

Disruptive Technology

Tomorrow's Supply Chain Today

"94% of industry executives think drone delivery is inevitable and more than 40% of manufacturers and retailers expect their logistics providers to have some understanding of driverless vehicles"

reported Professor **Alan Waller OBE**, event Chairman for the first LiSC UK event of 2015. Citing the findings of the 2015 EFT report '3PL Selection & Contracting' he continued "Almost 20% of manufacturers and retailers are already using 3D printing in their businesses. Is it all hype or will this technology change the world and our supply chains?"

Transformers - Supply Chain 3.0

"I believe the UK and world economies are now entering a significant period of creative destruction, one where the technology to join up the needs of the supply chain will be developed and supply chains revolutionised," observed the first keynote presenter **Sean Culey, Principal Consultant, Aligned Integration**. Creative destruction is a concept, made popular by Joseph Schumpeter in the 1940s, which suggests that, in a healthy capitalist system, new ideas and concepts will constantly overtake the old ones, changing previous economic and technological systems to make way for progress. These changes are driven in waves by innovators and entrepreneurs

Sean explained "Arguably the first period of creative destruction was the industrial revolution, 'Supply Chain 1.0'; significant technology developments lead to huge productivity gains all across the economy from agriculture to industry, and the birth of mass production and the introduction of the assembly line created a wide variety of new jobs in all sectors. Into the 1960s and 1970s, western manufacturing companies were out-

performed by new levels of quality, cost and efficiencies emanating from Japan, a process of creative destruction that still baffles some western companies!"

"The world is moving so fast these days that a man who says it can't be done is generally interrupted by someone doing it"

*Henry Emerson Fosdick
1878-1969*

"The computer age, or 'Supply Chain 2.0' brought economic and technological developments that connected enterprises and created 'knowledge workers'," explained Sean, "and we saw the global impact of the World Wide Web. So now it's time for 'Supply Chain 3.0'. Global supply chains are still largely human supply chains, but as we move towards 2020 we will see exponential acceleration of creative destruction, and the emergence and development of the cyber-physical supply chain. Historically creative destruction took time – it took 51 years for the steam engine to replace the atmospheric engine but it only took 20 years for a \$400 iPhone to replace 13 products including camera, phone, video, watch, calculator, satnav, portable music player, that would have cost more \$5,000 in 1991. Think about photography; when Kodak went bust in 2012 they owed more than \$1bn and employed more than 145,000 people. Meanwhile Instagram, the mobile photo- video - sharing app, was bought for \$1bn in 2012 and employs just 13 people."

Message from the Chairmen

We looked into the not-too-distant future at our first event of 2015, learning more about disruptive technologies that are becoming an everyday reality in our supply chains. Fascinating presentations from our excellent speakers gave delegates a vision of what might be keeping them awake in the months and years to come. The debate that ensued focussed on: the changing role supply chain leaders are playing in business to introduce, manage and capitalise on these technologies; the social implications of emerging technologies and the massive impact they will have on future strategy and skills requirements across business, our economy and globally.

Our next event will be co-located at the Multimodal 2015 exhibition at the NEC Birmingham on Wednesday 29 April, when we will hear about and debate the increasing role social media is playing in supply chains.

Thank you to everyone that completed our 2015 Member Survey; the results were very positive with members getting significant personal and professional value from their membership.

Please contact us through Twitter @liscuk or email info@liscuk.org.uk if you have any suggestions for the group, if you would like to present a case study at a forthcoming event or if you know someone who should be invited join.

We look forward to seeing you at an event soon.

Calum Lewis & Richard Wilding OBE
Co-Chairmen
Leaders in Supply Chain UK

Disrupters of the Supply Chain

"There are many emerging examples of technologies that are radically affecting the SOURCE, MAKE and DELIVER links in the supply chain" explained Sean.

Robotics

"Take robotics for example.

We are now seeing robots that can handle very delicate items, and this is having a major impact on the previously labour intensive agricultural sector."



