StrategicRISK

RISKS IN MANUFACTURING

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INTRODUCTION

Slings and arrows

The manufacturing sector needs solutions to multiple stresses

The number of genuinely international manufacturers that depend on increasingly extended product lifelines has grown rapidly. But so too is the stress they face. According to US-based risk management consultancy Globex International, there are at least 65,000 multinationals worldwide and the explosion in their number over the past 20 years shows no sign of slowing.

With this comes an unprecedented level of production. Such is the case for the aerospace industry, which is experiencing a ramp-up in production that will see it build the equivalent of 200 additional single-aisle aircrafts every year. The scale of production will undoubtedly place greater pressure on supply chains, leaving hundreds of companies vulnerable to supply chain delays and disruption (page 4).

The creation of almost any product comes to depend on suppliers in different jurisdictions, so it exposes the original manufacturer to a plethora of risks – regulatory intervention, contamination and interference, fraud and bribery, cyber attacks and logistical difficulties. These might include delays, the financial collapse of an important supplier, outright loss (like an entire shipment of Apple iPads in the US), currency difficulties or the kind of natural catastrophes that have wrought havoc in recent years to the US, Iceland, Indonesia, Thailand and Japan.

These modern-day risks to supply chains bring into question the benefits of just-in-time production – a model adopted by thousands of manufacturers as a solution to overproduction and excess inventory (page 6).

One obvious question is whether the supply chain – a patchwork of systems, in the case of most multinationals – is fit for purpose in this often hostile new world. As McKinsey noted in the wake of the Fukushima disaster: "Many global supply chains are not equipped to cope with the world we are entering. Most were engineered, some brilliantly, to manage stable, high-volume production by capitalising on labour-arbitrage opportunities available in China and other low-cost countries."

But, as the consultancy went on to explain, those opportunities are disappearing fast and are being replaced by a set of dynamics that the new multinationals – most of them medium-sized firms without unlimited resources – must learn to manage. Fortunately, solutions are at hand in the form of digitised networks and other elegant responses from the world's biggest manufacturers, such as Airbus (page 14).

If supply chains were manufacturers' only worry, however, there would be few complaints. Today's dynamic crop of manufacturers are also engaged in a once-in-a-generation battle to harness the potential of the digital age in the form of product lifecycle management (PLM), the advance adopted by Sir Ben Ainslie's America's Cup challenge (page 12).

Based on simulation software, this big breakthrough enables manufacturers to fully test a product or material before it is converted into concrete form. Not only does PLM create massive savings, but it is possibly the biggest contribution to product quality in 30 years.

Brave new world

All this is part of the brave new world of Industry 4.0, to give it one of its several names. The fourth phase of the industrial revolution that began in Britain about 250 years ago, Industry 4.0 stands on the shoulders of digitisation to enable truly remarkable innovations. High-powered clothing tags, for example, can act like transponders, instructing machines how they should be made. Some, such as Siemens, say Industry 4.0 is a few years away, but others believe it is already here.

Another highly intrusive phenomenon, and one that few companies know how to manage, is social media. Although it can be creatively harnessed into the digitised supply chain – albeit with risks – social media is such a powerful tool in the hands of consumers that it can seriously damage a brand in hours.

This was the case for the food and drinks industry after traces of horsemeat were found in processed foods (page 8). Thus, the best risk managers always have at hand a mitigation strategy to tackle an eruption of bad publicity.

The lesson for risk managers, argue consultants, is constant vigilance. Among these immense opportunities – in aerospace, with Industry 4.0 and in digital supply chains that deal with delays and audit suppliers to avoid potential contamination – lies danger. **SR**

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TOP RISKS IN... AEROSPACE

Manufacturing's biggest jigsaw

A forecast boom in the aerospace industry poses unprecedented supply chain problems

Reduced to its individual parts, a commercial airliner is the world's most complex and biggest jigsaw. It is a compendium of about four million items of varying sizes that, by a remarkable feat of manufacturing and logistics, arrive on the assembly line in time to play their part in the construction of the end product.

And since there are no vertical manufacturers in an industry that relies on myriad technologies and sciences, about 75% of these parts are produced by external suppliers. The aircraft manufacturer's supply chain has long been acknowledged as the most challenging of any industry – and it's about to get even more daunting with an unprecedented ramp-up of production.

Boeing's most recent market outlook anticipates an extra 36,770 aircraft taking to the skies in the next 20 years, equivalent to a doubling of the current global fleet. Late last year Boeing estimated that China alone would buy more than 6,000 of its mainly single-aisle commercial aircraft between now and 2035.

According to an analysis by global consultancy PwC, the pressure is on the aerospace sector to deliver the equivalent of 200 additional single-isle aircraft every year. And because much of that growth will inevitably be borne by a long tail of suppliers, it will place severe strain on their capacity and velocity.

Picture of volatility

Yet, as sources told *StrategicRISK*, the mooted increase in production tells only half the story. First, the increasing variation that airlines now demand within the same basic model of aircraft adds further complexity and risk for suppliers. Second, airlines often wait until the last possible date to decide on their configurations – another level of pressure that rolls right down the supply line. And third, so-called sturdy military orders that usually require little or no variation are decreasing relative to volatile commercial demand.

Even more sobering, nearly all companies in the supply chain are up to full capacity even before the ramp-up and have little room in which to manoeuvre. "They already have several years of production in their books," says one source.

It's not just the industry giants such as Boeing and Airbus – the original equipment manufacturer – that are faced with the task of developing supply chains sufficiently robust to handle future growth; it is the support sector as well.

According to International Data Corporation Manufacturing Insights, in order to keep pace with the servicing of new aircraft, the maintenance, repair and overhaul (MRO) sector will have to develop and nurture partnerships with new suppliers and logistics providers in double-quick time – particularly in emerging markets, where demand for their services is rising but where they do not yet have much experience.

The consultancy warns that greater globalisation introduces challenging factors for MROs to manage in the form of "inexperienced workforces, immature logistics networks and regulatory oversight challenges". They will need help from regional partners such as logistics providers to help them with local risks and compliance demands as well as workflow dynamics.

Consolidation

At this stage, there seem to be more problems than answers. But some industry veterans say a certain amount of consolidation will be inevitable as suppliers merge, possibly for financial reasons.

