Spotlight on Supply Chain

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Introduction:

It's time to add new dimensions to your supply chain

Supply chains hardly ever hit the headlines, but when a leading chicken-based fast-food restaurant chain in Britain ran out of chicken the national press jumped on the story. Suddenly, the concept of 'the supply chain' was national news. Something had gone terribly wrong and millions of consumers couldn't get their favorite seasoned, deep-fried meals. 700 stores had to close. The brand took a hit. The headlines cried 'crisis' and, for perhaps the only time in many consumer's experience, they began to think about just how complex the supply chain behind something they took for granted actually was.

In this Spotlight, we focus on the need to go beyond the traditional approach to supply chains. Our experts stress that they can no longer be seen as linear or flat. Digital has added new dimensions which can add deeper layers of data and control so that consumers get what they want faster, for less cost, and in more personalized ways.

But doing that takes work and the ability to see the world in different ways. It's not just the technology that counts, it's how you deploy it, connect it, and extract and analyze the data it yields. Our experts provide a range of insights, from how to reconceive the supply chain to how to see is as part of a business continuum. They talk about asset tracking and blockchain too. Both are becoming ever more important elements in supply-chain management. And they will continue to do so.

We hope you enjoy the opinions and insights these articles contain, and that they'll help you focus on the elements of your own organization which need to change or be augmented. Let us know what you think. And let's drive the sector into a new and profitable future – together.

The world isn't flat, it's round – and so is your supply chain

By Johan Carstens

Lead, Inspire and Deliver

As humans we deal in images. Images that tell stories. It's how we understand the world. That's why the concept of the 'supply chain' has the word 'chain' in it. It communicates the fact that making a product – large or small, complex or simple – takes a lot of interconnected elements. And that each element is important. A chain is only as strong as its weakest link. If the chain gets broken, then the whole ecosystem suffers.

For me, the image is a challenging one: yes, a supply chain is just that, a chain of people, machines, businesses, resources, and eventually customers. But it suggests a world that's flat. Flat and linear. Linear and rigid. One thing comes after another thing and there's little flexibility in terms of how it can be organized or managed. The world isn't like that anymore (if it ever truly was).

Manufacturing is an interactive customer-centric journey

Now, the world of manufacturing is round. It's circular. There are feedback loops that create added dynamism and open up new possibilities for manufacturers to engage with their customers and suppliers in much deeper and more intelligent ways. To understand what's possible we need to change our mindset; get away from the chain and move to the spinning globe. It's important to get our heads – if you'll forgive the pun – around that image.

For me, it's about seeing more and achieving a deeper, more nuanced understanding of all the elements which impact the production line. Yes, the making of the product is at the core of what manufacturers do. That won't change. It is a product-led industry. But, focusing solely on the production line leads you to see the world as flat. Looking outside the factory and engaging with suppliers far down the supply chain, and all way up to and beyond the final customer, gives you the ability to be smarter and more responsive to market needs.

That's what the 'smart' in smart-factory actually means. It's not just about the technology – though it's the technology that enables you to be smart – it's about how you look at your business and organize it on a daily basis.

Digital reveals the manufacturing world to be round, but it's up to you to make the most of that opportunity. And that's what I try to help customers do. At Fujitsu, we're focused on co-creating the smart factory through both technology and intellectual and market insights. That's how we achieve better outcomes, by understanding that we're dealing with an interactive, customer-centric journey.

All the way and around back again

On Christmas Eve, 1968, an astronaut on NASA's Apollo 8 mission took the famous 'Earthrise' photo of the Earth from space. It instantly became an iconic picture. It changed the way many people thought about the planet they were living on. Some historians trace the rise of environmental activism to that one image and the effect it had on people's consciousness.

I believe that the rapid rise of digital technology across the manufacturing sector is having the same 'Earthrise' effect. That's because it's enabling us to see the totality of the supply chain and recognize the fact that it is, in fact, circular. And it's a proactive view which helps to mitigate risk, avoid delays, improve productivity, and ensure deeper engagement with the final consumers of the products we make.

For instance, if your product needs to be packed into boxes at the end of the production line – and very few products don't – then what happens if there's been heavy rain in the areas that produce the cardboard that makes those boxes? Traditionally, that kind of information comes too late for the manufacturer to do anything about a shortage of boxes and a bottleneck occurs just at the point where the products are about to be shipped to stores or customers.

But, with a deeper, more extended set of connections via digital technologies, you can factor in the weather forecasts over those cardboard producing regions and hedge your bets by bringing in alternative suppliers.

Or, what if you are an automotive manufacturer and your supplier of leather for seats gets their raw material from a country where elections can turn violent and disrupt the economy? In the past, you might have thought, well that's not my problem. But, if the leather isn't produced then your supplier can't deliver the seat covers and your production line slows, with customers needing to be told the bad news that their shiny new vehicle will be delayed. Not good.

So, it's better that you and your supplier can 'see' the prospect of trouble coming the moment an election is mooted, let alone actually called, and, again, alternative suppliers are brought on line. That means your customers get their cars when they expected to get them. Happy customers!

And, increasingly, those customers are concerned about the potential for recycling the goods they have bought, used, and now want to upgrade or change. They don't want to contribute to the world's problems with plastics and waste; they want to feel that they are contributing to protecting the natural environment. Which means they want to see you recycle a wide range of materials. Now recycling is part of the supply chain. It's not an add-on, or a good-to-have element, it's a vital one. It can be a key differentiator between you and a competitor. Many companies are making a virtue of using recycled materials in their manufacturing process – that means sourcing new kinds of materials and letting customers know that you are doing it. For instance, 'ocean plastics' – plastics recovered from the seas, re-cycled and re-purposed, and then used to make new (recyclable) products. It makes us all feel better.

