



DHL

Delivered.

THE GLOBAL LOGISTICS MAGAZINE

ISSUE 01/2016

BUSINESS

NO CIGAR?

Discover if Cuba's new openness will light up its fortunes

SOLUTIONS

INSPIRING IDEAS

Step inside DHL's Innovation Center

VIEWPOINTS

FIRE WALL

Why social media was a lifeline during the Tasmanian bushfires

FOCUS

CUTTING EDGE

How engineering and manufacturing is adapting to new global challenges





DEAR READER,

The global economy keeps presenting us with many twists and turns, and this year will certainly be no exception.

For an industry vertical as diverse as Engineering & Manufacturing, these complexities have produced mixed fortunes, from a continued boom in aviation to a further decline in mining. Our Focus article "Twists and turns for E&M" explores some of the main trends affecting the sector – and how companies are responding to them.

Rio Tinto's Mark Pickett gives us a fascinating insight into his company and the intricacies of its inbound and outbound supply chain – here is a company with a long time horizon, with assets which can take 20 years or more to develop and a product life of a century or more.

Don't miss our update on the latest developments in China and also on Cuba, one of the new frontier countries, where we look at whether the country can restore its status as a historical trading hub after coming out of five decades of isolation.

Enjoy your read!

Sincerely

Bill Meahl
Chief Commercial Officer, DHL



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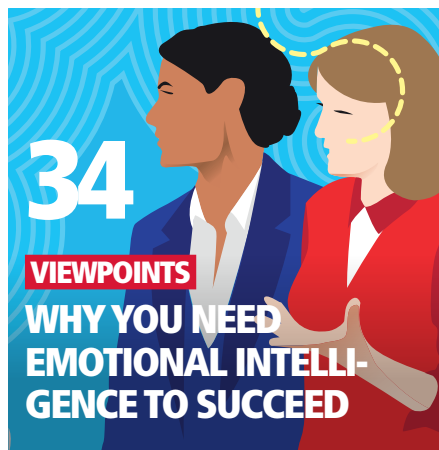
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WEB LINK



VIDEO LINK

The icons above indicate additional online resources.

A NOTE FROM THE EDITOR

Last autumn I had the pleasure of meeting the effervescent Melanie Irons at our DHL Innovation Centre in Germany. A native of Tasmania, the island state in Australia, Mel helped tens of thousands of people by spontaneously reaching out and using the power of social media in the face of a major natural disaster. As her home island was being ravaged by raging wildfires, she decided to take action and became a vital link to a community under pressure.

Michelle Bach

Read more about Mel's story and "Tassie Fires" in "Delivered. gets social media savvy with Melanie Irons" on page 32.



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CLEAR ROAD SENSE

For any driver who's ever been stuck behind a semi-trailer truck with no way to see if they can overtake safely, there's a clear solution on the horizon – in more ways than one. Technology giant Samsung has developed a truck that has a video wall on the back, which takes a live feed from a wireless camera at the front, so drivers

behind can literally see "through" the vehicle to the road ahead. Samsung has tested a prototype and is now seeking permits to bring the innovation to the open road.

 tinyurl.com/del-safety-truck

WIN!

We have 30 best-selling books from Travis Bradberry, President of TalentSmart – the world's leading provider of emotional intelligence tests and training – and co-author of "Why You Need Emotional Intelligence to Succeed" on page 34. To be in with a chance of winning either "Emotional Intelligence 2.0" or "Leadership 2.0," simply post Travis' article from www.delivered.dhl.com into your LinkedIn account and email the link to us at delivered.magazine@dhl.com. The first 30 names from a prize draw will each win a book – so make sure to include your postal address in your email and tell us which title you would prefer to win. Good luck!



FEELING HYPERSONIC

Oxfordshire-based Reaction Engines has just won backing from aerospace giant BAE Systems and the British government to develop its Sabre engine – a pioneering air-breathing rocket that can travel both in the atmosphere and beyond it – which, they say, could allow hypersonic airliners to travel anywhere in the world within four hours. What implications could that have for fast freight delivery?

 www.reactionengines.co.uk



ON TRACK IN THE COLD CHAIN

A new app is enabling DHL Global Forwarding's life sciences and healthcare customers to track their cold chain shipments. The LifeTrack app lets users get an overview of their shipments, alerts them to any in-transit issues and gives them 24-hour access to cold chain experts.

 tinyurl.com/del-cold-chain-app

AWARD-WINNING DELIVERED.



Delivered. is proud to have won the ICMA Creative Media Award of Excellence for Cover and Cover Story under the headline "Built to Withstand Tough Times" in issue 01, 2015. It's

the fifth award the magazine has received since its launch in 2013. Read more at:



 tinyurl.com/del-coverstory-1-15

THE RIGHT FORMULA FOR LEONARDO

Hollywood star and environmental campaigner Leonardo DiCaprio is to chair Formula E's new sustainability committee. Formula E, which brings the thrill of electric-powered motor racing to city centers across the world, wants the new body to help promote the mass use of electric cars.

 tinyurl.com/formula-e-leonardo

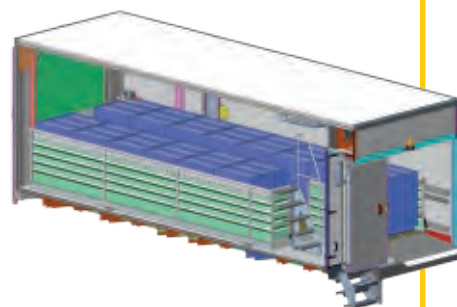
You can read more about Formula E on pages 33 and 38.



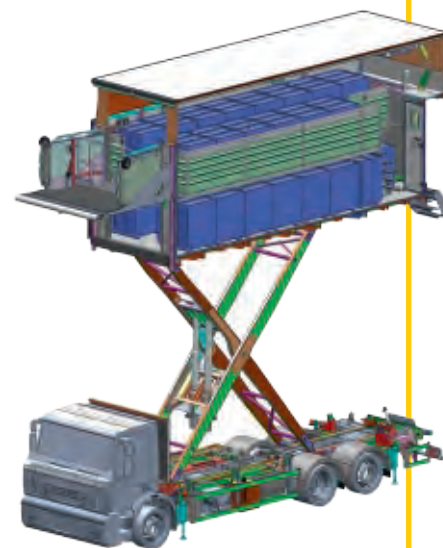
THE STORY

HIGH AND MIGHTY

With its customers increasingly requiring long-haul catering service support, DHL has designed a Catering High Loader truck, which is set to revolutionize airline catering deliveries. The new Double Deck High Loader increases capacity by about 70%, but does not make the vehicle materially taller, longer or wider, allowing it to stay compliant with airport and road regulations. The extra capacity will help cut the cost of final-mile airline catering services as well as reducing carbon emissions.



TOP DECK LOADING POSITION
Lifting Deck is in the down position, the roof is in the down position



TOP DECK UNLOADING POSITION
Lifting Deck is in the middle position, the roof is in the up position

 tinyurl.com/double-decker-high-loader

20 MINUTES

The time it takes to buy (and drive away in) a car bought from the five-storey, automated "vending machine" operated in Nashville, Tennessee by dealership Carvana



PLASTIC FANTASTIC

A 19-year-old aerospace student's idea for a floating boom to sweep up the alarming amount of plastic waste polluting our oceans is set to become reality. A two-year trial of Boyan Slat's Ocean Cleanup Array will begin this year off the island of Tsushima, between Japan and South Korea. Once the 1.2-mile (2-kilometer) array has been tested, plans are in place for a 62-mile-long (100-kilometer) version to tackle the so-called Great Pacific Garbage Patch.



www.theoceancleanup.com



BREAKING BORDERS

DHL Global Forwarding has carried out the pilot run for road freight under a new game-changing agreement for the logistics industry which aims to allow the seamless movement of vehicles between Bangladesh, Bhutan, India and Nepal. This should do away with the need to trans-ship goods from, for example, an Indian truck to a Bangladeshi truck at the border, thereby saving

time and cost. The main goal of the pilot was to track a DHL truck carrying multi-consignment cargo on a 397-mile (640-kilometer) route from Kolkata to Agartala in India, via Bangladesh, to assess the ease of its transit. DHL presented its findings from the trip to senior government officials including from Customs and to Asian Development Bank at a conference in Kolkata in December.



www.dhl.co.in/en.html

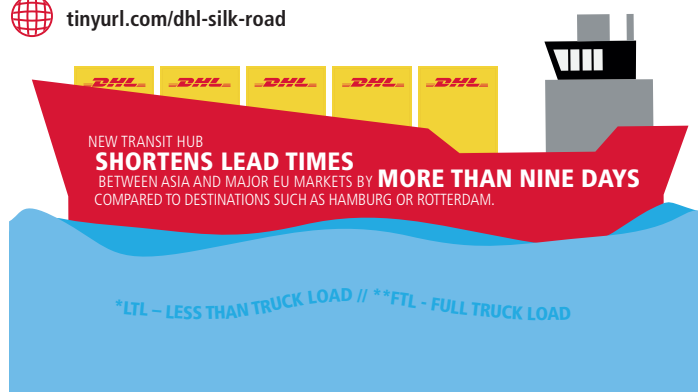


SILK ROAD SUCCESS

Following the ancient maritime trade route of the Silk Road allows DHL Global Forwarding, Freight to save more than nine days of transit time for ocean freight shipments between Europe, Asia, North Africa and the Middle East. The ocean and road freight multimodal service via the new transit hub in Piraeus, Greece, facilitates the distribution of cargo from Piraeus within two to five days to key markets in Europe via DHL Freight's network. **You can read more about the Silk Road – and its importance to the Chinese economy – on page 26.**



tinyurl.com/dhl-silk-road



LIVING RESPONSIBILITY



RESPONDING TO THE REFUGEE CRISIS

Millions of refugees from war-torn countries like Syria are continuing to make the perilous crossing to Europe and what they hope will be a new life. Deutsche Post DHL Group is set to play its part in helping the influx of displaced people into Germany, with a €1 million (\$1,081,100) nationwide project to meet the immediate needs of the refugees. The funds will go towards programs designed to help integrate arriving refugees, from making facilities available for housing to language acquisition and vocational support. The

project will be coordinated with partners such as relief agency Aktion Deutschland Hilft, non-governmental organization SOS Children's Villages, reading foundation Stiftung Lesen and educational social enterprise Teach First Deutschland. As a leading employer, DPDHL Group also plans to offer up to 1,000 internships and the aid effort will be managed locally by about 100 Deutsche Post branch offices across Germany.



tinyurl.com/del-refugee-crisis



WIND OF CHANGE

The energy industry is facing huge change: tougher markets, dwindling supplies of oil forcing companies to search in ever more difficult environments, and a reduced appetite for megaprojects. Renewables, however, are predicted to be a real growth area, with technological advances and global investment expected to expand capacity in the medium term. While facing different market pressures and outlooks, then, both conventional and renewable energy businesses are now looking at a comparable future of unprecedented challenges – one that necessitates significant rationalization of their global energy supply chains. A new white paper from DHL – “A New Frontier: Prospering in the Changing Energy Environment” – looks at this changing landscape both in terms of the challenges it may bring and the opportunities it may afford to both old and new sectors of the energy world.



 www.dhl.com/energywhitepaper2016

APRIL

19-21

The date of DHL's 2016 Global Technology Conference – this year in Singapore – with the theme “Staying Ahead of the Curve.” It's a chance to share, learn and network with your industry peers.