There are fears that a significant number of suppliers to major aircraft makers – commercial and military – have underinvested in new capacity and technology. As PwC adds, supply chain risk is a much bigger issue than product quality.

"When PwC looked at 12 key commercial and defence aerospace growth programmes, it found that one-fifth of suppliers are not financially ready to support the high ramp-up [that lies] ahead of them," the consultant reported. "At a time when banking and market uncertainties remain high, the

importance of checks on financial as well as operational and capacity vulnerabilities can't be underestimated."

Drastic solutions may be necessary to preserve the integrity of the supply chain. For instance, in late 2011 EADS (now named Airbus Group) was forced to take a majority stake in Germany's PFW Aerospace, which was in the throes of a liquidity crisis.

Insiders say similar strategic M&A deals are likely to happen again. "In order to meet growth pressures, some players will choose to purchase smaller companies and integrate them into their own business," says one source. "These companies can then be controlled more efficiently as part of a bigger operation."

In the same vein, accountancy giant BDO's head of manufacturing Tom Lawton warned recently: "Aggressive ramp-up rates are putting [aerospace] suppliers under enormous pressure and companies in the supply chain will need scale and resources to absorb this pressure over the longer term."

If companies want to stay in the game, he says, they must be prepared to invest in expansion overseas and to shorten supply chains.

Raising the game

Acutely aware of the challenges, the aerospace industry is developing systems and structures that it believes will transcend the problems inherent in long and complex supply chains.

For example, Ralf Dietrich, head of quality assurance at Premium Aerotec – a Europe-wide supplier of advanced structures for the entire Airbus range, as well as the Boeing Dreamliner and Euro Fighter – oversees a system called SQKTP. In English, this stands for security, quality, costs, delivery and personnel.

Targeting continuous improvement, the system calls for reports on a daily basis. As Dietrich explained at a recent conference, on time delivery (OTD) is taken for granted in the system and is automatically included under the heading of quality.

He also deploys a process map to measure how efficiently the quality of the product is managed. Specific tools are used to stay on top of Premium Aerotec's extended supply chain, such as real-time reporting against key performance indexes.

In the unrelenting pursuit of the integrity of the product, Premium Aerotec also uses 8D management, a tool originally developed by Ford Motor Company and now updated to Global 8D. The tool was created to identify, correct and then eliminate recurring problems in the development and production of products.

A team-based system, it is based on eight disciplines: planning, teamwork, description of problem, development of a short-term fix, determination of verification of root causes and then permanent fixes, prevention of any recurrence, and finally rewards for a successful effort.

Now standard in many assembly industries and particularly in the high-tech manufacturing companies, 8D's great virtue is that it provides a structured problem-solving process.

AirSupply

As pressure mounts, more solutions are appearing and most of them are based on standardised, common processes that link them all in a unified and collaborative way. At last count, Airbus had integrated more than 600 suppliers into AirSupply, a web-based software as a solution (Saas) tool developed by Munich-based SupplyOn.

AirSupply has turned into the default solution for much of the European aerospace industry, with most suppliers shutting down their previous systems in its favour. Airbus, Eurocopter, Premium Aerotec, Aerolia, Liebherr Aerospace and Thales Avionics are among those that use the software.

Highly collaborative, AirSupply allows interactive fine tuning of delivery quantities and dates among other essential processes. As SupplyOn's sales director Werner Jannings told *SR*: "[The system] also helps to identify risks and bottlenecks in the supply chain at an early stage (before delivery date) – and in a more structured way – for instance, by systematically checking all demands rather than by relying on gut feeling, as has often been the case in the past."

What is certain is that gut feeling won't cut it in this unprecedented ramp-up in activity. **SR**

THOUGHT LEADERSHIP

ALLAN MACPHERSON
Operations chief engineer,
London operations,
FM Global

TACKLING FIRE HOLDS THE KEY TO BUSINESS RESILIENCE

Fire is one of the most frequent and severe hazards that an organisation can face. It is also one of the biggest obstacles to business resilience, especially in the manufacturing industry. According to the Association of British Insurers, fire damage claims in the first half of 2009 cost £639m (€896m) – equating to €5m every day. This follows on from the €1.8bn fire losses in 2008.

One reason why the recorded losses of commercial property in the UK are so high compared with mainland Europe and the US, is that current regulations do not mandate sprinkler systems for any but the largest or tallest buildings.

The sprinkler industry also faces some strong misconceptions around cost and safety. When looking at the cost of implementing sprinklers, it's important to view the risk of fire outbreak over the lifetime of a property, rather than on a year-by year basis.

There may only be a 1% chance of fire at a site each year, for example, but if the site has a lifetime of 50 years, the risk is increased to 39%.

Using sprinklers, a more effective fire protection approach has been developed for warehouses that could reduce businesses' loss prevention costs by millions. The solution – an in-rack sprinkler design – uses current fire protection technology and enables facility owners to use fewer sprinklers and lower-capacity water systems.

It follows nearly three years of comprehensive research, consisting of advanced open-source computer fire modelling, water flow tests and large-scale fire tests at FM Global's research campus in Rhode Island, US.

