The world’s largest aircraft prepares to fly

Behind the scenes with the “game-changing” Airlander 10, as it gets ready to take to the skies

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**EDITORIAL**

The risk landscape is changing. Many industrial sectors are undergoing a fundamental transformation. New technologies, digitalization and the “Internet of Things” – a web of connected devices, machines, people and organizations that can interact with one another – are all altering customer behavior, industrial operations and business models. While undoubtedly bringing a wealth of opportunities, such innovations also pose a number of risks, such as cyber security, supply chain vulnerability and the potential for increased litigation.

AGCS recently brought together more than 100 corporate risk practitioners to discuss the industrial risks of the future at its biennial **Expert Days** event in Munich, emphasizing the importance of greater collaboration between insurers, risk managers and other experts to address the challenges posed by the Industry 4.0 environment.

This edition of **Global Risk Dialogue** looks at how companies can best respond to these new risk management realities in a comprehensive manner.

Enjoy the issue.

Chris Fischer Hirs
CEO
Allianz Global Corporate & Specialty
Global risks at a glance

$30bn catastrophe bill lowest for six years

The year 2015 was a relatively quiet one in terms of global significant insured losses, which totaled around $30.5bn, according to Guy Carpenter’s Global Catastrophe Review.

The $30bn+ annual loss tab is below the 10-year and five-year moving averages of around $49.7bn and $62.6bn respectively, the reinsurance broker said in the report. Last year marked the lowest total insured catastrophe losses since 2009.

The most impactful event of 2015 was the Port of Tianjin, China, explosions in August, rendering estimated insured losses between $1.6bn and $3.3bn, according to a Guy Carpenter report following the event. The series of winter storms and cold of the eastern US resulted in an estimated $2.1bn of insured losses, whereas in Europe, storms Desmond, Eva and Frank in December 2015 are expected to render losses exceeding $1.6bn.

Other significant events included the damaging wildfires in the western US, severe flood events in the Southern Plains and Carolinas and Typhoon Goni affecting Japan, the Philippines and the Korea Peninsula, all with estimated insured losses exceeding $1bn. View the report at http://www.guycarp.com/content/guycarp/en/home.html

BI tops Allianz Risk Barometer

Business interruption (BI), market developments and cyber incidents are the top three global business risks for 2016 and beyond, according to the fifth annual Allianz Risk Barometer.

While business interruption remains the top risk globally for the fourth year in succession, the corporate risk landscape is changing, with many industrial sectors undergoing fundamental transformation. Businesses will need to prepare for a wider range of disruptive forces in future, with the increasing impacts of globalization, digitalization and technological innovation posing significant challenges, according to the report.

The Allianz Risk Barometer identifies the top corporate perils based on the responses of more than 800 risk experts from 40+ countries around the globe. View the report at http://www.agcs.allianz.com/insights/white-papers-and-case-studies/allianz-risk-barometer-2016/

Aviation needs a million workers

More than one million new aviation personnel will be needed over the next 20 years, as global economies expand and airlines take delivery of tens of thousands of new commercial jetliners, Boeing predicts.

Between now and 2034, the aircraft maker estimates that 558,000 new commercial airline pilots will be needed, together with 609,000 maintenance technicians, with demand expected to be highest in the Asia Pacific region, which will account for 40% of this total.

Boeing’s Pilot and Technical Outlook notes that meeting this exponential demand for personnel will require utilization of the latest digital technology to match the learning requirements of a new generation. Instructors will need to have cross-cultural and cross-generational skills to engage an increasingly diverse aviation workforce.

Global fleet growth—along with an increasing trend in outsourcing maintenance, repair, and overhaul activities to third-party providers in emerging markets—will drive an increased need for qualified technicians sourced from more locations. View the report at http://www.boeing.com/commercial/long-term-market/pilot-and-technician-outlook/.

Damaged buses near the Port of Tianjin. Photo: Shutterstock

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AGCS presents at RIMS 2016

Over 600 clients and brokers celebrated the opening of the 2016 RIMS Annual Conference with Allianz at a special evening fête held April 10 in San Diego, California. The event was hosted by five members of the AGCS Board of Management, including AGCS CEO, Chris Fischer Hirs.

Allianz experts participated in three educational sessions as part of the conference schedule. Claire McDonald, Global Practice Leader International Insurance Solutions, was a panelist in the Global Insurance Programs session, James Van Meter, Unmanned Aircraft Systems (UAS) Product Line Head spoke on UAS exposures, and Christof Bentele, Head of Global Crisis Management spoke on geopolitical risks. In total, AGCS experts gave more than 25 media interviews.

RIMS is a global risk management organization for risk managers and their broker and insurer partners.

For more information visit http://www.rims.org/RiskKnowledge/RiskKnowledgeMain.aspx

AGCS launches motorsports unit

AGCS has launched a dedicated motorsports unit in North America with further expansion planned in Europe in future. The new division will offer insurance coverage designed exclusively for racing facilities, events, teams, sponsors and sanctioning bodies.

AGCS has partnered with Alive Risk as its managing general agent. Specializing in motorsports, Alive Risk employs top experts in underwriting, risk management and claims and is a division of All Risks, Ltd., the largest independently held broker in the US.

Allianz renewable energy investment hits €3bn

Allianz has bought three windparks in Finland, ensuring its investment in renewable energy has surpassed the ($3.4bn) €3bn mark.

Allianz Capital Partners (ACP), the captive, alternative asset investment platform of Allianz Group, signed an acquisition agreement for the windparks with Portofino New Energy, which is owned by Impax New Energy Investors.

Two of the windparks — Joukhaisselkä and Kuolavaara-Keulakkopää — are located in Lapland, in the north of Finland, and benefit from a joint operations and maintenance base. The third wind park — Saarenkylä — is close to the western coastline, in the region of northern Ostrobothnia. Together, they have a total capacity of 107.7mw, enough to satisfy the electricity demands of around 95,000 average EU households.

Allianz now owns 63 windparks and seven solar parks. The wind and solar portfolio of ACP generates enough renewable energy to supply over a million households, which is comparable to a city the size of central Paris. The renewable energy portfolio of Allianz currently includes sites located in Austria, Finland, France, Germany, Italy, Sweden and the US. For more information visit http://www.allianzcapitalpartners.com/en/

Allianz’s renewable energy investment portfolio includes sites on two continents.
Expert Days: The next generation of industrial risks

From cyber security to Industry 4.0 in practice, the industrial risks of the future were the focus of a two-day event hosted by AGCS, which brought together more than 100 risk experts to discuss the new challenges businesses face.

Digital innovation is bringing a wealth of opportunities but increasingly sophisticated production processes pose brand new business interruption risks. How the world of risk management and insurance is responding to this was the main item on the agenda at AGCS’ recent Expert Days conference in Munich.

Opening proceedings was AGCS Chief Underwriting Officer Hartmut Mai, who addressed the increasingly diverse focus of the Expert Days event, open to an international audience for only the second time. “The forum has become global, because risk is global,” he said, before emphasizing the importance of interaction between Allianz, risk managers and other experts.

Mai was followed by the keynote speech from Armin Nassehi, Sociology Professor at the Ludwig Maximilians University of Munich. Nassehi discussed the importance of risk in society and how complex systems can be easily destabilized. However, risks have to be taken in order to achieve progress, he added. The key lies in actively managing risk, which is no easy task, when decisions are often based on data from the past.

