Influential Technology Trends in 2016

There is so much talk about disruptive technologies and their impact on the logistics and supply chain sector that it can be difficult to assess which are having an immediate impact and which may become important in the longer term and indeed, even those which will have little or no impact at all. In this briefing, Ti's technology expert Ken Lyon gives his view on which advanced supply chain technologies to look out for in 2016.

Some mainstream technologies are now so well established that it is impossible not to factor them in to an overview of technology. These technologies set the weather for almost anything else that is introduced. They include:

- Mobile devices
- Cloud computing services
- Ubiquitous broadband and Internet connectivity.

Before I go on to look at specific technologies, we need to assess the state of the wider technology environment and how this will facilitate their development.

Mobile devices

The smartphone is the prevailing computing device for many people as they use it to communicate, collaborate and consume information and data at any time and in any location. Organisations will need to consider this when planning new services, working with customers and developing the workforce.

The mobile phone will also act as a hub for a variety of devices surrounding the user in their local environment, as well as being worn on their body. This has implications for HR in ensuring health and safety compliance, operations management and enhanced data collection (See Internet of Things section below).

In many respects mobile phones and tablets have replaced the desktop PC in many businesses, enabling more flexible working and office layouts. Operating facilities have been exploiting the mobility of portable devices for some time and as devices have become more powerful, they have been able to bring more capability to where it is needed.

The difference between operating systems on the various devices is not a significant challenge, as almost all software applications and services work identically across all the major platforms.

Cloud Services

The major cloud service vendors (Amazon, Microsoft, IBM, Google, etc.) continue to increase capacity and capability to their respective platforms. They will continue to expand the range of services they provide across these platforms, while maintaining (or reducing) their prices. It will be impossible for any company, irrespective of size, to match the capacity and performance of these grids as time passes.

Nonetheless, many existing organisations will persist in establishing 'hybrid' computing clouds, which will be a mix of internal and external (i.e. outsourced to an external cloud vendor) resources. They will attempt to justify this on the basis of security, legal compliance (in some industries) and reliability. However, the increased cost and management effort will be hard to justify going forward, as the issues of compliance and security have either been addressed, or will be very soon.

Cloud vendors expect the hybrid cloud market to consolidate over the next 12 months, but almost all new businesses across multiple sectors will elect to operate fully with cloud computing services as their base information services platform.

This evolution will continue to present a significant challenge to existing ERP vendors unless they can migrate their solutions into true cloud services. They will also need to significantly adjust their business models to take account of this.

A raft of new application services (apps) will continue to grow and they will match and, in some areas, eclipse existing ERP solutions.

Ubiquitous Broadband

In almost every location, there will be access to fast broadband. This will either be by open Wi-Fi networks (so security is a consideration) or via cellular networks. In many developed countries, mobile broadband speeds exceed fixed-line broadband by some margin. This is because it is cheaper to upgrade cell infrastructure than existing copper wire networks.

In the developing world, the issue will not be access to high speed cellular networks, but more the access to reliable power supplies to charge the devices that wish to connect to it.

The Five Technologies to Watch in 2016

1. Virtual Reality/Augmented Reality

There will be a flurry of publicity surrounding augmented reality systems. These are systems that enhance the vision of the user by immersing them

in a 3D simulation of the real world and presenting artificial images and scenarios around them.

The technology emerged from the computer gaming market, but due to improvements in processor technology, the simulations generated are incredible and can merge with real-world video streams, rivalling those that were once the preserve of dedicated flight simulators costing millions. All the user needs now is a headset and a connected computer. Some can also work directly off of a mobile phone, which acts as both the processing engine and screen.

The most high profile solution comes from Oculus (now owned by Facebook), whose 'Rift' headset is about to be launched in the US. A number of other vendors have similar products, including Google and Samsung.

The relevance to the industrial world is that the technology can also be used to provide additional information that is overlaid onto the real world. This can be especially useful in warehouses for inventory management, cross docking and shipping activities.

One thing to keep in mind is that the necessary processing power required to render the graphics and process additional data is well beyond the capabilities of all but the latest personal computers and devices.

2.   Connected Sensors/The Internet of Things

The Internet of Things has long been a popular topic of discussion in the logistics industry. However, for many it is unclear what this actually means. In the media it seems to mean anything: from your fridge deciding when to automatically reorder your groceries, to lost packages phoning home.

In reality, there are more and more devices becoming available for the home, including intelligent thermostats that regulate the central heating according to your habits, autonomous locks that can be monitored and managed from wherever you are, through to groups of sensors that can take account of the local environment to generate alerts or alarms. In the automotive world, the technology embedded in vehicle systems enables them to understand and react to their surroundings and respond accordingly.

Most mobile devices are also very powerful local sensor platforms that can be activated depending on the relevant requirement. They can photograph, record and inform via a speech synthesizer, a huge number of situations. Various applications (apps) are available that can exploit these capabilities.

The major impact of the IoT will not be seen in the home, at least for the time being, as in many cases the necessary infrastructure is not in place.

But in the industrial world and across cities that are able to upgrade significant parts of their infrastructure, there will be many more smart devices. These include street lighting, traffic systems, water and electricity management systems and many more.

In the retail environment, 'Beacons' will continue to build a presence in some major stores where they will engage with your smartphone to personalise offers just for you.

Major engine manufacturers are exploiting the IoT with embedded sensors in their products. These sensors constantly share data about their condition with the manufacturer and relevant maintenance monitoring services. The growth in the number of devices able to share information about their condition and their local environment will generate staggering amounts of data. Companies should consider how well equipped they are to capture and exploit this data before they decide to engage with the IoT.