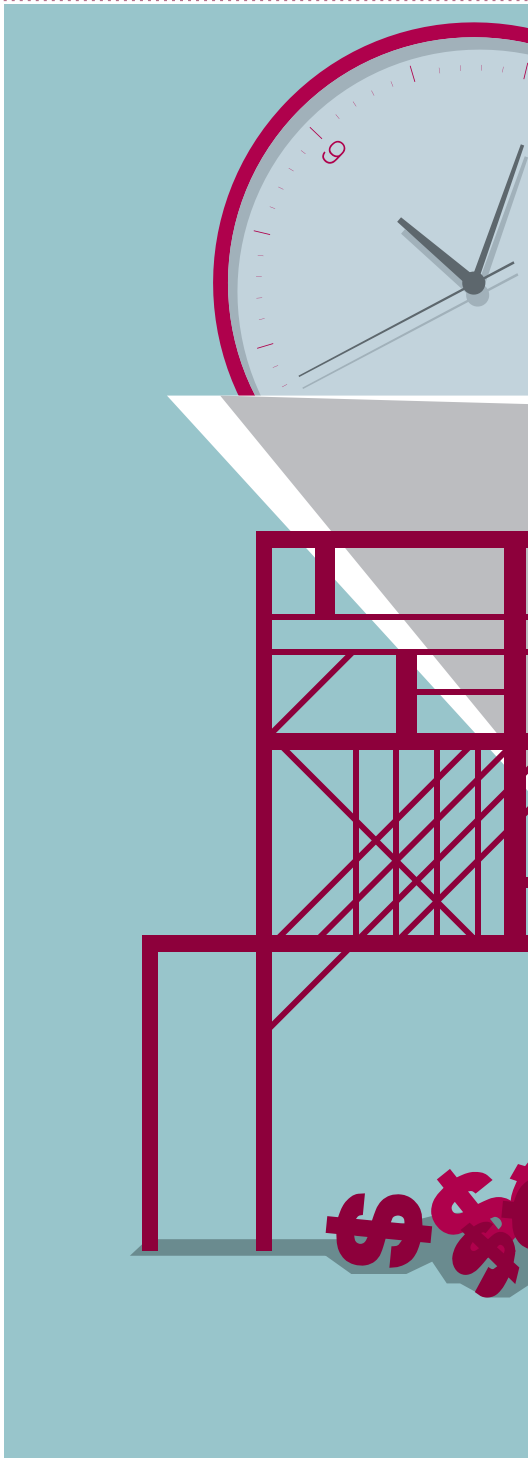
For example, in a 46,450msq warehouse with a 24m ceiling height, the cost of installing sprinklers, pumps and water tanks could fall from about €3.8m to as little as €2.4m.

Having been in existence for 100 years, sprinklers remain the most effective technology to mitigate the risk of fire.

The argument to have in-rack sprinklers installed in industrial buildings – particularly in facilities that are critical to the supply chain, such as manufacturing premises – has become stronger than ever.

While their installation may bring about an additional cost, it is important to remember that installing an extended coverage sprinkler system will deliver significant benefits every year for the lifetime of the facility.

TOP RISKS IN... JUST-IN-TIME PRODUCTION



Expect the unexpected

Just-in-time inventories are a key feature of fast-moving global companies looking for lower costs. But in a world of black swan events, such supply chain solutions can leave businesses dangerously exposed when the unpredictable happens

Since the waste-eliminating manufacturing technique known as just-in-time – or JIT – emerged from Japan's mighty automotive industry in the 1970s, it was quickly adopted around the world and has proved remarkably successful. But a series of geophysical, political and financial events – notably the financial crisis, Iceland's volcanic eruptions, Indonesia's floods of 2011 (and those earlier this year), the Fukushima tidal wave and the recent invasion of Ukraine – ended up making a nonsense of JIT arrangements around the world.

As a result, companies in most sectors of industry were left so seriously short of inventory that normal production was paralysed. In short, inventories had been cut too close to the bone and ever since risk managers have been forced to rethink their assumptions.

Many now turn to a quote in professor Nassim Taleb's landmark book *The Black Swan: The Impact of the Highly Improbable*: "Our world is dominated by the extreme, the unknown and the very improbable ... while we spend our time engaged in small talk, focusing on the known and the repeated."

In short, risk managers should actually expect deviations from the norm.

It is even possible that supply chains may be tested beyond their limits. If a manufacturer lands an unexpectedly large and urgent order, for example, it may not have enough materials or stock at its disposal to meet it.

That's why for these and a variety of other reasons risk managers of companies with global operations – and their number is exploding – now nominate disruption of the supply chain as one of their top threats.

An important reason for these fears is dependence on JIT inventory management systems. As far back as 2012, respected London-based think-tank Chatham House warned presciently: "The vulnerabilities of globalised supply chains, and particularly the just-in-time business model, are likely to be exposed by any disruption lasting more than a few days."

Chatham House researchers estimated that the average global JIT supply chain – which probably stretches for thousands of miles – had a maximum tolerance of around one week if a black swan-type incident took place.

Re-evaluation

Those forecasts could now be coming home to roost, especially given the increasingly scarce minerals and metals on which countless manufacturers rely.

Global consultancy PwC pointed out in a recent study – *Minerals and metals scarcity in manufacturing: The ticking time bomb* – the effects of such shortages on several industries as sustainability issues take effect. The report says: "There's a fine line between 'just in time' and 'just not there."

PwC's just global sustainability leader Malcolm Preston, an authority on climate change, regularly warns of such unforeseen disruptions – not just in terms of availability but also in price.

"For a large majority of the companies we interviewed, efficiency and collaboration throughout the supply chain are seen as essential to responding to [raw materials] risk," he says.