For natural catastrophe experts, this is a familiar issue. Carsten Block, Head of Earthquake Engineering at Wölfel Group, looked at changes in earthquake risk assessment of structures, before Ceyhun Eren, Head of Technical Underwriting and Risk Control at Allianz in Turkey, presented his findings on a risk-based approach to seismic vulnerability.

BMW’s General Manager of Corporate Insurance, Robert Mann, then offered an insight into the challenges BMW faces in monitoring and managing its thousands of suppliers around the world.

Rounding off the first day was Christof Bentele, Head of Global Crisis Management, AGCS, who discussed recent terrorist attacks and the changing landscape of international geopolitical risks and what Allianz can offer in the area of crisis management.

The second day of the conference saw Kai Peters, from the German engineering association, VDMA, discuss the possibilities of Industry 4.0, which connects the virtual and physical worlds and is already influencing the way things are made. How this looks in practice was demonstrated by Thorsten Widmer, Vice President Manufacturing Strategies and Investment Planning, Bosch, and ABB’s Bernhard Hennicke. But as Stefan Thurm, General Manager of the Allianz Center for Technology, added, it is important for companies to be aware of the level of complexity they can handle.

Meanwhile, a supertall buildings presentation combined several topics addressed across the two days, from a reliance on interconnected systems to safety from natural catastrophes. Clive Trencher, Engineering Risk Consultant, AGCS, said reaching new heights will continue to pose new challenges.

Paul Carter, Global Head of Allianz Risk Consulting, AGCS, brought the forum to a close. He acknowledged that corporate insurance often needed to react quicker in the face of technological changes, but stressed the importance of collaboration, “as nobody has all the answers”.

Find out more at http://www.agcs.allianz.com/insights/events/expert-days-2015/
Loss Log

More than a quarter of all shipping losses occur in South China and South East Asian waters, with passenger ship safety a particular area of concern.

There were 85 large ships lost last year, according to the fourth annual AGCS Safety and Shipping Review 2016, which analyzes reported shipping losses of over 100 gross tons.

Although losses remained stable year-on-year, declining slightly from 88 in 2014, this still meant 2015 was the safest year in shipping for a decade. The 2015 accident year also represents a significant improvement on the 10-year loss average (2006-2015 period) which totals 123. In total, shipping losses have declined by 45% since 2006, driven by an increasingly robust safety environment and self-regulation.

More than a quarter of all losses in 2015 (22) occurred in the South China, Indochina, Indonesia and Philippines maritime region, which has been the top loss hotspot for the past decade. Losses increased year-on-year, unlike the other major maritime regions such as East Mediterranean and Black Sea (11), Japan, Korea and North China (8) and the British Isles, North Sea, English Channel and Bay of Biscay (4), which all saw losses decline compared with 12 months previously.

A number of recent ferry losses in South East Asian waters have raised concerns about safety standards, particularly on domestic routes. Frequent sailings and profit pressures means scheduling maintenance can be challenging.

To find out more about the Safety and Shipping Review 2016 visit http://www.agcs.allianz.com/insights

Source: Safety and Shipping Review 2016, Allianz Global Corporate & Specialty
**4 Questions for...**

**Atul Kulkarni**  
Global Head of Farm & Ranch, Allianz Global Corporate & Specialty

Tough socioeconomic issues are impacting traditional farm and ranch and agribusiness operations, while shifting farming trends, new technologies like drones and novel business models like “agritainment” promise to drastically alter the face of the market, as Atul Kulkarni explains.

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**Allianz is expanding its Farm & Ranch and Agribusiness product globally. Describe the business.**

Farm & Ranch is part of the MidCorp line of business (also known as Mid-Corporate or Middle Market Commercial). The appetite is chiefly small to mid-sized farms. Allianz has written specialized coverage for farms and agribusiness in the US for over 150 years. We are expanding globally where we already have a foothold and are also pursuing new market opportunities. For instance, we are broadening our appetite to include agribusiness operations like wineries and “agritainment,” which is an emerging class of business where farmers invite the public onto their premises for pick-your-own fruit, petting zoos, hay rides, corn mazes, pumpkin patches and seasonal and fall festivals etc. While we have historically insured winery operations primarily in and around the Napa Valley and Sonoma, California, recently we have transferred that expertise to the South Africa market. We are also broadening our appetite as far as target account size from hobby farms and smaller farms to larger agribusiness operations. This small and large segment expertise makes us a formidable competitor across the US and around the world.

**What trends impact the Farm & Ranch and Agribusiness segments globally?**

Many trends are impacting the business. For example, climate issues continue to impact farms and wineries around the world. Current market conditions in California can be traced to the recent drought, for example. Farm land is dwindling. Farmers feel financial pressure from lower crop production, decreases in land prices and increases in costs of water. Wineries are also globally affected by the warming climate. Certain markets that were too cold to produce decent wine before are now booming (Midwest US, New York, Virginia, Canada). On the emerging trends front, there is tremendous interest by farmers and ranchers in drone technology to survey fields. We will tap Allianz Aviation expertise as we explore possible coverage considerations, giving us a definite competitive edge in the global Farm & Ranch space.

**How do current global economic conditions affect the Farm & Ranch business?**

Economic developments heavily impact the Farm & Ranch business, both in the US where our product is more established and certainly globally where we are looking to expand. US crop exports are under tremendous pressure because of the strengthening US dollar, and pressures by global agribusinesses are putting small, family-owned farms under economic duress. In terms of market trends, local food (“farm-to-fork”) movements continue to affect global food distribution patterns as consumers become interested in locally-sourced ingredients. With the rise in online information and in disposable incomes, organic and non-genetically modified organisms (GMO) buying trends also continue to rise in popularity. Allianz must carefully follow these global trends so that we are positioned to offer the best advice and solutions to our clients.

**What are some of the competitive advantages Allianz’s Farm & Ranch product offers?**

A robust suite of coverages coupled with expertise (underwriting, loss control and claims) make Allianz a strong insurance solution. Our competition is with local, regional and mutual insurers for smaller farms and hobby farms, but we offer higher limits on farm dwellings and a greater footprint than more regional players. On larger accounts, where we compete against more specialist Farm & Ranch insurers, we have the ability to write across borders—for instance, if a farm operation in North Dakota has exposures in Canada we can partner with the local AGCS office to write the deal. Our risk services also give us a strong advantage for small, mid-sized, large and complex accounts.
Loss prevention and mitigation advice

Insurers have a vital role to play in ensuring the impact of a loss event is minimized but they can also help to prevent incidents from occurring in the first place. Allianz Risk Consulting produces a number of guides which focus on the management, control and reduction of different risks, available now at http://www.agcs.allianz.com/insights

Natural Hazard Checklists: Windstorm/Flood
Losses from windstorms and flooding can be greatly minimized by adequate preparation before the storm or flood arrives, including the development and implementation of comprehensive written emergency plans. http://www.agcs.allianz.com/insights/expert-risk-articles/windstorm-loss-mitigation/
http://www.agcs.allianz.com/insights/white-papers-and-case-studies/natcat-checklist-flood/

Risk Bulletin: Safe product manufacturing

Tech Talks: Capacitor banks
Capacitor banks can present fire and explosion hazards. Several losses have occurred over the last few years with AGCS clients. Recommendations to prevent property damage and business interruption losses. http://www.agcs.allianz.com/risk-consulting/arc-downloads/arc-tech-talks/

Risk Bulletin: Panama Canal
The Panama Canal expansion plan will be inaugurated this year. This risk bulletin examines the potential impact on the maritime industry. http://www.agcs.allianz.com/insights/white-papers-and-case-studies/panama-canal-risk-bulletin/

A major fire broke out in a warehouse around midnight. The alarm was raised and emergency measures were immediately taken. What are the lessons learned?

