously unaccounted industries such as telecoms and IT, Nigeria has moved past South Africa to become Africa's largest economy, with a GDP totaling $509.9 billion.

Charles Brewer, managing director DHL Express Sub-Saharan Africa commented, "We have a firm belief that Africa is delivering on its obvious promise and have continued with expansion plans throughout Sub-Saharan Africa, investing heavily in facilities and increasing our vehicle and aviation fleet."

— Look out for an in-depth country report on Nigeria in the November issue of Delivered.

"AFRICA IS NOT ONLY THE LAST FRONTIER BUT POSSIBLY THE BIGGEST FRONTIER FOR BUSINESS."

Ken Allen, CEO DHL Express

DHL FLEET EXPANDS

TWIZY IN YELLOW: Suitable for urban deliveries.

A long-term investment in new technologies and fuel concepts is part of the DHL climate protection program, GoGreen. That commitment sees the company's fleet of alternative vehicles expanded to 10,500, including electric, bio fuel, gas, ethanol, and dual fuel. Electric vehicles like the the Renault Kangoo Z.E., currently making deliveries across Europe, are particularly suitable for urban areas, where their CO_2 efficiency is at its greatest.

Learn more about DHL's GoGreen program at: **tinyurl.com/DHL-protection**

Photo: DHL (2), getty images, Not impossible /Project Daniel

PRINTING A **NEW ARM**

The first thing 16-year-old Daniel did after receiving a prosthetic arm was to eat a chocolate brownie. Feeding himself had not been possible since losing both his arms in a bomb blast two years earlier in war-torn South Sudan. Daniel's life was saved by soldiers who took him to hospital, but it was the new arm that gave him back his hope and independence.

The prosthesis was the first of its kind, created on-site at the refugee camp where Daniel was living, using 3D printing technology. The idea was the brainchild of California-based Not Impossible Labs, who crowd-sourced innovators from around the world, including the inventor of the Robohand, to develop the 3D printable prostheses.

After successfully printing and fitting an arm for Daniel in November 2013, the project began training locals to print and fit additional hands and arms for the many other amputees. It's part of a larger project undertaken by Not Impossible Labs to resolve healthcare issues using low-cost, do-it-yourself solutions to enable high-tech devices to reach people in need.

"We're hopeful that others around the globe will utilize the power of this new technology for similar beginnings," said Not Impossible founder Mick Ebeling.

The prostheses' specifications are free and open source, enabling production by anyone, anywhere – changing lives for Daniel and others like him around the world.

Learn more about Not Impossible Labs at:

www.not impossiblelabs.com/

ARM FOR DANIEL: Printable prosthetic.

Building a better box

The humble shipping container has been a huge boon to global trade since its invention in 1956, but as so often, there's always room for improvement. The European Commission is looking at the advantages of making containers out of carbon-fiber composites. Lighter and easier to use, a carbon-fiber container would prove cheaper than its steel equivalent after just 120,000 kilometers – it could even be designed to fold flat when empty and would improve security as the material can be more easily scanned.

Amazon Dash

E-tail versus retail continues: Dash, a handheld gadget created to simplify food shopping, makes online purchases even easier. The customer simply scans barcodes or speaks into a microphone to create a shopping list for Amazon Fresh, the e-tailer's food delivery service.

Improved tracking for ocean shipments

Position tracking and temperature control capabilities for shipments by sea are getting better. With DHL Global Forwarding's Ocean Secure service, customers can now access real-time information on the location and condition of their sensitive cargo and take remedial action when necessary.

Learn more about DHL's Ocean Secure at:

tinyurl.com/DHL-secure

Strategy 2020 outlines DPDHL priorities

With Strategy 2020, Deutsche Post DHL has outlined the Group's strategic priorities for the coming years and set ambitious financial targets. Strategy 2020 builds on the company's core strengths while emphasizing organic expansion in emerging markets and e-commerce logistics. It aims for sustainable profitable growth, with the goal of becoming the leading force in the logistics industry.

STRATEGY 2020
Focus.Connect.Grow.

Learn more about DHL's Strategy 2020: Focus.Connect.Grow. at: tinyurl.com/DHL-2020

LIVING RESPONSIBILITY

BIG PHARMA BATTLES NEGLECTED TROPICAL DISEASES

The World Health Organisation's ambitious program to control or eradicate 10 out of 17 of the world's most devastating neglected tropical diseases (NTDs) by 2020 has brought together some of the world's leading pharmaceutical companies, including GlaxoSmithKline, Merck KGaA, and Johnson & Johnson. The NTDs targeted affect more than one billion people worldwide and are endemic in 149 countries.

By controlling and preventing the transmission of diseases such as soil-transmitted helminthes (STH), otherwise known as intestinal worms, the program aims to improve the quality of life of those affected and contribute to the overall development of an area by removing illness as an obstacle to future success.

The Children Without Worms project has allowed countries to significantly improve their outreach for treating STH, while also providing the education necessary to help prevent more cases in the future.

"The support of Johnson & Johnson has been fundamental in improving the health of our children," said Dr. Martha Reyes, Director, National Immunization Program, Nicaragua, where they are now able to reach all children through age 12.

In 2010, Johnson & Johnson increased its commitment from 35 million to 200 million annual doses of Vermox for the treatment of STH in school-age children. While GlaxoSmithKline donates 800 million albendazole doses annually, both to treat STH infection in school-age children and for the elimination of lymphatic filariasis (LF), more commonly known as elephantiasis. DHL is working with the WHO, the pharmaceutical industry, and organizations on the ground to ensure the donated drugs are delivered through an effective end-to-end supply chain.

ELIMINATING ELEPHANTIASIS: Children in Togo line up for albendazole.

FIVE NEW **AIRPLANES**

Five new Boeing 737-400 aircraft are to be added to the DHL network fleet serving the Americas, providing more fuel-efficient planes better suited for inter-regional routes. Part of a multi-year service agreement between U.S. cargo carrier Southern Air and DHL, the new fuel-efficient planes will fly routes on rapidly growing trade lanes from Caracas, Venezuela to Barbados, Trinidad and Tobago, Bogota, Colombia, and Panama. In the U.S., the new aircraft will add flights from Cincinnati to Philadelphia, Hartford, and St. Louis.

5,186

km is the range of a Boeing 737-400

A century of air freight

A century ago, when a German publisher chartered a plane to send its newspapers across the country, it cut just one hour off the traveling time by train. Today, 52 aircraft take off around the world every minute, delivering $12.1 million worth of cargo. Times certainly have changed. This year, IATA is marking 100 years since the world's first commercial flight. Carrying 50 million tons of cargo freight annually, aviation brings social, economic, and cultural benefits to people around the globe.

100 YEARS OF COMMERCIAL FLIGHT

Learn more about the anniversary and IATA at:

flying100years.com

CROWDFUNDING A CURE

With average annual healthcare costs in the United States at $8,000 per capita, crowdfunding sites such as Kickstarter, GoFundMe, and Giving Forward have become a go-to resource for many patients. Launched several years ago as a means of garnering financial backing for projects ranging from movies to unusual inventions, such sites now also see some patients and their families turning to crowdfunding to cover medical costs. And it seems to be working, replacing old-fashioned fundraisers like bake sales. In 2012, the most common request for funding on GoFundMe was medically based, with one cancer patient raising over $144,000 in donations.

Learn more about how crowd funding is helping health care at:

tinyurl.com/CrowdHealth

"IT DOESN'T COST THE WORLD TO SAVE THE PLANET,"

says Professor Ottmar Edenhofer, co-chair of the UN's Intergovernmental Panel on Climate Change. A report by the team of 1,250 international experts concludes that we can cut carbon emissions without sacrificing living standards.

SAFE FOR PACKAGES

DHL's new Secure Package Box will allow customers to take delivery of items even when not at home. The box comes in various sizes and formats, costing from $130, and is installed outside the house. It can only be accessed by the owner and designated DHL couriers. So far, more than 500 boxes have been tested in two pilot cities in Germany – Bonn and Ingolstadt – with a nationwide rollout taking place in May this year. The Secure Package Box ensures DHL customers receive their parcels safely and on time, and couriers don't need to make return trips, which can drive up the total cost of last mile deliveries.

INSIDE THE BOX: The new Secure Package Box can be accessed only by DHL couriers, and its owner.

Photo: getty images (4), PR, DHL, Marcus Perkins / GSK

FOCUS:
LIFE SCIENCES
& HEALTHCARE

New lease on life sciences

The world's healthcare requirements are changing, and the life sciences industry needs to supplement traditional strengths in research and innovation with a transformation in the way products are made, sold, and delivered.

TRADITIONAL STRENGTHS: Sterilizing equipment in a high-tech research laboratory.

Fifty-six brand-new drugs were launched in 2013, the biggest number in more than a decade. This jump is encouraging news for patients who have been waiting for potentially life-changing treatments, and for an industry wrestling with a host of technical, economic, and regulatory pressures.

It is also a tribute to the continuing innovation of the research community. Ten of the new products launched last year work in ways that no drug has before. Worldwide, 70% of the 5,000 or so new molecules currently in clinical trials have the potential to become "first-in-class" medicines. Around one-third of recent drug launches are biopharmaceutical products, complex molecules engineered from living cells rather than simpler chemical building blocks. Forecasts suggest that by 2018 half of the top 100 pharmaceutical products will be biologically based.

Inventing new drugs is difficult. A single approved medicine can take up to 15 years to develop and can cost more than $1.2 billion. For pharmaceutical companies, however, that challenge is increasingly being compounded by difficulties in getting their products to the right patients at the right time, and at the right price.

Meanwhile, time is running out for older, established products. When patent protection on big-selling drugs expires, competitors rush generic alternatives to market at lower prices, causing the value of sales to drop by 70% or more. In the United States, generic medicines accounted for less than half of all prescriptions in 2000; by 2012 it was 84%. In that year alone, patent expiry is estimated to have cost the industry $38 billion in sales, and another $230 billion is at risk between now and 2018 as more products reach the end of their patents.

Customers are putting pressure on prices, too. As populations age, disease profiles change, and sophisticated new treatments become available, the cost of healthcare is rising. According to OECD forecasts, if left unchecked, demand for health-related spending in developed economies is set to rise from 6% of GDP today to 14% by 2060. Governments, healthcare providers, and individuals are pursuing policies to contain this growth wherever possible, which in turn puts increasing pressure on the healthcare industry to demonstrate the cost-effectiveness of its offerings.

70%
of the new molecules currently in clinical trials could become "first-in-class" medicines.

The industry's established manufacturing and supply chain methods don't stand up to that scrutiny. High inventories and expensive transportation can help shield customers from the effects of long cycle times and inflexible manufacturing processes, but they also add costs that the industry can no longer afford.

Frustratingly, for manufacturers and patients alike, the industry's high-cost supply chains aren't preventing serious service issues from occurring. According to U.S. Food and Drug Administration (FDA) figures, American hospitals and pharmacies are currently experiencing around a hundred drugs shortages. Supply problems have many root causes, from lack of appropriate manufacturing facilities to problems obtaining raw materials. Advanced biopharmaceutical products are notoriously tricky to produce, with low yields and constrained production capacity. Quality problems are becoming increasingly significant too, particularly as regulators around the world become stricter in their scrutiny oversight and will readily shut down production facilities or recall products that don't meet the necessary standards.

Photos: previous page, getty images; this page, Thomas Ernsting / laif

Market access challenges are even more significant in the developing world where demand for healthcare products is exploding. The market for pharmaceutical products in BRIC economies rose by 22% in 2011, for example, almost nine times the global average. However, as a fraction of GDP, healthcare spending in emerging economies is still one-third of that in rich countries. The difference in absolute terms is even starker: per capita healthcare spending in Germany is more than $4,000, compared with around $130 in India and less than $100 in many African countries. Factor in the vast size of emerging regions, poor infrastructure, and unpredictability of demand and it becomes clear that the healthcare industry must find new ways of doing business if it is to serve these markets effectively.

25%
of the Asian population is 55 or older. This expanding demographic, mostly with limited purchasing power, is fueling demand for cheaper drugs.

"STARTING FROM AROUND 6% OF GDP IN 2006–10, THE COMBINED PUBLIC HEALTH AND LONG-TERM CARE EXPENDITURE FOR OECD COUNTRIES IS PROJECTED TO REACH 9.5% IN 2060."