Finally, one problem that will take time to resolve is that of Internet addressing. The prevailing addressing convention (known as IPV4) has reached its limit. As every device needs an address on the network, this presents a big problem.

Fortunately, the successor standard (IPV6) has an abundant number of free addresses. However, it is not that compatible with IPV4, so mixing and matching devices between the two is very time consuming and in many cases, impractical. This will be resolved over time, but consider this as one of the barriers to general deployment of IoT networks in society.

3.   Social Networks for the Office

Facebook are about to begin piloting their "Facebook at Work" service. Although this has similar capabilities to Facebook itself, it has been designed to operate as a dedicated resource inside companies, providing them with a social network service that is orientated around their business.

There have been a number of solutions providing collaborative communication platforms for companies for a long time. However, in many cases they were services that acted as a poor combination of email, file sharing and content management (e.g. Sharepoint). They were designed around established, hierarchical organisational structures, but are unsuited to the flatter, more agile company structures prevailing today.

In contrast to the outdated and clumsy products just mentioned, solutions such as Slack, Jive, Salesforce Chatter and others are all building substantial footholds in the corporate world. This is because they enable rapid, coherent and transparent collaboration. In addition, they are easy to implement and maintain, as they all run in public Cloud environments. They can also be used on any kind of computing device, seamlessly. But the entry of Facebook into the market will probably be pivotal.

4.   Autonomous Vehicles/Transportation Management:

There has been a huge amount of comment on this topic in the media and rather than repeat much of this, it is better to highlight a few key items.

Autonomous vehicles will be operating in some form across a number of countries in the next few years. These are vehicles where the driver will be present, but the vehicle will navigate and steer without help from the driver. The driver will be able to intervene at any time. The traffic control and traffic management infrastructure in most countries will adapt to exploit this.

Every vehicle manufacturer (particularly those that are a global brand) is developing this technology. As cars are seen by many technology companies as the ultimate mobile 'device', they will enter the market with new business models. They will enter the market in partnership with a conventional manufacturer or as a dedicated manufacturer in their own right. Tesla has shown what can be done if convention is ignored.

Concerning the evolution of electric vehicles, if a large percentage of the existing vehicle population in the developed world were fully electric or 'plug-in' hybrids, the existing electric grids would not be able to cope with the demand. The problem is even more acute in the developing world. So expect to see major developments in battery technology, renewable energy storage (i.e. solar & hydro-electric) and energy management systems, before large scale deployment of electric vehicles.

In the commercial vehicle segment, vehicles will also develop as sensor platforms (over and above their existing telematics capabilities). However, the degree of operational autonomy will be confined to collaboration with other vehicles (convoy automation) and advanced operational guidance as part of transport and delivery 'systems'. As a model for this, think of how production plants synchronise the use of robotic guided vehicles.

Car ownership in cities will decrease, replaced by on-demand transportation services.

All of the above will help with sustainability, energy efficiency and ease congestion – allegedly.

What is clear, is that the conventional business of vehicle manufacturing will transform fundamentally. This will have a significant impact on the supply chains and partner ecosystems of the incumbents.

5. Artificial Intelligence/Personal Assistants:

Systems are getting smarter, as can be seen in the consumer world with Microsoft's Cortana, Apple's Siri and Alexa from Amazon.

The technologies driving these virtual assistants are also learning from their users, the more interaction they have. This will bring major benefits in areas such as healthcare, education, etc. because having a virtual librarian 'on-demand', can help in all manner of daily activities.

At the moment these systems are in their infancy and confined to personal devices (with the exception of Alexa, that is available as part of the Amazon 'Echo' device). When they are eventually available as systems for the home (or office), monitoring and managing environmental, entertainment and communication systems, their value will really be appreciated.

In a commercial environment, their ability to monitor and augment the actions and activities of service delivery personnel will bring huge benefits. It should help to reduce errors, help to respond rapidly to unexpected problems or events and dramatically improve efficiency.

As a caution to those wondering if we will be ceding control to the machines with the availability of these systems: The answer is no. At the moment even the most advanced systems are not sentient, or even close to this ability.

In Summary:

It is interesting to note that innovation in technology is almost exclusively seen in the consumer segment. Technologies that have been successfully developed for the consumer are usually robust, reliable, easy to use and inexpensive.

This demystification of technology has challenged the traditional Information Technology departments in organisations in almost every way. This trend is now unstoppable and IT functions will either embrace this change and adapt, or lapse into irrelevance.

Established vendors of enterprise solutions are also learning this lesson, as exploiting a web browser to mimic the function of a browser on a desktop is not the same as what can be done in a fully-fledged app on a mobile platform. The young people entering the workforce now know the difference. They also have fundamentally different views about how they live and work in concert with technology, as it is how they interact with the world. It is not a tool they use to do their jobs, the job will have to fit into their technological world.

About Ken Lyon, Ti Advisory Board Member

Ken Lyon is Managing Director of Virtual Partners Ltd and has over 30 years of experience in the transportation industry. Ken specialises in the use of advanced information systems to manage the operations of 3PL (Third Party Logistics), 4PL and Lead Logistics Providers and their trading partner networks. Over the past few years he has helped start-ups concerned with supply chain technologies and before that, he spent 10 years as a Director and VP of information services at UPS, helping to establish its Logistics and supply chain services Group. Ken was recently appointed Chairman of the Board for an international logistics software group and also sits on the board of Ti. During the past 25 years, he has participated in conferences and conventions for the US Department of Defense, Government of Singapore, The JOC, Nikkei and many others. Ken is a Fellow of the Chartered Institute of Logistics & Transport and a member of the US OSD sponsored Highlands Forum.

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