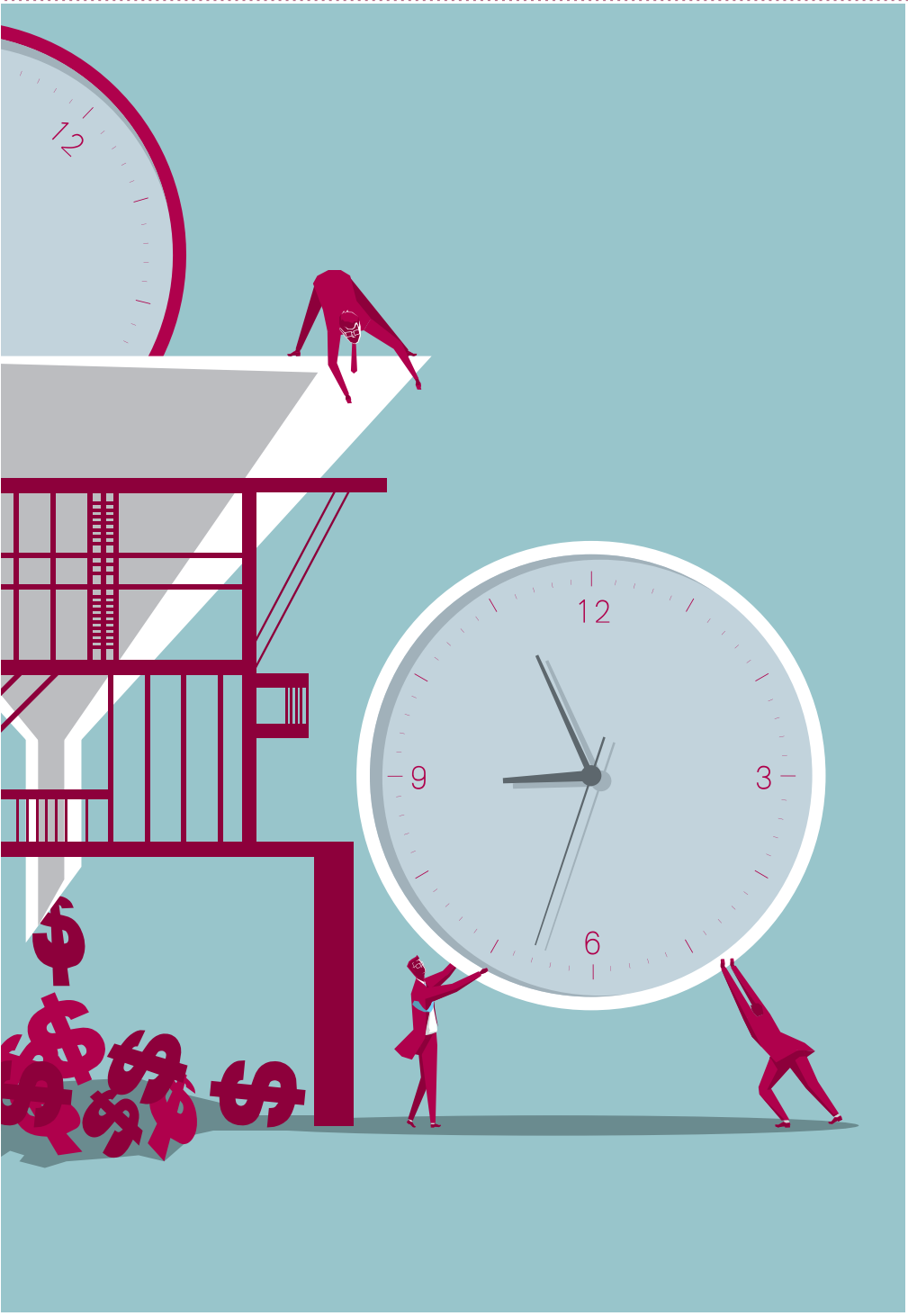
"While the effects of scarcity can cause stress at any link of the supply chain, it is especially evident as you move down the supply chain."

Many exposed manufacturers now recognise this. US-based chemical giant Dow points out in its latest annual report: "Major hurricanes have caused significant disruption in Dow's operations on the US Gulf Coast, logistics across the region and the supply of certain raw materials, which had an adverse impact on volume and costs for some of Dow's products.

"Due to the company's substantial presence on the US Gulf Coast, similar severe weather conditions or other natural phenomena in the future could negatively affect Dow's results of operations."

JIT explained

JIT is defined as a production model in which items are created to meet demand instead of being produced in surplus or in advance of need. The purpose of JIT production is to avoid the waste, overproduction, waiting times and excess inventory, thus making significant



'While the effects of scarcity can cause stress at any link of the supply chain, it is especially evident as you move down the supply chain'
PwC

savings. The revisionists now argue that JIT thrived in a different and much less interconnected world of manufacturing. The Japanese car industry's suppliers were located near the main plants; they talked the same language, usually knew each other personally, shared the same geography, lived by the same commercial laws and regulations. They were not subject to the same levels of disruption as today's global manufacturers.

In today's less predictable world, even Toyota has learned lessons. The automotive giant has been gradually implementing a strategy that, if necessary, allows all of its models to be produced in more than one plant around the world.

It is possible to triumph over highly disruptive and unpredictable events, as logistics giant DHL demonstrated during Europe's 2011 ash cloud. With an emergency plan already in place, it was able to maintain almost normal schedules while millions of deliveries by other firms were either delayed or cancelled.

From its German base, DHL rerouted cargo planes to the least affected airports and, if that wasn't possible, shifted deliveries to a small army of trucks and vans.

Learning from experience

Other companies can learn from disruptive events to protect them in the future. Dow Chemical Company has been rolling out since 2010 a project called Scram across 20 global business units – with big benefits.

Short for 'supply chain resilience assessment and management', Scram is based on six major sources of disruption that could seriously affect production. It applies disruption scenarios that mimic anything from a shutdown of a production site to an outage of raw material, both of which could bring normal output to a standstill. A simulation model then measures the full impact of such events.

The result of this in one unit – a glycol ethyl plant – was that 95% of normal output could be maintained under existing capabilities. Surprisingly and gratifyingly, the simulations revealed that Dow had actually been overcautious and could reduce the fixed assets and working capital it was employing without increasing risk any further. Result? Annual savings of $1.1m (€1m) in the plant.

Many other manufacturers are shrinking their geographic reach. In the US, UK and Europe, companies that once moved production to emerging countries such as India and China, mainly because of lower labour costs, have decided that extended supply chains make them too vulnerable to disruptions. Many of them are relocating plants back home.

Unless a manufacturer is prepared to conduct similar exercises to Dow, however, which proved its ability to withstand a black swan, many consultants believe it might just be simpler and safer to run an overstocked inventory – just in case. **SR**

TOP RISKS IN... FOOD AND DRINK

Hidden dangers of sweet success

Food and drink companies cannot afford to be complacent as their practices come under ever closer scrutiny and consumers ask more and more questions

With combined revenues exceeding €1trn and a rate of growth that comfortably beats most other manufacturing sectors, Europe's food and drink businesses appear to have little to worry about. But all is not what it seems. Shaken by the horsemeat scandal of 2013 and other lower profile irregularities, regulators are getting tougher. And as the penalties for breaches of regulation are becoming more punitive, communications-savvy consumers are also much faster to complain.

As an example of the closer attention the industry is getting from regulators and consumers, in June and July alone the UK Food Standards Agency issued 12 recalls of products, including wine, soft drinks, soup, spices, palm oil, smoked fish and tofu.

The reasons cited ranged from the presence of small pieces of plastic and broken glass, salmonella and other toxins, to the discovery of illegal dyes. All these breaches suggest failures at the manufacturing level.