Find out more here:



tinyurl.com/Global-Tech-2016

JUNE

20-22

The 16th DHL Global Life Sciences & Healthcare Conference will take place on this date in Miami, offering engagement with LS&HC industry peers, leading suppliers and DHL experts. Register here:



tinyurl.com/Global-LSH-2016

DEVELOP A GREENER BUSINESS

Today's companies, large and small, are looking for ways to go green. For many, sustainability has even become a business priority – one hundred percent of DHL's largest customers already have environmental protection programs in place. As part of our commitment towards a sustainable future, DHL has developed a “GoGreen Solutions” workbook to help customers identify and develop logistics solutions that conserve resources and improve environmental and economic efficiency. Using the workbook, customers work side by side with their DHL customer manager to evaluate their own logistics activities, outline their green needs and visions and identify potential courses of action and areas of improvement. These include ready-to-use services as well as the development of customized solutions. **Please contact your key account manager if you wish to receive further details. You can find out more about DHL's GoGreen program and download the workbook here:**

 tinyurl.com/del-green-solutions



CONVENIENT COLLECTION

Blue Dart, South Asia's premier courier service, owned by DHL, has launched a new parcel locker service in the Unitech Cyber Park Gurgaon, India, and is set to roll out the model across the country. The service sends customers a security code in an SMS message when their package is delivered to the lockers, leaving them to use the code to collect it at a convenient time.



www.bluedart.com

WIN!

DHL is offering you the chance to win an exclusive invitation for two to “Exhibitionism – The Rolling Stones” at the Saatchi Gallery, London, which runs from April to September. The exhibition will feature over 550 original and irreplaceable artefacts from the band's 50-year history. DHL is proud to be the Presenting and Official Logistics partner for “Exhibitionism.” To find out how to enter the competition – and be among the first to view this unique collection – please visit:

 tinyurl.com/win-delivered







TWISTS AND TURNS FOR ENGINEERING AND MANUFACTURING

The complexities of the global economy have produced mixed fortunes for engineering and manufacturing companies, but transformation is underway across all parts of the sector.

GROUNDBREAKING CHANGE:

The slowdown in the mining industry has affected the construction of new mines — and the manufacturers of mining equipment.

In a world of big data and pocket-sized technology, it's easy to underestimate the continued importance of engineering and manufacturing activities. Doing so would be a mistake, however: manufacturing accounts for just over a sixth of global GDP (17 percent) and a seventh of global employment (14 percent). And the sector's economic impact is even more significant. Fully 70 percent of global trade is in manufactured goods, and in mature economies each manufacturing job is estimated to generate 2.2 others elsewhere in the economy.

Then there's the simple fact that so many other sectors depend entirely on the ingenuity and output of engineers and manufacturing companies. The world relies on the machines that harvest crops, dig minerals from the ground, produce microchips and transport passengers and cargo across oceans.

Yet it is precisely the fundamental role it plays in so many other sectors that makes life so challenging for engineering and manufacturing companies. Manufacturers are fully exposed to the ebb and flow of global economic and political tides, volatile commodity prices and shifting patterns of consumption. And as the sector determines so much of how we produce and consume energy, water and scarce raw materials, it is at the front line of the struggle for environmental sustainability, too.

For a clear example of the diverse impact of these forces on different parts of the sector, you need look no further than the differing fortunes of two important industries. First, take mining. After a decade-long boom, driven largely by rocketing demand for raw materials from rapidly emerging economies in Asia and Latin America, the price of many of the sector's key products has plummeted in recent years. By December 2015 iron ore, for example, was trading at a quarter of its 2010 price.

The end of the "resource supercycle" has forced mining companies to revisit their investment plans, with annual capital expenditures in the sector forecast to fall to \$65 billion in 2017, down from almost \$150 billion in 2012. For the companies that make mining equipment, the slowdown in the construction of new mines has had a severe impact on sales, with major players announcing drops in deliveries, forward orders – and profits.

For contrast, look at the aviation sector. Since 1981, annual air passenger numbers have increased by a factor of five, from 640 million to over three billion. As the world becomes wealthier, and more tightly connected, that growth is only expected to continue, with passen-

ger travel demand forecast to rise 5 percent a year for at least the next two decades. Airlines are scrambling to find cost-effective ways to meet that demand. At close to 80 percent load factors, passenger aircraft utilization is at an all time high. And the long-term increase in fuel prices – fuel costs doubled as a fraction of airline operating costs between 2001 and 2014 – is boosting the appetite for larger, lighter, and more efficient modern aircraft.

For plane makers, that is powerfully good news. Aircraft production has increased more than 80 percent over the last 20 years and global demand is forecast at around 32,000 new full-size passenger aircraft in the next 20. The biggest aircraft makers, Boeing and Airbus, currently have order backlogs equivalent to almost ten years' production, and Airbus says it needs to build a new single-aisle airliner every six hours to keep pace with demand.

70 PERCENT

The percentage of global trade attributed to manufactured goods

GROWTH ENGINE:

The upturn in the aviation sector has been good news for aircraft manufacturers.





Pressure to change

Where these widely differing sector outlooks come together is in the pressure they exert on engineering and manufacturing companies to change. Miners may be slowing their construction programs, but they still face a compelling need to improve the cost efficiency of their operations. That puts a renewed emphasis on the reliability and effectiveness of the equipment they use and creates demand for smarter, more sophisticated machines that boost yields at lower cost. Aircraft makers need to ramp up manufacturing speed, but they also have to ensure they are building the kinds of products their customers want – mastering the challenge of working with new materials and adopting advanced new engines, controls and passenger comforts.

In these industries, and in the rest of the sector, those pressures aren't just changing products – they are re-shaping entire businesses. Customers looking to squeeze every last drop of competitive advantage out of their assets are increasingly asking for products to be tuned to their very specific needs, for example. Siemens estimates that the number of available variants for industrially manufactured products has risen by 250 percent in the last 10 years alone. That increases complexity for manufacturers, calling for flexible production systems to manage a proliferation of different product designs.

And delivering the right equipment at the right time and at the right cost is only part of the story. The relationship between customer and manufacturer is becoming ever more intimate throughout the lifetime of the product, with customers looking for service and support in the field that goes beyond fixing things when they break down, to encompass assistance with operation and continual through-life improvement as technologies advance and operating conditions change. According to consultant McKinsey & Company, “service-type” activities already make up 30 to 55 percent

of manufacturing employment. As the importance of service rises, manufacturers need the people, infrastructure and technology to support it. Getting that won't be easy. Boeing is forecasting demand for 609,000 new aerospace technicians over the next two decades, for example, 238,000 of them in Asia.

Chain reactions

As engineering businesses transform, so must their supply chains. The challenges companies face today show the importance of supply chain performance all too clearly. Leading aircraft makers struggled to meet delivery deadlines in 2015, for example, due to production problems at a manufacturer of the lie-flat seats that have become a staple of long-haul business travel. Delays at West Coast ports in last year caused many U.S. companies to rethink their supply links to the Asia Pacific region.

And if they are already being tested, the demands placed on companies' supply chains are only likely to become more intense, not least due to rising customer expectations. “Consumer product supply chains have shown exactly what is possible in terms of customization and immediacy of availability,” says Reg Kenney, President DHL Engineering and Manufacturing. “Now managers are asking why they can't have the same type of service in their business-to-business supply chains.”

“Manufacturing close to the customer has cost, speed, complexity and risk benefits.”

Klaus Dohrmann, Vice President Strategy and Development, DHL Engineering and Manufacturing

TRUCKING ON:

Pressures on the E&M sector mean that the right equipment must be delivered on site at the right time – and at the right cost.

WELL-OILED MACHINE:

In today's climate, mining companies are looking closely at the cost efficiency of their operations.

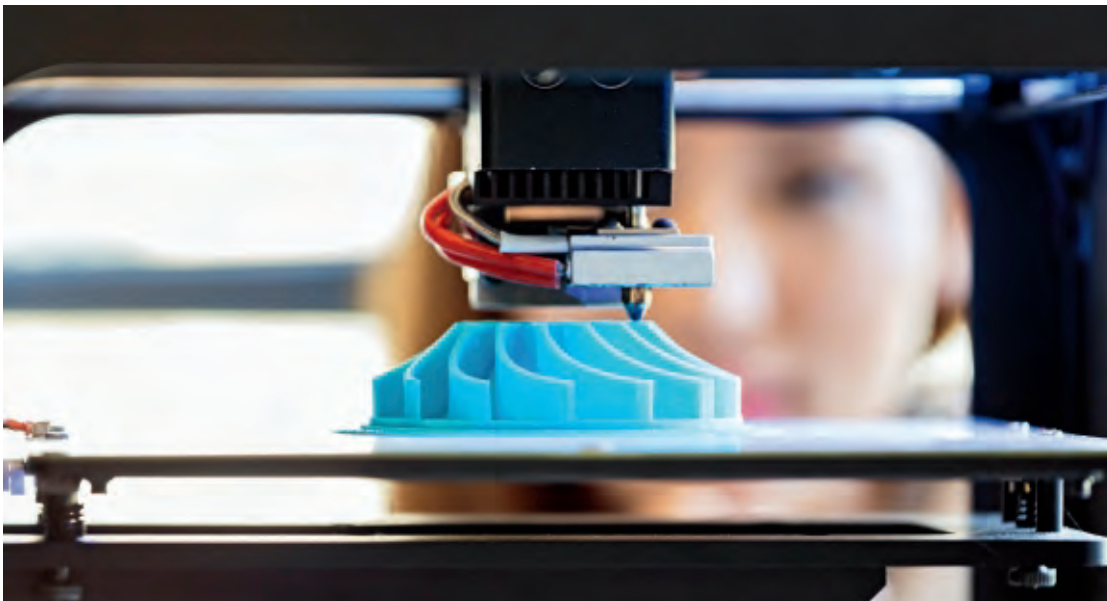
In response, engineering and manufacturing supply chains are becoming shorter, more flexible and more highly integrated. After years stretching around the world in search of new markets and low-cost sources of production, many firms and industries are now “regionalizing” their supply footprint – concentrating activities in or near key markets and clustering in locations with other firms in similar industries. The advantages of this approach are numerous, especially as rising labor rates in regions like China are eroding their former cost advantage. “Manufacturing close to the customer has cost, speed, complexity and risk benefits,” says Klaus Dohrmann, Vice President Strategy and Development, DHL Engineering and Manufacturing. Being located close to other companies in the same sector helps promote innovation and the exchange of ideas, he adds, and allows companies to collaborate with governments, industry associations and academic institutions to promote R&D activity and skills development. Aviation Valley near the city of Rzeszów in south-eastern Poland, for example, is now home to more than 100 aerospace companies employing 23,000 skilled engineers, designers and technicians. Rzeszów University of Technology helps keep the industry supplied with people skilled in the sophisticated CNC machines widely used in aerospace manufacturing. Similar clusters have developed in Asia, notably in Singa-

pore, where the local aerospace industry employs 19,000 and records revenues of around \$8 billion.