Sean presented fascinating videos and case studies of the application of robotics in various parts of the world economy: Robot trucks fitted with radars, lasers and GPS systems now work mines in Australia operated from a control centre 1,500 km away in Perth. The container port in Rotterdam uses driverless vehicles to move containers between ships and storage. The use of robotics in manufacturing is not a new concept, but the price of robots and their ability to be deployed quickly and effectively has meant they are more accessible than ever before.

Rethink Robotics (rethinkrobotics.com) is now making low cost (average \$22,000) highly adaptive robots for a variety of uses including line loading, machine tending, packing, and finishing. These robots can be set-up in under an hour by non-technical staff, simply by showing them what you want them to do! This 3-feet tall, two-armed robot with a computer-screen face, animated eyes, has the capability to automatically adapt to changing environments through cameras, sensors and software that enable it to 'see' objects, 'feel' forces and 'understand' tasks.

"We should also remember," observed Sean, "humans take thousands of years to evolve and adapt to their situation, these robots can be upgraded frequently to improve their productivity." Chinese company Foxconn, the world's largest electronics manufacturer, has recently announced that it will replace 500,000 workers in its new factory with robots.

In the warehouse environment robots are becoming more commonplace, and are often used to manage the flow of inventory. "In the US Amazon installed 15,000 warehouse robots to help it deal with the demands of its peak operation," explained Sean "a move which shows how flexible automation can be."

Autonomous Vehicles

Sean explained "I think most of us have heard of driverless road vehicles and, while there will be a need for changes to legislation,

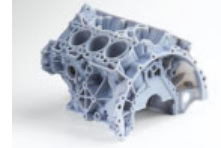


Google predicts driverless cars will be on the road by 2017, Volvo have already driven over 120 miles in a driverless road train in Spain, and Mercedes have said they will test their driverless vehicles on UK roads in 2015. It is very unlikely this technology will replace the driver in

the vehicle, rather the driver will be able to otherwise dispose of their time." The use of drones is rarely out of the news but, despite Amazon's insistence that it is serious about drone deliveries, significant changes to legislation would be required to make this a reality, certainly in the UK. Automated cargo ships are further examples of technological developments in this area; the EU is funding £2.8m investment in this area.

Additive Layer Manufacturing (3D Printing)

The concept of 3D printing has been proven, and is already changing the supply chain for the manufacture of small items, including spare parts, components, models, clothing, footwear and, worryingly, weapons. Sean joked "Websites such as Makerbot / Thingiverse contain all the plans you'll ever need to print things you didn't know you needed!" It's not just small items that can be printed. "Big area additive manufacturing can now print much bigger items such as cars and event houses. This is an area where adoption of the technology is showing exponential growth" explained Sean.



Intelligent Machines



Sean explained "Any innovation that supports both marketing and operations is going to have an impact – and the introduction of intelligent vending machines like the Coca-Cola Freestyle has certainly done that. The machine is much more than a simple dispenser; it is a data capture tool and a marketing device. It also transmits supply and demand data to Coca-Cola and to the

machine owner, including which brands are sold and at what time of day. The Freestyle has also demonstrated the effectiveness of releasing new trial recipes in select markets, gathering consumer feedback and then beginning full-scale production."

"There has been an explosion in the use of intelligent machines in our personal lives too," said Sean. "Amazon Echo is a new gadget that sits in your home and is always on – you can ask it questions, request music, create lists... Its brain is in the cloud, running on Amazon Web Services so it continually learns and adds more functionality over time. The more you use Echo, the more it adapts to your speech patterns, vocabulary, and personal preferences."

The Internet of Things and Big Data

The Internet of Things (IoT) is the network of physical objects, people and animals embedded with electronics, software, sensors and connectivity to enable it to achieve greater value and service by exchanging data with the manufacturer, operator and/or other connected devices, for example fridges that can reorder milk, waste bins that contact refuse collectors when they are full, parking sensors in car parks directing drivers to vacant spaces, wearable medical devices allowing doctors to monitor patients remotely, inventory tracking, etc. Cisco estimates the number of connected devices in 2014 outnumbered the world's population by 1.5 to 1.