Read our #RiskBulletins from Allianz Risk Consulting experts at: www.agcs.allianz.com/risk-consulting/allianz-risk-consulting-expertise
Airlander 10 – the world’s largest aircraft takes to the skies

Housed in one of the largest hangers in the world – where some of the first airships were stored a century ago – a hybrid “airship” debuts in the skies over England this spring. The behemoth, one day to transport luxury tourists and deliver remote cargo payloads, promises to shake up the industry and redefine what we know about aerial vehicles and how they can be put to commercial use.

JOEL WHITEHEAD
Look! Up in the sky. It’s an airplane. Or is it a helicopter? A “blimp”? Actually, it’s none – and all – of the above.

Although it resembles an airship on steroids, Airlander 10 is the world’s most innovative, practical and commercially useful hybrid aircraft. A cross between an airplane, airship, helicopter and hovercraft, it’s bigger than a football field and 60 feet longer than an Airbus 380 – and greener and quieter than any other air transport in existence.

Named for its cargo capacity of 10 tons (a future Airlander 50 is already on the drawing board that will carry 50 tons of cargo; a model 200 or 500 isn’t beyond reason) the new craft is an elegant workhorse alone in its field.

The designer and manufacturer of Airlander is privately-owned, UK-based Hybrid Air Vehicles (HAV). The craft employs a simple, stable, ground-breaking design void of internal or external structure, with an envelope (shell) made of triple-ply, anti-UV, anti-leak, anti-strike Teflon-type material that is exceptionally strong, durable and repairable or patchable in the field.

The aircraft’s finishing touches are taking place in the Cardington hangars in Bedfordshire, England, where the first airships were made back in 1916. The technology used today, however, is far different than what was used then.

**Airlander’s innovative technology**

According to HAV, the founders of Airship Industries met with English scientist, engineer, inventor and airship specialist, Barnes Wallis, in 1971 to identify limitations of the traditional airship design.

On a beer mat, Wallis jotted down some notes: lifting gas should not be hydrogen, but helium; fabric should be improved to avoid non-rigid shells; weight saving plastics and composites should be used where possible; four-vectorized propulsors should be incorporated to improve the maneuverability of the craft; the flight control system should provide the pilot more command over the craft. These hallmark features were later adapted for Airlander.

Up to 60% of the vehicle’s lift is provided by helium and the remainder by the forward momentum provided by an aerodynamic “wing” powered by four independently configured and vectored engines, isolated in respect of lightning strikes.

Its multi-mission capability allows Airlander to carry passengers, payloads or stores for up to five days without landing or to operate within an unmanned environment for as many as 15 to 20 days. It can land on ice, sea, sand, anywhere. In 35 knot crosswinds, it would take off vertically like a helicopter. All it requires to operate is a 100m rectangle of clear space beyond its actual “footprint”. 

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**THE 1 MINUTE DIALOGUE**

- New vehicle “floats” using latest lighter-than-air technology that combines aerodynamic lift with vectored thrust
- Eventual global commercial deployment, after initial test phase
- Applications include transportation, communication, and intelligence, surveillance and reconnaissance missions
- Insurance is key to public confidence in Airlander

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Photo: Hybrid Air Vehicles
In designing the vehicle, HAV re-examined basic aerodynamic principles and applied modern technology and materials to create new capabilities and efficiencies. The result is a new, improved mode of air transport offering major improvements in safety, operating cost and flexibility, and environmental impact, with a significantly lower carbon footprint than any other form of air transport.

The vehicle cost about $100m (£60m) to design and build, according to Chris Daniels, Communications Director, HAV. “We believe it will be the first aircraft of its size to achieve commercially viable zero carbon flight, once the technology is well established in the coming years to allow for that.”

Capabilities and uses
Currently Airlander is in the beginning of a rigorous testing phase, having only left the hangar for its initial flight this spring.

An earlier version had one successful US Department of Defense (DoD) test flight in 2012. Military cuts subsequently cancelled the program. HAV was granted an export license afterwards which permitted repatriation to the UK.

HAV sees a host of potential applications for the Airlander series, including communications, heavy lift, and intelligence, surveillance and reconnaissance (ISR) deployments.

Potential uses of the Airlander for communication purposes might be as a communications relay station serving or providing infrastructure to extremely remote areas.

Prospective heavy lift uses could include remote access to or from inaccessible locations, to transport freight over long distances, to support military ground operations or to move transoceanic freight at a much lower cost than airfreight.

Potential ISR scenarios might be to offer commercial sensing/surveying to unmanned military reconnaissance and sensing missions, to patrol the seas or national borders, to run search and rescue missions or even to provide non-military surveillance activities for commercial or community security.

“This technology is almost endless in its applicability, while also being beneficial to the surrounding area and environment at large,” says Daniels.

“Besides its myriad uses, we believe that it will deliver 1,800 jobs and significant export revenues to the UK. We have already expanded our workforce from 20 to 115 in under a year.”

1 Renaissance Strategic Advisors (RSAdvisors) independent study, 2014.

As lead insurer on the Airlander 10, AGCS has a stake in the quality of the vehicle’s innovation, design and craftsmanship.

AGCS Underwriting Manager Products/Airports Regional Unit London, Craig Armitage explains: “Allianz’s interest in covering HAV is because we recognize this technology is game-changing. It combines the best of rotor wing/fixed wing and lighter-than-air vehicles. It is a remarkable machine and independent aviation experts expect the hybrid market to be worth up to $50bn (£36bn) in the next 20 years with over 600 vehicles deployed.”

“From an underwriting perspective this was an exciting, unusual and challenging project from the start which brought out the best qualities of all the Allianz teams involved,” says Paul Wrenn, Underwriter Products/Airports Regional Unit London.

Public, private and crowdfunding investment mix keeps the Airlander afloat
Potential investors seem attracted to Airlander ever since HAV launched a record-breaking crowdfunding campaign last year. “We’re a very small company competing in a huge, Tier 1 space against aeronautical giants,” says Daniels.

“While we’ve received multiple public and private funding grants, we found early on that we needed to ensure the liquidity beforehand to employ over a hundred highly qualified engineers, to secure an expensive supply chain with premiere client vendors, and to continue to ensure proper and necessary regulatory compliance.

“We’ve found social media and crowdfunding solutions to be amazingly effective and successful ways to raise private equity to keep our business capitalized as well as attract public interest in our company. Plus, there is a knock-on effect since the more we raise, the more our corporate valuation increases. Further investment opportunities will be forthcoming.”