Physical proximity is useful, but it isn’t sufficient to give engineering and manufacturing companies the level of supply chain integration they need. After all, it is impossible to organize a supply cluster around an aircraft in the skies over the Pacific, or a machine tool running in a remote corner of China. That’s where technology comes into play.

Manufactured products are already bristling with sensors collecting data on numerous aspects of their performance and condition. A Boeing 787 generates around half a terabyte of data per flight, for example. Today, the vast majority of this data is transient – it is used by operators and automated control systems, then archived or abandoned. The emergence of the Industrial Internet is set to change that, allowing companies to sift through that data looking for early warning signs of future failure or opportunities for product improvement and letting them communicate quickly and seamlessly right across the supply chain.

The implications for engineering and manufacturing companies are profound. Machine makers can fix or fine-tune their products in collaboration with customers on the other side of the world. Or they can pre-emptively manufacture and deliver appropriate parts to



PRINT WORKS:

Advances in 3D printing technologies may mean that companies can build spare parts at customers sites, as needed.



HEAVY LIFTING:

As engineering businesses transform, so must their supply chains.

For an in-depth look at the challenges and opportunities facing the engineering and manufacturing sector, see DHL's new white paper "Engineering & Manufacturing 2025+: A DHL Perspective on Future Engineering & Manufacturing Supply Chains." This report identifies six major trends for the E&M sector over the next decade examines the current environment and trends, the sector's response and the implications for supply chain management.

To download the white paper, please visit:



tinyurl.com/del-e-m-dhl

customers before failures lead to production downtime. 3D printing technologies may even let companies build spare parts at customers sites as needed "Linking engineering, supply chain operations and services data through the cloud means operators can optimize factories and products in real time and continuously improve them throughout their lifecycle," says Marco Annunziata, Chief Economist and Executive Director, Global Market Insights at GE, in a recent white paper. "As a result, machine uptime, throughput, and inventory turnovers increase. Higher responsiveness leads to higher sales."

Capturing this potential will require another significant shift in the way engineering and manufacturing companies design, operate – and connect – their supply chains, however. It's a shift that is only now getting underway. "The industry is not there yet," warns Reg Kenney. "It is looking hard at how to capture the right data, draw intelligent conclusions from it and how to ensure quality, but for the most part companies have not yet determined how their processes will need to change." ■ Jonathan Ward

3 QUESTIONS FOR

Reg Kenney,
President
Engineering and
Manufacturing,
DHL



1. What have been the implications of recent economic and political volatility for the engineering and manufacturing sector?

The economic situation has underlined the need for these companies to be agile and responsive. Take the example of the BRIC economies. Two or three years ago there were high expectations of growth from each of those regions, but right now, only India's economy is performing strongly, and we are seeing better growth in areas of Africa, the Middle East and other parts of Asia. Our engineering and manufacturing customers have had to adjust their businesses and reconfigure the supply chains in response.

2. Has the fall in energy prices reduced your customers' focus on sustainability and energy efficiency?

Absolutely not. Sustainability has never been higher on the agenda for many of our customers. Even at today's prices, energy is still a significant cost for many of them. But equally importantly, these companies take a long-term perspective and think about the interests of a broad group of stakeholders – including society at large. So we still see a lot of investment in technologies and business approaches designed to reduce carbon footprints, and there is considerable interest in more efficient supply chains.

3. Of the many challenges the sector faces today, what stands out for you?

I believe the issue of talent will become an increasingly important one that will have an impact right across the sector. The industry will need engineers with new skills to design new generations of efficient, highly connected products, but it will also need technicians to support those products in the field and truck drivers to keep supply chains running. Those are all areas where suitably qualified people are in short supply.

250 PERCENT

The rise in available variants for industrially manufactured products over the last 10 years



RIO TINTO: MINING FOR SUCCESS

The inbound supply chain is a key area of focus for mining giant Rio Tinto explains Mark Pickett, the company's General Manager Raw Materials and Services.

Many of the things you own probably started life in a Rio Tinto mine. The Anglo-Australian multinational may have taken its name from the site of its first mine, next to the Rio Tinto River in southwestern Spain, but in the 140 years that have passed since that purchase Rio Tinto has grown to become the third largest mining company in the world. Today, the company has operations in more than 200 locations in 40 countries across six continents. It employs around 60,000 people and is a leading producer of aluminum, copper, iron ore, coal, uranium, diamonds and industrial minerals.

The mining business is one that demands patience and stamina. "We operate long-life, low-cost assets," says Mark Pickett, General Manager Raw Materials and Services at Rio Tinto's Global Procurement Hub. "It can take more than 20 years to develop a new site, which may then have a productive life of a century or more."

Things may move slowly in the mining world, but move they certainly do. As centuries of production have gradually depleted the deposits of metals and minerals located in more accessible parts of the world, the industry has searched ever further afield for new resources. One of Rio Tinto's most important current development sites, for example, is the Oyu Tolgoi copper and gold mine, located on the border between Mongolia and China, 550 kilometers south of Ulaanbaatar.

It is not unusual, says Pickett, for Rio Tinto to operate "thousands of kilometers from the nearest city or other infrastructure." Needless to say, such remote locations come with significant supply chain challenges. Rio Tinto often has to construct its own towns for mine workers, along with roads, railway lines and port facilities with the capacity to move millions of tons of material every year. It also has its own fleet of ships to transport them around the world. In 2014, the company's Pilbara iron ore operations in Australia, for example, shipped more than 280 million tons of ore over a 1056-mile (1,700-kilometer) rail network to four different port terminals.

Varied supply chains

For Mark Pickett, however, the focus is not the company's world-class outbound supply chains, but the challenge of keeping its facilities supplied with the fuel, construction materials and chemicals they need in order to keep running. As well as responsibility for purchasing services for the global organization, he manages the supply of a wide

range of inbound materials, including "petroleum coke, liquid pitch, alloys, bulk items and chemicals."

"Our inbound and outbound supply chains are very different," he explains. "The inbound supply chain is much more varied and fragmented." Historically, the company has devolved responsibility for the management of its inbound logistics to individual sites, says Pickett.

"We usually hold significant inventories close to our operations," he explains. "Doing that was considered to be an insurance policy, but today we are starting to question that approach." The reasoning behind those questions is painfully obvious. The collapse in commodity prices over recent years is driving a sharp change of focus for mining companies. During the boom years from the turn of the millennium, miners had one priority – to maximize production. Now they need to think hard about costs and efficiency.

"This has always been a cyclical industry," says Pickett. "But the last boom was so long that there are plenty of people in the company who don't know anything but the boom times. When you have price reductions of 10 to 40 percent, or even 70 percent in some cases, that calls for quite a culture change."

At the heart of that culture change is a new focus on cash, capital and cost effectiveness. "We are trying to reduce working capital across all our operations," says Pickett, "And our old approach led to high levels of obsolete inventory, to inventory that was not well-maintained, and to us buying items we didn't need."

In response to the changing environment, Rio Tinto is revisiting many aspects of its procurement and inbound supply chain strategies. "We are changing what we use, looking for broader specifications and standardized products," explains Pickett. "We are also looking at our relationships with suppliers and service providers." All these details matter, but the largest savings, he notes,

200

Number of Rio Tinto's locations around the world



come from “not buying things.” In the case of inbound logistics, the priorities are simple. “Obviously we want to operate our logistics activities as efficiently as possible, and doing that delivers moderate savings. But for us it is much more important to reduce inventories.”

Achieving such inventory reductions without threatening mine productivity is the key challenge here and, to tackle it, Rio Tinto is looking for solutions wherever they can be found. “We want to be world class in everything we do,” says Pickett. “To do that we are benchmarking ourselves against the best organizations in the world, collaborating with our customers and suppliers to look for improvement opportunities, and revisiting decisions about what we do ourselves and what we want to outsource.” For logistics, he adds, there is a clear division. “We have to be world class in outbound logistics, but we won’t achieve that alone on the inbound side.” Instead the company is looking at a strategic outsourcing approach – devolving responsibility for its inbound supply chains to a specialist Lead Logistics Provider (LLP).

Respecting the environment

Alongside the drive for improved efficiency, however, Rio Tinto is also determined to maintain its focus on environmental and social responsibility. “The materials we develop are owned by the communities in which we

MEN OF STEEL:

Rio Tinto engineers on site at the Kitimat Modernization Project, an upgrade of the 60-year-old Kitimat aluminum smelter in British Columbia.



“We are benchmarking ourselves against the best organizations in the world, collaborating with our customers and suppliers to look for improvement opportunities”

Mark Pickett, General Manager Raw Materials and Services, Rio Tinto

work,” says Pickett. “So it’s very important for us to employ local people, to use local suppliers and to treat the environment with respect.” It’s an area where the mining industry has had a poor reputation in the past, he notes, and changing that is a priority today. “There are opportunities for logistics to contribute here, whether it is ensuring the carbon footprint reduction of our own and our suppliers’ vehicles or redesigning packaging to reduce the amount of waste that goes to landfill.”

With everything up for discussion, Pickett suggests that this might also be the time to look at new ways of collaborating with competitors. “Mining already has some history of cross industry collaboration,” he notes, citing the example of Quadrem, an electronic marketplace mining supplier established in 2000 with investment from suppliers and the participation of around 20 major mining companies. “Now I think there is the opportunity to do something similar in logistics.”

The logic of a collaborative approach is compelling argues Pickett, with so many suppliers shipping goods and materials to the same mine sites, and rival mine operations often located in relatively close proximity; but the challenge remains to find the right operating model, and the right partners to make it work.

With the right will, collaborative and outsourced approaches to logistics are something the industry could put in place within the next three to five years, he suggests. But like everyone in the mining industry, Mark Pickett also has an eye on the longer-term future. By the time his two boys, now three and five, have grown up, the world may be a very different place. “There are all sorts of curve balls that might come our way,” he concludes, “3D printing might dramatically simplify our inventories of spare parts, and all our sites have airstrips, so larger, longer range drones could also be an interesting option.” ■ *Jonathan Ward*



www.riotinto.com

REMOTE CONTROL:

Rio Tinto's Weipa bauxite mine and port in Queensland, Australia. Remote locations such as this come with significant supply chain challenges.

A WIN FOR SHIPPING, A FEAT OF ENGINEERING

The New Suez Canal speeds up transit on a main global shipping route, thanks to smart engineering and construction.

In 2015, Egypt's Suez Canal, one of the world's key trading routes, completed its first expansion in 145 years.

A breakthrough for global shipping, the expansion – expected to nearly double capacity from 49 to 97 ships crossing per day by 2023 – was also an engineering feat.

During a single year, some 2,000 workers of 45 nationalities demonstrated record-breaking productions with dredging volumes of more than 1.4 million cubic meters a day. The

project, which cost over \$8 billion, widened and deepened part of the existing canal, adding 45 miles (72 kilometers) of new waterways, and cutting waiting time for ships from eight to 11 hours to three.

