

BIG DATA- BIG OPPORTUNITIES OR BIG PROBLEMS?

TRANSPORT INTELLIGENCE
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The term 'Big Data' is regularly used to describe a very large data repository containing everything an organisation needs to know, or wants to know. As is usual in such cases, these massive aggregations of data may contain grains of truth surrounded by huge clouds of misunderstanding.

As more and more devices are linked to the Internet and other networks, at a minimum they usually identify their location and status. In effect, they act like a sensor, albeit in many cases they are 'passive', incapable of doing nothing more than sending "this is me and I am here" messages. This explosion in the population of connected devices is also generating huge amounts of data. As this data is aggregated by organisations in large databases, it is termed as 'Big Data'. How this data is qualified, classified and analysed is crucial, because when it's done well, it can lead to competitive advantage in the marketplace.

The quality of large aggregations of data depends on how accurate the data is and the precision of any context. Many organisations have accumulated huge amounts of data, but this is of limited value if it is imprecise, inaccurate or lacking in context. Any attempts at seeking to clean up data sets such as these can be costly and possibly of limited value. But it is more disruptive to include inaccurate data in any Big Data project as misleading information may result.

It does illustrate the point that the implementation of any new systems must be established using a master data set that has been validated for accuracy and context. This will ensure that any other systems are able to reference to a common source once they are deployed. This is critical in preventing errors and misunderstandings across the organization as systems using the data, informs operations.

As the cost of computing power has declined, it has become much more economical to insert processors into almost every electronic device. The growth of cellular communications networks linked to the Internet has provided the means by which these devices can 'phone home' and send information about where they are and what is happening.

This is particularly true of the mobile phone, which has moved far beyond the role of supporting a basic telephone call. A large majority of phones, including those in the developing world, have the ability to send data and images as a minimum. For the logistics industry, with the constant requirement to monitor and manage supply chains across town or across the world, this provides considerable opportunity. The ability to communicate directly with any part of the supply chain gives the logistics manager a precise picture of how operations are performing. They then have the opportunity to respond quickly to

problems or unexpected events, thanks to the improved 'visibility' provided by the streams of data generated as Orders and Inventory move through the supply chain.

Of course, just generating the data from the supply chain is useless if there is nowhere to store the data for analysis. Unfortunately, the technology platforms in many organisations lack the appropriate architecture, scale or relevant software tools to do so.

Large scale Cloud platforms are now being used by many companies as a way of supporting the required scale, but they are also a way of interconnecting trading partners and enhancing their ability to communicate and collaborate. This strategy also makes it easier to accumulate very rich data sets that can be exploited for the benefit of the community of users as a whole.

How Big Data is Used:

Across almost every industry there are examples of how companies are exploiting the opportunities provided by analysing very large databases. Obviously, those industries that depend on the extensive use of information systems are early adopters of these technologies. Not only do they have extensive volumes of data, but also it is frequently in a form that can be analysed. Now every industry is starting to explore the potential.

The extent to which the accumulation of data has consequences is clearly illustrated in the healthcare sector by the growth in personal health monitoring devices that are now available. These work in concert with applications that record all manner of data points from blood pressure, heartbeat, steps taken, calories burned, etc. The average smart phone also has the ability to provide basic monitoring capabilities, but this happens by exploiting other sensors built into the phone such as GPS. This results in the individual not only knowing how much energy they have expended as they took so many steps, but also the total distance covered. The vendors of such systems hope that this combination of technology and data, motivates users to become more aware of their own health and how they improve (or not) over time.

The aero engine manufacturers have been capturing engine performance data in flight for years. This data is constantly being transmitted to the manufacturers so that any variation from expected norms generates an alert. This information is then used to trigger specific inspections at the next point the aircraft lands, along with the appropriate recommendations for resolving the issue. This can include having a replacement engine available at the airport, which is then installed before the plane is allowed to continue.

This regime is well established and has resulted in enormous gains in reliability and a reduction in flight delays due to engine problems. The engine manufacturers (e.g. Rolls Royce, GE, Pratt & Whitney) now have massive amounts of data that is constantly analysed

for improvements and greater insight into how the next generation of engines can be made more efficient and effective. Every flight that takes place continues to add to these data stores and is only part of the data that is now being captured from the numerous systems on board aircraft.

If the same principle is applied to supply chains, it could reveal opportunities for efficiencies and performance gains. Previously this was the domain of the operations analysts and industrial engineers that looked to measure activity and suggest improvements. At best, this approach only works inside a company rather than across a complete supply chain. At worst, suggested improvements are subject to conjecture and challenge based on how the findings are interpreted. If a supply chain is able to share data from every aspect of its operation at any time, it is more likely to result in definite conclusions. Data that is accurate and available in abundance usually results in better decisions and less ambiguity.