OECD Economics Department Policy Notes, No. 19

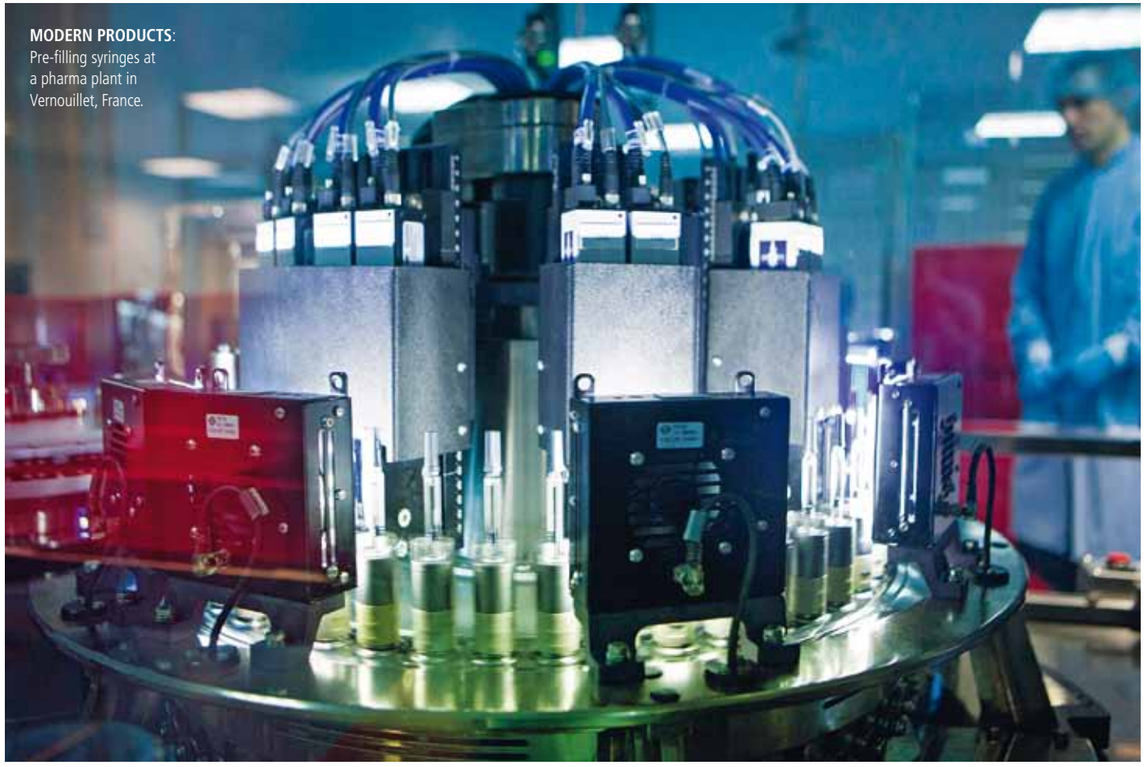
Low-cost generic medicines selling in Asia at one or two cents a dose may seem far removed from advanced biopharmaceuticals at $1,000 or more, but the cost of making and distributing either of these products forms a much higher fraction of the final selling price than it does with traditional patent medicines. This is forcing healthcare companies to reassess their manufacturing supply chains and delivery models. The change is already underway, and over time it is likely to be as fundamental as anything the industry has faced before.

TIME FOR A DIFFERENT TREATMENT

The imperative to meet ever more widely distributed demand at lower cost has already driven significant globalization in supply chains, with companies producing or sourcing active pharmaceutical ingredients from large-scale facilities, increasingly located in low-cost regions, while formulation and packaging activities are located in or near end-user markets. The six basic steps needed to produce a vaccine may take place in six different facilities during a two-year journey around the world.

As it has in other industries, this deintegration of manufacturing is allowing life science companies to become more selective about the parts of the value chain in which they take an active role. Outsourced manufacturing offers healthcare companies quick, cost-effective access to additional capacity, or to the specialist skills and equipment needed to manufacture increasingly complex products. It also creates new opportunities for specialist service providers that can offer the cost benefits or technical skills needed by the market. As integrated pharma companies choose to outsource more of their manufacturing activities, contract manufacturing organizations producing both active pharmaceutical ingredients and finished products are growing at twice the rate of the overall industry.

"We are going to see a situation in which life sciences companies increasingly focus on the core activities that will deliver the best return on their



MODERN PRODUCTS: Pre-filling syringes at a pharma plant in Vernouillet, France.

capital," says Angelos Orfanos, President of Life Sciences and Healthcare, DHL Customer Solutions & Innovation. "If that core is drug discovery and creating better outcomes for patients, then companies will want to focus on that, rather than on manufacturing or distribution."

Globalization and outsourcing comes with their own risks, however. Companies must work harder to control quality and ensure regulatory compliance, both inside the different manufacturing facilities that contribute to their products, and across the logistics links between them. Multiple supply chain links also create security issues, with theft and counterfeiting on the rise.

"Healthcare supply products have very specific temperature and humidity requirements during storage and transportation, and that is increasingly the case for modern biopharmaceutical products," says Orfanos. "As more countries adopt stringent regulations covering manufacturing and distribution practices, manufacturers need to be able to demonstrate that they have their supply chains under control from end to end."

Increasingly, that control and traceability needs to embrace not just the overall supply chain but also the transportation of individual products. Led by California, which will begin to phase in new rules as of 2015, healthcare regulators around the world are starting to require electronic tracking or "e-pedigree" systems that allow individual product batches to be traced from manufacturer to patient.

There are also potential commercial benefits from greater control over the downstream supply chain. "Using wholesalers or distributors to move products to market can simplify distribution, but it also creates a disconnect between life science companies and the healthcare professionals and patients who are their customers," says Orfanos. "Manufacturers are now looking to get that connection back."

In some cases, this requirement is driving structural changes in the industry as companies move from tiered supply chains to direct-distribution models. Such models can also offer cost benefits, for example by improving product visibility in the supply chain and allowing inventory levels to be reduced from months down to weeks or even days.

To balance the benefits of direct control against the costs of implementation, manufacturers are increasingly outsourcing both the execution of their supply chains and the ownership of the necessary assets to third-party service providers. As a natural extension of this approach, they are also exploring the use of shared-service models, which offer additional benefits in terms of efficiency and flexibility. "We began to see a strong growth in interest in shared services during the 2008 recession," says Orfanos. "Initially, companies were interested in turning the fixed cost of logistics infrastructure into variable costs but over time they've begun to see real benefits in adopting shared facilities, particulary in emerging markets where they maybe don't have the secure volumes to justify dedicated assets."

The forces driving life science companies to think harder about their logistics and distribution models are only likely to intensify in years to come. The emergence of autologous cell therapies, produced by genetically modifying the patient's own cells, will demand fast, efficient, and fully traceable round-trip logistics between patients and manufacturing sites. Regulators in even the most remote emerging markets will soon demand the same safety and security standards as the developed world. For healthcare players, the supply chain is becoming every bit as important as the research pipeline. — ***Jonathan Ward***

FOUR TRENDS IN LIFE SCIENCES AND HEALTHCARE

In light of increasing cost pressure and regulation, life sciences and healthcare companies are demonstrating resilience and reinvention. According to Deloitte's 2014 outlook for the sector, drivers for growth include technological advances and product innovation. Yet companies are also faced with four issues offering both challenges and opportunities:

Healthcare reforms
Recent passed legislation in countries such as the U.S., Germany, Brazil, and the U.K. is accelerating the transformation of the global healthcare market from volume-based to value-based. Some companies are struggling to respond to the challenges and opportunities but those who are able to understand and adapt are likely to be leaders in coming years.

Regulatory changes
Regulatory compliance is a critical issue, particularly in emerging markets in Asia and Latin America. Non-compliance can expose an organization to revenue losses, reputational risks, and can raise patient safety issues, or even criminal sanctions. These may include government policies and mandates, drug safety, counterfeiting, information security and privacy, intellectual property protection, corruption, M&A/JV, and other third-party risks.

A smaller and more connected world
Today, global life science companies are operating in a smaller, more connected world, offering opportunities and challenges. Aside from an aging population and rising incidences of chronic diseases, increases in government funding and other anticipated impacts from healthcare reforms could be drivers for the sector. The same is true of emerging markets, although some are being hit by slowing growth and other pressures.

Innovation and value
Turning innovation into commercial products is a major challenge. Many innovations require expertise in a number of scientific disciplines. Consequently, today's innovations require collaboration and cooperation – both characteristics of new risk-sharing business models in the sector. Increasingly, large and small companies are engaging in joint ventures, partnerships, and acquisitions to fulfill their objectives.

Find out more about Deloitte's 2014 Global life sciences sector outlook at: **tinyurl.com/Deloitte-GlobalLife**

Photos: getty images, DHL

30%
of the total of the top 10 pharmaceutical markets – the combined share expected to be accounted for by the four BRIC markets by 2016.

THREE QUESTIONS FOR

Angelos P. Orfanos
PRESIDENT, LIFE SCIENCES & HEALTHCARE, DHL

"QUALITY AND COMPLIANCE IS ALWAYS A CRITICAL PRIORITY FOR LIFE SCIENCE SUPPLY CHAINS"

What are the main logistics challenges that your life science and healthcare clients face today?
Our customers are managing starkly opposed pressures. On one side, the entire industry is becoming increasingly cost sensitive due to rising competition and tighter budgetary constraints in established markets and the need to serve huge and fast growing emerging economies where individual spending power is much lower. On the other, complexity is rising fast as supply chains get longer and more elaborate and new products are introduced. Medical products have always required tightly-controlled transportation, handling, and storage, but those requirements are heightened for some of the latest technologies such as advanced biopharmaceuticals.

What has been the impact of new regulations such as the European Good Distribution Practice Guidelines?
Quality and compliance is always a critical priority for both science supply chains and the industry as whole, together with logistics suppliers like DHL, who is continually reviewing, updating, and auditing its processes and quality management systems to ensure that they are aligned with the relevant regulations. Last year's changes in Europe certainly led to a spike in such activity but that's only part of an ongoing process. Equally important for many of our customers is the way that a number of emerging markets are quickly adopting similarly strict logistics and distribution standards.

How is DHL's life sciences and healthcare market offering evolving to help meet the needs of the industry?
Our extensive (and rapidly growing) dedicated life sciences infrastructure relieves our customers from a lot of cost and complexity. We have the knowledge, equipment, and experience to deliver the standard of service they want in the markets they need to access. And new offerings like our THERMONET temperature-controlled distribution network make accessing those services simpler and more cost-effective.

NEW MEDICINE: LSH companies are no longer holding so much of the value chain in-house

TO THE PHARMACY AND BEYOND

The life sciences industry remained highly insourced for longer than most others, but changes in the sector are now driving rapid growth in outsourcing right across the value chain.

The high development costs and tightly regulated environment of the healthcare sector have, historically, encouraged companies to keep much of the value chain in-house. But many of the forces shaping the sector today make outsourcing a compelling proposition. Volatile demand means it is harder to keep wholly-owned production and distribution assets profitably busy. More activity is moving to lower-cost regions, and life science players are increasingly letting partners in contract manufacturing organizations (CMOs) take on the costs and risks of building and running networks in them. The business is getting more diverse and specialized, too, forcing players to ask themselves whether they can justify the cost of their own facilities, or whether they should leave some things to others with advantages in know-how or scale.

Logistics and distribution activities are a key area of outsourcing growth in life sciences, as companies move into new markets and seek to improve the cost-effectiveness and flexibility of their downstream supply chains. But the evolution of outsourcing in the sector has been shaped by the relative scarcity of suppliers that can operate to the right technical and regulatory standards. "Even in Europe, we've seen different markets adopt logistics outsourcing at different speeds," says Dr. Eddy De Vita, CEO Italy and Sector Leader Life Sciences and Healthcare Europe at DHL Supply Chain. "In Italy, a few local players saw the opportunity and invested in the right capabilities some time ago, and now the pharmaceuticals market is basically 100% outsourced. In Germany, by contrast, there wasn't the same network of suppliers, and so companies kept more of their logistics in-house for longer."

$5.6 BILLION
is the expected spending in 2014 for cold chain logistics services in the life sciences and healthcare sector

Learn more about DHL's solutions for life sciences and healthcare at:
tinyurl.com/DHL-Healthcare

The move to outsourced logistics now has considerable momentum, however. Industry magazine *Pharmaceutical Commerce* estimates that the sector will spend $5.58 billion on cold chain logistics services alone in 2014, along with almost $3 billion on logistics to support clinical trials. And it isn't just shipping and storage that are being outsourced. "We are carrying out more value-added services for our clients," says De Vita. "From packaging in our own GMP-certified facilities to handling invoices and sales orders."

Changes in healthcare technology will serve to further increase the demand for highly sophisticated logistics capabilities. Emerging genetic and cell therapies will require fast, precise two-way connections between patients and manufacturing sites, for example. Service models are changing, too. "Patients are increasingly accessing treatments in their own homes," notes De Vita. "That's already requiring us to extend controlled transportation to thousands of new locations." — ***Jonathan Ward***

GOOD PRACTICES, COULD BE BETTER

As regulators are paying more attention to logistics and distribution in life sciences and healthcare, navigating complex and rapidly evolving rules is a continual challenge for the industry.

Pharmaceutical and medical device companies have become accustomed to rising regulatory scrutiny: in the U.S., recalls of pharma products have increased by more than 25% every year since 2005, and the U.S. Food and Drug Administration (FDA) sent 199 warning letters to medical device makers in 2013 – a new record.