"We need to make sense of the vast quantity of data generated by the new technology and connected systems," advised Sean, "data is the world's next global resource and it signifies the end for mass marketing and mass production."

diary dates

Wednesday 29 April 2015
(NEC Birmingham am)

- Social Media and the Supply Chain

The use of social media technology at an operational & tactical level

Other Dates for 2015 / 2016

Tues 6 October 2015

Fri 4 December 2015

Tues 9 February 2016

Multimodal 2016 - date TBC

Tues 4 October 2016

Fri 2 December 2016 - date TBC

Industry 4.0 – The Fourth Industrial Revolution

Sean concluded “The fourth industrial revolution is enabled by the internet of things. The future supply chain will be: **Personalised** – where consumers become creators, and mass production is replaced by customisation; **Automated** – from 3D printing to digital products on demand and from robotic production to autonomous vehicle delivery; and **Localised** – production will be reshored nearer to the customer, supported by local micro-logistics networks and home production capability.”



The Future Starts Today

“Historically I don’t think we have been working in the most innovative industry;” challenged the second keynote speaker **Markus Kückelhaus from DHL**, “I think generally there has been an inability, or unwillingness, to react to significant changes that occur gradually in many parts of the supply chain. This situation is definitely changing, and we are now seeing technological advances that have significant potential for the logistics sector.” Markus has been Director Trend Research at DHL Customer Solutions & Innovation since August 2012, working with his team to monitor and leverage trends that will impact the logistics industry in the future.

DHL’s Trend Research Team is based in Germany, and looks at emerging trends in the supply chain sector, from mega trends such as the implications of globalisation through to micro trends and start-up technologies. The research involves partners from technology providers and academics through to customers and suppliers. “The information we collate is presented to the business on the DHL Logistics Trend Radar (see Further Reading below), identifying trends and emerging technologies and putting them into perspective in terms of disruptive potential and impact on a scale from short to long term. Suggestions on how to tackle the trend and on the benefits for corporations complete the picture,” explained Markus.

“I believe the key focus areas for logistics in the next 5 years are: Crowd logistics, low cost sensor technology, 3D printing, augmented reality, autonomous logistics and big data,” predicted Markus.

Augmented Reality

“By adding layers of computer generated information to the real environment, for example via phones, tablets, smart glasses, etc. it is possible to expand physical reality and totally transform the user experience,” explained Markus. IKEA, for example, have launched an app that enables consumers to ‘see’ how an item of furniture will look in their home; travellers are able to point their Smartphone at foreign language text and Wordlens will provide a translation.

Markus suggested “In the logistics sector this technology has significant use in warehouses, e.g. for vision picking where smart glasses scan barcodes to reduce errors and increase productivity.

A recent pilot scheme carried out by DHL showed a 25% increase in efficiency through the use of vision picking, so this technology is already proving itself. In transportation the technology can be used to translate trade documentation or to provide dynamic traffic support, and in last mile deliveries to improve van loading, parcel handling information e.g. weight, handling requirements and final metre challenges such as concealed entrances.”

Autonomous Logistics

“Recent worldwide media attention has put unmanned aerial vehicles (UAVs) in the spotlight. We’ve all heard about drones and how they’re going to be making all the deliveries in the future,” joked Markus, “but I think we need to be realistic here; there are cases when this technology is absolutely appropriate, but many where it is not.”

Indeed DHL has researched and tested the limits and capabilities of UAV technology extensively, and publically. “Additionally we need to be aware of the regulatory framework and social restrictions within which we can operate;” warned Markus, “technological advancements are surging ahead of the speed of social and political change; this lag will affect the acceptance and employment of UAV technology for some time.”

With significant research to support his position, Markus suggested some applications of the technology across industry in general. “UAVs are increasingly being used by major energy companies to monitor their infrastructure, where the size of installations, scale of operation and the environment and weather conditions challenge other means of monitoring. Other applications have been observed in forestry and farming, construction planning, environmental protection, film and photography, and humanitarian aid delivery.”