1 Renaissance Strategic Advisors (RSAdvisors) independent study, 2014.
Insurance is key to public confidence in Airlander

"From a risk standpoint, this vehicle is designed from the best and most sound technology," says Armitage. "It can easily fly on three or fewer engines, and if all engines failed independently it could float to the ground."

Allianz UK currently insures HAV on a commercial combined/property policy to cover the vehicle and facility at Cardington where work on Airlander is being readied for flight testing. Now, AGCS leads the test flight manufacturers risk policy for the assembly phase and, from February, the manufacturers hull/flight risk (aviation products) policy has taken effect as the vehicle’s construction phase subsides and test flights begin. "It’s a good example of how Allianz works with various internal units to create a holistic solution for the customer," says Armitage.

"Although a new risk, HAV established a technical expertise in its industry second to none and public and private confidence in its business model is persuasive. As Airlander moves beyond the commercial production phase and into the testing phase, that confidence will only grow stronger," Armitage says.

Hwfa Gwyn, HAV Financial Director, explains that usually there are separate policies for individual risks, but companies like HAV ideally look for insurers who can provide holistic solutions that join all the coverage gaps for the whole business: "That was key to our insurance decision to work with Allianz, as well as their financial stability and global footprint to grow as we do and where we do."

"Once we’ve demonstrated our capability, reliability and safety to our customers, they will be ready to do business with us and we will grow rapidly," adds Grundy. "Ours is a constantly changing business and to have a flexible insurance partner is vital to our business strategy."

Aviation insurance at AGCS

In addition to the Airlander some of the more innovative risks AGCS has insured include:

- Space: In 2014 alone AGCS insured 21 space launches through its space underwriting team based in Paris, France.
- Project Orbis – the first airborne operating theatre for eye treatment in the world
- Telecommunication, earth observation and scientific satellites
- Fire-fighting and spraying airplanes
- Unmanned aerial vehicles (UAVs)
- Stunt kites

For more information
http://www.agcs.allianz.com/sectors/aviation/
Critical infrastructure systems like those driving power generation, water treatment, electricity production and other platforms are interconnected to form the energy “grid”. Although beneficial to the public this grid is vulnerable to cyber-attack by hacktivists or terrorists. How can these perils be mitigated? Can the power grid be secured?

STUART COLLINS
During a particularly harsh winter, a group of hacktivists spreads panic by bringing down the US power grid. Millions of homes and businesses are plunged into darkness, communications are cut, banks go offline, hospitals close and air traffic is grounded.

Such a scenario sounds apocalyptic, but it is a realistic threat, according to Idan Udi Edry, Chief Executive Officer at nation-E, a provider of cyber security solutions that safely allow customers to connect their infrastructure to the internet, thereby enabling them to connect and control critical assets remotely and safely.

**Complexity of critical infrastructure**

Critical infrastructure, like power generation and distribution, is becoming more complex and reliant on networks of connected devices. Just decades ago, power grids and other critical infrastructure operated in isolation. Now they are far more interconnected, both in terms of geography and across sectors.

As the US power grid scenario highlights, the failure of one critical infrastructure could result in a devastating chain reaction, says Edry.

Unsurprisingly, the vulnerability of critical infrastructure to cyber-attacks and technical failures has become a big concern. And fears have been given credence by recent events.

In December 2015, the world witnessed the first known power outage caused by a malicious cyber-attack. Three utilities companies in Ukraine were hit by BlackEnergy malware, leaving hundreds of thousands of homes without electricity for six hours.

According to cyber security firm Trend Micro, the malware targeted the utility firms’ SCADA (supervisory control and data acquisition) systems and probably began with a phishing attack.

The blackout was followed two months later by the news that the Israel National Electricity Authority had suffered a major cyber-attack, although damage was mitigated after the Israel Electricity Corporation shut down systems to prevent the spread of a virus.

**Industry sectors vulnerable to cyber-attack**

The energy sector is one of the main targets of cyber-attacks against critical infrastructure, but it is not the only one. Transport, public sector services, telecommunications and critical manufacturing industries are also vulnerable.

In 2013, Iranian hackers breached the Bowman Avenue Dam in New York and gained control of the floodgates. Oil rigs, ships, satellites, airliners, airport and port systems are all thought to be vulnerable,
and media reports suggest that breaches have occurred.

Cyber-attacks against critical infrastructure and key manufacturing industries have increased, according to US cyber-security officials at Industrial Control Systems Cyber Emergency Response Team (ICS-CERT), the US government body that helps companies investigate attacks against ICS and corporate networks.

It reported a 20% increase in cyber-investigations in 2015, and a doubling of attacks against US critical manufacturing.

Over the years, a wide range of sectors have become more reliant on industrial control systems – such as SCADA, Programmable Logic Controllers (PLC) and Distributed Control Systems - for monitoring processes and controlling physical devices, such as pumps, valves, motors, sensors etc.

The most high profile example of a cyber-attack against critical infrastructure is the Stuxnet computer virus. The worm, which targeted PLCs, disrupted the Iranian nuclear program by damaging centrifuges used to separate nuclear material.

The incident caused concern because Stuxnet could be adapted to attack the SCADA systems used by many critical infrastructure and manufacturing industries in Europe and the US.

In one of the only public examples of a SCADA attack, a German steel mill suffered major damage after a cyber-attack forced the shutdown of a furnace, the German Federal Office for Information Security reported in 2014. The attackers used social engineering techniques to gain control of the blast furnace systems.

“Infrastructue cyber-attacks target control systems, not data

Cyber-attacks against critical infrastructure and manufacturing are more likely to target industrial control systems than steal data, according to the Organization of American States and Trend Micro.

Their research found that 54% of the 500 US critical infrastructure suppliers surveyed had reported attempts to access control systems, while 40% had experienced attempts to shut down systems. Over half said that they had noticed an increase in attacks, while three-quarters believed that those attacks were becoming more sophisticated.

“Infrastructure cyber-attacks target control systems, not data

According to Lloyd’s, the economic and insurance impact of a severe, yet plausible cyber-attack against the US powergrid could total in excess of $240bn, possibly even rising to more than a $1trn.¹

¹ Industrial Control Systems Cyber Emergency Response Team (ICS-CERT), 2015

According to Edry, hackers are becoming much more interested in operational technology, the physical connected devices that support industrial processes. “The vulnerability and lack of knowledge of operational technology is the most dangerous thing today,” he says.

As an example, he cites a cyber-attack against a New York City office block in which a hacker accessed the building management systems – which can control power, communications, security and environmental systems – via a connected vending machine. The building shutdown resulted in estimated damage of $350m from lost business, he says.

IT systems more secure than industrial control systems

However, the security of industrial control systems and connected devices has fallen behind that of IT systems. Many of the connected devices used by industry are based on serial communication technology – which Edry likens to the beeps and squeals associated with the old-style internet dial-up.

Edry believes that operational technology is a vulnerable and poorly protected element of cyber security. While IT infrastructure has given rise to an army of cyber security consultants, products and services, industrial control systems by comparison are not well served, he says.

The problem is not about to go away. In fact, cyber-attacks against physical operating technology look set to increase with the growing use of connected devices.

For example, the convergence of the digital and physical worlds is set to accelerate with the "Internet of Things" ("IoT"), which will see more and more everyday devices embedded with electronics that collect information and connect to a network.