Overall, with increasingly valuable brands to protect, food and drink companies are significantly more vulnerable than they were a few years ago. It's no surprise then that, alongside the ever-present concerns about the volatile price of raw ingredients, the threat to brand and reputation has for the first time become the major worry for the industry, according to Aon's latest survey of global risk management.

Related to this, the risk of deepening regulatory oversight has jumped from eighth in the survey two years ago to third this time.

Worries about brand damage are growing despite evidence to the contrary. As Aon executive director Norman Andrew says: "Only 8% of respondents can confirm that they have actually suffered some kind of material loss because of damage to their brand or reputation."

Feeling the heat

Some companies are taking no chances. Drinks giant Carlsberg, for instance, has about 447 brands to protect. It has a risk management strategy that relies principally on a heat map that reflects the degree of short- and long-term risks, as well as the effectiveness of preventative action.

A dynamic tool, the heat map runs a two-dimensional rating system that estimates the impact of the specified risk on net revenue, brand image and the likelihood of the threat materialising.

Responsibility for reviewing the group's overall exposure lies with the executive committee, which updates the heat map to reflect movements in perceived risks. It also uses the map to identify emerging risks over a three-year horizon.

The executive committee then takes appropriate action on the basis of what the map is telling them.

In a ground-up approach, the executive committee also taps the intelligence provided by far-flung local factories and then feeds their reports into the map. "Local-level risk assessment follows the same principles as group-level risk assessment and is based upon the heat map," the company explains.

To make sure that action is taken at the production sites instead of simply at headquarters, the executive committee hands responsibility right down through the organisation by appointing local risk owners. They are charged with mitigating any current or emerging threats through a practical series of actions whose results are monitored and evaluated.

This year, Carlsberg has identified the hottest risks – those pushing into the upper right quartile of the heat map -- as the impact of duties and regulation, and the deteriorating state of the Russian economy.

In the longer term, Carlsberg's latest annual risk management workshop has identified the image of beer in Europe – an issue of direct concern to brand reputation – as a strategically important risk.

Supply chain

As the UK food and drink industry senses the dangers presented by dramatic developments such as e-commerce, it is moving logistics professionals up the executive ranks.

According to Simon Eagle, a senior consultant at supply chain consultancy Scala, the most successful companies in the fast-moving consumer goods sector (FMCG) – which is dominated by food and drink – are giving their supply chain managers a much bigger say in the business, including board appointments.

"Influence at [the logistics level] is needed more than ever as companies have the opportunity to make – or not make – critical decisions on how they operate their supply chains," he says.

In this environment, there is clearly no time for complacency. Yet even some of Britain's large food manufacturers seem to think the UK horsemeat scandal, which

'Food and drinks manufacturers should implement a single coordinated system to manage information about all suppliers across the world and map their supply chains before there's another horsemeat scandal'
Adrian Chamberlain, Achilles

originated in Romania, bears no relation to them. According to a survey commissioned by supply chain risk management specialist Achilles in the wake of the scandal, 82% of manufacturers said the scandal had not changed the way they manage information about their suppliers. This is despite the fact that more than half of them reported that they know less about their second-tier suppliers than their first-tier ones. Astonishingly, 40% said they didn't know exactly who all their suppliers were.

According to Achilles chief executive Adrian Chamberlain, the industry should abandon its historic reliance on paper record-keeping because it offers little benefit for an increasingly complex and globalised supply chain. At the time of the scandal, he commented: "Food and drinks manufacturers should implement a single co-ordinated system to manage information about all suppliers across the world and map their supply chains before there's another horsemeat scandal."

Brand credibility

Some sectors of the industry, particularly processed foods such as meat or fish, may have to work on the credibility of their brands. Following incidents such as the horsemeat scandal, UK consumers lack confidence in the authenticity of many products.

A study released in July by scientific consultancy Leatherhead Food Research revealed that up to 43% of consumers are not confident processed foods contain the type of meat or fish specified on the label. Of all these products, chilled and frozen ready meals scored the lowest – 5.6 for meat and 6.3 for fish on a scale of 1 to 10 – while sausages and fish fingers were ranked at 6.8 and 7.2 respectively.

"The food industry needs to take a multi-layered approach to address the myriad issues associated with food fraud," says Leatherhead research scientist Dr Monee Shamsher. "Our new species authenticity testing technology puts the power back into the hands of manufacturers and retailers, but it is only part of the equation."

The long-term solution, she says, is to show decisive measures are being taken to combat the problem.

Meanwhile, providing food for thought for large producers, whole meat and fish from local butchers and fish mongers topped the confidence scale with a score of 8.6. **SR**

RISK MANAGERS' VIEW

Staying one step ahead

Risks to the manufacturing business range from accidents in factories to costly product recalls and business interruption. But in today's globalised and technically advanced world, risks are no longer local and they have far-reaching consequences. A natural catastrophe in one country can affect production lines on the other side of the globe; a major product recall can be communicated to the world in seconds through social media and other digital communication, compounding reputational damage. The risk landscape is more challenging than ever. Two leading risk managers tell *StrategicRISK* how they are managing a complex portfolio of risks.

PROFILE

Name: Gabriele Palandri
Job title: group risk manager
Company: Finmeccanica

Responsibilities: Palandri defines the risk transfer strategy and then negotiates the most appropriate and cost-effective insurance cover for the group. Moreover, he has to assure an efficient management of insurance programmes and claims. He is also responsible for the implementation of a risk management process aimed to identify and evaluate the potential insurable risks affecting the group, recognising the most appropriate risk mitigation actions, monitoring the activities performed over time and keeping the group's insurable risks register updated.

Company profile: With a long-standing legacy, deeply rooted in the European manufacturing sector, Finmeccanica has always looked to the future and innovation. Finmeccanica is consolidating its leadership and increasing its global competitiveness with a greater focus on aerospace, defence and security – helicopters; aeronautics; electronics, defence and security systems; and space – offering integrated solutions. With about 54,000 employees – of which more than 13,000 are engineers – the Group operates on a global scale with four main markets – Italy, UK, US and Poland – and a presence in 20 other countries.