Markus admitted the application of UAVs in the logistics sector is a much more challenging prediction. “The first and last metres of an urban delivery are the most challenging and probably provide the most opportunities for using UAVs in the logistics industry. But it is also the application with perhaps the largest number of barriers to their use, for example relating to privacy and safety concerns. It is also the most challenging in terms of regulatory framework conditions and infrastructure, so I think it’s unlikely we’ll see urban UAV deliveries in the next 10 years. Outside urban areas, for example where the regulations do not require the operator to have ‘line of sight’ there are, of course, other opportunities that may offer significant business potential.”

Alan Waller invited questions for the speakers before moving to the breakout sessions.

Social Concerns

Phil Streatfield, LCP Consulting observed “The social implications for this technology are massive – millions of people across the world will be unemployed.” **Sean Culey** responded “It’s very true – if your hands are your skill then you will no longer have a job for life. Nike recently made 109,000 people redundant in its off-shore manufacturing plants, then created only 1,000 new jobs in its in-house automated facility. This puts massive pressure on regional social structure, and highlights wealth inequality. Disruption used to be the outcome of a really good strategy– now it is the strategy!”

“But if everyone is unemployed,” questioned **Larry Woelk**, BiS Henderson, “who will have the money to buy the technology?”

Alan Waller, Solving Efeso observed “Every technological innovation in previous years has actually created jobs, albeit in new areas, so perhaps new opportunities will emerge.” **Richard Wilding**, Cranfield University suggested “It looks like the skill set that people will need in the future will be very different – technical skills will be prominent.” Markus agreed “We’ll still need truck drivers, but they’ll be doing a very different job with very different skills.” Sean concurred “There will be dramatic changes to the dynamics of the workforce, with an emphasis on acquiring talent that has a high level of design and creativity skills. There will be a massive reduction in functional, ‘I’ shaped skills, but a massive increase in demand for ‘T’ shaped skill-sets. And a consequential change in the corresponding management skills needed in business. The issue won’t just be about job losses from business using robots, however, it will also come from the subsequent demise of companies that have been complacent for decades, and have failed to take the opportunity to understand and control their end-to-end Supply Chains. Robots need to know what to do; if a company doesn’t have a strategy then no amount of technological innovation will help them survive.”

Breakout Groups

All the breakout groups were asked to consider: ‘Whether the developments discussed were just another wave of change, or is it was something different this time? Over the next 5 to 10 years will we see the start of a dramatic change to the social construct as people become technologically unemployed? And, if this happens, will there be a whole host of new jobs that will replace those that are automated?’

The **first group**, facilitated by **Chris Markey**, Chris Markey Associates, believed the accompanying generational shift meant the change was seen as far less dramatic for Generation Y, as they have not known anything different. They tend to see technology as an enabler supporting innovation and development of new sectors and industries...unlike earlier generations!

The **second group**, facilitated by **Les Beaumont**, Cadence Management Consulting, suggested that due to the cost of entry change wasn’t happening really quickly but, as the cost of entry begins to fall the speed of change will accelerate. They believe that the shortage of labour in certain areas of the country or the world may be the issue that focuses hearts and minds, as the geography of labour may have a bigger impact on growth in developing countries.

In contrast, the **third group**, facilitated by **Larry Woelk**, BiS Henderson, argued that the changes discussed were in fact an evolution not a revolution, and we were already in the midst of a level of significant change that has been seen before in history. The group did however show concern that it is the speed of the current change that is unprecedented. Sean agreed “We are seeing exponential evolution, but there is a cultural lag. Consumers today are ‘always on’; they are better equipped than ever before and we need consumers to exist to keep capitalism alive and generate creative destruction!”

The **fourth group**, facilitated by **Andrew Blatherwick**, A2B4P, suggested it wasn’t really a wave of change due to its speed – they described it as a ‘social upheaval’ which challenged the role of the human race and questioned its economic sustainability.