Consumer devices are increasingly becoming connected – such as wearable technology, smart devices, domestic appliances and children’s toys. So, too, are our homes and cars.

According to Edry, growing digitalization and the "IoT" could create a perfect cyber security storm.

He notes that, where a company would once have control over its systems, physical networks and servers,
the trend has been to run devices, software and data through virtual networks, such as cloud computing. "Even the network is now off the network," he says.

Confidence in infrastructure security is key
Confidence in data and systems security is key if society is to benefit from the potential efficiencies that the "IoT" can bring. And public confidence is just as important for the SCADA systems that keep aircraft in the air as it is for the IT platforms that underpin mobile banking.

For example, in the past year a number of airlines have suffered from technical issues and cyber-attacks that erode consumer confidence. Polish national airline LOT grounded planes in June 2015 after its flight plan system was disabled by hackers in a Distributed Denial of Service (DDoS) attack. Weeks later in July, United Airlines grounded its fleet after suffering a technical fault. "The digital age is here. We can’t prevent it. It is becoming part of us. But we see news headlines of breach after breach. We are losing our confidence in the digital age," says Edry.

He believes that more needs to be done to deter cyber criminals, and to protect operational technology.

The cost of creating a successful attack is small for cyber criminals, which is why there are now so many attacks, explains Edry.

"We have seen that as the cost of launching a successful attack has gone down, the number of attacks has risen. So we need to develop technology to increase the cost of successful attacks," says Edry.

"We can’t stop 100% of attacks, but we can create technology to increase the cost so that the hacker says: ‘I don’t want to deal with this organization as it will cost me a lot of time and computer resource,’ he says.

“If we can prevent the damage, it will incentivize insurers to offer higher limits and give customers more incentive to buy.”
The “post-information” age of augmented reality, big data, “clouds” and other technologies is upon us, reimagining everything we thought we knew about manufacturing, and offering countless possibilities. However, such advances also necessitate refining existing, and developing new, risk services beyond the traditional ones offered for manufacturing risks.

First there were steam engines, harnessing water power to create products. Then, electric power created mass production. Next, late in the 20th century, computers reimagined what manufacturing was – and could be. The Information Age was upon us. Now, we are in a new industrial age – the fourth industrial revolution. A “post-information” digital age. The “Internet of Things” (“IoT”) – or Industry 4.0.

Integration and connectivity offer benefits but they also come with risks that will challenge business in the future. “There needs to be more risk awareness and understanding linked to increased levels of interconnectivity and interdependency, and more consideration to how we manage them in the future,” explains Michael Bruch, Head of Emerging Trends, AGCS.

The risks seem evident enough, as do the advantages. Is there a happy medium? Are we at the tipping point? Just what is driving the changes?

Social trends
The underlying trends driving “IoT” and Industry 4.0 can be found in four key areas: digitalization; big and small
data; energy harvesting (where energy is captured from natural sources and stored in small autonomous devices); and interactive systems/artificial intelligence (AI). Since the 1970s, when computers were first introduced, there has been a 90,000 times increase in computer power and speed – two important factors for computing applied to industrial applications, explains Bruch. The end cost of digitalization is increasing speed and affordability to end-users.

According to a 2015 McKinsey Global Institute study, The Internet of Things: Mapping the value beyond the hype for Industry 4.0 to deliver its maximum potential, the cost of basic hardware, low-power sensors, radio-frequency identification (RFID) tags and battery power and storage systems must continue to drop.

One of the major outgrowths of digitalization is data – big and small. Most companies do a good job of gathering data, but far fewer companies actually analyze and learn from the data. Data quality is more important than data quantity. It is important that small, precise data be excised from larger data pools to drive sensitive, delicate industrial tasks, says Bruch. Analysis is key.

Energy harvesting to power autonomous wireless and portable devices is an important component to industrial interconnectedness and may hold the key to efficiency gains as ambient power sources that replace batteries and minimize operational maintenance and costs are introduced.iii

Since the 1970s, automatons have been used in factories. Artificial intelligence (AI) technology has progressed, however, so that now humans and machines flawlessly interact, as machines do with other machines. Talking products, armed with voice recognition software, even communicate with the production system. Manufacturers are reducing the cost of production, as well as enhancing speed and performance, by introducing even more sensitive “smart products” and “smart factories” (see page 22).

AI is the wave of the manufacturing future and industries that employ it and similar digital technologies will be the “winners” of tomorrow’s marketplace. Clearly, however, not every sector will find the transition easy. Nor may the average factory worker.

The Industry 4.0 workplace
In early 2015, a Chinese firm in Dongguan specializing in precision technology set up the world’s first fully automated, unmanned factory in a facility that formerly employed 650 people. A small technical staff of 60 human beings (soon to be reduced to 20) monitor everything through a central control system. Defective products dropped from over 25% of production to less than 5%.v It is a given that digitalization will take its toll on certain jobs.

“Essentially, any job that one can imagine as being digitalized will likely become a victim,” says Bruch. He explains that a recent Oxford University study found that the 10 most likely jobs to be automation victims include telemarketers, insurance underwriters, claims adjusters, ...

“Winner” and “Loser” sectors in Industry 4.0:

**“Winner” sectors**
- IT and electronics
- Automotive
- Transportation & logistics
- Healthcare

**“Loser” sectors**
- Retail;
- Telecommunications & media
- Finance (including insurance)v

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1. Cisco IBSG, April 2011, device per person, AGCS Expert Days presentation

Source: KPMG
10 most likely occupations to suffer from digitalization*

1. Telemarketers
2. Title Examiners, Abstractors, and Searchers
3. Tailors, Seamstresses
4. Mathematical Technicians
5. Insurance Underwriters, Claims Adjusters
6. Watch Repairers
7. Cargo and Freight Agents
8. Accounting Clerks
10. New Accounts Clerks

(*1 is the most likely occupation to suffer)


watch repairers and accountants’ clerks [see above]. Growth in field services, asset management, robotic maintenance, remote diagnostics and analytics expertise will offset job losses due to digitalization.vi

Industry 4.0 will impact labor strategies as well. Despite fears that automation will replace workers, however, actually highly skilled labor demand will increase. A Deloitte studyvii predicts that Industry 4.0 might slow incidences of offshoring in developed economies as global competitiveness, minimized relocation initiatives and the opening of more production locations in Europe and North America become the norm.

Digitalization relies on the adaptation of new technical skills, notably in the case of operating activities and mechanical working processes in production, purchasing, and warehousing and logistics. In some cases, retraining or further training in new applications will be needed. In future, companies will pay more attention to developing the competencies of their employees.

To benefit from exponential growth, companies must organize around digital power, tap external knowledge pools, combine assets, gain better market and industry knowledge, learn customer preferences, focus on learning new skills, and innovate much faster than in the past. Companies will become learning organizations, so as to make full use of the new technologies inherent to digital transformation.

**Business opportunities**

Where is the value potential of Industry 4.0 to business? The McKinsey report reviews its potential impact on nine “settings” and predicts a total impact to the global economy of between $3.9tn and $11.1tn. Total industrial economic impact on businesses (commerce, transportation and logistics, factories, retail environments, and worksites) will be between $2.33tn and $6.68tn.