As life science supply chains become longer, more complex, and more challenging, industry regulators are increasing their focus on logistics and distribution too. In Europe, updated Good Distribution Practice (GDP) guidance was published in March 2013, coming into force in September of the same year. In February 2014 two Czech wholesalers became the subject of the first GDP non-compliance report to be added to the European Medicine Agency database.

"While the new European GDP guidelines reflect European directives and other regulatory changes that came into force in the 19 years since the publication of the previous guidelines in 1994, their publication has driven a spike in activity for us, as healthcare companies audit their supply chains to check compliance," says Mike Meakin, VP Global Quality Regulatory & Compliance, Life Sciences & Healthcare, DHL Supply Chain.

Regulations never stand still, however, and as the industry comes to terms with one new set of guidance, other changes are already gathering on the horizon. This February, for example, public consultation began on the latest version of Annex 15 of the European Good Manufacturing Practice (GMP) regulations. This section, which covers qualification and validation, impacts the design and execution of logistics processes.

44
national industry regulators have joined the Pharmaceutical Inspection Co-operation Scheme (PIC/S) to draft an international GDP standard.

Download the DHL THERMONET brochure at:
tinyurl.com/DHL-temperature

INCREASED SCRUTINY: Navigating complex, evolving rules is a challenge for the sector.

Photos: getty images (2)

"Section 5 of the new annex concerns the verification of transportation," explains Meakin. "The draft includes the requirement to extend risk assessments to consider the impact of conditions other than temperature, like humidity, vibration, and the potential effects of delays or the failure of monitoring equipment. It also says that transportation routes should be clearly defined, and suggests that companies consider the effect of seasonal variations on longer routes."

Today, regional variations in GDP, requirements and product labeling standards add cost and complexity for manufacturers. "At DHL we track 35 different sets of standards in our annually updated Yellow Book guide to GDP," says Meakin. "And we've developed a number of services to help our customers comply with local regulations." In Turkey, for example, DHL runs a dedicated facility with ten production lines printing identification codes onto imported medicines. As part of the Falsified Medicines Directive that brought in the EU GDP the EU member states have until the start of 2018 to introduce similar safety features on their medicines.

In the face of this rising complexity, efforts to standardize distribution regulations are gathering pace. The Pharmaceutical Inspection Co-operation Scheme (PIC/S), for example, an association of 44 national industry regulators, is working on a draft international GDP standard, using the new European guidelines as a starting point.

Achieving global harmonization will be a time-consuming process, so it is no surprise that healthcare players are increasingly relying on their logistics partners to help them achieve compliance across global supply chains. By the end of this year, DHL will have extended its THERMONET temperature-controlled life sciences airfreight service to 60 locations worldwide, covering around 90% of the major healthcare freight routes.

"We launched DHL THERMONET last year to give our healthcare clients a robust, standardized service that helps them meet GDP requirements," explains Laura Ackermann, VP, Global Head Life Sciences Network & Operations Air Freight.

The DHL THERMONET product is built upon GDP-compliant operating procedures and a quality management system. "We train and audit our people at every station in the network – and every shipment is monitored according to a lane-level SOP." The service is built on a strong technical backbone too, using DHL's dedicated LifeTrack IT platform and robust, automated temperature monitoring. "Ultimately, it is the manufacturer's responsibility to ensure that their distribution processes comply with regulations, but services like DHL THERMONET make that much more straightforward," concludes Ackermann.— ***Jonathan Ward***

Photo: Elvin Lonan

EXECUTIVE VIEW

REDDY'S FOR TAKEOFF

Like any pharma company operating in a global marketplace, Indian-based Dr. Reddy's Laboratories needs to run a highly optimized, highly effective supply chain. Dr. Ravi Prakash Mathur explains how Dr. Reddy's meets its current supply chain demands – and the challenges it can expect in the future.

Last year, Dr. K. Anji Reddy, the founder of Dr. Reddy's Laboratories, hailed as one of the creators of the modern drug industry in India, passed away, aged 72. The company he built up and left behind – a 30-year-old integrated global pharmaceutical business headquartered in Hyderabad – has been a big success story. This is a trusted brand that generated consolidated revenues of $2.23 billion in 2012/2013, while featuring on the Forbes Asia Fab 50 list of the top companies in the region.

The accolades don't stop there. In 2012, Dr. Reddy's Laboratories was recognized as one of India's Best Managed Boards in a study by the Economic Times and Hay Group, and named Best Company in an Emerging Market at the 9th Annual Scrip Awards ceremony in London in 2013. Earlier this year, Dr. K. Anji Reddy was posthumously conferred the Hall of Fame Award at CNBC-TV18's India Business Leader Awards. It was a fitting tribute to a remarkable man. "In improving access to affordable, high quality medicines and in innovation, his contributions have been extraordinary," said his son, Satish Reddy, MD and COO of the company. Dr. K. Anji Reddy had the courage, expertise and vision to strive for excellence so that his company could be "committed to providing affordable and innovative medicines for healthier lives." Over the decades, reliable logistics have played a central role in helping make that vision a reality.

17 THOUSAND

staff and associates are employed by Dr. Reddy's worldwide.

Dr. Ravi Prakash Mathur, SCM Director - Head of Logistics, is part of the team seeking to uphold Dr. Reddy's legacy and drive the company towards future success. In the complex and constantly evolving world of pharmaceuticals, with its unblinking focus on product sensitivity and on-time delivery, this isn't always easy. Yet Dr. Reddy's Laboratories has never been afraid of a logistical challenge.

In looking to expand overseas, for example, it became a pioneer among Indian companies. Currently, Dr. Reddy's Laboratories has manufacturing facilities in India, Mexico, and the UK, technology development centers in India, the Netherlands, and the UK, plus two plants in the USA. Through its three businesses – Global Generics, Pharmaceutical Services and Active Ingredients (PSAI), and Proprietary Products – the company offers a wide portfolio of products and services including Active Pharmaceutical Ingredients (APIs), Custom Pharmaceutical services (CPS), Generics, Biosimilars, differentiated formulations, and New Chemical Entities (NCEs).

Each business has its own unique supply chain requirement but all need to be responsive and agile. "A responsive and agile supply chain helps an organization to achieve efficiencies in its own systems and meet customer demands," says Mathur. "In addition to the customer expectations across all regions it is also an integral requirement of all manufacturing organizations."

ABOUT DR. REDDY'S LABORATORIES

Founded in 1984 by Dr. K. Anji Reddy in Hyderabad, Dr. Reddy's Laboratories started out as a supplier to Indian drug manufacturers, but soon began exporting to other markets. Today, Dr. Reddy's develops, manufactures, and markets a wide range of pharmaceuticals in India and overseas with major markets including India, the United States, Russia-CIS, and Europe, as well as other select geographies within emerging markets.

Through its three businesses – Pharmaceutical Services and Active Ingredients, Global Generics, and Proprietary Products – Dr. Reddy's offers a portfolio of products and services including active pharmaceutical ingredients (APIs), custom pharmaceutical services, generics, biosimilars, and differentiated formulations.

The company's major therapeutic focus is on gastro-intestinal, cardiovascular, diabetology, oncology, pain management, and anti-infective medicines.

REGULATORY COMPLIANCE

Dr. Mathur oversees logistics for Dr. Reddy's Global Generics business and, in theory, his team's job is simple; to ensure their medicines reach patients across the globe on time. Yet its active pharmaceutical ingredients, finished dosage forms, and biological products are marketed to over 100 countries with an emphasis on North America and Europe, India and Russia-CIS, and other emerging markets. So in practice, of course, it is a massively complicated operation. "This is a hugely challenging task," agrees Mathur, "because shipping across borders involves many things which include navigating through a complex network of regulatory bodies, like customs and health regulators, operators of ports and airports, and third party logistics service providers." His team oversees all of this, while giving utmost priority to preserving product quality, complying to regulatory norms during international transit, and ensuring supply chain integrity. Since the launch of new products is an integral part of Dr. Reddy's business model, it's vital that Mathur and his team are aware of each region's different regulatory requirements.

Mathur says that regulation is one of the most problematic areas for any pharma company to deal with – and it's going to become more complex in the years ahead. "In pharma, we have to constantly watch out for regulatory changes," he says. "The pharmaceutical industry directly impacts people's health and thus is a highly regulated industry. Quality norms are getting stricter by the day. Commitment on safety, and environmental protection is also of utmost importance. We at Dr. Reddy's not only meet standards and meet those requirements but also go beyond. Quality, benefits and safety including reliable storage and supply, are integral to our drugs. All our products meet regulatory and safety approvals."

For Dr. Reddy's Laboratories, a highly optimized, highly effective supply chain is its mission critical. To that end, it has been designed to be replenishment-driven and has several stellar features which have enabled it to power an efficient supply chain system. "That system assesses inventory at all supply chain nodes and enables transfer of consumption data, in order to supply inventory on the basis of most recent consumption," says Mathur. "It truncates replenishment time and refills inventory as frequently as possible from the previous node to consumption points. It maintains buffer inventories at every supply chain node to meet immediate demand. This is a very different paradigm from the conventional forecast-based system. As far as the generics business is concerned, Dr. Reddy's supply chain is based on very robust processes that draw from bodies of knowledge such as 'theory of constraints' and lean management. The supply chain is also integrated end to end and supported by a powerful IT infrastructure, providing visibility of inventory across various supply chain nodes and capturing inventory data and supply data in real time, which is vital in responding effectively to customers' demands.

1ST

in rankings among India's most respected pharma and healthcare companies (Business World, 2013)

STORAGE AND TRANSPORTATION RELIABILITY

Looking to the future, Mathur knows there will be further supply chain challenges. The secret is to be agile enough to respond to them. "Changes in technology, regulatory environment, and competitive landscape lead to changes in any value chain," he says. "As and when these changes happen, one has to recognize the new fulcrum point of the value chain and respond accordingly." He believes that the secret of good supply chain management is having an understanding of the ecosystem of international logistics and the knowledge of how to leverage it. "One needs to create and nurture relationships with the service providers that can bring solutions to the table and thereby create value for the organization," he says. "For this, one also needs a good understanding of your own organization's strategy and mission. Ability to put into place systems and processes is also important."

DHL's business relationship with Dr. Reddy's has existed since 2004, and often includes the transportation of both time-critical shipments and products that have to be launched in global markets. "The company has a sharp awareness for our requirements," says Mathur. "The quality and efficacy of our medicines must be 100% and that includes the absolute reliability of storage and transportation."

With such a demanding role in the company, Mathur insists he is not particularly driven in his personal life. Away from work, he meditates to destress. "I believe meditation can help you not only relax but can also help you reconsolidate your energies," he says. That's just as well, because he needs all the energy he can get for the job he does, which, luckily, is one he loves. "My job gives me the opportunity to develop and implement new solutions that the organization can leverage," he says. "It is exciting to explore new methodologies, processes, and technologies that can lead to meaningful change." It's a sentiment that Dr. K. Anji Reddy would wholeheartedly agree with. — ***Tony Greenway***

"THE QUALITY AND EFFICACY OF OUR MEDICINES MUST BE 100% AND THAT INCLUDES THE ABSOLUTE RELIABILITY OF STORAGE AND TRANSPORTATION."