Paul Horton, Travis Perkins provided feedback for the **first group** around their focus question “What will be the impact of these developments on our ability to strategically plan our supply chain/business futures? How quickly will automation replace the manual

activities of ordering, storing, picking, packing, shipping and planning? How is this likely to impact our in-house/outsourcing /off-shoring strategies? Paul observed “The impact on longer term investment decisions will be seen very quickly – why would we make decisions about warehouses and vehicles for the next ten years when the world might change in five? We will also see an increase in decisions being taken at local level depending on the nature of the supply chain, for example if it’s highly bespoke it is probably economically more viable to invest in automation than in a more commoditised supply chain. Today, supply chain strategy IS the business strategy and it needs to take account of adaptive technology. Artificial intelligence doesn’t scale well, but the emergence of self-learning robots and computers makes the concept more attractive and applicable.” Markus concurred “In an average 3-5 year contract it is very difficult to get a return on investment in automation. Modularity and flexibility are key in this area, which is why robotics are an important element, mixing automation and manual operations. We now look for payback within 18 months in a supply chain business from such investment.” Alan Waller observed “We used to see Board Level Strategy Reviews taking place every 3 years, now they need to be taking place annually or even continually!”

The **second group** looked at the implications for the skills and experience requirements of future supply chain leaders. **Richard Wilding**, Cranfield University, provided the group feedback: “The supply chain leaders of tomorrow need not only the technical skills for the role – essentially just a qualifier for the job anyway – but also a relational skill set. What might be perceived as ‘softer skills’, for example empathy, influencing skills, conflict management and social coordination skills, are now vital in supply chain management. Our job in supply chain is to spot an opportunity and then build a relationship with the specialist in the appropriate area. Leaders need vision, not just for the day job but also to identify and capitalise on such opportunities. **Les Beaumont** observed “The market has higher expectations of supply chain leaders; there is now a requirement for them to be light on their feet and responsive to change but also to lead the culture of the business.” Sean suggested “We need a culture of innovation in supply chain – if the culture can’t be adapted then the business will become uncompetitive. If you’re not disrupting then chances are you’ll be disrupted!”

Looking at the approach supply chain leaders should take in the Boardroom to influence business strategy, **Neil Weatherall**, Austin Bell Consulting, provided the feedback from the **third group**. “Before you take this to the Boardroom it’s very important to gather customer experience and insight, and make sure the Board understand the expectations of customers. You will need be able to demonstrate the whole product and system required to deliver value, often the use of internal and external partners can provide invaluable support to this process. In larger organisations it can be very difficult to produce the business case for such initiatives, so perhaps focussing on a niche application that can be up-scaled in the future would help prove the case. We also strongly feel that using the next generation is key to being able to communicate the ideas!” Markus agreed “Proving the case in a small way can be very powerful, but this can also take time. DHL has been looking at the use of big data for some time now, but it was when we demonstrated an error rate reduction from 12% to 9% that the Board started to take a strategic interest and the project is now being up-scaled.” **Calum Lewis**, LEGO, noted “Supply chain in the Boardroom is still often seen as functional; we know it is in supply chain that opportunities exist to drive new needs that weren’t there before.” Alan Waller agreed “Supply Chain should be orchestrating the Board.”

The **final group** considered the major challenges and inhibitors to the ongoing development of the fully automated Supply Chain. **John Mangan**, Newcastle University, spoke for the group "It seems technology moves faster than the inhibitors do, so they rarely have the chance to kick in! It also moves significantly faster than the regulatory process. The big question for us is 'Can you upgrade your skills fast enough to keep up...?' We believe social media has an important role to play in the issue of cultural lag and social disruption; perhaps this will prove to be the moral conscience of the economy, raising the question of ethics, and so on. There was certainly much social media coverage after the working conditions of staff at Foxxconn were exposed on Twitter." Sean suggested "We have a new reality; you can stand and shout at the waves if you like, but countries, economies and businesses that don't adapt will be left behind. It's true we don't change our laws quickly enough to keep up with changing technology, but preventing innovation isn't the answer." Indeed it appears SMEs will be more likely to flourish than some larger businesses, due to their size, agility and ability to react strategically in the new environment. Markus added "Perhaps we need innovation on the regulatory side too! The decision making process in all organisations – business and Government - must change, but it probably won't happen quickly enough."