Industry 4.0 is positively impacting businesses in many fundamental ways, all of which impact top line profitability. Among many other benefits, enhancements are realized by eliminating inefficiencies and product defects; by reducing machine downtimes and anticipating maintenance schedules; by automating work; by increasing forecasting accuracy; by lowering emissions and waste, while more sustainably using resources; by reducing inventories-on-hand through just-in-time manufacturing; by significantly reducing losses from human error; by delivering highly customizable products; by greatly decreasing worker injuries; and by enhancing the customer experience.

There are a multitude of examples as a result of becoming digitalized – and the list is growing. Automation greatly enhances quality production output, as seen in the Dongguan, China, example above. And in London, the Oyster Card, which gives travelers access to trains, subway lines and buses, also serves as a “smart” alert mechanism for the Greater London Authority for train malfunctions, delays, and so on.

“Industry 4.0 creates enormous new value potential, especially for industrial companies and not least for our global economy and society,” says Bruch. “These new trends will change communication, the working environment and industrial development radically.”

**Emerging risks**

With opportunities come risks. Aside from the direct benefits to industries, Industry 4.0 benefits the entire supply chain. The chain is better monitored, more predictable and visible and improved tracking brings more efficiency, better alignment and collaboration, and reduced losses due to spoilage or expiration. These are definite positives, says Bruch. However, security flaws built into embedded software code is difficult to detect. The more connected devices, the more entryways for hackers. The current security level of smart hardware is rather low. Cyber security is a real concern. Most businesses are

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woefully ill-prepared for cyber-attacks. Federal Bureau of Investigation (FBI) Director, Robert Mueller, predicts that cybercrime will soon eclipse terrorism as the main industrial worry.

Digital products despite their convenience or efficiency also carry with them an upsurge in technical and litigious risks. Liability claims may be leveled against the developers and vendors of predictive maintenance software in cases where injury or death occurs. Many legal ramifications follow in the wake of digitalization, but risk management is also impacted.

**What does Industry 4.0 mean for risk management?**

How will traditional risk solutions offered by insurers be impacted? Risk managers will see a shift of their risk portfolio which will impact traditional insurance solutions and stimulate the need to innovate new risk mitigation solutions in areas of intangible risks (for example, brand, intellectual property, cyber).

With inventory optimization, however, and difficult supply chain risks, as well as more complex claims, insurance demand and cyber threats could impact covers like marine cargo, property damage, and business interruption (BI), conceivably causing an increase, says Bruch. With health and safety issues, covers like workers compensation and general liability could be impacted, as sensors and autonomous machines would prevent accidents and limit toxic exposures.

And with cyber risks, covers like cyber, BI and intellectual property might increase, as more prevalent risks would exist due to devices being potential entry points for data breaches and interconnectivity being able to spread the damage quickly and significantly. The accumulation potential of shutting down complete infrastructures would also significantly impact future claims scenarios.

To push digitalization forward, there is to be some connection to and cooperation with the end-client. Demands are no longer traditional – like coverage for a company’s factory – but intangible, like cyber or reputational risk. Refining existing and developing new risk services beyond the traditional is key and is best accomplished with innovation, product and business model research and development, creative exploitation of data and risk patterns, and movement away from traditional to digital interfaces. But in the end, insurers must engage with their clients to benefit jointly from the next industrial revolution.
Factories of the (not so) distant future

As the “Internet of Things” (“IoT”) evolves, tomorrow’s factories will look much different from today’s. Products will “move themselves” along the line. Augmented reality software will allow employees to learn new tasks quickly. Products will “predict” when they need a tune-up. Replacement parts will be made on-the-spot with 3D printers. Some factories are already there. But what perils do they face? How can risk management help?

JOEL WHITEHEAD
The “Internet of Things” (“IoT”) is an ever-growing network of interconnected devices, people and machines forecast to have an economic impact of up to $11.1trn by 2025. It is transforming industry and bringing many opportunities with it. The so-called Fourth Industrial Revolution, or “Industry 4.0”, is a collective term embracing a number of contemporary automation, data exchange and manufacturing technologies, especially in the industrial setting.

Companies expect the transition to significantly transform their businesses, albeit at a substantial investment (some estimates run as high as 50% of planned capital over the next five years). But with the investment can come considerable rewards, despite the price tag.

Business risks such as cyber-attacks, capital pressures and infrastructure breakdown concern those considering conversion. Technological risks were prominent in the Allianz Risk Barometer: Top Business Risks 2016 survey. “Cyber incidents” appeared in the top three risks for the first time and also ranked as the top long-term risk.

Business partners must be connected within the supply chain for the model to be effective. Open standards must be in place. Safe, secure networks must be available, as well as fast, flexible IT systems. “It hasn’t been easy for us,” admits Widmer. “But it’s not easy for most companies.”

“Cyber security risk will only increase, as each device can be an entry point for data breaches,” explains Michael Bruch, Head of Emerging Trends, AGCS. “Interconnectivity can increase the damage significantly, creating high accumulation potential, which, in turn, will fuel demand for specific cyber insurance solutions.”

With Industry 4.0, human beings play the pivotal role based on digital information that helps them speed up and improve their decision-making capabilities.

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With Industry 4.0, human beings play the pivotal role based on digital information that helps them speed up and improve their decision-making capabilities.

“The success criteria for Industry 4.0 is that we have people, not just robots, in the factories of the future.”

Job performance is improved by innovative forms of learning models. Workers are supported by newer, faster ways of learning (for example augmented reality) that integrates them into the work process, assists with skill-building, and helps maintain well-being through workplace ergonomics. Work is impacted by a connected environment in which interaction of

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1 The Internet of Things: Mapping the Value Beyond the Hype, the McKinsey Global Institute, June 2015.
2 Industry 4.0: Opportunities and challenges of the industrial internet, Pricewaterhouse Coopers (PwC), 2014.
Managing Industry 4.0 risks

Do companies increase cyber risks by implementing Industry 4.0? What about risks that emerge as a result of decreasing maintenance staff and other key operational roles? Specialists are definitely still needed in an Industry 4.0 factory.

Calculating potential risks isn’t easy. “We have only limited experience with loss scenarios and very little real loss data to work from,” explains Michael Bruch, Head of Emerging Trends at AGCS. “Data security and protection, the risk of data misuse, reputational risks for the manufacturer or even by a connected vendor in the supply chain – all of these have to be considered. These things are real, but they’re intangible, difficult to quantify, and surely poised to be an even greater threat in future.”

The risk landscape is tricky, too, for insurers. “Around 80% of cyber damages can be prevented as a result of professional internal risk management,” explains Bruch. “Predictive maintenance is another area where progress is being made. We are closely collaborating with customers to determine the best possible point in time to carry out maintenance work during operations to limit the cost and frequency of maintenance cycles and extend the lifespan of the machines.”

“Industry 4.0 is a way to learn more about process improvement – not to just implement something new and consider the process set in stone,” says Thorsten Widmer, Vice President of Manufacturing Strategies, Investment Planning and Industry 4.0, Bosch. “Change happens, even within a connected industrial model, and change is a good thing.”

Big opportunities with Industry 4.0

But is this new model an industrial revolution or just another evolution? “If you look for technological trends that have come to us through connected industry,” says Widmer, “the argument can be made that the ‘IoT’ is truly revolutionary.” Bosch has a stake in the revolution by equipping several of their 250 or so global factories with the full range of smart technologies.