Clarity from Complexity is Hard.

Supply chains can be incredibly complex and with such complexity comes the potential for problems, disruptions and delivery delays. This usually costs both time and money when seeking to resolve the situation and get things back on track. A system capable of capturing data at every point in the chain, qualifying its meaning and placing it in the appropriate context, is an incredibly powerful management tool, or more accurately, decision support tool for the business in such situations.

Supply chain visibility has been seen as an essential component for managing supply chains for years, but so few companies have been able to achieve it. This is usually due to the relevant information being captured by a variety of different systems, most of which are controlled by different organisations. The age of the various systems also has a bearing on matters, as older systems are difficult to interact with (notoriously so in some cases), data definitions are inconsistent and mechanisms to exchange data electronically inefficient. This situation is now being exposed by the so called 'consumerisation of technology', with most people using smartphones, tablets and personal computers to manage their daily lives. They shop online, arrange travel schedules and communicate seamlessly across country and around the globe. They use universal platforms residing in data centres that, to them, is geographically irrelevant. The expectation users now have, especially young people and people that don't work in technology manufacturing and support professions, is that all systems should be as easy to use as smartphone apps.

This presents established businesses with a difficult choice. Do they continue augmenting internal technology platforms that are increasingly expensive to maintain and upgrade, or do they migrate to the new solutions designed to operate as Internet services? This is especially tough if they have senior management who have supported massive investment decisions in the wrong technology choices and then have to explain to shareholders why their investments will have to be written down (or in some cases, written off).

As the proliferation of sensors, devices and systems generate huge amounts of data; it is essential that the operational systems used to monitor and manage supply chain and logistics activity do not become overwhelmed. Unfortunately, time is not on their side, as the benefits of analysing streams of operational data 'as it happens' (in Real Time, as it's called in the IT business) are compelling.

"A Single Version of the Truth"

Companies that are able to capture and analyse appropriate sets of data not only make more informed business decisions, but by using advanced analytic applications, they are able to predict the potential impact and implications. This is the primary value of any central operational system, as it should provide a 'Single Version of the Truth' for the entire organisation or collaborative community.

Any senior executive has responsibility for making accurate and informed decisions to take the business forward. They have an expectation that the data and information they use to make those decisions is as accurate as possible. Competing interpretations of what data may mean, is not only unhelpful, it can be very costly. This is why there should be only one reference point informing all others – the so called 'Single Version of the Truth'.

The value of this is clearly illustrated in situations where companies are collaborating across a transport network or supply chain. The ability to discuss problems (or opportunities) is so much easier if all parties are examining the same data, enhanced with appropriate layers of context that describe what it means to them. This avoids confusion, misinterpretation and errors such as double counting or duplication.

Capturing data is one thing, being able to analyse and reveal the appropriate information it holds is something else. Fortunately, great strides have been made in presenting information in easy to comprehend graphics. Data visualisation tools are very powerful and this is vital in the context of supply chain data, as many participants are often viewing the same information in different ways. This can result in confusion and misunderstanding. The key is to use simple universal images and terminology to create a common understanding of the data. This builds trust between supply chain partners, which in turn, leads to greater collaboration and cooperation.

The senior executives responsible for strategy and operations in almost all organisations are working in an increasingly dynamic environment. The so-called 'C' level executives, who comprise the ultimate management team, are demanding a constant stream of accurate information to drive the business. It is becoming increasingly challenging to direct operations without access to accurate data drawn from all parts of the operation. Those executives able to access powerful data visualisation tools, analysing data coming from every part of the operation, as it happens, have a huge advantage. It gives them agility and

adaptability over and above competitors that cannot access operational data fast enough and lacking the appropriate context or meaning.

Modern supply chain operations rely on logistics service providers to deliver a constant flow of information back to shippers and between the related parties. This enables more informed decisions and faster responses to unexpected events. As products are now usually built to order or manufactured in small batches, this has resulted in smaller inventory pools. This makes sense as it has reduced costs for manufacturers who have reduced the amount of capital they have invested in inventory. This only works if they can keep the supply chain moving, as any delays or interruptions may mean the products or parts are not available when their customers want them. If the logistics operators are able to monitor every stage of their operations, they can manage their assets more effectively, plan more accurately and alert partners in advance of any problems. This obviously means that they need information systems capable of supporting these requirements.

Flexible and agile information systems are essential for any 3PL or transport company. Until a few years ago these kinds of systems were only available to the largest players, as the costs were very expensive and usually required a lot of internal development. It also required access to very expensive communications networks - if they were available. This is no longer the case. The Internet provides universal communications access, powerful computing platforms are available, on demand, as services in the 'Cloud' and smartphones act as personal information assistants, delivering data and information directly to supply chain managers and operators. These platforms have been designed to support very large volumes of transactions and store data generated from numerous locations.