Dr. Ravi Prakash Mathur, SCM Director – Head of Logistics at Dr. Reddy's Laboratories

Photos: getty images (3), Elvin Lonan

BUSINESS

Big data: Fuel for the digital age

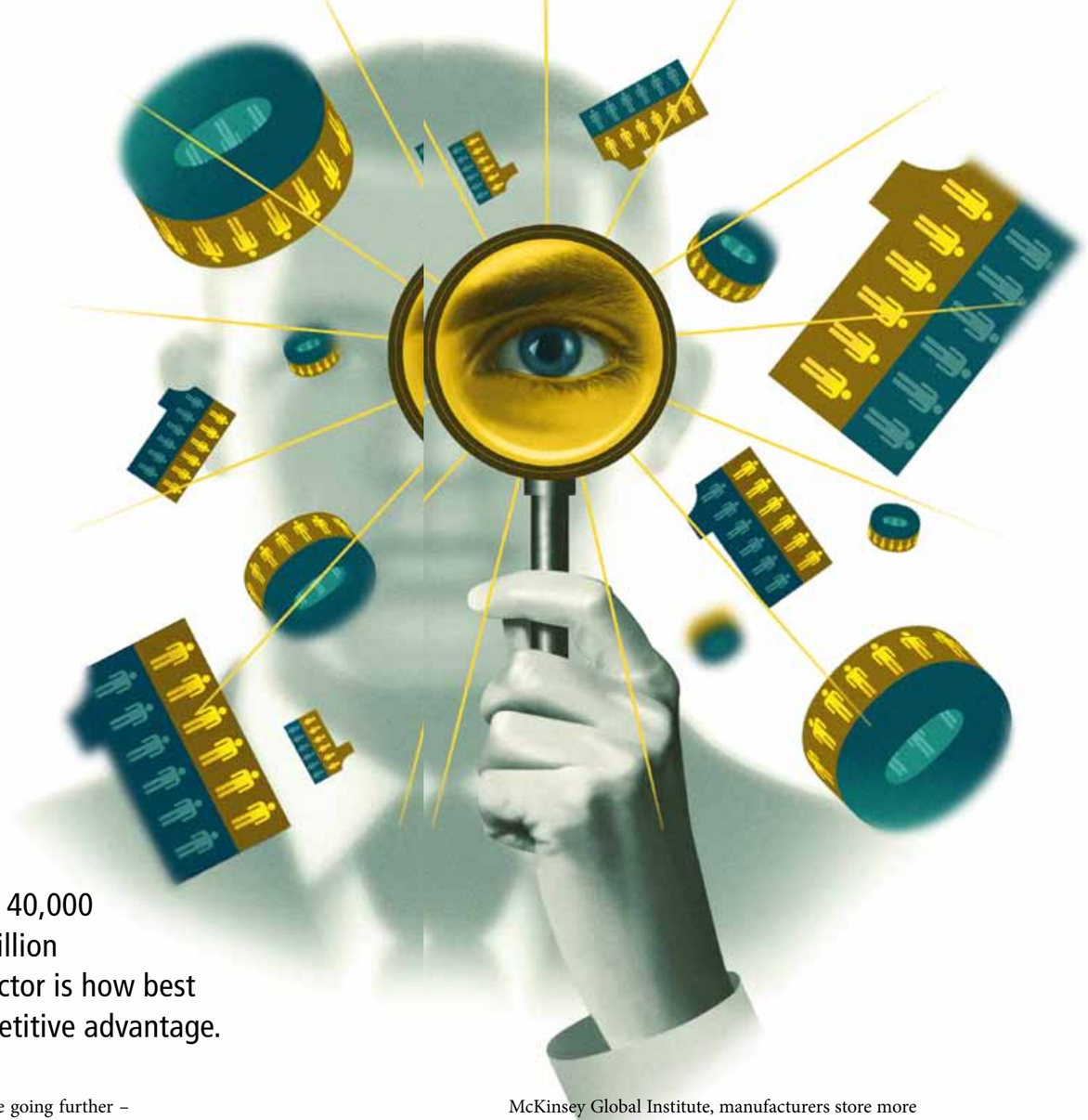


Illustration: Stuart Briers

With the quantity of data exploding – it's predicted to hit 40,000 exabytes by 2020 (one exabyte is the equivalent of one billion gigabytes) – the question for business leaders in every sector is how best to exploit this seemingly endless resource to create competitive advantage.

For Caterpillar, excavation is nothing new. But today, the company is excavating data as well. Through an intelligent network, the construction and mining equipment manufacturer can monitor its heavy equipment, collecting data on repair history and usage patterns. Construction-site managers use this data to flag equipment due for maintenance and ensure machinery is used efficiently, while dealers use it to stock the right inventory.

Using sales data to stock shelves is something that retailers have done for years. But they are also early adopters of other big data applications. Supermarket chains like Tesco in the U.K. figured out back in 1995 that if they could harvest and analyse the purchasing data of individual customers, they could devise precise marketing campaigns tailored to individuals' personal preferences. The customer loyalty card has been a hit ever since.

These days, retail companies are going further – combining sales data with information about customers' online behavior in order to anticipate demand. The online retailer, Amazon, for instance, recently patented a technique called "anticipatory shipping," a method to start delivering packages even before customers click "buy." Based on a customer's previous orders, product searches, wish lists, returns, and how long their cursor hovers over an item, Amazon plans to box and have ready to ship products it expects customers will want, but haven't yet ordered. The packages could wait at the shippers' hubs or on trucks until an order arrives.

In the same way, manufacturers with multiple sites around the world more accurately plan procurement in their supply chains by combining their own tracking data with regional sales of end-products, returns, and repairs. According to a study by the McKinsey Global Institute, manufacturers store more data than any other sector – close to two exabytes of new data was stored in 2010 alone. "This sector generates data from a multitude of sources, from instrumented production machinery (process control), to supply chain management systems, and systems that monitor the performance of products that have already been sold."

In supply chains, however, big data applications are not yet common, says Lora Cecere, founder of consulting firm Supply Chain Insights. "The traditional supply chain is invested in transactional data," she says, "they are just starting to think about this whole world of unstructured data."

Combining data from different sources holds huge potential. Companies can overlay the geographical locations of suppliers and distribution centers with statistics on tornadoes, floods, earthquakes, and other natural disasters, and then use predictive analytics to calculate the probabilities of such disasters occurring at each site. The results can help companies devise better business continuity plans, minimizing their supply chains' exposure to these risks.

In fact, by exploiting the possibilities opened up by big data, supply chain risk management can be taken even further. Using a continuous stream of data from blogs, social media, and news sites, companies can track a wide variety of developments – from power outages to industrial action – in real time, across their entire supply chain. DHL's new tool, Resilience360, does just that, making it possible to identify all sorts of potential sources of disruption and quickly put in place effective contingency plans.

On the other hand, by combining data from various sources – operational metrics on deliveries and service qualities, complaints to customer services, and comments posted on social media sites – companies can spot problems early on and take corrective action. "By setting up listening posts to monitor customer sentiments, which is the mining of unstructured text, companies can improve brand protection and reduce the time to respond to any problems," says Cecere.

And as more and more everyday devices are connected to the web, data from the Internet of Things can be used to create new revenue opportunities for businesses. In Japan, Toyota plans to launch a service that uses information on vehicle locations and speeds, road conditions, and other parameters collected and stored via the telematics in cars. Combined with other information, it will help local governments improve traffic flow, provide mapping services, and support relief and aid services in the event of a disaster.

According to Cecere, supply chain and logistics managers "can learn a lot about the commercial benefits from what other types of companies are doing with big data, how they are using different types of data that is coming at them at high velocity."

Big data is an opportunity for competitive advantage just waiting to be tapped. — ***Tam Harbert***

REFINING **CRUDE**

If raw data is like crude oil, then it must be refined to produce the kind of fuel that will power the digital economy. With the volume of data doubling every two years, the challenge for companies is not just how to process it all, but how to find and exploit the information with real value.
In his trend report, "Big Data in Logistics," author Markus Kückelhaus explains how the logistics industry can extract information and process it in ways that produce competitive advantages and, in some cases, create entirely new revenue streams.
With examples of best practice from other sectors, he shows the change of mindset that is required.
Mobile phone operator Telefónica, for example, has a huge amount of data from the digital trails left by its subscriber base. The company realized that, when the data is anonymized and aggregated, it can be used to gain insights into how segments of the population behave collectively, and that this information can, in turn, be of value to other businesses.
Every company today owns a lot of data. The key is to find ways of creating additional value from these information assets.

For a copy of the trend report, go to:

tinyurl.com/DHL-bigdata

COULD "NO DATA" BE THE NEXT BIG THING?

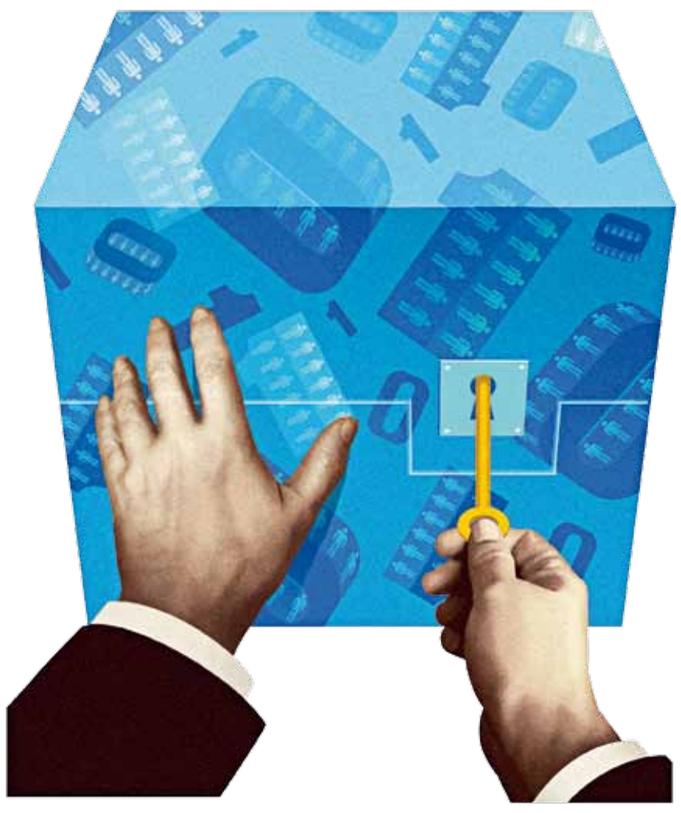
Amid growing unease around the commercial gathering of personal information, collecting less data – or even no data at all – is starting to be seen as a possible competitive advantage.

Today's technology enables businesses to collect personal data from customers on an unprecedented scale. This is big data at the personal level – and it could be worth $1 trillion by 2020 in Europe alone, according to the Boston Consulting Group.

But unease about the amount of private information shared online is mounting and, as a result, a new market in products and services that help protect privacy is emerging. Tools such as privacyscore help consumers estimate the privacy risk of using a website based on how it handles personal and tracking data. Consumers can even block brands they don't trust from gathering data about them, using services like Ghostery. Devices such as Safeplug allow users to browse the Internet in private by routing all traffic through an anonymous network. The search engine DuckDuckgo does not send users' search terms to other sites, thus preventing what it calls "search leakage." And for smartphone users wishing to prevent third parties following or eavesdropping on them, there is the Blackphone, unveiled in February this year.

Learn more about the no data trend at:

tinyurl.com/trends-nodata

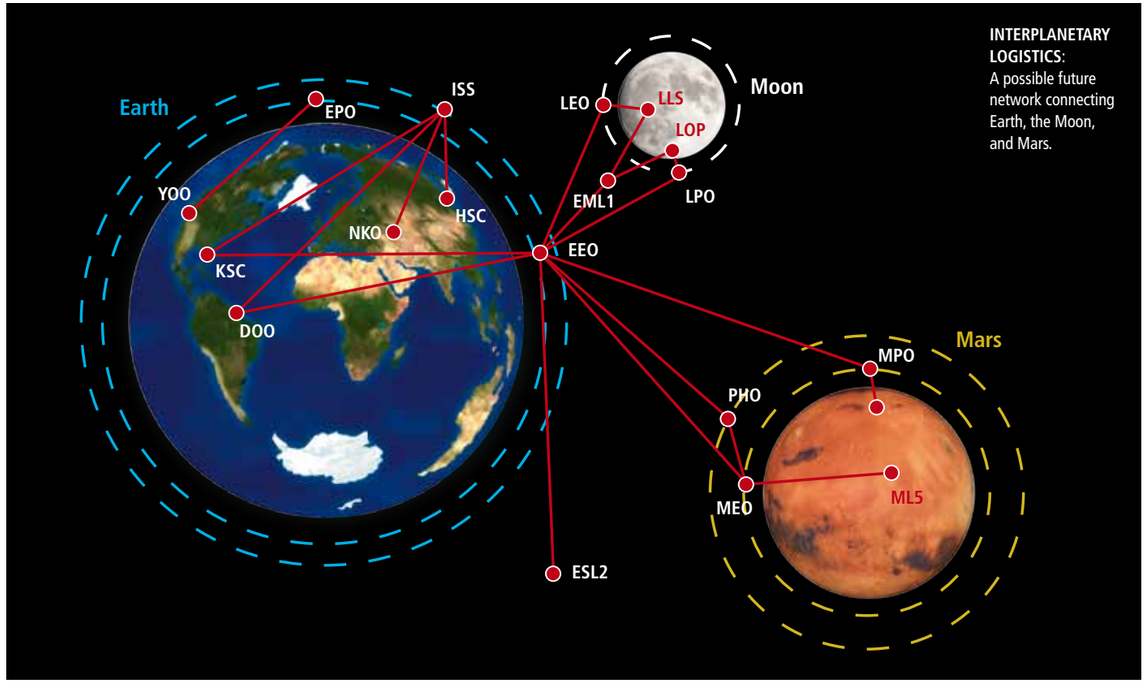


It's clear there is growing demand among consumers for more control over how their data is collected and used. This fact is not surprising. Digital footprints reveal not just search terms, IP addresses, names, phone numbers, and residential addresses, but also spending habits, lifestyles, preferences – and those of friends. It is now almost impossible to say which information is collected by whom or how it is used.

According to a survey conducted by the Pew Research Center, 86% of Internet users report that they have tried to remove or mask their online actions, while only 37% believed it was possible to do so. Research by Ipsos Mori, in the UK, reveals that the number of Internet users that trust companies with their personal information online is falling year on year, and a hefty 45% of respondents say they do not trust companies with any personal data. This lack of trust will take its toll on online businesses, unless something is done.