The expansion is part of a wider government plan to create a global logistics and trade center around the Suez Canal. ■ *Michelle Bach*



tinyurl.com/del-new-suez-canal

21

cutter suction dredgers
were deployed and five
hopper dredgers

200 MILLION

cubic meters of sand dredged
in nine months

80

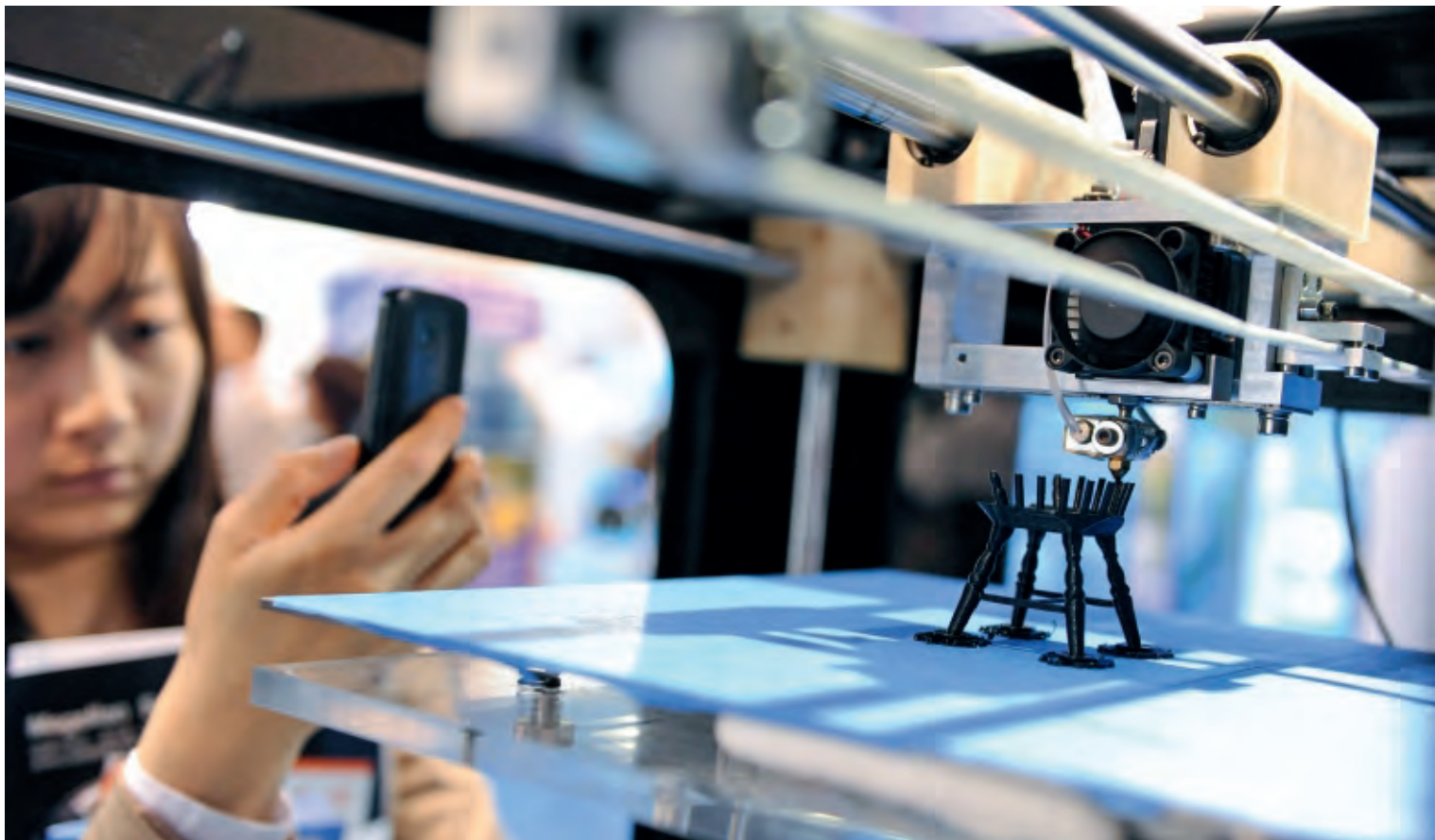
KILOMETERS

of pipelines were required to
remove the dredged material

147 METERS

wide and 24 meters deep





THE FOURTH INDUSTRIAL REVOLUTION

For the world's most senior executives, the future of global production systems has reached the top of the agenda, says John Moavenzadeh of The World Economic Forum.

If you want to know what's on the mind of the most influential people in the global economy, there's only one place to be every January: The World Economic Forum (WEF) Annual Meeting in Davos, Switzerland. Since the 1970s, this meeting has brought together senior leaders from business, government, academia and charities to discuss the most pressing topics of the time.

The role of the WEF, says John Moavenzadeh, Head of Mobility Industries at the organization, is to advance the kinds of complex, global, multi-stakeholder issues that can't be addressed by individual business or governments working alone. Recent mobility topics, chosen after consultation with business leaders around the world, have included the impact of technology, the future of global

trade and overcoming sustainability challenges. The principal theme of the 2016 meeting was "mastering the fourth industrial revolution."

First, some definitions: what is the fourth industrial revolution? The world has undergone three previous transformations in its technologies of production, says Moavenzadeh. First there was mechanization, driven by the introduction of steam power in the 18th century. Then came electrical power, a key enabler for the growth of mass production in the early 20th century. The third industrial revolution was brought about by the development of electronics and information technology, enabling the widespread use of automation. And the fourth? That's a little more complicated, Moavenzadeh admits, but it builds on the digital transformation initiated by the third revolution. The term refers to the

impact of a convergence of disparate emerging technologies, from large scale digital platforms and smart sensors to 3D printing and synthetic biology to nanotechnology and advanced robotics.

Poised for transformation

That these technologies are poised for revolutionary effect today is the result of a number of critical factors. For a start, there's the unprecedented combination of low cost and wide availability. "Digital platforms have now become ubiquitous," says Moavenzadeh. And Moore's law, which describes the exponential rise of computing power over time, is playing out in similar ways across other sectors, he adds. "Less than a decade ago it cost \$250,000 to decode a complete human genome. You can do that for less than \$1,000 dollars today."

Changing consumer attitudes matter, too. The first generation of children to grow up in a world full of computers, digital communications and the Internet is coming of age right now. They are bringing with them "different consumption habits and different ideas about the purchase and use of products and services." Finally, there is the emergence of a new generation of disruptive companies, willing to invent entirely new industries for themselves or to take radically different approaches in established areas.

In fact, it is precisely the lack of a single enabling technology that makes the latest revolution so different and so much more complex than its predecessors. Moavenzadeh highlights three characteristics that will set the fourth industrial revolution apart from its predecessors: speed, as entire industries are created or transformed in years rather than decades; scope, since "nobody is going to be left untouched" by the coming changes; and, perhaps most significantly, the need to take a systems approach, as the changes will be far broader and deeper than those of the past.

To get an idea of the likely size and scale of those changes, he says, you only need to look at other sectors that have recently undergone technology-driven transformations. "The media and entertainment industries were among the first to face such widespread change in the 1990s and 2000s," notes Moavenzadeh. "You saw companies going out of business, new players emerging extremely rapidly and customers totally changing their behavior."

Similar transformations are underway right now in other sectors, he notes, citing the impact of companies like Uber and Didi on urban transportation. On-demand services like these, he says, are enabling "a shift from individually owned vehicles to shared fleets." GM's announcement in January that it would invest \$500 million

in ride-sharing platform Lyft demonstrates that established players are taking notice. Add the fourth industrial revolution technologies that are enabling self-driving vehicles to the mix and you have the potential to fundamentally reshape transportation in cities around the world. "In the U.S. today, around 15 percent of household income goes to buying and operating cars that are idle 95 percent of the time," says Moavenzadeh. "With shared autonomous vehicles, utilization rates go up dramatically, and that will unlock huge value in all sorts of areas, like freeing up the space that is currently devoted to parking in cities for other uses."

New manufacturing models

For engineering and manufacturing companies poised on the verge of this revolution, the changes are likely to be every bit as varied and far reaching, touching everything from product design to manufacturing footprints and even fundamental business models. Moavenzadeh cites two examples. "One area I'm very excited about is the emergence of the circular economy," he says. "Take domestic laundry: for the past 50 years or more, laundry systems have been based on the linear model. You buy a washing machine, you use it until it wears out, then you throw it away and buy another one. Now imagine an alternative where the manufacturer retains ownership of the product. They can deliver a much higher quality unit to your home, one that is equipped with sensors that can communicate information on its performance back to them, and as a user, you just pay ten cents or so for every wash." The advantages of such an approach would be numerous, he suggests, including greater performance and value for the user and lower costs for the manufacturer, who can take back machines for repair, refurbishment or upgrade, allowing much more of the value of the product to be retained over the long term. "Our planet's

63 PERCENT

The percentage of WEF consumer industries strategy officers surveyed who agree that, by 2030, at-home manufacturing will be mainstream in both developed and developing markets thanks to 3D/4D printing



JOHN MOAVENZADEH

John Moavenzadeh is WEF's Head of Mobility Industries, a broad remit that encompasses the automotive sector, aviation, logistics, travel and tourism. Educated at Carnegie Mellon University, the University of Michigan and Harvard, he is a professional engineer with career experience that includes product design engineering at Ford Motor Company and time with the management consultancy Booz Allen Hamilton. From 2003 to 2006, he was Executive Director of the MIT International Motor Vehicle Program.



“We will see new technologies that reduce that reliance on scale, so you will be able to make more of those parts close to where they are actually used.”

John Moavenzadeh, Head of Mobility Industries, World Economic Forum

landfills won't miss all those used and discarded washing machines,” he adds.

The way those washing machines are manufactured may change fundamentally, too. Moavenzadeh cites 3D printing as an example of a broader phenomenon that will upset today's ideas about the relationship between scale and cost in manufacturing. While 3D printing is never going to compete with injection molding for the manufacture of simple products, he notes, it will replace certain components such as jet engine nozzles within more complex assemblies. Many of today's products are assembled from parts made in large volumes and shipped around the world, a process that comes with significant time, energy and financial costs. “We will see new technologies that reduce that reliance on scale, so you will be able to make more of those parts close to where they are actually used.”

Implications for supply chains

Those changes will have similarly profound implications for engineering and manufacturing supply chains, notes Moavenzadeh. The automotive supply chains required to

build and support fleets of shared autonomous vehicles will look very different from those that have evolved around today's private cars, for example. And the ability to manufacture complex or customized products cost effectively at small scale could reshape global distribution networks for those products. But if some supply chains will become smaller and simpler, he argues, others will become larger and more complex, like those required to support products in the circular economy, which may travel between manufacturer and multiple end users repeatedly during their lives.

Getting there

How can companies, or countries, best position themselves for success in this complex, fast-changing world? Moavenzadeh argues that a key change will be in the significance of elements required in production. “The classical factors of production include land, materials, energy, labor and so forth, but know-how is emerging as the most important determinant of advanced manufacturing,” he says. “China, for example, built much of its current manufacturing economy on advantages in labor cost.” After the fourth industrial revolution, he argues, it will be know-how that becomes the preeminent requirement to drive growth and innovation in the Chinese economy. “Know-how is a different thing from knowledge: you can get knowledge from a book, or the Internet, but know-how must be learned from direct, practical experience grounded on the right skills and education.” Gaining that experience should be the focus of any organization aiming for success in the fourth industrial revolution, he argues, citing efforts like the German government's Industry 4.0 initiative as examples of the sort of approach that will help to foster it.