Unfortunately many older logistics systems were never designed to exist in such an environment. They are often limited in the amount of data they can handle, the number of transactions they can process and the ability to accept a colossal volume of messages arriving simultaneously. Although some of these systems may have unique and customised functionality for specific operations, unless they can be accessed and this capability shared via cloud services, they will struggle. If they cannot function within these new environments, their value will be limited and will rapidly become redundant.

As logistics operations evolve, the underlying data stores will be massive repositories of information that will increase in value the more they are refined and augmented. Data related to supply chain operations will be combined with data captured from other sources and systems, to provide a rich picture of the operating environment and the parties therein. Every party involved in the supply chain will be able to contribute or receive information as required. Mobile devices extend the reach of these actions to any part of the chain anywhere there is access to a network signal. These information 'pools' will co-exist with other similar aggregations of information, sharing data according to strict access and security and permissions.

The mechanisms to manage this are of necessity complex, but will be informed more by the data structures used in massive social networks rather than the traditional hierarchical or relational database technologies. These older models are robust, but unwieldy and difficult to modify and unable to support colossal numbers without enormous administrative overhead. Imagine having to speak or email a user administrator before you can add a friend on Facebook, a connection on LinkedIn, or a follower on Twitter. The number of parties connected to many supply chains or logistics operations can vary enormously, being able to harvest information from such diverse communities will transform the understanding of the logistics service providers. This will take their ability to keep their customers informed to another level. It will also promote co-operation across the entire logistics chain, improving efficiency and reducing costs.

A detailed understanding of the customer and their shipping activities should provide insight into how services can be tailored specifically for them. The analytic systems will suggest options for new services or alternate scenarios for dealing with shipment delays or disruptions. Depending on the scope of the logistics operators services, it may be possible to design cross industry services for managing inventory, providing transport capacity priced by real time rate engines, (similar to the methods used by the new taxi services that adjust price against capacity by the second) and the ability to reconfigure orders in transit in response to variable market demand. All of these and many more can only exist if the data driving them is timely, accurate and presented in context.

True supply chain visibility may finally be within reach for those organisations able to exploit Big Data. At any time, shippers will expect to be able to interrogate their partners systems in order to see detailed views of shipments in transit. They will expect to be alerted automatically about any changes or delays, but more likely, they will expect the service provider to have either resolved the issue, or at least present them with options for dealing with the problem, all backed up by the data and rationale supporting the decision. Unless your systems environment is capable of evolving into something like this, you will be at a significant disadvantage to any competitors that are able to do so.

About the Authors

Ken Lyon is the Managing Director of Virtual Partners and is one of the pioneers of information development and supply chain collaboration within the logistics industry. Ken has over 30 years' experience and is a member of Ti's advisory board.

Mirek Dabrowski, as the president and co-founder of oTMS, is leading the company with his rich experience in the logistics industry and deep understanding of China's transportation industry. With major focuses on project management, planning and execution, Mirek has more than 16 years' experience in the logistics industry and worked for multiple international logistics giants, in charge of their businesses in China. Before founding oTMS, Mirek was the general manager at DSV. Mirek managed DSV's businesses in ten

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About Transport Intelligence

Transport Intelligence (Ti) is one of the world's leading providers of expert research and analysis dedicated to the global logistics industry. Ti utilises the expertise of professionals with many years of experience in the mail, express and logistics industry to develop a range of market leading web-based products. Ti reports, profiles and services are used by the world's leading logistics suppliers, consultancies and banks as well as many users of logistics services.

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About oTMS

oTMS is a leading provider of logistics management platform in China

- *oTMS pioneered and commercialized the first community logistics management solution in China*
- *Over 150 shippers and 3PLS are using oTMS solutions to manager orders every day.*
- *Compared to traditional TMS, oTMS can help increase the efficiency and reduce the cost both by 10 times.*
- *oTMS has gained more than 1 million orders on average per month.*
- *oTMS now covers five major fields: clothing retail, consumer product, industry manufacturing and auto components, pharmacy.*
- *oTMS can bring benefits to all corporations linked in the transportation process by increasing efficiency, reducing cost and speeding currency flow.*
- *oTMS gained A+ round investment from Chengwei Capital, Matrix and Baidu in June 2015.*

Vision of oTMS

By connecting the whole process of transportation, oTMS is aiming at bringing clients a new management experience and more business opportunities.

Concept of oTMS – Connected Transportation

oTMS creates and develops the "Connected Transportation" solutions at first in the market. Leveraging cloud computing and mobile Internet technologies, oTMS distributes SaaS solutions to connect every party in the transportation process, including shippers, 3PLS,

trucking companies, drivers, into a seamless ecosystem with well balanced, mutual benefits and a shared work flow that can benefit everyone.

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To Find Out More

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