In the aftermath of the U.S. National Security Agency's data gathering scandal, tech firms like Apple rushed to reassure consumers that their business does not depend on collecting personal data – effectively distancing themselves from the likes of Facebook and Google. One of Europe's biggest retailers, Sonae, in Portugal, recently surprised industry observers by announcing that they would give back to their customers the data collected through their loyalty card program.

In this environment, could collecting no data be a viable option, possibly even a competitive advantage? Could firms that actually forgo the collection of personal data altogether, while still providing an excellent service to consumers, also be winners in the big data game? — ***Janet Anderson***



INTERPLANETARY LOGISTICS: A possible future network connecting Earth, the Moon, and Mars.

THE LONG HAUL

Private companies are already involved in resupplying the International Space Station. Now, logistics researchers are developing solutions for the Moon and Mars.

Think your supply chain is difficult? Try supplying life-saving equipment over a 54-million-kilometer voyage between two moving planetary bodies. Plus, your vehicle must carry all fuel onboard, and can't stop for repairs along the way.

To prepare for manned missions to Mars or a return to the Moon, researchers at the Massachusetts Institute of Technology have developed an interplanetary supply chain management architecture for space exploration. Lead researcher Olivier de Weck says the team developed the SpaceNet software to model the flow of vehicles, crew, and cargo from the ground through space to orbit or a planetary surface.

Supply chain optimization is essential when it costs $15,000 per kilogram to push a payload into geosynchronous orbit, and an estimated $41,000 per kilogram to land cargo on the Moon. Long-range military operations and supply chains for remote areas such as NASA's Arctic base gave some initial insights. The researchers created a network of space logistics spanning Earth, the Moon, and Mars, as well as Lagrangian points – locations where the offsetting gravity between planetary bodies makes it easier to park spacecraft.

Learn more about MIT's Interplanetary Supply Chain Network at:

tinyurl.com/spacelogistics

Learn more about Mars One at:

mars-one.com

From the research, two key elements emerged: prepositioning and refueling. Creating a depot at the Earth-Moon Lagrangian point would allow spacecraft headed to the Moon or Mars to take on supplies en route. Similarly, flexible refueling strategies could reduce launch weight and cost and reduce safety risks.

The team has also developed a container that searches its own contents via RFID, helping astronauts to find critical items stored onboard. On the International Space Station (ISS), misplaced supplies have shut down space walks for several days. Being able to find items you need is vital when there is no way you can easily send for replacements.

The ISS relies on manned and unmanned capsules for resupply missions. Along with the space agencies from Europe, Japan, and Russia, two private sector companies operate supply craft. One of these, SpaceX, is using the ISS as training for an even more ambitious project – the establishment of a permanent human settlement on Mars. SpaceX's founder, Elon Musk, thinks that humans could become multi-planetary by 2025.

And Musk is not alone. The Mars One mission is already selecting from thousands of applicants who are willing to make the one-way journey to the Red Planet, and live there for the rest of their lives. — ***Gary Wollenhaupt***

Illustration: Stuart Briers; Infografic: MIT Space Logistics

Supplies into space

With the demise of the U.S. Space Shuttle program, the International Space Station some 380 kilometers above the Earth relies on manned and unmanned capsules for resupply missions. Over the course of a year about 9,000 kilograms of cargo is delivered to the ISS at 60-90 day intervals. During the average six-month deployment, the complement of six astronauts relies on these resupply missions for everything from breakfast food to spare parts to gear for the next science experiment. Also, each year about 2,000 kilograms of cargo head back to the surface, everything from trash to scientific samples. Planning for a resupply mission takes up to a year, with every square centimeter and gram accounted for in the cargo ship. Mission planners ensure potentially dangerous cargo is kept separate, and also ensure cargo is packed to withstand the extreme temperature and g-forces inherent in space flight.

Learn more about supplies into space at:

www.spacex.com

HOW TO HANDLE THE BIG BANG

The phenomenon known as "big-bang disrupter syndrome" has become an unpredictable but game-changing fact of life in the retail and consumer goods sectors. Here are some strategies for dealing with the new uncertainty.

Worldwide PC sales fell by 10% in 2013 – the biggest fall on record. According to computer industry analysts IDC, 2014 could see a further fall of 4%, taking PC sales back to 2008 levels. The cause? Soaring sales of smartphones and tablet computers such as Apple's iPhone and iPad. "While the PC still remains the primary computing device, PC usage is nonetheless declining each year as more devices become available," explains Jay Chou, Senior Research Analyst at IDC.

The meteoric rise of the smartphone and tablet computer is just the latest manifestation of what's being called "big-bang disrupter" syndrome, as Larry Downes and Paul F. Nunes termed this phenomenon in a Harvard Business Review article in March 2013. Simply put, big-bang disrupters are innovations which redefine product categories and markets almost overnight, powered to dominance by consumers abruptly changing their previous product preferences. As with the fabled flutter of a butterfly's wing that becomes a hurricane, small shifts can quickly become mass movements. In short, instead of incremental product evolution, they abruptly redefine the realm of the possible – leaving retailers and consumer goods manufacturers struggling to catch up.

According to Lisa Harrington, author of the white paper "Consumer as Disrupter", rapidly changing and unpredictable consumer behaviour is making volatility and complexity the norm in the retail and consume goods industries. But why exactly? Download the white paper at:

tinyurl.com/
DHL-consumer

MARKET DISRUPTION:
PC sales are plummeting, while tablet sales soar

Adding to the challenge is a digitally empowered, global middle class that is able to spot, evaluate, and make the move to disruptive products faster than ever before. From Amazon.com to TripAdvisor, consumers are interacting directly with each other to recommend new products and services, leaving traditional marketing channels such as advertising and retail salespeople increasingly frozen out of the loop.

For businesses looking at how best to respond to such disruption, the dangers are obvious. Consider Microsoft's recent $900 million write-down of its inventory of Surface RT tablet computers. At such rapid inflection points, in short, no one wants to be left holding inventory that consumers don't want to buy.

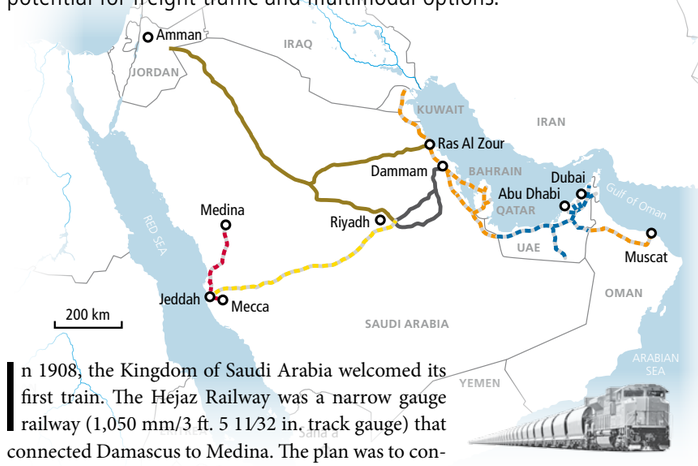
So what is the alternative? A report published by DHL Supply Chain, entitled "Consumer as Disrupter," points to several promising anti-disrupter strategies – including postponement, flexible shared networks, and tailored sourcing. "Retailers and consumer goods manufacturers are rethinking their supply chains with an eye towards building a portfolio of options, risk tolerances, and capabilities," notes report author Lisa Harrington, a lecturer in supply chain management at the University of Maryland's Robert H. Smith School of Business. In this new, disrupter-prone era, she adds, "...they know they must create a supply chain that is fit for purpose." Tailored sourcing, for instance, sees low-cost and efficient sourcing for the high-certainty portion of product demand separated from the more flexible, higher-cost sourcing that is used to service less certain portions. Shared networks, meanwhile, see consumer goods manufacturers recognize that individually delivering to retailers is not a strategic competitive differentiator and that sharing delivery networks cuts costs for all.

Postponement, finally, delays final product differentiation until closer to the point of sale, positioning inventory where it is most flexible, reducing both inventory levels and the risk of obsolescence. "In situations where demand is building strongly, positioning inventory more centrally can help manufacturers and retailers respond to demand more nimbly as it arises," observes Richard Wilding, Professor of supply chain strategy at the Cranfield School of Management.

Whatever the method, thanks to big-bang disrupters, the consumer marketplace is changing rapidly, and supply chains must adapt. — ***Malcolm Wheatley***

FINALLY FULL STEAM AHEAD IN THE GULF?

With national rail projects across the Gulf States starting to take shape, the long-awaited plans for a connected railways project across all states and beyond look set to materialize, unlocking the potential for freight traffic and multimodal options.



In 1908, the Kingdom of Saudi Arabia welcomed its first train. The Hejaz Railway was a narrow gauge railway (1,050 mm/3 ft. 5 11⁄32 in. track gauge) that connected Damascus to Medina. The plan was to connect Constantinople, the capital of the Ottoman Empire, with Mecca, Islam's holiest city. World War One intervened and the railway was shut down in 1915. Exactly a century later, Saudi Arabia and its fellow Gulf Cooperation Countries (GCC) first approved a feasibility study for a railway project linking Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates (UAE).

After several years of shifting deadlines since 2008, it now looks like the project is coming to life, with designs for the proposed 2,117-kilometer-long network due to be completed and construction to start in late 2014 or early 2015. According to Dr. Ramiz Al Assar, Resident Advisor from the World Bank to the GCC Secretariat General, the nearly $200 billion network, which also includes several metro lines, will be fully operational in 2018. "2013 has seen a turning point in the regional rail market," according to Middle East Economic Digest (MEED), "with more than $30 billion worth of rail construction contracts awarded and a lot more to come."

The $15.5 billion core GCC rail route will provide a link from the borders of Iraq to Muscat on the Indian Ocean, and plans are undergoing consultation for a new rail causeway linking Bahrain and Saudi Arabia; another linking Bahrain with Qatar, a network extension from Oman to Yemen, and connections to Jordan via Saudi Arabia and Iraq via Kuwait. In the longer term, rail links could even be extended to Turkey, Central Asia, and China, thus establishing the GCC as a crossroads on a modern-day version of the Silk Route.

In logistics terms, the rail connection would help to limit road congestion, particularly at borders, which is due to increase steadily as all GCC states enter a phase of ambitious expansion requiring the import of goods and materials. Investment in logistics infrastructure such as new sea ports and airports means added freight traffic and, with the new rail network, the possibility of a multimodal market offering across the Gulf for the first time.

Dr. Tobias Plate, Senior Partner at Roland Berger Strategy Consultants comments, "The development of a GCC-wide rail network has, without doubt, the potential to fundamentally transform the logistics industry in the region by facilitating a faster and more reliable movement of goods throughout. As such, the new rail network will further contribute to the the peninsula's economic development by enabling new industrial clusters and urban developments to spring up. In the short term, the enhanced logistics infrastructure will make the GCC a globally important logistics hub. In the long run, given the potential to extend the rail network to the Eastern Mediterranean and Europe, the GCC could become the hub of a completely new supply chain model, building on an integrated sea-rail transport chain from Asia to Europe."

However, before work on a GCC-wide network can truly commence, the six states need to establish a governing body, the GCC Railway Authority. While various talks have been held, a date for the establishment of the body has so far not been set. "We hope that we will progress with (the formation of) the GCC Railway Authority," Dr. Al Assar commented at the third annual Oman Land Transport Summit in 2013.

While the wheels of pan-GCC progress may seem to grind a little slow at times, the project is firmly on the states' agenda. Plans for national rail networks are now in place in all GCC states, and real progress is being made. Abu Dhabi laid some 120 kilometers of track on its $11 billion Etihad Rail project. The 1,200-kilometer line, scheduled to be completed in 2018, will link major industrial zones, cities, and ports in the UAE, and eventually connect with the GCC railway. And Saudi Arabia, which already operates a railways network with a total length of some 1,380 kilometers, extending from its oil-rich Eastern Province to the capital, Riyadh, has already laid the first 120 kilometers of the GCC network. — ***Michelle Bach***

Photos: previous page, NASA / SPACEX; this page, getty images, Etihad Rail, Infografic: Nico Wilkesmann

MASTERING MULTIMODAL

Air freight or ocean? Rail or road? The right multimodal mix can cut costs, help to reduce inventories, increase responsiveness, and lower carbon emissions. The question is, which mix is the right one?

Globalization has left businesses with a headache: ever-longer and more complex supply chains, full of inventory. Ocean freight may be cheap, in short, but it slows responsiveness. Air freight is fast, but costly. Road freight provides door-to-door flexibility, but carries a penalty in terms of both carbon emissions and cost. Rail freight, meanwhile, offers lower costs and lower carbon emissions, but only between fixed points.

Smart strategies for integrating the right transport modes together within a single multimodal framework, reckon experts, can not only save companies up to 80% in cost but also deliver on other important strategic objectives. A shift to multimodal can reduce or even eliminate warehousing, by using ocean freight legs as "floating warehouses in transit," as well as cut carbon emissions and improve responsiveness.