For individual companies, however, a key challenge may be in extending their current know-how to meet the demands of system-wide changes in their business. “If you look at Uber, the kinds of public policy battles they have had to fight to access new markets require very different skills from those needed to build the underlying technology.” For CEOs, therefore, Moavenzadeh's advice is straightforward: Step out of your comfort zone, meet the technology disrupters, meet tomorrow's consumers – not just younger people, but also people from tomorrow's key markets, like Africa – and listen to what they have to say. Enabling just those kinds of interactions through the WEF is what makes his role particularly satisfying, he concludes. “The World Economic Forum has helped to shift the mind-set of many business executives. It's great when you see a light bulb light up in the mind of a senior industry leader, or when a CEO tells you that a random encounter with a social entrepreneur from India has totally changed their perspective.” ■ Jonathan Ward

**100
PERCENT**

The percentage of WEF mining & metals strategy officers surveyed who agree that, by 2050, 25% of annual mineral production will come from new frontiers and unconventional operations



www.weforum.org/agenda/archive/fourth-industrial-revolution

CUBA – THE NEW FRONTIER

After five decades of isolation, Cuba is opening its economy and rebuilding ties with the U.S. This could be a boon for its people and foreign businesses, but it will take time to restore the island as an historical trade hub in the Caribbean.

Currently, Havana, Cuba's capital city, is buzzing with U.S. and other foreign visitors – so much so that more and more locals are opening their homes as restaurants to cater for the surge in visitor numbers. The reason for this influx – and with it a rise of home-based barbershops and other entrepreneurial cottage businesses – is that Cuba, which was all but closed to Americans for more than five decades, is now open for business again, albeit in a limited way.

The first changes in Cuba's fortunes began after President Raúl Castro, who was elected in 2008, started to liberalize the economy and take steps to lure foreign

90

The distance that Cuba lies, in miles, off the U.S. coast

investment and renew trade with the U.S. Then, in December 2014, Castro and U.S. President Barack Obama announced plans to improve diplomatic and trade relations, a move that has brought attention back to the potential of an island that was once a major trading partner with the U.S. and a gateway to the Gulf of Mexico and Latin America. In December 2015, the U.S. and Cuba resumed a direct mail service, suspended 52 years

NEW VOYAGE:
A ship leaves the port of Havana.



ago, which means that letters and packages can once again be sent between the two countries. Even more significantly, it was also announced that a bilateral arrangement to establish scheduled air services had been reached by Cuba and the U.S. – a breakthrough, said the U.S. Department of State, that would “facilitate an increase in authorized travel, enhance traveler choices and promote people-to-people links between the two countries.” After the announcement, a number of US airlines said they would seek approval to begin services as soon as possible. In the media, this thawing has led to speculation that a crippling U.S. trade embargo, which has been in place since 1960, may be lifted.

There are many reasons to be excited about Cuba’s prospects now, 57 years after the revolution that installed state control by a Communist regime which isolated the island from much of the world. For example, Cuba has one of the highest literacy rates in the world. It has a wealth of copper, iron, magnesium and zinc resources, too, and one of the world’s largest nickel deposits. Oil and natural gas resources lie offshore; plus there’s potential for expanding farmlands, including land that could be used to grow sugar and tobacco for its iconic rum and cigars. Add in deep-water ports and a strategic location 90 miles off the U.S. coast, and investors are looking at Cuba as the new frontier. Spanish global energy company Repsol, for example, has drilled offshore for oil in recent years, while Belgian and Mexican companies plan to build factories in a free-trade zone in the Mariel port west of Havana. No wonder more and more businesses are looking at the opportunities it affords.



\$77
BILLION

Cuba’s GDP in 2013

A new transformation

The country is used to adapting to new realities. After the Soviet Union collapsed in 1991, Cuba’s main source of support and cheap oil was cut off and its economy crashed. The then-president, Fidel Castro, found a new lifeline in Venezuela, which shipped in subsidized oil in exchange for Cuba’s renowned health services, reviving growth and Castro’s grip on the economy. But in 2014, Raúl Castro – who took power after Fidel’s health declined – had to find another strategy when a plunge in global oil prices dried up Venezuela’s support.

“Transition has always been happening in Cuba,” says John Gronbeck-Tedesco, author of “Cuba, the United States, and Cultures of the Transnational Left, 1930-1975.” “The country has had to make changes internally to exist as a nation under the Revolution.” Mark Jones, a Latin America expert at Rice University in Texas, says Raúl Castro appears to be pursuing a Chinese model of economic liberalization within a context of totalitarian political control. “This keeps dissent to a minimum and blocks any potential challenge to the Cuban Communist Party so that it can maintain



HIGH ROLLERS:

Expert Cuban cigar rollers make handmade cigars from cured leaves. The country’s cigar industry could benefit from an expansion of farmland used to grow tobacco.

political control,” he says. The idea is to bring in foreign investment to develop the country’s natural resources and boost trade, helping to expand the \$77 billion economy that, according to the World Bank, will grow a cool 2 percent in 2016, in line with 2015.

Yet the process may prove sluggish. One reason is that Cuba is still wary of U.S. intent and there are fears that backtracking by a future Republican president could delay full trade. In line for the job of president when Raúl Castro steps down is Miguel Díaz-Canel Bermúdez, a 55-year-old electrical engineer who has risen from minister of higher education to the first vice president of the Council of the State. However, other potential leaders have come on the scene before, only to get pushed aside. On top of these concerns, there’s a serious lack of infrastructure and broadband access, a two-currency system, limited consumer spending power and legal uncertainty about profit repatriation and dispute settlement. All of which means it’s unlikely that investors are going to rush in, says Peter Schechter, director of the Adrienne Arsht Latin America Center at the Atlantic Council, a Washington D.C. think tank. “If you look beyond the shiny, interesting attractiveness of an almost virgin market, there is a series of serious issues that will make companies think twice, thrice, four times and five times,” he says. But companies are taking a deep look. “We want to export to Cuba, we want to trade with Cuba,” noted Bill Lane, Senior Director of Global Government and Corporate Affairs for U.S.-based global machinery producer Caterpillar, in a recent webinar. “Everything that Caterpillar makes is needed in Cuba. They don’t need to rebuild their infrastructure, they need to build it.”

Trading hub

Beyond the hurdles, Cuba has the potential to become a major trading hub in the Western hemisphere. Since 2000, U.S. companies have started selling to Cuba again under a cash-in-advance system for select agriculture products, building materials, medicine and medical devices. Cuba can send some commodities to the U.S., but only from private enterprises.

An increase in trade and improvements in logistics infrastructure hinges on a lifting of the U.S. embargo. When that happens, a flood of tourism will drive up demand for building materials as well as construction, engineering and financial services. The increase in trade will in turn lead to improvements in legal practices, customs clearance and trade facilitation. “Cuba will get there,” says James Min, DHL Vice President of International Trade Law based in the United States. “It’s just a matter of time.” Min believes the progress could be like the opening up of former Soviet countries, which were forced to improve logistics as trade demand rose. This will bring more logistics suppliers to a country where DHL has got in early.

In September 2015, the U.S. authorized direct trade with Cuba, doing away with a previous requirement for



BUILDING UP:

Infrastructure is badly needed in Cuba. Here, diggers prepare the ground for a rail track to be constructed as part of a port project in Mariel, near Havana.

vessels to enter another country’s port before docking in the U.S. This means that bookings can now be made direct between Miami and Havana, cutting freight costs. And as trade increases with the U.S., Min expects Cuba to refocus on that market and reduce shipments to Asia. “Cuba has a tremendous geo-strategic location and they still have a lot of the commodities that they are competitive in, like sugar, citrus and tobacco,” he says.

The challenge is to make it happen. A good role model, according to Schechter, is Colombia. It has invested heavily in education, infrastructure, health-care and security over the past 15 years to go from “the precipice of ruin” to “a shining example of how to get things done right.” To do this, Cuba will have to recreate the national consensus that fueled Colombia’s transformation. It’s not without its challenges; but the opportunities are too good to miss. ■ Charles Newbery

 tinyurl.com/cuba-info

CUBA

Population: 11.379 million (2014)

GDP: \$77.15 billion (2013)

GDP – real growth rate:

2.7% (2013, est.)

Exports: \$5.187 billion (2014, est.)

Imports: \$14.7 billion (2014, est.)

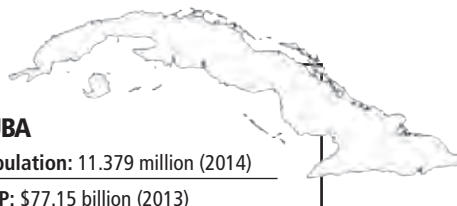
Labour force, by occupation:

Agriculture: 18%

Industry: 10%

Services: 72% (2013, est.)

Sources: The World Bank - World Development Indicators, The CIA World Factbook



ROBOTS IN STORE?

Robot technology may soon be packing, picking and moving goods – and solving a looming labor shortage in the logistics industry.

There's a new challenge in store for the logistics and supply chain sector: as demand for deliveries rises, the work force in many markets is predicted to shrink and age. The solution? Robots may soon be standard in warehouses around the world.

E-commerce is growing at an extraordinary rate (an estimated 10 percent per year in the U.S., according to Forrester Research). Take the Chinese festival of Singles Day which has become one of the biggest online shopping days in the world. In 2014, sales in Alibaba's sites Tmall and Taobao reached \$9.3billion. In 2015, that figure rocketed to over \$14.3billion. No wonder logistics firms are already running short of workers to pick, pack and move shipments.

In the future, the problem is likely to worsen: across the developed world, populations are slated to shrink and go gray, leaving the U.S. and other major economies with labor shortages in the millions of workers.

That's a problem robots might be able to solve, according to a white paper by DHL. Robots that work with human colleagues could help fill the gap between the required work force and the available labor pool and make logistics jobs physically easier, so employees can work into their 60s and beyond.

Flexible and low cost

Thus far, the use of robots in the logistics arena has been limited by the complexity of the work, because logistics robots must be able to handle a wide array of different



**\$1
BILLION**

The amount the collaborative robotics sector is expected to reach by 2020. A collaborative robot works with and alongside a human operator

parts in an infinite number of combinations. Robotic technology is beginning to catch up with the demand for machines flexible and low cost enough to work in the logistics and distribution environment. Recent advances are the result of three factors: a flood of government research funding, venture capital and significant investments from tech giants like Amazon and Google.

The attention and investment is toppling a series of key barriers. To be useful in logistics, robots must have “eyes” to see an object, “hands” to pick it up, “feet” so that they can move the object to another place and “brains” that coordinate all of these tasks. Cell phones and video game systems like Microsoft’s Kinect have driven a tremendous drop in the costs of optical, tactile and motion sensors, giving robots “eyes.” To solve the problem of “arms,” several companies are working on robot arms that are less powerful or equipped with sensors to detect nearby humans, making them safer for people to work near or even with.