Q. What do you see as the top risks for the manufacturing sector?
A. The risks associated with the conduction of the aerospace, defence and security business are plentiful and, if not properly managed, could lead to significant economic and financial consequences and potential damage to the reputation. But they could also be converted into opportunities.

In terms of the top risks, as our business is strongly dependent on national government expenditure, fluctuations in public budgets are a big concern for us, as is the increase in competition within civil markets owing to the ongoing economic crisis and emerging competitors.

Another key risk scenario relates to potential liabilities for clients and third-party organisations as a result of design or manufacturing defects. These events, in some cases, may arise from activities pertaining to suppliers and sub-suppliers.

Risks related to supply chain must be considered and managed carefully, not only because of potential product liability risks, but also because supply chain management is becoming a strategic factor in achieving technical and economic success.

Regulation and compliance is central to manufacturing, particularly with regards to design, development and manufacturing of products for the defence sector.

Last but not least, risk managers should consider their organisation's exposure to natural disasters and environmental risks.

Q. How are risk managers dealing with these risks?
A. It is necessary to implement adequate systems and procedures in order to identify and evaluate the risks affecting the business, taking into account potential correlations between several risks scenarios. This will help risk managers identify the most appropriate loss prevention and risk mitigation actions. It is also essential to implement a monitoring procedure to ensure all activities are performed appropriately.

Q. How are insurers supporting risk managers to deal with these risks?
With respect to the insurable risks, it would be useful to have insurers more involved in supporting the industry on loss prevention activities. More specifically, with regard to the supply chain risks, insurance companies should invest more resources and capacity in developing alternative solutions, such as contingent business interruption coverage triggered not only by standalone threats, such as fire, but also by natural disasters.

> *"Consider what is being produced and what footprint will be left behind. I believe there is too much being produced and resources wasted on products that people do not need"*
>
> **Sabrina Hartusch**, Triumph

PROFILE

Name: Sabrina Hartusch
Job title: global head of insurance
Company: Triumph International Holding

Responsibilities: Hartusch's mission is to safeguard the Triumph business through the optimisation of all global and local insurances and minimise the negative cash impact on Triumph globally by having adequate and cost-efficient insurance in place. She aims to increase overall value and minimise current and future enterprise risk.

Hartusch is also president of Swiss risk management and insurance association SIRM.

Company profile: Triumph International is one of the world's largest intimate apparel companies. It has a presence in over 120 countries with the core brands Triumph® and sloggi®. Globally, the company serves 40,000 wholesale customers and sells its products in 2,100 Triumph Stores as well as via several own online shops. Triumph International employs more than 33,000 people and achieves revenues of 1.9 billion Swiss francs (2013). It is a member of both the Business Social Compliance Initiative and the Global Social Compliance Programme.

Q. What do you see as the top challenges for the manufacturing sector?
A. Each manufacturing industry will have its own challenges. However, there are some common challenges. The first consideration for manufacturers is whether to produce products in-house or to buy into third-party solutions that promise flexibility/speed. This option, however, may expose manufacturers to quality and intellectual property issues.

The second issue is to decide on the country in which to base the production of goods. It will be important to take into account the security and sustainability of production in the chosen country.

The third challenge relates to labour factors. There are a host of issues, such as whether the business can recruit local qualified staff and whether high turnover and retention will become a problem, for example.

Fourth is time to market. Considering efficiencies in the production line is an essential factor in ensuring products are launched on time.

Fifth – and this is one I personally feel is important, although it could end in a philosophical debate – is to consider what is being produced and what footprint will be left behind. I believe there is too much being produced and resources wasted on products that people do not need. Here I am largely thinking of consumer goods.

Q. How are risk managers dealing with these challenges?
A. Good risk managers have a wide radar over their organisation and see these risks. The question is: how is the risk manager involved in managing these risks and do they need to be involved at all?

Often there is good communication between the risk manager and top management or business units and risks can be dealt with in tandem. Communication in businesses are getting better and better at this.

There is always room for improvement, however. In some businesses, risks lie entirely with senior risk managers. But two pairs of eyes see more than one, so collaboration with business departments and top management still makes sense.

A risk manager cannot expect that each staff member knows what he or she is doing and what his or her mandate is. It is down to the risk manager to step up proactively and communicate the risk agenda across the business. I have never seen this approach being perceived negatively.

Q. How are insurers supporting risk managers to deal with risks in manufacturing?
In manufacturing, insurers tend to focus on supply chain risk and business continuity risks. I find insurers also do a fairly good job with these two risks, and some even offer a better than expected service.

Insurers do care about the overall risks to manufacturers, but they also face challenges and may not be able to provide cover for all risks, particularly the intangible threats. These risks and how they are dealt with have to be driven from within the company.

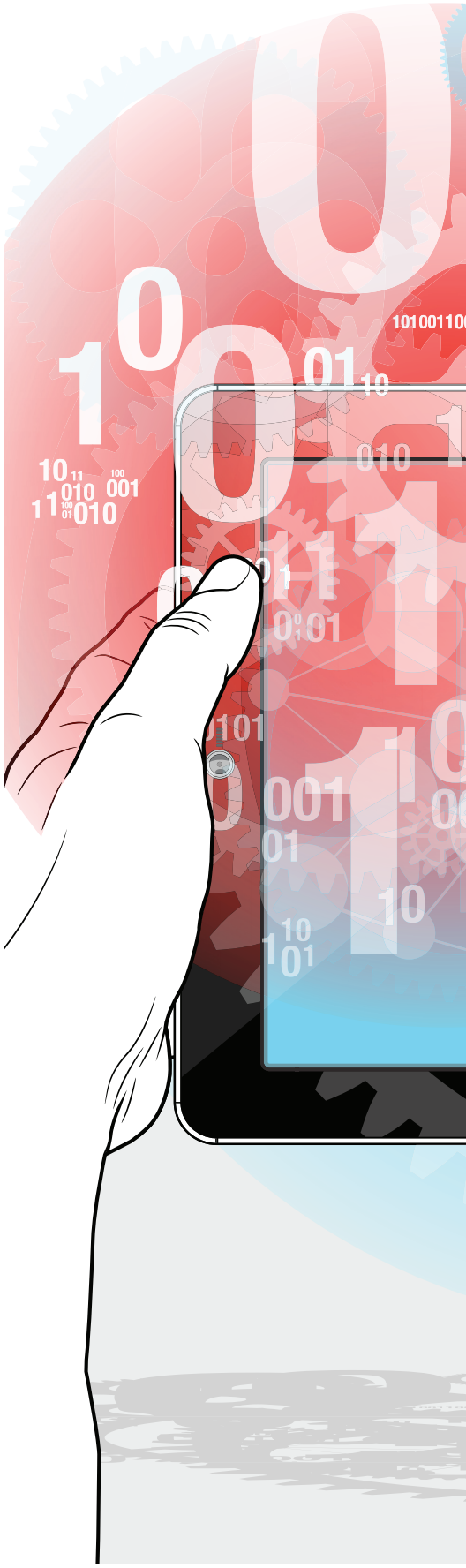
Nonetheless, I do see good-quality knowledge from insurers and this can help clients – though I tend to say that the communication stream between the insurer and the risk manager or, furthermore, the company overall can be improved.