"Finding the right mix for a business is a very individual process," says Joachim Kochsiek, expert for multimodal logistics at Fraunhofer Institute for Material Flow and Logistics. "There is no hard and fast 'right' answer. Getting the right mix between multimodal solutions depends on many factors – such as the product in question, the volume and frequency of shipments, the distance traveled, and more."

Conducting an in-depth, individual analysis is essential. "In addition to the basics of cost and speed, shippers consider reliability, predictability of lead times, and overall ease of use when considering the best mix of modes," says Richard Stewart, professor of logistics at the University of Wisconsin at Superior. Risk and reliability play a part too, as does carbon reduction to meet environmental targets.

As companies mull the right multimodal mix, shifts in freight patterns can be seen right across the United States, Europe, and Asia. Consumer goods and electronics, for instance, which once relied almost exclusively on air in order to get products into customers' hands faster, now commonly go multimodal using rail or sea as markets are saturated and prices of goods have dropped. On the other hand, time can also be the primary factor for mode selection. During highly orchestrated global launches, the latest must-have tech gadgets are shipped on high-priority consignments by air to destinations across the globe, as consumers line up around the block, prepared to pay premium pricing on launch day.

According to Stewart, in the U.S., breakeven mileage for rail freight is no longer in the 800–1,600 kilometers range, making shorter distances economical. And in the United Kingdom, the Department for Transport estimates that breakeven for non-bulk rail is about 320 kilometers, and that around 17% of the 850 million tons transported on the road network covers this distance and more – implying that businesses could shift up to 150 million tons of goods to rail to increase their supply chain effectiveness.

> "THERE IS NO HARD AND FAST 'RIGHT' ANSWER. GETTING THE RIGHT MIX BETWEEN MULTIMODAL SOLUTIONS DEPENDS ON MANY FACTORS."
>
> Joachim Kochsiek, Fraunhofer Institute for Material Flow and Logistics

INCREASING RESILIENCE AND SUSTAINABILITY

The right multimodal strategy can also help companies increase their supply chain resilience and sustainability. For instance, for companies relying mainly on trucks, roadwork and frequent traffic jams can cause problems for time-sensitive deliveries. Switching to rail or inland waterways for part of the distribution requirement can prove to be the right choice – even for non-bulk cargo and shorter distances.

British supermarket chain Waitrose, for instance, successfully trialed a multimodal road-rail service to supply two of its three stores in Scotland, far from the company's heartland in the south of England. The switch to rail, says Waitrose management, achieved a saving of 0.4 tons of CO_2 per trip, without increasing costs. In addition, they report, the use of rail instead of road has provided useful volume flexibility at periods of peak demand. Meanwhile a French supermarket chain saves an estimated 250 tons of CO_2 annually supplying stores in Paris using barges on the Seine river instead of relying only on trucks. And for a Turkish clothing manufacturer shipping jeans from Istanbul to Germany via sea, rail, and truck, going multimodal means reducing carbon emissions by almost 1.5 tons per container, down from the 2.7 tons emitted when going exclusively by truck.

Combining rail and air freight may also be a means to lower costs and still have a day definite service. Another choice may be combining sea and air. Shippers based in China, for example, may choose to send containers by sea to Dubai and then continue to Europe via air with reliable door-to-door transit times. One such multimodal offering is DHL's SEAIR service, which unites ocean and air freight in a single service, booked and invoiced as a combined transportation solution.

In Europe, where 75% of freight still goes by road, the use of rail is still constrained by infrastructure bottlenecks and the ongoing liberalization of the rail market. But moves to develop multimodal infrastructure on a larger scale aim to provide better infrastructure services for rail freight users. One such project is Weastflows, funded by the European Regional Development Fund, which targets west and east freight routes across several European countries. The project seeks to identify sustainable gateway regions by leveraging information and communications technology and telematics, including geospatial applications, to improve flows and develop more efficient and greener supply chains – even extending into southern Europe and Asia, notably China.

ROAD OR RAIL: Smart multimodal moves can save companies up to 80% in cost.

Photo: corbis

MORE THAN MEETS THE EYE

"Multimodal is more than about connecting the different transport modes to leverage the individual strength for a customer. Focus is on making the entire shipping process from booking to billing consistent, as simple as possible for the customer from every origin to every destination, no matter the transport mode, for B2B and B2C shipment profiles. Customers deserve reliable lead times, full shipment visibility, a proactive customer service, and easy pricing rounding up a truly multimodal offering, like we do with our DHL DOOR-TO-MORE service," says Thomas Kowitzki, head of product development at DHL Freight.

Applications such as transportation planning tools are also aiding multimodal decision-making with centralized IT systems pooling special knowledge to support businesses in planning and organizing intermodal transports. And as rail begins to displace road freight in the multimodal mix, carriers are starting to deliver solutions that meet shippers' needs in a rail freight environment.

"We've developed autonomous temperature-controlled containers that can guarantee consignment temperatures from -25°C to 25°C – ideal for all kind of temperature-sensitive goods such as high-tech, perishables, or pharmaceuticals," says Bruno Selmoni, head of road freight and multimodal for Asia Pacific at DHL Global Forwarding. The containers are also equipped to be monitored for vibration levels, as well as with anti-tampering devices that instantly send alerts about problems, and GPS location devices to provide tracking information. "Companies are seeing that multimodal can offer more than meets the eye," he observes.

That said, points out Richard Wilding, professor of supply chain strategy at Cranfield University's School of Management, while multimodal approaches can successfully create more resilient supply chains, it's vital for businesses to understand not only the full risk profile involved in going multimodal, but also the corresponding cost-to-serve implied by a multimodal transport solution. "Using ocean freight to feed a de-coupling point such as a warehouse, and then air freight for the final leg to the customer, combines cost savings with agility and responsiveness – but only if the de-coupling point doesn't add dislocation and disruption," he notes.

DHL's Selmoni concurs. "Shippers now expect to book their freight on a single interface, and get clear rates for end-to-end service with single-invoice solutions," he sums up. "And that's precisely what we offer."

*— **Malcolm Wheatley***

80%
cost savings can be achieved by switching to multimodal.

Learn more about multimodal at:
tinyurl.com/DHL-multimodal

Watch a video about DHL DOOR-TO-MORE at:
tinyurl.com/DHL-Door-To-More

B-EYOND THE BOTTOM LINE

The "B Team," a group of globally renowned business leaders dedicated to making business work better for both people and the planet, are presenting an initiative aimed at fundamentally altering the way companies go about things.

Can business save the world? Not on its own, but it can certainly be an engine of change for the better. That at least is the view of a group of globally renowned business leaders and policy-makers brought together by serial entrepreneur Sir Richard Branson and Jochen Zeitz, former Chief Executive of sports goods company Puma, with the aim of making business "work better" – the B Team.

The team – whose members include Ratan Tata, Unilever Chief Executive Paul Polman, former Irish President Mary Robinson, and Muhammed Yunus, the microfinance pioneer and Nobel laureate – is the advance party for "Plan B," an initiative aimed at fundamentally altering the way companies go about their business, putting their activities on a more sustainable footing that benefits both the planet and its people and not just the bottom line.

"We are at a critical crossroads," explains Zeitz. "While business is responsible for many of the problems we see in the world today, business can also play a large role in developing and driving the solutions for many of these problems." Among the problems he cites are resource scarcity, climate change, and growing inequalities that, combined, will "undoubtedly fuel unprecedented levels of volatility and uncertainty."

A further problem is that much of the business community does not realize this as it is mired in short-term thinking and chasing of immediate profits. That is where the B Team comes in, an accelerator of possible solutions and a means of spreading the word and leading by example.

Since its launch in 2012, the 15 strong team has been steadily gaining attention and signing up new supporters. At this year's gathering of the World Economic Forum in Davos, the team were out in force to explain why it is time for a rethink.

Among them was Arianna Huffington, founder of Internet portal, the Huffington Post. "Plan A – the way we have been running business, with emphasis on short-term growth, quarterly earnings, ignoring the impact on planet and people – is not working," she said. "It is not working for individuals, it is not working for corporations, it is not working for the planet."

The answer, she argues, is to "change the culture and atmosphere in which business works". The way to do that is to identify a series of "challenges" that business leaders adopt and lobby for. These include a shift to accounting standards that go beyond narrow, short-term tallies of profit and loss and reflect the cost of business to the environment and society; the overhaul of regulation to eradicate "warped incentives"; to support human rights and diversity within business.

Observers might be forgiven for raising a skeptical eyebrow. For years, businesses have sought to persuade the rest of us that they are not just hard-nosed chasers of profit. Which self-respecting company has not embraced some form of "corporate social responsibility", even if only to present themselves as a "better", more humane outfit? Cynics might add that while undoubtebly many corporate types have their hearts in the right place, priorities are quickly established when it comes to the bottom line. Not so, claims Huffington. She cites the example of the coffee chain Starbucks which came under pressure from some shareholders to trim healthcare benefits, a demand it resisted on the grounds that they actually made commercial sense in terms of reducing longer-term costs as workers were healthier, productivity was higher, and retention rates were better.

Kathy Calvin Chief executive of the United Nations Foundation, the wing of the U.N. that coordinates work with other international bodies, also considers it "old-fashioned" to think in terms of trade-offs between profits and principles. She sees business as an effective agent for policy change, as there is "a shift from rhetoric to action." One reason is government, whose scope for maneuver has become more limited as public coffers thin out and fundamental issues of contention, such as climate change, are mired by a lack of necessary international agreement. Opinion polls surveys, such as the Edelman Trust Barometer run by the eponymous public relations group, rank business ahead of government in terms of popular trust, and note that the gap is increasing, despite the impact of recent scandals on the reputation of the corporate sector. Entrepreneurs such as Bill Gates lead approval rankings. Business leaders and entrepreneurs, Calvin says, are in a position to change their own operations and then share their experiences with others. And this is not happening in a vacuum. Right now, she adds, there is "lots of debate" at the U.N. about a development framework for the next 15 years, which will be called the Sustainable Development Goals following on from the Millenium Devlopment Goals that shaped policy from 2001 until today. "We need the voice of business. It needs to be at the center of it," she told French television.

However, speaking out on issues that touch on politics and policy has often been something that businesses struggle with. Sir Richard Branson acknowledges this, and says that the B Team aims to address it with public encouragement for those who do put their head above the parapet. Most recently, he praised Apple boss Tim Cook for refusing to be cowed by a climate change skeptic think tank and shareholder in the computer company, which had attacked the group's sustainability program. Cook stood his ground, telling his critics to "get out of the stock."

The B Team also singles out certain non-members for praise. For example, it recently cited Swedish home interiors group Ikea as an inspiration for its drive to promote sustainability across its operations. The overall aim is to change behavior by example and encouragement – effectively deploying peer pressure. This is an approach that has been successfully employed by Bill Gates and legendary investor Warren Buffett with the Giving Pledge, under which the extremly wealthy agree to donate half their fortunes to charitable causes.