Technology similar to self-driving cars may soon power robots that can move safely in constantly shifting environments such as shipping warehouses or even perform “last-mile” deliveries straight to homes and offices, giving robots “feet.” And, finally, robot designers are working to harness the computing power of the cloud to move computationally demanding tasks such as image processing off board, reducing the need for robots loaded down with advanced processors.

Another field attracting attention is the possibility of using robotic technology to enhance human performance rather than just supplement it. Exoskeletons – powered suits that give people power, strength and endurance that they would not normally have – could help prevent injuries or make it possible for older workers to perform physically strenuous tasks with less effort.

Improved service levels

Several companies are working on mobile robots that would cruise warehouses picking items just like a person would. The concept is scalable: if you have a small distribution center you could add robots one at a time as you grow, for example. And by automating smaller warehouses, companies would provide improved service levels by locating distribution centers closer to customers.

A similar phenomenon could change the face of “last-mile” delivery. Not unlike drones, small robots could cruise city streets and sidewalks, bringing packages from warehouses or delivery hubs to customers autonomously.

“Robots could pick easy items while humans pick the more complicated products or complete complex tasks.”



When it comes to a fully-automated future, logistics professionals have a right to be skeptical. Robots have been hyped for decades, and for most of that time they’ve failed to deliver. But that’s poised to change. As the study’s authors wrote, “our children can’t picture a world without computers and it is likely that their children will feel the same way about robots.” Someday soon, warehouses and supply chains will see machines and humans working side by side to deliver goods faster and more economically. ■ **Andrew Curry**

The white paper will be available in March 2016. To download it, please visit:



www.dhl.com/trendresearch

Alternatively, if you would like a copy of the report sent to you as soon as it is published, please email DHL’s Trend Research team at: trendresearch@dhl.com

CHINA'S ECONOMY: THE OPPORTUNITIES OF MATURITY

The maxim in China has long been “higher, faster, further.” Yet all of a sudden the economy is slowing, and exporters and investors are becoming increasingly nervous. What can we expect of China in the future, asks Dr Frank Appel, Chief Executive Officer, Deutsche Post DHL Group.

Growth and international trade are the driving force behind the world economy – and for decades, China has served as the turbocharger, a “workbench for the world.” This is no longer an absolute truth. China is currently undergoing a period of transformation. What was once an “eternal miracle” with investment-driven, double-digit growth is transforming into a national economy that is increasingly attempting to create its growth strength from domestic consumption, innovation and a strong service sector. The country’s unique structural environment, in particular, makes this transition extremely challenging – and not something that will happen overnight.

Nervousness on the financial markets is manifestly very high

The financial markets have reacted extremely nervously to the recent and abrupt depreciation of the Renminbi (RMB) with a slump in prices. I view this as somewhat of an overreaction that is more rooted in psychology than actual economic performance. What we are currently observing in China is the normalization of a domestic economy that has achieved a level of maturity. China’s economy is currently growing by 6.5-7 percent. Even if growth rates much in excess of 7 percent may now belong to the past, increases of 6 percent remain entirely realistic in future. As such, China remains, in my opinion, on a healthy growth course and I am absolutely convinced that the growth of emerging economies such as China will continue to significantly outperform more mature markets in the medium and

long term. This is not only a question of growth rates: China is now, after the USA, the second largest national economy in the world. With an increase of 6 percent, growth in China would still be greater than if we were to include the entire economic performance of a country such as Poland or Sweden.

China will soon be the largest market for online trade

Increasing urbanization and catch-up consumer spending among the growing Chinese middle classes will play a significant role. Over the coming years, China will develop into the largest market for online trade and DHL intends to play an active role in this journey. At the end of July 2015, we put a new DHL eCommerce terminal into operation in Shanghai. By the end of 2015, two additional delivery points in North and South China were set up and running. In future, the new terminal in Shanghai is to be the central consolidation center for the international dispatch of goods manufactured in China. What’s more, we will offer individual dispatch solutions for online retailers in the USA and Europe shipping to China. The Chinese eCommerce sector offers enormous potential. In the first five months of 2015 alone, revenue had already reached the level recorded for 2014 as a whole.

China is changing – and redefining its role within the world economy. We should support this transition with patience and confidence rather than resorting to crisis scenarios. ■



DR. FRANK APPEL

Dr. Frank Appel joined Deutsche Post DHL Group in 2000 and has been a member of the Group’s Board of Management since 2002. In 2008 he assumed the role of Chief Executive Officer and Chairman of the Board of Management.

LIVING THE DREAM

China's economy has slowed from a position of high growth, but a number of "China Dream" initiatives promise to make a positive impact on this still reforming country.



China's president Xi Jinping has a grand vision for what his country can achieve in the 21st century. He hasn't wasted time letting the world know about it, either. In his first three years of office, we have seen him outline his "China Dream" (a treatise to rejuvenate the Chinese nation "with reform and innovation at the core") and a host of major initiatives, which could have a far-reaching impact on social and economic reform.

Recently, however, the Chinese economy has slowed from a position of high growth to a 25 year low of 6.9 percent. In June of last year, its stock market soared to 150 percent, then took a dramatic tumble, provoking volatility and global investment panic. Its start to 2016, however, has been much worse: in January, dramatically falling shares forced an early end to trading twice in one week, as the world watched on nervously. In January, China's central bank revealed that it was injecting 600 billion yuan (\$91.22 billion) to help with liquidity before the new year celebrations in February.

Among the doom and gloom, there are many positives, however. Financial experts note that its 6.9 percent growth is desperately disappointing for China, but admit that most countries in the West would regard this figure with utter envy.

China already benefits from its Free Trade Agreement with the Association of Southeast Asian Nations (ASEAN), which came into effect in 2010, where bilateral trade, according to China Daily, is expected to rise from \$500 billion expected in 2015 to \$1 trillion by 2020. On the wider world stage, although excluded from U.S. pres-

ident Barack Obama's Trans-Pacific Partnership (TPP), China has embarked on its own range of measures to increase its role and influence abroad, as well as steer its economy to a more sustainable and balanced future.

Regionally, one of the most important is the launch of the Asian Infrastructure Investment Bank (AIIB), announced in 2013. Viewed by many as either a counterweight or rival to the World Bank, one thing is certain: China has experience in building infrastructure on a massive scale. While the funds will come from many other developed and developing countries, the fund will be based in China and has the backing of 50 nations, though again, it remains, like the TPP, a divide between the U.S. and China. State news agency Xinhua says after becoming operational at the end of 2015, the AIIB aims to fund, from a sizable \$110 billion piggy bank, its first projects in the second quarter of 2016, and more over the next five years.

Belt and Road

Transport links also feature highly in two other infrastructure initiatives, a new Silk Road and a Maritime Silk Road. Jointly known as the Belt and Road Initiative, one seeks to recreate the land route over which trade used to pass between China and the Mediterranean through Central Asia. The second is the route Chinese trade similarly traveled to Africa by sea. International news agency Reuters says the \$40 billion Land Silk Route will be an infrastructure fund to boost connectivity across Asia to "break the bottleneck." Together, the projects will look to build roads, railways, ports, and airports across Central and Southern Asia.

But probably by far the most important reform that China is seeking is a greater global role for its currency, the Renminbi (RMB). It is pushing hard for the International Monetary Fund to accept it as a reserve currency. The U.K. is already supportive, hoping to use its financial center clout to become a major RMB clearing house.

According to a report on China's State Council website by the International Monetary Institute at Renmin University of China in Beijing, China has made good progress with internationalizing its currency, which is now the fourth most used in global payments. As the Belt and Road initiative is executed, the report says the RMB will facilitate the financing of the encompassing countries, while more Chinese companies going abroad will also boost internationalization.

Certainly the RMB sharing the same status as the U.S. dollar, pound sterling, yen and euro would be the ultimate achievement for Xi Jinping. And with still more than half of his term of office left, he might well be able to make that dream a reality. ■ Keith Crane

A longer version of this article is available at:

 tinyurl.com/living-the-dream-del

SOLUTIONS

A PLATFORM TO INSPIRE, CONNECT AND ENGAGE

Step inside DHL's Innovation Center in Bonn, Germany which recently reopened its doors with a brand new design and extended services.

Open to DHL customers and partners, the center invites visitors to take a journey and explore visions, trends and solutions in the logistics area and beyond. The Vision Suite provides a glimpse of what logistics might look like in 2050; so-called Trend Cubes make social and technology trends and their impact on logistics tangible; while the full range of today's DPDHL Group capabilities can be discovered in the Solution Box. All three dimensions come together in the stunning Center Piece, currently showcased by a Formula E car, which demonstrates DHL's sustainable logistics solutions. A dedicated "design-thinking studio" presents the ideal setup for tailored customer innovation workshops.

To visit the DHL Innovation Center, experience the latest trends as part of a tour or workshop customized to your demands, please contact your DHL sales representative.

VISION SUITE:

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PROGRAMS & PROTOTYPES: View in-use vehicles from DHL's GoGreen program, as well as state-of-the-art prototypes.

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TREND CUBES: Explore the logistics trends of tomorrow, such as augmented reality, the Internet of Things and 3D printing.



AUGMENTED REALITY



AUTONOMOUS LOGISTICS



LOW-COST SENSOR TECHNOLOGY



INTERNET OF THINGS



BIG DATA



3D PRINTING



FAIR & RESPONSIBLE LOGISTICS



ROBOTICS



CENTER PIECE: Explore e-mobility and sustainability solutions (a new "robot" Center Piece will be installed mid 2016).

SOLUTION BOX: Discover state-of-the-art solutions across all industry sectors along the entire value chain.





RISKY BUSINESS

Increased supply chain risks have been the major unintended consequence of two of the most significant business trends of recent decades: globalization and lean production. Now companies are fighting back with new ways of identifying, managing and mitigating risks.

Flooding at a single automotive plant in Thailand in 2011 led to 29 separate production disruptions around the world. Last year, delays at ports on the US west coast resulted in \$7 billion in lost sales and additional transport costs for retailers. Driven by the quest for lower manufacturing costs or access to specialist capabilities, companies are increasingly likely to source materials and components from around the world. Yet this has greatly increased the number of potential points of weakness in their supply chains, especially as some key production sites are now located in regions more vulnerable to natural disasters.

As supply chains have increased their exposure to risk, they've increased their vulnerability, too. Short product lifecycles and the desire to conserve working capital encourages companies to keep inventories and buffer stocks as low as they possibly can. This is an approach central to the Japanese "just-in-time" philosophy. When supply chains are running smoothly, this way of working has been incredibly successful, cutting manufacturing costs, improving companies' ability to respond to market shifts and simplifying quality control. But when problems do occur, there is far less slack available in these lean, tight supply chains, leaving companies with less time to react before the impact of problems reaches their customers.

Another significant issue is lack of transparency. Companies don't always know the routes and transport modes their suppliers use, where products are along

**\$7
BILLION**

The amount retailers lost in sales and additional transport costs in 2015 because of delays at U.S. west coast ports



To download the report, please visit:

 tinyurl.com/resilience-dhl

these routes or where suppliers get their own components and materials from. When Toyota was forced to rebuild its supply chain after the 2011 Tohoku earthquake, managers were surprised to discover just how many parts relied on the same few suppliers far upstream. "We thought [our supply chain] was pyramid-shaped, but it turned out to be barrel-shaped," said one official.