One such technology is Radio frequency identification (RFID). Although not a “new”...

Humans-to-machines and machines-to-machines is the norm, not the exception.

From the perspective of Widmer, the “IoT” transformation at Bosch is ongoing. “Of course, there are challenges and opportunities in a connected world. There are bound to be bumps in the road,” he says.

Challenges of implementing Industry 4.0

As always, market volatility is a challenge. With every fluctuation in the market, more resiliency is required, along with reliable and expeditious data. “Businesses have to perform in a volatile, uncertain, complex and ambiguous environment,” says Bettina Stoob, Head of Innovation, AGCS. “Economies of scale as a business mantra will be replaced by speed-to-market in the fourth industrial era.”

Add to that the desire to extract real value and analysis from all the received and processed data and it’s easy to see the challenge. According to a study by CRO Forumiii, data analytics can boost productivity and generate savings — if it is used right.

“Reputational risks for the manufacturer have to be considered”

Bosch’s smart factories use data for a number of activities but the more difficult task is to find value-added uses for all the data. “Data alone is nothing,” says Widmer. “It must be transferred into useful information to be beneficial.”

Other challenges involve individual customer requirements, since in the “IoT” model delivery times and product life cycles are shortened. “The most revolutionary topic in all of the Industry 4.0 discussion is disruptive business models,” says Widmer. “Technology has developed at a robust pace, but as a business model it has been disruptive.”

There are risk considerations, workforce implications, and process upgrades to make, just to get in the game. “Industry 4.0 is a tool for managers to learn more about production processes and process improvement,” says Widmer. “It isn’t just that we implement something new and consider it done. Change happens — and that’s a good thing. With change comes opportunities.”

iii The Smart Factory: Risk Management Perspectives, CRO Forum, December 2015.
technology, it helps guide products along the line by communicating directly to sensors along the way.

**Augmented reality** applications are used at some Bosch facilities allowing employees to access job aids for maintenance tasks in real-time and on-the-spot to decrease downtime.

Some Bosch factories use **3D printing (rapid prototyping)** for quick part replacement, resulting in less downtime. Advanced systems handle multiple materials like plastic and metal together without needing separate processes or changing of materials.

**Networked smart tools** provide real-time process anomaly information to the industrial control system (ICS), reducing downtimes and failure costs.

A Bosch factory in the US applies advanced **predictive quality control** data-mining concepts to maximize complex data gathered by the system.

Similarly, **predictive maintenance** concepts are applied as sensors along the line proactively search for places in need of maintenance and alert the production system.

**Driverless vehicles** move manufacturing parts from storeroom to production line, nudge the pieces along, and collect, process and communicate data enroute – thanks to sensors guided by RFID guides.

**Automated production assistants (APAS), or robots** handle dangerous, strenuous or monotonous tasks on many Bosch lines, or work hand-in-hand with employees on the line.

**Supply chain maximization** is achieved by the digital recording of the flow of goods along the line. The supply chain is virtually mapped and logistics are enhanced by data capture, maximizing efficiencies and minimizing costs and inventories.

"All of these technologies and many more have been good for industry," says Widmer. "However, the network must be secure for people, processes, and information. Data security is paramount." Effective risk management is of primary importance.
Managing supply chain resiliency in an age of complexity

Since pioneers like Henry Ford, manufacturers have helped blaze the industrial innovation trail. But as production becomes leaner, supply chains are longer, more complex, and highly interdependent on things seemingly outside the risk manager’s control. How can businesses build more resilient and reliable supply chains in order to mitigate risk?

STUART COLLINS AND GEOFF POULTON
In 1913 Henry Ford brought motoring to the masses with the production of the Model T in a new purpose-built factory in Detroit, Michigan. Ford’s genius was to simplify and speed up production and in doing so he helped change manufacturing and supply chain management forever.

Model T production started with a bare chassis, which moved along the line through a series of workstations until a complete car was driven off under its own power at the end of the line. Feeder lines along the route were synchronized to supply the right parts at the right time.

Ford’s moving assembly line enabled the company to cut production times by a multiple of four – at its peak, one Model T rolled off the Detroit production line every 10 seconds of every working day. The company eventually produced over 15 million Model Ts over an almost 20 year period, making it one of the bestselling models of all time.1

Complexity drives risk

Much like other consumer goods, cars are today manufactured in far greater numbers. The industry has also gone global. Volkswagen produces automobiles from 119 production plants in over 30 countries.2

In line with other consumer products, automobiles today are much more complex. While the 1913 Model T had several thousand parts, over 30,000 components go into the average Toyota.3

Manufacturing has changed in other ways. As manufacturers have sought efficiencies, many have moved from being part-makers to assemblers. Ford now purchases some $100bn of parts each year, 80% from its 100 largest suppliers.4

However, the increased complexity of supply chains, as well as their global reach and concentration on a small group of specialist suppliers, has created new business interruption risks for manufacturers.

The risk of supply chain disruption in the automotive industry, for example, was brought into sharp focus following the Japan earthquake and Thailand flooding in 2011. The industry suffered a shortage of certain paint pigments and microprocessors produced in the two affected regions. From sourcing raw materials to delivering the finished product to consumers, every part of the supply chain is vulnerable to disruption, explains Volker Muench, AGCS Global Property Practice Group Leader. And it’s not just earthquakes, floods and fires that can cause disruption, but political violence, civil unrest, strikes, port closures, infectious disease outbreaks and cyber-attacks as well, he says.

“As companies have gone down the route of reducing cost, complexity has increased.”

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“As companies have gone down the route of reducing cost, complexity has increased.”
Early warnings
Given the potential efficiency savings, manufacturing and supply chains will continue to become more and more complex, but this can be handled by appropriate supply chain management, believes Muench. Business continuity plans tend to be developed with an historical event or predicted scenario in mind, such as a storm or a strike. “But it is the overarching supply chain management that makes for a robust supply chain network,” he says.

The “picture book” supply chain management organization does not exist in reality. Each company’s supply chain management will reflect its own set of circumstance and operating environment. However, there are a number of factors companies can look for when assessing the resilience of supply chains and suppliers. For example, many large manufacturers monitor suppliers to watch for early warning signals, such as changes in their management, fluctuations in production quality, trends at competitors and commodity prices.

“Credit ratings are useful, but organizations need to look for early warning signals and tackle emerging issues before they get into crisis mode,” advises Muench. A company’s supply chain leadership, its resources and reporting structure are other useful indicators of resilience. “The higher up supply chain management sits in the organization the better the chances are of detecting a problem early.”

Another early indicator is knowing the supplier’s suppliers, especially beyond the first supply tier. “We can use big data to identify knots of suppliers right down to the third, fourth or fifth tier,” according to Muench.

Test every link in the chain
Managing the supply chain is challenging enough in mature markets. But global business realities and cost reduction pressures inevitably take supply chains to countries with less developed infrastructures, where risk management and asset protection are less mature.

“It’s important to analyze all points of the supply chain,” says Allianz Senior Risk Consultant Marine, Björn von Diepenbrock.

“That means looking at the transport infrastructure, condition and characteristics of transport routes, duration and climatic influences. How is the communication infrastructure? Are there sufficient safety standards in place? How secure is the social and political situation and how might disturbances affect the supply chain?” Transportation, packaging and load securing is a major issue, partly as there are no common international standards for quality.