Further Reading

- The European Business Review Nov/Dec 2012
"Transformers : Supply Chain 3.0" - Article by Sean Culey
- TRANSITION POINT! Revolution, Evolution or Endgame?
Non-fiction book by Sean Culey www.seanculey.com
- www.dhl.com/en/about_us/logistics_insights/dhl_trend_research/

Concluding Remarks from the Speakers

Markus concluded "When we talk about disruptive innovation we cannot only talk about technology – we must also look at many areas including social trends, risk, ecosystems, collaboration, demographic changes, and so on."

Sean added "Individually the disruptive technologies we have mentioned may seem to be simply interesting and innovative technological advances," "however I believe the real opportunity is in aligning these together to radically transform the end-to-end Supply Chain. Businesses in control of their Supply Chains will be able to align and exploit these new opportunities, whereas companies lacking control will not."

Alan Waller closed the event thanking the speakers and delegates for their contribution to this important subject.

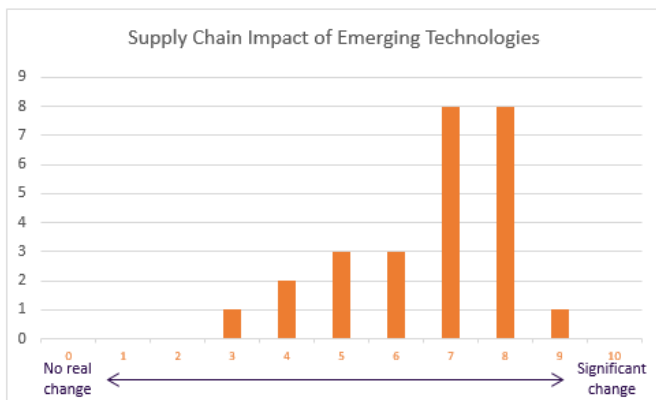


Left to right: Sean Culey, Alan Waller (Event Chairman), Markus Kückelhaus

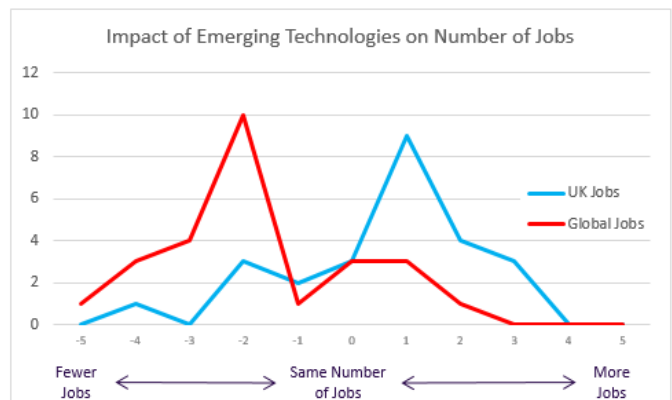
Delegate Poll

Chairman of the event, Alan Waller, facilitated a delegate poll by show of hands, focusing on two key questions.

Q1: Are emerging technologies just hype? Will they bring real change in the next 5-10 years or are they a myth?



Q2: What effect do you think the emerging technologies will have in the number of jobs in the UK and Globally?



Members of LiSC can enjoy a 20% discount on the delegate fee for the 6th Global Supply Chain 'thought leadership' Summit, to be held in Athens 29-30 September 2015.

To book your place please visit www.2015gscs.com and register using the code Athens20.



LiSC UK is an independent, invitation only network of leading practitioners helping to shape the future of the supply chain profession.

To maximise effectiveness there is a careful balance between retailers, manufacturers, academics, consultants, IT providers, third party logistics providers and government; to ensure this balance, the numbers in each category are strictly controlled and managed. The overall membership is limited and restricted to those professional logisticians holding a director-level appointment or who are very senior logisticians in a large organisation and are passionate about the supply chain and its role in business and sustainable economic development. Membership invitations are first approved by the LiSC UK Executive Committee.

The group meets four times per year to debate current issues, with themes and topics suggested by members.

For more information contact info@liscuk.org.uk or go to www.liscuk.org.uk