For a while, it looked as if supply chain vulnerability might threaten to undo some of the key advantages of globalization and lean manufacturing. Today, that seems less likely. Increasing recognition of the importance of supply chain risk is driving a revolution in its management. The latest report in DHL's InsightOn: series takes an in-depth look at the nature of that revolution.

Risk response

InsightOn: Risk and Resilience examines how the type and severity of the risks faced by companies are changing, mapping the risk landscape and its impact on different industry sectors, including automotive, engineering and manufacturing, energy, life sciences and technology. It then looks at the new tools of supply chain risk management: how big data, smart software and advanced analytics are helping companies to find and fix the weak points in their networks and how leading companies are improving their planning, preparation, prevention and risk response processes to boost resilience and keep costs under control.

Detailed case examples show how these approaches are being applied today in some of the world's most demanding and risky supply chains, highlighting the key role of collaborative approaches and new partnerships in the creation of risk-tolerant supply networks.

Finally, the report examines the economics of resilience: the growing body of evidence that shows companies that take a proactive approach to supply chain risk can avoid these downsides and also benefit in other ways; plus the skills, tools, processes and cultures they develop mean they are exceptionally well-positioned to seize emerging opportunities for competitive advantage, wherever they occur. ■ Jonathan Ward

THE RACE TOWARDS SUSTAINABLE MOBILITY

A new report outlines how sustainable mobility innovations have been sparked by the Formula E Championship, the world's first fully electric racing series.

Many of us are drawn to urban living, attracted by the promise of greater opportunities, increased wealth and improved amenities. Indeed, by 2050, the United Nations estimates that 66 percent of the world's population will live in cities. The downside is that urban areas are negatively impacted by the mass movement of goods and people, which means that finding environment-friendly sustainable mobility solutions has become increasingly urgent. Identifying and delivering short-term solutions is the most pressing challenge.

As this search intensifies, racetracks in some of the world's biggest cities aren't the most obvious place to look for innovation inspiration; but the Formula E Championship, the world's first fully electric racing series which began its second season in Beijing in Octo-

23
PERCENT

The percentage of global CO₂ emissions produced because of transportation that uses fossil fuel combustion



FORMULA E CAR
SEASON I

ber 2015, has acted as a catalyst for technology innovation in the automotive industry. Entertainment may be at the heart of the Formula E concept, but it is an event that is also keenly aware of other “e” elements – namely environmental and energy concerns.

As the Championship's official logistics partner, DHL has published a report – called “eStory: Undertaking the Mobility Challenge” – which outlines the mobility innovations and green technology solutions that have already spun off from the Formula E event. The report features case studies from 13 Formula E partners, including how U.K.-based Aquafuel Research has patented renewable energy generators which run on

glycerine; the pioneering role of India's Mahindra Racing in developing electric power-trains; how BMW has integrated a total lifecycle approach into its production systems; and how the Championships have accelerated the development of charging systems for e-vehicles. Clearly, these are examples of “sustainable development fueled by innovation.”

The report also identifies three key levers to help such mobility innovation evolve:

Technology

Mobility has always been influenced by advances in technology. It's crucial to devise intelligent transport systems driven by data management, to optimize the flow of people and goods through densely populated urban centers, but also to ensure that current solutions become more efficient and use fewer resources.

Infrastructure & Business Models

Often technologies rely on infrastructure to be efficient. Without geographically comprehensive charging networks, for example, the adoption of electric vehicles is likely to remain low. The impact of changing regulatory and legislative frameworks must always be considered, as strong political initiatives have the power to significantly change infrastructure and business models.

Change Management & Communication

Effective communication is vital for achieving common understanding and overcoming resistance to change. The transition to more sustainability requires a change of habits and mindset, because as good as a solution might be, it is worthless if not adopted. To achieve successful communication, different channels must be used and account taken of how people retain information.

Messages about sustainability must always focus first on the particular sector to which they apply (logistics, for example), but must also focus on the wider population who may know very little about that sector. “Being able to innovate is a key success factor,” highlights the report's author, Manoella Wilbaut, Head of Global Commercial Developments & Sustainability, DHL Customer Solutions & Innovation. “The report is part of a wider B2B program called ‘eStory’ that aims to boost innovation and sustainable mobility. We trust the real value comes from the ability to connect people and work in eco systems. Let's envision the future in a pragmatic and innovative manner!” ■ Ian Halstead

To download the report, please visit:

 tinyurl.com/formula-e-dhl

VIEWPOINTS



***DELIVERED. GETS SOCIAL
MEDIA SAVVY WITH...***

MELANIE IRONS

During the Tasmanian bush fires of 2013, Melanie Irons created a Facebook page that – by sharing information and solving problems – became a social media lifeline for those caught up in the ensuing chaos.

Melanie Irons knows all about the power of social media. In January 2013, she had planned to have a quiet five days away from her Tasmania-based personal training and health coaching business to put the finishing touches to her PhD.

That, however, was the week the most devastating Tasmanian bush fires since 1967 began – and, by the end of it, Mel's life had changed irrevocably. Tasmania, an Australian island state with a population of half a million, had just had its hottest day on record when the major fires started. They were lethal, burning for more than four months, destroying property, infrastructure, businesses, cutting off power and isolating communities.

"On that first day, I was at home watching the news and keeping an eye on developments on social media," says Mel. "Although the fires were some way from where I was, and I wasn't directly affected by them, I still felt connected to the community affected and my heart went out to everyone who was suffering."

Melanie felt powerless and wanted to do something – anything – to help those in need. So she rang her local radio station and announced on the air that she had just created a Facebook page called "Tassie Fires – We Can Help." The idea was that people could use the page for information or post messages on it if they needed anything – and Mel would try to coordinate a response.

Soon after getting the page up and running, Mel was at the centre of a social media storm, and was getting so many messages and requests – including information about missing persons and offers of help or donations from individuals and organizations – that she couldn't even leave her computer to take a shower. She barely ate or slept.

When she first started the page, Mel had no real idea what she was getting herself into. "I was utterly blown away," she remembers. "Within an hour, I had 3000 people following the page. The level of traffic was insane. At its peak there were nearly 21,000 people following the page, and nearly 3 million unique visitors saw content from the page within the first 12 months." Since the fires, Mel has been helped by 13 local businesses to launch a website that will work hand in hand with the Facebook page for future disaster events (www.tassiefireswecanhelp.com).

These days, Melanie works part-time as a social media consultant sharing her experiences with businesses and organizations, and is modest about her achievements. "It's nice that people appreciate what I did, but I was just directing traffic," she says. "Without the community response, I would have been powerless."

Did you use social media before "Tassie Fires"?

I had very little experience of it and no experience of emergency management. As a personal trainer, however, I am

used to managing crowds, motivating people and thinking critically. My studies at uni also certainly helped me to have many of the right "soft skills" for that role.

What made you think that social media could help in this situation?

I'd noticed people posting messages like: "I'm going to go to this place to help" or "I'm out searching for this person – has anyone seen them?" I realized that if they all started to help they could cause a huge burden on the emergency services. It needed someone to organize and coordinate a response at a distance.

You've said "almost anything I needed I got when I asked for it on social media." Such as?

Well, there was an oyster farm that was without electricity and set to lose 100 million individual animals. The loss of this hatchery would have directly impacted more than 200 families around Australia. I put the word out that I needed three massive generators, some electrical engineers and electricians and some boats. And I needed them now. And those specific requests got filled quickly and helped to save the hatchery. The ability of the people was extraordinary. It made me realize the power of crowdsourcing.

What do you say to people who dismiss social media as "trivia"?

I think it's totally understandable. If you'd asked me three years ago, I would have had said the same. So we do need social media evangelists who can help change the minds of skeptics – or the people who are "digital immigrants." I have to say after my experience that it's very short-sighted not to recognize that social media can be a powerful tool, and that the pros most definitely outweigh the cons.

Do you meet organizations who use social media well – and those who use it badly?

Yes. To use social media effectively an organization needs excellent communicators, a lot of time and a lot of resources. When I make recommendations to them, some say: "That's great, Mel, but we just don't have the manpower." It's still a relatively new space for a lot of them. I'd like to see a greater use of volunteers in all areas of emergency management, not just for operational roles.

What's your main message about social media?

It's about communicating – and listening. There are plenty of companies who don't use it quickly enough and suffer the consequences. So being incredibly rapid and having good communicators can be a godsend. ■

Tony Greenway

3000

The number of people following Mel's "Tassie Fires" page just one hour after its launch



WHY YOU NEED EMOTIONAL INTELLIGENCE TO SUCCEED

Emotional intelligence is responsible for 58 percent of your performance, so what are you doing to improve yours?

When the concept of emotional intelligence was introduced to the masses, it served as the missing link in a peculiar finding: people with average IQs outperform those with the highest IQs 70 percent of the time. This anomaly threw a massive wrench into what many people had always assumed was the sole source of success – IQ. Decades of research now point to emotional intelligence as the critical factor that sets star performers apart from the rest of the pack.

Emotional intelligence is the “something” in each of us that is a bit intangible. It affects how we manage behavior, navigate social complexities, and make personal decisions that achieve positive results. Emotional intelligence consists of four core skills that pair up under two primary competencies: personal competence and social competence.

Personal competence comprises your self-awareness and self-management skills, which focus more on you

individually than on your interactions with other people. Personal competence is your ability to stay aware of your emotions and manage your behavior and tendencies.

- Self-awareness is your ability to accurately perceive your emotions and stay aware of them as they happen.
- Self-management is your ability to use awareness of your emotions to stay flexible and positively direct your behavior.

Social competence is made up of your social awareness and relationship management skills; social competence is your ability to understand other people’s moods, behavior, and motives to respond effectively and improve the quality of your relationships.

- Social awareness is your ability to accurately pick up on emotions in other people and understand what is really going on.
- Relationship management is your ability to use awareness of your emotions and the others’ emotions to manage interactions successfully.

Emotional intelligence, IQ, and personality are different.

Emotional intelligence taps into a fundamental element of human behavior that is distinct from your intellect. There is no known connection between IQ and emotional intelligence; you simply can’t predict emotional intelligence based on how smart someone is. Intelligence is your ability to learn, and it’s the same at age 15 as it is at age 50. Emotional intelligence, on the other hand, is a flexible set of skills that can be acquired and improved with practice. Although some people are naturally more emotionally intelligent than others, you can develop high emotional intelligence even if you aren’t born with it.

90 PERCENT

The number of top performers who are high in emotional intelligence



Personality is the final piece of the puzzle. It's the stable "style" that defines each of us. Personality is the result of hard-wired preferences, such as the inclination toward introversion or extroversion. However, like IQ, personality can't be used to predict emotional intelligence. Also, like IQ, personality is stable over a lifetime and doesn't change. IQ, emotional intelligence, and personality each cover unique ground and help to explain what makes a person tick.

Emotional intelligence predicts performance.