“Whether on the road or at sea, it’s a problem that can lead to significant damage to parts and products, which can also disrupt other parts of the supply chain,” adds Diepenbrock.

In order to address these risks, companies must work with their forwarding companies as closely as possible. Insurance providers can also help.

Insurance role
Insurance can’t take away the risk of supply chain disruption, but it can help make businesses more robust, according to Muench. Supply chain insurance and business interruption insurance cover property damage and resulting business interruption, including ongoing costs and lost profits. Other insurance coverages, including trade credit, product recall, cyber insurance, cargo insurance and political risk coverage also provide some protection.

Digital production
The move towards digitalized factories will see physical production and supply chains become more automated. For example, sports car manufacturer Maserati uses digital technology to increase product customization, yet shortening the production. The latest Ghibli model comes in 27 versions, 13 colors and 205 configuration options.

“If we go back in history to when Ford was first making cars, everything would have been done internally and with a focus on delivering technology, not choice,” explains Volker Muench, AGCS Global Property Practice Group Leader. “Now the automotive industry is all about speedy delivery, cost and functionality.”

Maserati uses a “digital twin” - a virtual version of the physical prototype - when designing new models, helping to reduce new model time to market from 30 months to 16.

Therefore, Maserati designs production facilities in parallel with design, using an automated production system that includes communication with suppliers. Before production, suppliers receive exact information about which parts are required for the assembly of each customized car.

Maserati and Siemens drive digitalization in the automotive industry.

Digital technology can increase product customization yet shorten production.

Photo: Shutterstock
But insurance is more than just a policy. It is also a bundle of services like risk analysis, benchmarking and mitigation advice that can help analyze supply chain quality and resilience, says Muench.

For example, insurers have natural perils expertise and sophisticated catastrophe modelling capabilities to assess exposures to floods, storms and earthquakes. Such knowledge can help clients assess natural perils risks in their supply chains and at their suppliers’ premises.

Insurers have also developed natural catastrophe early warning systems which can be used by clients to anticipate disruptions, such as modeling the potential impact of an approaching storm on suppliers and the supply chain.

Similarly, insurers can use their business continuity planning and supply management system knowledge and expertise to review plans and test them to breaking point.

Insurers are developing tools that should help organizations better manage their supply chain disruption risks in the future. For example, Allianz has been using “big data” to map suppliers to various industries and organizations, and hopes to make a service available to clients next year.

“We can provide company specific scoring for suppliers location and benchmark this for a given industry,” says Muench. “This is already the case in property risk, where insurers assess building standards, sprinklers etc, but it is equally important to know the quality of suppliers.”

Over time, such developments should help insurers offer greater limits. “The more information we have, the broader we can go. The more we can bring supply chains down to locations, the better we can model and monitor exposures. And only then are you in a position to offer higher limits,” says Muench. And in those areas where the infrastructure is questionable, insurers can offer risk engineering expertise.

"Where we can, we send surveyors to check the condition of trucks, ships, loading and unloading points," explains Diepenbrock. “We have tracking devices to monitor transportation, gathering data such as location, accelerations, vibrations and temperature. Based on this, clients can carry out analysis and testing to make changes, whether in packaging, unloading equipment or even the transport route."

The growing automation and digitalization of supply chains raises cyber risks. “If an algorithm is wrong or the IT system goes down, the supply chain could be severely disrupted,” says Muench. Cyber is often thought of in terms of hacking and theft of personal data. Production facilities work on industrial control systems where the main focus is in production stability and less on data security. As such they often use old software versions that have not been patched.

"Supply chains are prone to technical failings, internally or with suppliers, as well as through internet access,” Muench concludes.
Earlier this year, a new combined-cycle gas turbine (CCGT) power plant, nicknamed “Fortuna”, located in the Lausward district of Düsseldorf, Germany, went live and was handed over to Stadtwerke Düsseldorf AG, the municipal utility company.

As a result of going live, the facility set three energy output world records: a maximum electrical net output of 603.8 megawatts (MW); a net power-generating efficiency rating of approximately 61.5%, which beat the old record of 60.75%, also held by Siemens, at a power plant in Irsching, Germany; and the capability to deliver up to 300MW for the district heating system of the city of Düsseldorf, an international peak value for a power plant equipped with only one gas and steam turbine.

The highly efficient plant sits on the Rhine River in the busy harbor district of Düsseldorf.

The high efficiency level boosts fuel utilization up to 85%, while reducing CO₂ emissions to a mere 230 grams per kilowatt-hour, which are the result of innovative developments in the design of components, materials used, and the overall construction of the facility. The gas turbine can run at full load in less than 25 minutes after a hot start, enabling it to also be used as a backup for renewables-based power production.

Because of the plant’s close proximity to the downtown area, special importance was attached to minimum emissions and lowest achievable noise levels. Of particular importance to risk managers, the project was successful with regard to occupational safety. More than two million man-hours of work were put into the plant’s construction without a single accident. AGCS was lead insurer on this monumental project.

The Facts & Figures section highlights the efficiency and impacts of the “Fortuna” CCGT plant:

**Combined-cycle** – A gas turbine generator generates electricity while waste heat from the gas turbine is used for steam to generate additional electricity via a steam turbine.

**61.5% efficiency** – A natural-gas-fired combined-cycle power plant such as this one, with an electrical efficiency of 61.5%, theoretically saves approximately 2.5 million tons of carbon dioxide (CO₂) annually. This corresponds to the amount of CO₂ emitted by 1.25 million passenger cars, each driving 15,000 kilometers a year.

**CO₂** – Reduction of 2.5 million tons per year

**600,000** – Number of Düsseldorf residents who will be supplied heat and electricity from the plant

**25 dB** – Noise exposure in the urban area: normal conversation is about 60 dB (the plant is in the bustling Rhine River harbor area of Düsseldorf, in the heart of the city)

**25 minutes** – Amount of time after a hot start until the plant is operating at full capacity

**78** – Number of contracts to date of similar facilities to be built by Siemens.
How cyber risk impacts business

Businesses increasingly face new exposures from cyber risk including first- and third-party damage, business interruption and regulatory consequences. This infographic illustrates some of the many “gateways” through which a business – in this case a factory – can be impacted by cyber risk due to increasing interconnectivity. Attacks by professional hackers or so-called hacktivists dominate the headlines but a study by the German Federal Association for Information Technology, Telecommunications and New Media (Bitkom) also reveals that – in many cases (around 52%) – current or former staff members are responsible for cyber incidents.

Data protection and liability risks dominate the cyber landscape today. However, impact of business interruption from a cyber incident and further development of interconnected technology will be of increasing concern to businesses over the next decade.


Incidents up in Arctic Waters

There were 71 reported shipping incidents in Arctic Circle Waters during 2015 – up 29% year-on-year and the highest in a decade. In 2006 there were just 8 incidents. Machinery damage/failure (46) was the cause of 65% of these incidents, driven in part by the harsh operating environment.

The incoming Polar Code will help ensure more responsible shipping in such high-risk waters but safety questions remain about best practices and clean-up. Fishing vessels (27) accounted for 28% of incidents, doubling the total from a year earlier.


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