One of the challenges is that top management's view of insurers is often very narrow. I experienced a situation where top managers were searching for advice/knowledge about a particular risk, but it never came into their minds to ask an insurer. So there is work to be done to improve communication streams.

EMERGING RISKS
INDUSTRY 4.0

Production lines that think for themselves

The next industrial revolution is nigh with the advent of product lifecycle management – or Industry 4.0 – which will super-connect all the diverse elements of manufacturing



The overnight success of the America's Cup challenge led by Sir Ben Ainslie owes much to a process that will soon be on the lips of every European manufacturer as we head into the next industrial revolution. The process that so rapidly accelerated Land Rover BAR's catamaran to the status of a leading contender is known as product lifecycle management, or PLM.

By employing PLM in the development of this extreme craft, the challenger's boffins were able to simulate, analyse and test a vast number of different geometries critical to its performance. "Thanks to [the software], we can test 100 geometries at the touch of a button," says Land Rover BAR's technical director Andy Claughton.

Welcome to Industry 4.0, a genuine revolution that through digitisation links all the elements of manufacturing in a way that enables them to communicate constantly via the internet and virtual networks.

The ultimate in intelligent manufacturing, this real-time conversation goes on across production lines, supply chains, tools and workstations, and of course humans.

According to scientists at the forefront of Industry 4.0, the resolution has not yet reached full factory-wide scale, although experts say they are closing on this digital Holy Grail and the potential is set to be mind-blowing. Take, for example the so-called RFID (radio frequency identification) tags commonly attached to all kinds of products, from jeans to cars. Today's tags don't do much because of their limited communication range and storage capacity. Thus they serve as simple position finders.

But Siemens head of product management Markus Weinländer foresees a new generation of RFID systems with massive storage capacity that act as transponders.

"They can make a major contribution to the realisation of Industry 4.0 by acting as the eyes and ears of IT," he says. "For the first time transponders will be able to carry additional information, such as the production requirements, together with their assembly plan. All of this will be readable at relatively large distances."

Among other benefits, he predicts this new wave of RFID tags with four kilobytes of storage will greatly facilitate the mass customisation that consumers increasingly demand because they will contain all the required bespoke information.

"To remain competitive in today's global market environment, many companies now have to be able to produce in tiny batches without higher costs," he says.

'Transponders will be able to carry additional information, such as the production requirements, together with their assembly plan'
Markus Weinländer, Siemens

PLM in action

How does PLM work? It "realises" products by simulating a digital twin that is essentially a virtual copy of the end product. It is not possible just to touch it or feel it.

Thus, regardless of whether the product is a high-tech catamaran or a truck axle, it can be virtually developed in differing configurations and thoroughly tested along the entire development chain before the button is pressed and the assembly line starts.

This is not pie in the sky. The Mars Rover, which has been operating on the red planet since 2012, went through thousands of

PLM-enabled simulations before the design was finally signed off.

Closer to earth, Detroit-based automotive supplier American Axle developed dramatically quieter and smoother axles far more effectively and cheaply by using digital twins in the design process. As a welcome bonus, the warranty costs of American Axle dropped by 20%-30% a year because the final product was of a higher quality.

Digital conversation

The super-connected factory in which all people and machines talk to each other in a digital conversation could be standard 10 years from now, predicts Siemens.

Because every element "knows" what to do, products will actually control their own manufacture. "In this way, the production process will be recorded and controlled at a virtual level from start to finish," Siemens predicts.

And because the R&D department will be tied in to the digital conversation, constant improvements in product quality will become the norm.

Is Industry 4.0 then the manufacturing sector's dream come true? Although it's too early for the risks inherent in 100% smart production to become evident, lessons can be learned from today's factories.

Production systems that rely on radio frequencies, cloud computing and top-to-bottom digitisation, are clearly exposed to cyber risk. Even today's much less digitised manufacturers have experienced rogue outages. And what are the risks of an RFID tag containing sensitive commercial information falling into the wrong hands?

But through all of its iterations, from the original industrial revolution to the current one of mass production, the sector has shown an ability to manage most of the challenges it has faced along the way. **SR**

THOUGHT LEADERSHIP

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Operations vice-president, client services manager, London operations, FM Global

DISRUPTION: KEY TRENDS

Emerging technologies present considerable opportunities, but risk managers must be prepared for the resulting consequences on their organisations. Three key trends have the potential to disrupt the manufacturing sector, mainly because the associated risks remain an enigma:

Nanotechnology

To put the scale of nanotechnology into context, one single sheet of newspaper is about 100,000 nanometres thick. Potential applications include biomedical electronic manufacturing, as well as solutions to environmental problems.

A nanotechweb.org report has suggested that by 2011, governments had spent $67.5bn (€61bn) on the science, and by 2015, a staggering €225bn will have been invested.

However, the advent of nanotechnology is not without risk. Little is known about the full impact of nanoparticles on the environment or health, although in some cases, chemical composition, shape and size have created toxic effects.

3D printing

Although the first device for 3D printing was created 30 years ago, the technology is still in its infancy. Yet as the technology's capabilities and proliferation increase, so too will its potential effect on operations.