How much of an impact does emotional intelligence have on your professional success? The short answer is: a lot! It's a powerful way to focus your energy in one direction with a tremendous result. Talent Smart tested



TRAVIS BRADBERRY

Co-author of Emotional Intelligence 2.0 and President at TalentSmart (www.talentsmart.com)

Dr. Travis Bradberry is the award-winning co-author of the #1 best-selling book "Emotional Intelligence 2.0" and the co-founder of TalentSmart – a consultancy that serves more than

75 percent of Fortune 500 companies and is the world's leading provider of emotional intelligence tests and training. His best-selling books have been translated into 25 languages and are available in more than 150 countries.

For details of how to win a copy of Emotional Intelligence 2.0, see page 4.

This essay was first published on www.inc.com

emotional intelligence alongside 33 other important workplace skills, and found that emotional intelligence is the strongest predictor of performance, explaining a full 58 percent of success in all types of jobs.

Your emotional intelligence is the foundation for a host of critical skills – it impacts most everything you do and say each day.

Of all the people we've studied at work, we've found that 90 percent of top performers are also high in emotional intelligence. On the flip side, just 20 percent of bottom performers are high in emotional intelligence. You can be a top performer without emotional intelligence, but the chances are slim.

Naturally, people with a high degree of emotional intelligence make more money – an average of \$29,000 more per year than people with a low degree of emotional intelligence. The link between emotional intelligence and earnings is so direct that every point increase in emotional intelligence adds \$1,300 to an annual salary. These findings hold true for people in all industries, at all levels, in every region of the world. We haven't yet been able to find a job in which performance and pay aren't tied closely to emotional intelligence.

You can increase your emotional intelligence.

The communication between your emotional and rational "brains" is the physical source of emotional intelligence. The pathway for emotional intelligence starts in the brain, at the spinal cord. Your primary senses enter here and must travel to the front of your brain before you can think rationally about your experience. However, first they travel through the limbic system, the place where emotions are generated. So, we have an emotional reaction to events before our rational mind is able to engage. Emotional intelligence requires effective communication between the rational and emotional centers of the brain.

Plasticity is the term neurologists use to describe the brain's ability to change. As you discover and practice new emotional intelligence skills, the billions of microscopic neurons lining the road between the rational and emotional centers of your brain branch off small "arms" (much like a tree) to reach out to the other cells. A single cell can grow 15,000 connections with its neighbors. This chain reaction of growth ensures it's easier to kick a new behavior into action in the future.

As you train your brain by repeatedly practicing new emotionally intelligent behaviors, your brain builds the pathways needed to make them into habits. Before long, you begin responding to your surroundings with emotional intelligence without even having to think about it. And just as your brain reinforces the use of new behaviors, the connections supporting old, destructive behaviors will die off as you learn to limit your use of them. ■ *Travis Bradberry*

MANAGING THE UNKNOWN:

How We Should Tackle Risk in Global Supply Chains



AN ESSAY BY ANDREAS WIELAND

Andreas Wieland is an Asst. Professor of Supply Chain Management at the Department of Operations Management, Copenhagen Business School. His research interests include strategies to manage risk by increasing the robustness of global end-to-end supply chain systems.

Early approaches to managing risk in supply chains were based on enterprise risk management tools – tools that had been developed for a system called the “company.” These tools often contained risk categories relating to operational and financial circumstances within the company. Moreover, these tools were easily scalable, as they allowed the inclusion of additional risk categories. It comes as no surprise, therefore, that the notion of risks further upstream and downstream in the supply chain has led risk managers to include new categories such as “supplier insolvency,” “supplier quality” or “defects of supplied parts (per million).” The inclusion of such categories that represent risk sources outside of their own companies has certainly been a great achievement. But, as I will argue, this is not enough to shift from a company view towards a supply chain view that has been shown to enable value creation.

1. Managing risk beyond the own company.

The “company” and “supply chain” views are fundamentally different – so it is thus not possible to simply assume that approaches that are suitable for one system are also suitable for another.

A company can sometimes be a relatively large system; however, it is usually centrally controlled, has relatively well-defined boundaries and its processes and organizational structure can, at least in principle, be mapped. This is usually not the case for end-to-end supply chain systems. Not only are supply chains, by involving different organizational cultures, languages, locations etc., far more complex and dynamic than companies, but companies often do not even have access to the suppliers of their own direct suppliers – not to mention all the different raw materials suppliers further upstream.

For example, if 30,000 parts are needed to build a car – many of them coming from different suppliers and suppliers’ suppliers – it should become obvious that the scalability of traditional risk management tools becomes quickly limited. Identifying and assessing all types of risks from all suppliers, all suppliers’ suppliers and finally all raw materials suppliers is simply impossible! Plus, doing this is also not always reasonable: many of the supply chain disruptions that happened in recent years were, in fact, caused by risks that had not appeared on risk category lists. Could we really imagine that a volcano eruption in Iceland

would halt Europe's air traffic, for example? Or that a Tsunami in Japan would cause a nuclear accident? I certainly did not and I doubt that having tried to identify even more risk causes to add to the list would have helped much.

2. Increasing the robustness of the supply chain.

But what would have helped in these cases if the old approach of optimizing the list of potential risk causes fails? Instead of looking at the causes of risk it would be better to focus on the systemic characteristics of the supply chain system in order for it to be robust if something bad happens – irrespective of its cause! The harmful thing for Japanese car manufacturers after the 2011 earthquake was not that it was an earthquake that had happened. It was that many of their redundant suppliers were located in the same region. Worse, even the non-Japanese plants of these companies were affected, as they had failed to make the supply chains of different regions independent. These companies also realized that they did not hold enough inventories for important components – ones that could not be built in other places. From a cost perspective, it might make sense to centralize warehouse capacity; but to increase the robustness of your supply chain, a certain amount of redundancy makes a lot of sense. (We should not forget, however, that two redundant suppliers for the same materials often supply from the same sub-suppliers, which can create a false security.)

It's not just the design of your supply chain that can help your company become more robust. It's also the design of your product. Avoiding materials that can only be supplied from certain regions, such as rare-earth materials, or suppliers of non-standardized parts, can help to reduce or even ward off certain types of risk. Modular product design can help to at least semi-finish a product and to add missing modules at a later stage when they become available again. Such systemic solutions help companies cope with risk in the supply chain without paying too much attention on the exact causes of risk.

3. Prerequisites of a robust supply chain.

As we have seen, there are potential ways to increase the robustness of a supply chain, i.e. its ability to avoid and resist risk. But why are some companies more successful in implementing these than others? Our research [1] clearly shows that both intra-organizational and interorganizational factors affect the supply chain's robustness.

Intra-organizational factors include:

1. Leadership commitment. Investing in robustness pays out only when a risk occurs, i.e. in the long term. In the short term, investments might have a negative impact on cost-based or profit-based KPIs. Therefore, a supply chain can only become robust if the C-level (those highest in senior management) acknowledges its importance.

2. Human capital. Coping with supply chain risk is not only a top-down approach. Companies need skilled SCM talent – people who are aware of potential disruptions, experienced in identifying problems and know how to solve them.
3. Relationship magnitude. To reduce risk in the supply chain, strong relationships between different departments within a company can be crucial. This helps to exchange relevant information about ongoing or future problems. For example, Ericsson restructured its organizational chart to foster internal relationships after a major supply chain disruption in 2000.
4. Risk management orientation. Another factor that can create additional robustness is a risk-oriented culture throughout the entire company. This can involve processes to learn from previous disruptions and processes to proactively implement solutions.

Interorganizational factors include:

5. Node criticality. Some elements of the supply chain make it typically more vulnerable than others. This is, for example, the case for suppliers who deliver several key components or own centralized distribution centers. Identifying critical nodes and redesigning the network is, thus, a good strategy to reduce vulnerabilities.
6. Bargaining power. Some nodes in the supply chain have a stronger power position than others, e.g. single suppliers of a key component, or buyers of complex components such as those in the car industry. Such companies should use their power to ensure that the entire supply chain becomes robust, e.g. by forcing partners to implement risk-mitigating procedures.
7. Visibility. Shortly after the 2013 Rana Plaza tragedy, some Western fashion retailers did not even know that their shirts had been produced in the collapsed Bangladeshi plant. Yet companies such as Switcher, with their Respect Code solution, demonstrate that end-to-end visibility is, in fact, possible all along the supply chain.
8. Network complexity. Recent research clearly demonstrates that a high complexity of the supply chain can increase the frequency of disruptions. Companies should thus try to reduce the number of direct suppliers, the number of supply chain tiers and the geographical spread of their supply base. ■

[1] Durach, C.F., Wieland, A. & Machuca, J.A.D. (2015). Antecedents and Dimensions of Supply Chain Robustness: A Systematic Literature Review. *International Journal of Physical Distribution & Logistics Management*, 45 (1/2), 118–137.

WHAT'S THE STORY, MR FORONI?

KEEPING FORMULA E ON TRACK



Massimo Foroni heads the DHL team responsible for transporting cars, batteries, spare parts and support vehicles to Formula E races around the world.



Transporting state-of-the-art racing cars to high-profile motorsport events around the world sounds exciting. It is exciting. But it's high-pressure too, because whatever happens, the cars have to be at the race on time – so it means we have to plan in minute detail to be ready for any eventuality.

Before we became the official logistics partner for the Formula E Championship, we already had a lot of motorsport experience with Formula 1 and GP2, for instance. The difference with Formula E – apart from the fact that it's the world's first fully electric series – is that the races take place around city centers. In Monaco, they are used to racing cars through the streets. But take Moscow, which, for the 2014-2015 season, hosted a race last June. It was an entirely new experience for them, so there can be many delays until the organizers and officials are ready. And anytime anyone touches one of our containers, our team has to be there.

The first-ever Formula E race was held in 2014 in Beijing and that presented us with some big challenges: complex customs in a country with a high level of security – plus, in downtown Beijing,

trucks can only drive at night. Another complication, wherever our destination, is that the lithium-ion batteries for the cars, which weigh 355 kilograms net, are volatile and sometimes have to travel by air. So my team – who have a wide experience of motorsport logistics – have to make sure that everything is transported safely, which is a specialist business. Another challenge is monitoring our carbon footprint. Where we can, we try to avoid flying and prefer ocean or, where possible, rail. The downside with transporting by rail is the constant vibration, as the equipment we transport can be quite delicate.

I love motorsport but the nature of the job means I'm usually working during an event. Although last year – in Punta del Este, Uruguay – I got to see a race for the first time! Very exciting! For me, the best part of this job is seeing so many different places and cultures, and our involvement with Formula E is so new and collaborative. We think and work as one team. ■ *Tony Greenway*



tinyurl.com/dhl-formula-e

FACT: A race takes more than fast cars.

DHL also – moves medical vehicles and broadcasting equipment by air, as well as containers of racing-related freight by ocean routes.



40

Number of fully electric, state-of-the-art cars DHL transports to Formula E races around the world



108,920

The maximum brake horsepower of the Wärtsilä 14RT-flex96C – the most powerful diesel engine in the world. A big ship needs a powerful engine. And they don't come any more powerful than this – the Wärtsilä RT-flex96C, specially designed for supertankers and the new generation of very large container ships (transporting 16,000 containers). Weighing 2,300 tons, the engine is 89 feet (22 meters) long and 44 feet (13 meters) wide, and can propel a ship at speeds of up to 27 knots (50 kilometers per hour). The 14 cylinder version runs on 1,660 gallons of heavy fuel oil per hour.

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