For Jochen Zeitz, this is where leadership is key. If they can get the next generation of corporate leaders to sign up for Plan B – recent new supporters include Blake Mycoskie of Toms shoes – then they can "ignite a movement" for change. "If we are successful," he says, "Plan B will grow to include thousands of business leaders who are advancing it with their own companies, ultimately creating a fundamental shift in the way business is conducted." ***— Fred Schulenburg***

> "WHILE BUSINESS IS RESPONSIBLE FOR MANY OF THE PROBLEMS WE SEE IN THE WORLD TODAY, BUSINESS CAN ALSO PLAY A LARGE ROLE IN DEVELOPING AND DRIVING THE SOLUTIONS."
>
> Jochen Zeitz

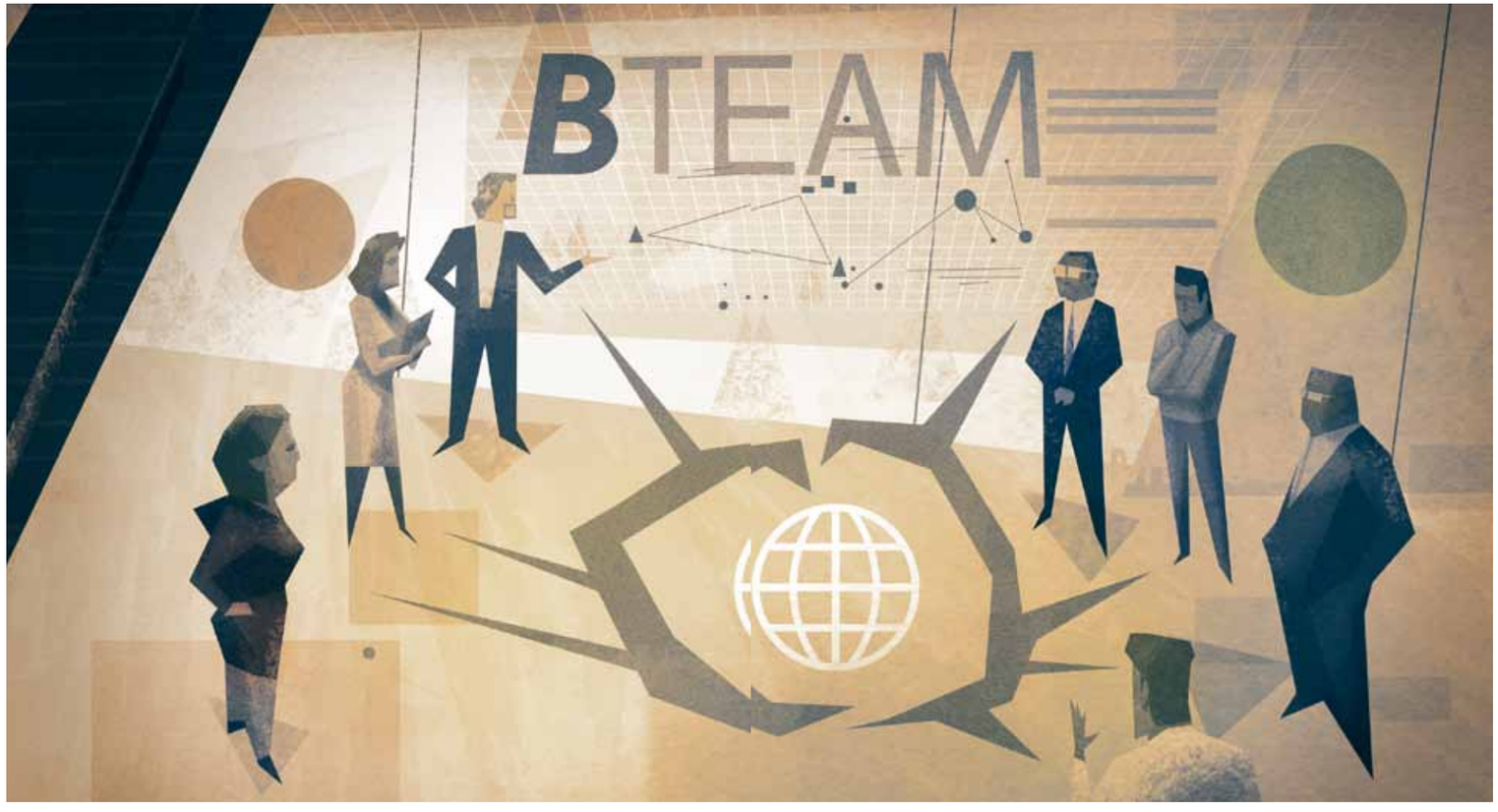


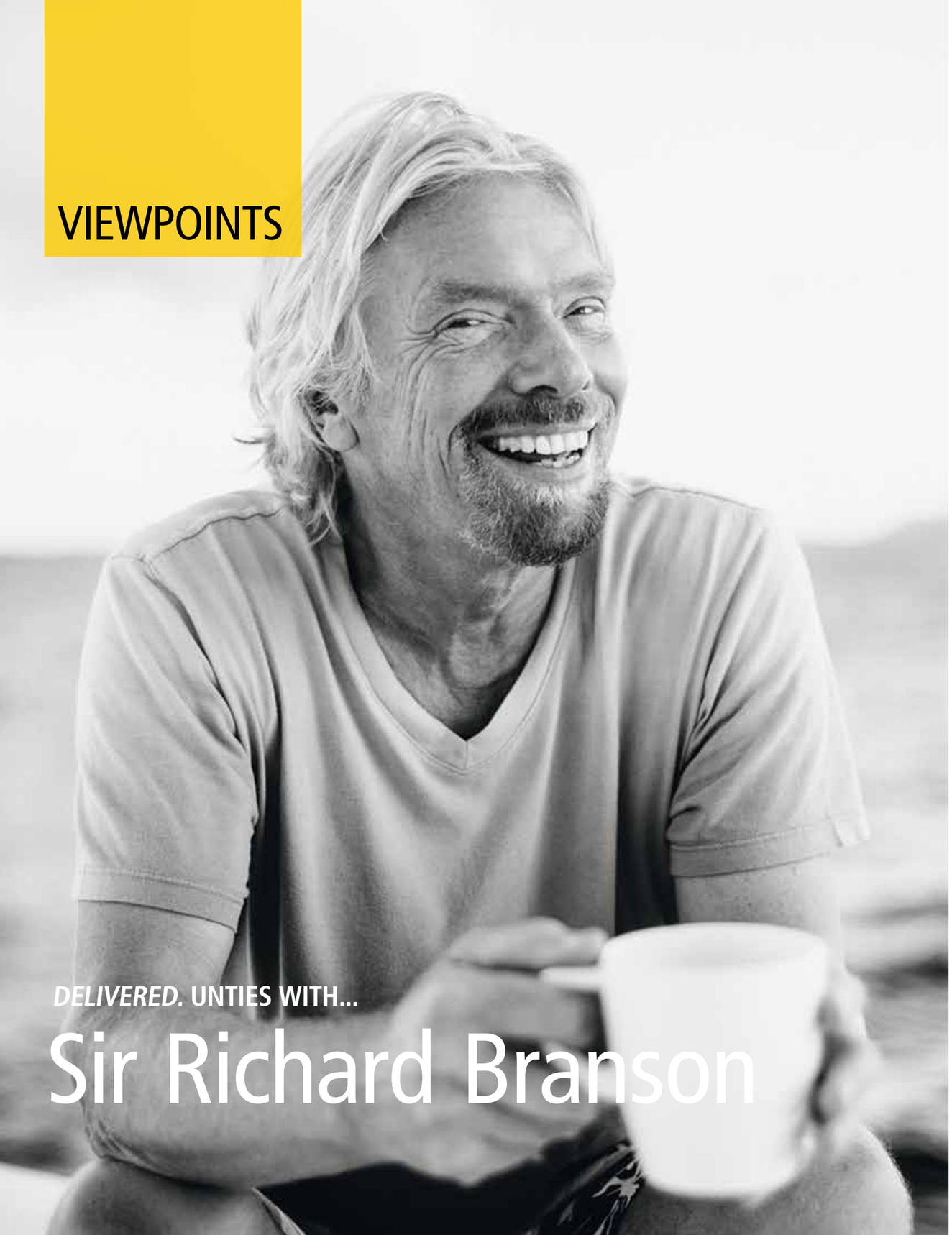
Illustration: The B team

TO B OR NOT TO B: Mary Robinson, Mohamed Yunus, Jochen Zeitz, Sir Richard Branson, Ariana Huffington, Paul Polman and the rest of the B Team are working to persuade business to set a better example.

Learn more about The B Team and their Plan B at:

bteam.org

VIEWPOINTS



DELIVERED. UNTIES WITH...

Sir Richard Branson

Photo: Virgin

The word "can't" obviously doesn't figure in Sir Richard Branson's vocabulary. When he has an idea he is passionate about – and he has many – he does everything in his might to turn it into a reality. His tenacious, go-getting attitude, coupled with his legendary laid-back nature, has made him one of the world's most successful, unflappable, and instantly recognisable entrepreneurs.

But then the self-made Branson has always had an unshakeable belief in himself and a superhuman drive to see things through. It's a powerful combination that has impelled him from Blackheath, in South London (where he was born 63 years ago), to Necker, his own private island in the Caribbean.

Yet Branson is dyslexic and, as a pupil at the independent Stowe School in the leafy county of Buckinghamshire, U.K., was no one's idea of an academic success. Nevertheless, his optimism, single-minded motivation, flair for business, love of a challenge, and eye for a good idea was obvious to all. On his last day, the Headmaster, Bob Drayson, told him: "I predict you will either go to prison or become a millionaire." Drayson was right on the first count (at 20, Branson was jailed for a night on suspicion of tax evasion), although he seriously underestimated his former pupil on the second. Millionaire? Try billionaire. In fact, last year, Forbes put Branson's fortune at US$5 billion.

Famously, Branson began his first venture in his teens. Not having a phone, he would amass piles of loose change and use a public phone box to make business calls. By the age of 17 he had begun his own magazine (which he christened The Student); at 20 he started a mail order record company; and at 21 he opened his first record shop on Oxford Street in London. He called it Virgin.

Over the last 40 years, Branson has been busy turning his brand into a global phenomenon. He went on to start Virgin Records and founded the Virgin Group, created the Virgin Atlantic airline, Virgin Mobile and, more recently, Virgin Galactic, which he plans will become a space tourism company. He was awarded his knighthood for services to entrepreneurship in 1999, has had cameo roles in movies, broken records crossing the Atlantic by boat and the Pacific by balloon, and is a philanthropist who has pledged to give half his fortune away to good causes. Plus, he co-founded The B Team (see p. 30-31), a not-for-profit initiative formed by a global group of leaders to create a future where business is a "driving force for social, environmental and economic benefit."

What's more, unlike the average business person, he's done it all without wearing a tie. He LOATHES them. "I often have a pair of scissors in my top pocket to go cutting peoples ties off," he admitted in one of his blogs. "Find your nearest pair of scissors and cut your tie off. Or better still, cut your friend's tie off! They'll thank you for it when the ideas start flowing..."

What has been your business philosophy over the years?

It's always been 'Screw it, let's do it!' and looking back this has helped give me the push to make many business decisions over the years. I think people are often too afraid to take risks. There are plenty of entrepreneurs out there with great ideas but it's taking the leap to make a go of it that takes a large amount of courage.

You are always described as a'maverick'? Do you see yourself that way? What sets you apart from other entrepreneurs?

Leaving school at 16, the early years at Student magazine, and establishing our music business cemented my reputation as a maverick. I have never really seen myself that way, more someone who follows their passions and interests. A lot of our businesses have been founded out of a personal interest I had and a belief that we could make people's lives better. I think I am like many entrepreneurs who have that sense of fearlessness and put in the same huge amount of hard work as I did.

Where do you get your ideas from – and how do you know which ones to trust and follow... and which ones to forget?

Ideas can come from anywhere and I think you should always be open to this. The same goes for advice – make sure you listen to every little bit of advice you're given, particularly when it comes from your friends, family, and colleagues. I'm incredibly lucky to be surrounded by a fantastic group of people at Virgin whom I trust and whose opinions I value. We'll always work through ideas together and if we all really believe in something, we'll make it happen. You can't expect other people to get enthusiastic about your idea if you're not passionate and excited about it yourself.

Do you believe you can be truly innovative without taking risks? What are some of the biggest risks you have taken in your career in order to be innovative?

There is a curiosity along with a determination and drive that's ingrained in entrepreneurs, and I think it's the attitude that comes with risk-takers that makes them innovative.

Follow Sir Richard Branson's Blog at Virgin:

http://www.virgin.com/richard-branson

Leaving school aged 16 to start Student Magazine was a risk – I made the decision not to go down the traditional career path. However, saying that, I think entrepreneurialism is much more accessible today which is fantastic to see. I suppose Virgin Atlantic could be classed as a bit of a risk. Industry experts didn't think that a company like Virgin with a background in music could make it work or saw us as any sort of competition. It was our unique take on travel and an 'outsiders' perspective which brought about our success, and it's for this reason Virgin Atlantic will always hold a soft spot in my heart.

What was your reasoning behind the creation of The B Team?
The B Team was formed to help encourage doing business for the wellbeing of people and the planet. All the members of the team are committed to this mission and we'll be working in our own organisations, as well as in partnership with others, to try our very best to achieve it.

How easy or difficult was it for you to persuade business and political leaders to join The B Team – and what effect is it having?
Doing business sustainably is something all members of The B Team feel strongly about. We're a group with a unified approach and shared ambitions to change the way we do business.

I think public figures should use their influence for the greater good and help to make the world aware of the changes that can be made – we want to encourage businesses to follow suit and for their competitors to take note. We are all working inside our own companies and organisations to meet these commitments and at the same time we are forming partnerships and solutions around our 'Challenges' since we announced them last June.

What is the latest news from Virgin Galactic? Are you still on target to launch this year?
I will give a cautiously optimistic yes to the second part of that question! While it is true that we are tantalisingly close to the finishing line and have made fantastic progress, particularly over the last 12 months with three flawless, supersonic powered flights, we have a few more tests to go and safety will always be paramount. This is without doubt the most challenging but also the most fabulous project we've ever embarked upon at Virgin and I'm both enormously proud of what we have achieved and increasingly excited about the prospect of experiencing the wonder of space for myself. It promises to be a great year as we complete the test flight programme and move to our wonderful HQ at Spaceport America in New Mexico in readiness for launch of the world's first commercial spaceline.