It will revolutionise the production process, creating customised products far more quickly and cheaply. It is estimated the global market will be worth more than €7bn by 2020. In time, with cheaper printers and greater abundance of new materials, manufacturers will need to keep a close eye on how the technology is used and regulated.

Cyber risk

Manufacturers are increasingly targeted by hackers and cyber criminals, and by rival companies and nations engaged in corporate espionage.

With the focus on performance and safety when existing manufacturing systems were developed, security was much less of an issue, making many vulnerable today. Threats vary and include gaining access to sensitive systems and data, use of advanced malware and internal threats.

Over the next 20 to 30 years, these three emerging technologies could transform the manufacturing industry. The potential benefits are unprecedented, but like many great history advances, they come with risks that need to be managed carefully.

EMERGING RISKS
DIGITAL SUPPLY CHAINS

Supply chains: the digital way forward

Digital supply networks promise to bring much sought-after transparency to often impenetrable supply chain relationships, but they also bring concerns over security and compliance

When a major US automotive group was concerned that it knew too little about the financial health of companies down the supply chain, it decided to seek a solution that gave it much a more accurate insight into the viability of the companies it relied on.

The result was the Alderney Scorecard, an algorithm-based programme that identifies financially distressed firms by retrieving information about their profitability, liquidity and liabilities. Having done so, it rates them on a score card ranging from "healthy" to the rock bottom "very distressed".

"What this tool does is help customers mitigate risk," explains Alicia Masse, co-founder of Michigan- based Alderney Advisors, which designed the programme.

A former North American finance operations manager for Ford Motor Credit Company, she adds: "With this tool [contracting companies] can get with their buyers and prepare contingency plans."

The Alderney Scorecard, which is essentially a form of supplier-tracking software, is a recent example of developments in the increasingly urgent quest for 100% transparency, the most recent expression of which is the fully digitised supply chain.

To many, this is the Holy Grail of supply chain management as it enables parties on both sides of a transaction to understand more about each other, especially in terms of finance. As Fred Hubacker, a 36-year veteran of Detroit's motor industry and executive director of turnaround specialist Conway McKenzie, warned recently: "The financial health of any enterprise is one of the critical elements in terms of understanding how much business you can afford to do with that supplier."

There seems to be little disagreement that most of today's supply chains are overdue for revolution. Capgemini Consulting notes: "Hybrid supply chain models [paper and IT] have resulted in rigid organisational structures, inaccessible data and fragmented relationships with partners."

Degrees of digitisation

But how to improve things? According to global consultant Accenture, there's a right and wrong way to digitise the supply chain. The least effective method is merely to "digitally enhance" it and thus fall far short of the potential.

A fully digitised chain, by contrast, creates a different and much more efficient way of doing business by tapping a variety of new-era tools – social media, mobile communications, analytics and cloud computing.

Think of it as a digital supply network (DSN), suggests Accenture. A DSN provides a holistic view of the supply chain that unites not just physical flows but also talent, information and finance in a cohesive

> **'If you look at your supply chain as an arena to penny-pinch, as opposed to treating your suppliers as partners, you'll miss a competitive advantage'**
> Mikkel Brun, Tradeshift

infrastructure. A DSN "is more connected, intelligent, scalable and rapid than traditional supply chain management", says Accenture.

One important bonus is that a fully implemented DSN is highly collaborative – it allows two-way communication between suppliers that is said to create value right along the network.

In broad terms, Capgemini Consulting would agree. "Digital supply chains enable business process automation, organisational flexibility and digital management of corporate assets," it states.

Savings potential

A fully integrated DSN should move every process of a supply chain online, with hefty savings. Thus a variety of functions – procurement, invoicing, approval cycles and payment procedures – can be accessed at any time, preferably through the cloud, in a way that allows employees to see pretty much the entire relationship between a supplier and their company.

The benefits go straight to the bottom line, points out Christian Lanng, chief executive of Tradeshift, a Denmark-based e-invoicing platform that counts Air France KLM among its customers .

"Beyond the benefits of anytime access, there are many additional time and money-saving advantages to digitising the supply chain," he says. "For example, e-invoices allow companies to save an average of $505 [€454] per invoice while eliminating inefficient and often redundant approval systems."

Lanng cites other unexpected gains – easier and more timely payments to suppliers to help build trust, storage of useful data around every transaction, and increased security because paper documentation is eliminated.

Tradeshift co-founder Mikkel Brun summarises the added value of such a system. "If you look at your supply chain as an arena to penny-pinch, as opposed to treating your suppliers as partners, you'll miss a competitive advantage that allows you to be better, more productive and more efficient," he says.

However, as with any management revolution, there are dangers. As researchers from consultancy McKinsey pointed out in a study earlier this year, industry leaders are concerned about wholesale data-sharing and cyber security if they were to implement a full-scale DSN.

These fears may be justified. Beat Schlumpf, owner of Swiss based GSL Consulting, which specialises in logistics and supply chains, says: "An internationally oriented supply chain encompassing several participants involves considerable legal and IT problems."

Among other concerns, Schlumpf cites conflicting regulations about cross-border communication and storage of data, acceptability of electronic documents in legal issues and potential conflicts over true ownership of the data.

He also points to the effectiveness of security embedded in often competing systems and, above all, fears that the data may be copied or otherwise used without authorisation, as well as outright theft.

If organisations do decide to establish DSNs, another risk could be a half-hearted approach that fails to fully integrate it into the business and organisation – a "digitally enhanced" system.

Legacy chains

The proponents of DSN say that the bigger risk is in not in adopting it. As Capgemini explains, today's legacy crop of hybrid supply chains is complex and unwieldy. Most global companies operate several hundred applications whose sole job is to support the supply chain. This result is lengthy implementation cycles and high maintenance costs.

Plenty of other deficiencies are cited by businesses, including inadequate co-ordination of information between regional branches and head office, poorly married data and large-scale data redundancy. In addition, poor insights into suppliers routinely result in extra costs, production delays and risk to the reputation of the brand.

"Localised disconnected initiatives and silo-based operations pose a serious threat to competitiveness in an increasingly digital world," warns Capgemini.

There is little doubt that the digital supply network is the way forward. What matters now is the way in which it is implemented. SR

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