SIR RICHARD BRANSON: THE HIGHLIGHTS

The Entrepreneur
1966–71: launches Student magazine, starts mail-order record company, and opens first Virgin record shop in London.
1972–84: Launches the Virgin record label and signs the likes of Mike Oldfield, The Human League, and Culture Club to make it a musical powerhouse around the world.
1984–90: Launch of Virgin Airlines, Virgin Holidays, and Virgin Balloon Flights. Virgin Atlantic flies from Gatwick, London, to JFK, New York, for the first time.
1992–2000: Launches Virgin Cinemas, Virgin Active health clubs, and Virgin Mo bile. In 1992 he sells the Virgin music label to Thorn EMI for a reported $1 billion (£560 million). Branson later re-enters the music business with V2 Records.
2001–10: Launches Virgin Digital download music service and Virgin Galactic, the first-ever commercial space tourism company.

The Social Entrepreneur
2004: Launches Virgin Unite (the working name of The Virgin Foundation).
2007: Inspired by a conversation with musician Peter Gabriel, Branson launches The Elders, a group of individuals who use their "collective experience and influence to help tackle world problems." Nelson Mandela is the founder member.
2009: Virgin Unite creates the Carbon War Room – a group of top entrepreneurs – to focus on delivering a low-carbon economy.
2012: Brings together the B Team, a group of global business leaders, to make "business work better."

The Adventurer
1986: Branson breaks records with fastest transatlantic crossing in his boat Virgin Atlantic Challenger II.
1991: Makes world-record hot-air balloon flight across the Atlantic.
2004: Achieves the fastest crossing of the English Channel in an amphibious vehicle.
2012: Becomes the oldest person to kite surf across the English Channel.
2014: Sets a new Guinness World Record title for most people riding a kitesurf board.

Photo: getty images

"I THINK PUBLIC FIGURES SHOULD USE THEIR INFLUENCE FOR THE GREATER GOOD AND HELP TO MAKE THE WORLD AWARE OF THE CHANGES THAT CAN BE MADE."

Do you think future planetary living is possible?
I'm starting to believe anything is possible. Years ago I never thought I would be in the position to offer people the experience of space travel and now it seems that this is just around the corner. We've started exploring the opportunities in getting to space and the next natural progression is staying put up there. This won't happen overnight but I think over the next 20 years if we can get enough people wanting to fly to space, this will give us the financial resources to do even bigger things.

We are featuring an article on the MIT Logistics in Space programme in this issue. Gazing far into the future, could you see Virgin playing a part in space exploration, logistics, and travel?
It is definitely one step at a time with space travel – but that's not to say that we don't have lots of big ambitions and dreams for the future! We are already developing a second space vehicle which will launch small satellites rather than people, but using the same air-launched system which will increase the frequency and flexibility of launch dramatically while at the same time significantly reducing cost. The small satellite manufacturers and users have been crying out for a better launch system for years and success in this area will have the potential bring some incredible ideas to reality – space-based solar energy and cheap global internet access to name but two! Longer term we are looking at how we can use our experience of operating and building winged human spacecraft to take people and cargo on long-haul, transcontinental flights via space, dramatically reducing both journey times and environmental impact.

You have so many business and philanthropic interests. Can you ever turn the phone and email off and relax – and if so how do you like to let off steam?
I must say, I do like to be kept busy but I decided to move to Necker Island to improve my quality of life. You've got to look after yourself and being on Necker Island allows me to keep fit and healthy. One of my favourite things to do is kitesurf which definitely helps me forget about the real world for a bit. It's great for the body and the mind and I love the adrenaline rush you get when going at high speeds, with just the open water in front of you – it's absolute heaven!

What is your favourite place on Earth? And why?
Oh, without a doubt Necker Island, I feel incredibly lucky to be able to call it home. I will always remember when I first caught a glimpse of it from the helicopter all those years ago – the crystal clear turquoise waters and beautiful white sand. It holds so many wonderful memories for me – it's where Joan and I were married, our children Holly and Sam grew up there, The Elders (an independent group of global leaders who work together for peace and human rights) and the Carbon War Room (a non-profit organization that accelerates the adoption of business solutions that reduce carbon emissions at a gigaton scale) were conceived there... It's also simply a beautiful escape and somewhere to spend some quality time with friends and family.

Who would your top five dinner guests be if you could have anyone sitting around your table? Either currently or people from history?
It's a tricky question as I always end up adding to the list and suddenly I've got a huge party on my hands! If I'm limited to five then I think it would have to be Archbishop Tutu and Nelson Mandela for his wisdom and humour; Cleopatra for her legendary beauty; Sir Francis Drake, the ultimate adventurer, and Amelia Earhart, the first woman to cross the Atlantic in a plane.

You are entering a team at the first Formula E racing series. What are your expectations for Formula E and for the Virgin Racing Team?
Virgin has a history in pioneering new ways of doing things, not just because of a sense of adventure, but also to find better ways of doing things. Formula E is exactly that. It promises to be a compelling series, not just for fans but also for the technological fallout that will drive innovation – the ambition of the championship is to have a real impact on electric car technology.

The Formula E Series will be incredibly exciting. I love that we will be racing around city centre street circuits and that fans can influence the race via social media – I am expecting a lot of spectators, plenty of fun, and some sparks flying.

We have winning expectations for the Virgin Racing Team. Our aim is to create the best team to put us at the front of this unique and environmentally friendly racing series. We have got some great announcements coming up over the next few months, so watch this space. — ***Tony Greenway***

Link zu Galctic Hangout Google Science Fair:

virgingalactic.com

Watch Sam Branson's "Galactic Hangout" at the Google Science Fair 2014 at:

tinyurl.com/Galactic-Hangout

NEXT-SHORING: A CEO'S GUIDE

AN ESSAY BY
LOU RASSEY, KATY GEORGE, SREE RAMASWAMY

Katy George is a Director in McKinsey's New Jersey office, Sree Ramaswamy is a fellow of the McKinsey Global Institute and based in their Washington, D.C. office, and Lou Rassey is a principal in the Chicago office.

Rather than focussing on offshoring or even "reshoring" – a term used to describe the return of manufacturing to developed markets as wages rise in emerging ones – today's manufacturing strategies need to concentrate on what's coming next.

Evolving demand from new markets places a premium on the ability to adapt products to different regions. Meanwhile, emerging technologies that could disrupt costs and processes are making new supply ecosystems a differentiator. Accordingly, a next-shoring perspective emphasizes two forms of proximity: to demand, and to innovation.

ECONOMIC FUNDAMENTALS

The case for next-shoring starts with the economic fundamentals of demand (as local factors are growing increasingly important) and supply (as the dynamics of labor and energy costs evolve).

Most demand is local. More than two-thirds of global manufacturing activity takes place in industries that tend to locate close to where their products are sold. This simple fact helps explain why manufacturing output and employment have recently risen, both in mature economies and in emerging markets such as China. Emerging markets' share of global demand is also climbing, from roughly 40% in 2008 to an expected 66% by 2025. As that share rises, the diversity of needs it reflects leads to fragmentation. In the automobile industry, 90% of recent capital expenditures have involved product derivatives worldwide and capacity expansions in new markets.

Labor costs become less important. Rapid wage growth in China hasn't choked off manufacturing expansion there. True, in a few labor-intensive, trade-oriented industries such as apparel, labor-cost changes often tip the balance in locating production. But higher wages in China are also increasing local demand, thus reinforcing manufacturers' local investment choices.

And energy costs, too? Partly because of lower natural-gas prices, the McKinsey Global Institute (MGI) estimates that by 2020, lower cost energy could boost U.S. GDP by $400 billion to $700 billion. And energy storage technologies, especially lithium-ion batteries and fuel cells, are becoming more capable and less costly. As advances continue, more companies may be able to focus on local demand patterns rather than energy concerns in placing their geographic bets.

Illustration: Stuart Briers

TECHNOLOGY DISRUPTION AHEAD

At the same time, advanced robotics, 3-D printers, and the large-scale digitization of operations are poised to alter fundamental assumptions about manufacturing costs and footprints.

Advanced robotics: cheaper, more proficient robots are another reason companies may locate more manufacturing closer to major demand markets, both in developed countries and in developing nations, where robots could bridge shortages of some production skills. MGI research suggests that 15% to 25% of the tasks carried out by industrial workers in developed countries and 5% to 15% of those in developing countries could be automated by 2025.

3-D printing: cheaper 3-D printing is already allowing some companies to accelerate product development. Soon, targeted usage of in-house printers will enable new supply-chain models that, in some cases, may replace traditional parts suppliers. The equivalent of copy or print shops may emerge to manufacture items based on customers' design specifications.

Digitized operations: cloud computing, mobile communications, advanced analytics, and the Internet of Things – the growing collection of sensors and actuators embedded in products and equipment – are starting to combine in powerful ways. Increasingly, products can communicate: with each other, with robots and advanced machines inside factories, and with customers and suppliers. Manufacturers will have an unprecedented global view into who makes what, where, and how well, enabling some to buy and sell underused production lines "by the hour."

NEXT-SHORING

In developing and emerging markets alike, both proximity to demand and proximity to innovation will be critical. Next-shoring isn't about the shift of manufacturing from one place to another but about adapting to and preparing for the changing nature of manufacturing everywhere.

Optimizing location decisions: new products, market segments, and consumer preferences are exacerbating perennial risks such as variations in seasonal demand, wages, and exchange rates, boosting uncertainty. Operational agility – the ability to adapt design, production, and supply chains rapidly to fluctuating conditions while preserving economies of scale – will thus carry an even greater premium. Volkswagen, for example, has moved from traditional vehicle platforms to modular architectures that provide greater flexibility for manufacturing several product variants.

NEXT-SHORING IS ABOUT ADAPTING TO AND PREPARING FOR THE CHANGING NATURE OF MANUFACTURING EVERYWHERE.

Building supplier ecosystems: new combinations of technical expertise and local domain knowledge will become the basis for powerful new product strategies relying on collaborative supplier ecosystems. More robust information flows among partners will yield improvements ranging from more efficient logistics to better payment systems. Many manufacturers' supply bases may thus need significant upgrades to create joint competencies in areas such as robotics.

Developing people and skills: all this will place a premium on manufacturing talent. Organizations will need to invest more in formal training and on-the-job coaching to bridge crucial gaps such as too few technically skilled workers in advanced economies and too many workers experienced only in routine manufacturing in developing economies. The ability to build external relationships – with suppliers, education partners, and local government officials who can influence the development of vibrant, sophisticated supply ecosystems – will be a major competitive advantage.

The new question for manufacturers won't be whether to produce in one market for another, but how to tailor product strategies and match local needs with the latest manufacturing know-how and digital expertise. Accordingly, while the road map for every company, industry, and location will be different, we believe that the principles we've laid out here should be useful for all.

This essay has been adapted from "Next-shoring: A CEO's guide" by Katy George, Sree Ramaswamy, and Lou Rassey, McKinsey Quarterly, January 2014. To learn more on the future of manufacturing, go to:

tinyurl.com/DHL-guide

WHAT'S THE STORY, MS. WAITE?

"FOOD IS NOT AN EXACT SCIENCE AND PEOPLES' PASSION OVER IT NEVER CEASES TO AMAZE ME."

ENJOY YOUR MEAL: In-flight menu options are designed to delight our customers' diners and make them want to come back for more.

New and innovative foods are created for seasonal menus.

Desserts taste about 30% less sweet when eaten at high altitude.

AT YOUR SERVICE

Food expert Lynne Waite brings a unique flair and 25 years of experience in the catering business to DHL Supply Chain.

It might surprise a few people, but DHL is more than just a logistics provider. At DHL Supply Chain for example, we cater for passengers on planes and trains, providing food and amenities. We constantly seek out new opportunities and challenge ourselves to create menus that enhance the passenger experience.

After gathering over 25 years' experience in the catering industry in the public and private sectors, I now head up the team that provides food on British Airways short- and medium-haul flights as well as United/Continental long-haul flights from London Heathrow Airport, and Virgin Trains on the UK's West Coast Main Line.

In this role, I find and present new and innovative foods for our seasonal menus; source products from producers, manufacturers, or caterers; survey supplier production sites; and assure that all safety standards are met. I also regularly participate in "food safaris" to stay on top of hot trends like street food, home-grown edibles, gluten-free foods, and nut and grain milks versus soy varieties.

What I've found is that travelers don't usually consider how their meals are delivered, but they do care whether the food excites them – what it looks and tastes like. Food is not an exact science and peoples' passion over it never ceases to amaze me. To nurture that passion, we listen to what people say, delve deeply into customer demographics, and then create options that delight our customers' diners in a way that makes them want to come back for more. It's all about the final customer; if I can find the right match with the right products to suit their needs, then my job is an easy one!

CATERING AT HIGH ALTITUDE

Passengers' perceptions of saltiness and sweetness drop by around 30% at high altitude. The decreased humidity in the cabin also dries out the nose and dulls the olfactory sensors essential for tasting the full flavor of an ingredient or dish.

3.5 MILLION MEALS AND 10 MILLION SNACKS DELIVERED BY DHL PER ANNUM

4,000 trolleys and 1,000 oven racks prepared by DHL daily

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