Digital is the tool, your mindset is the differentiator

I spend a lot of time talking about technology – from RFID/NFC tags to the rise of Rich Communications Services (RCS) – but what really matters is, as I've already stressed, your mindset. I don't mind talking about it. But I prefer to act. And because Fujitsu is a manufacturer in its own right – and a long established one – we are putting into practice what we preach in our own factories. That makes my argument – Fujitsu argument – stronger and more resonant.

Digital technologies are tools, it's how you use them, and what you do with the data they yield that counts. That means changing your mindset to see the supply chain as a continuously spinning circle, like your own planet. The data is circular too: you need to process, analyze and act on it, and then use the feedback to improve what you did before. Nothing stands still, it keeps going round.

That means having a vision of what the ultimate consumers do, and how they reveals their changing needs. Understanding market trends before they become entrenched is important in terms of achieving competitive advantage. RCS helps you do that. The fact that the SMS system is now much richer and can carry more complex or nuanced messaging to consumers will have a big effect on manufacturing. It's linked to the idea of mass customization or Lot Size 1. If you know what individuals want, you're better able to tailor your products for the right cost on your production line.

You can also manufacturer in a more responsive way to cope with individual events or times of year (like Black Friday or a big soccer match). Let's say there's a big match in Munich at the Allianz Arena, or in Barcelona at the Nou Camp, or at Wembley in London. Two sets of supporters will converge on one area. You can ensure that the right levels of merchandise are available in the stadia – that's easy. But you can also broaden your view to the surrounding areas – the bars, restaurants, stores, and so on. One set of fans like one kind of beer, the other another. So, supply more of each. Then track the products and the people. Send out RCS messages with vouchers or offers for tailored products available on the day, or later online. It's all about engagement as well as using data to drive business.

Actually, it's a very human-centric approach to manufacturing. And that's what Fujitsu has always been about. Making life better for all of us – as manufacturers and as consumers. You don't need me to tell you how important your supply chain is, but I believe it's important we start to see it differently – it's round, not flat. It's deep not thin. It's all about data and people and driving growth that benefits us all.

Lessons from the front-line:

how to create a supply chain that can cope with uncertainty

By Walter Graf

Not so long ago, I was at our Fujitsu Distinguished Engineer conference in London. A consultant put up a slide which surprised me. It was a quote from the great German Field Marshal of the 19th century, Helmuth von Moltke, the military architect of German unification. This is it:

> "One cannot be at all sure that any operational plan will survive the first encounter with the main body of the enemy."

It came from an essay he wrote in 1871, 'One Strategy', and it has been quoted in many contexts ever since. In fact, it's hard to find a general – from Eisenhower to Colin Powell – who hasn't used the quote in some form or another. It reflects not just the reality of conflict, but most other walks of life too, especially business.

You create a business case – which is your commercial battle plan, so to speak – and then you go out into the world and engage with the market and with customers. And all bets are off. Your plan could crumble in ways you did not anticipate. Or, of course, it might work spectacularly well. That's what we hope will happen. It's also what every military commander hopes... the night before a battle. What - in a military sense - applies for the first encounter can be applied to the manufacturing industry in the form of the advent of disruptive technologies like AI, quantum inspired computing, or distributed ledger technologies and the faster then ever changing market requirements.

Good planning and responding to circumstances

Von Moltke understood that the key to success in any walk of life, not just the military, was good planning plus the ability to respond to circumstances (mostly unforeseen) in positive ways. To be elastic rather than rigid. There is no point sticking to a plan if it is not working. Just because a plan has been developed over a long period of time with a lot of hard work from very clever people, does not mean it has to be adhered too despite clear signals which tell you it's wrong. Von Moltke knew how to change his plans quickly. It's why he's quoted today and not forgotten.

It's instructive to look beyond the famous quote to what von Moltke said a few lines later. He said that 'a path on which you hope to reach [your goal] cannot be firmly established in advance.' And then added that you 'must make a series of decisions on the basis of situations that cannot be foreseen.' For me, that's exactly the philosophy and approach every manufacturing business needs to adopt when it comes to delivering Industry 4.0.

You might think I've made a big, intellectual, leap there. What's von Moltke got to do with Industry 4.0 (other than its German origins)? I think it has everything to do with it. Why? Because Industry 4.0 is both a philosophy and a plan. It's an approach to an uncertain, fast changing world, in which nothing is certain and everything is being disrupted.

You can't escape the future

Let's say you're a manufacturing of gear transmissions. Your goal is to build a production line and a supply chain that optimizes the production of quality products for big automotive OEMs. Sure, you've heard that the rise of electric vehicles and autonomous cars is inevitable, but you're sure that it will take a generation to affect your business.

But what should you be doing now to prepare for the future, especially if that future arrives far faster than you expected (it probably will)?

Von Moltke would advise you not to try and plan for all possible circumstances. You just couldn't do it. But that doesn't mean you should do nothing. That's not an option either. By the time the future begins to form, it will be too late to react to it. What you need to do is look beyond your daily routines and look at the bigger picture so you can form a set of principles you can follow to become a more agile organization in terms of what can be done now, and what can wait. That means abandoning a top-down perspective and bring more people (and departments) into the mix to create a constantly iterative approach. That's how you become truly agile.

Of course, not every manufacturer will be affected in such a dramatic way. Another example might be a company that's merely looking at its supply chain and working hard to get its production time down from 24 hours to 12. That looks good on paper. You've cut it in half! But, if the true cycle – from customer order to product delivery is currently seven days, then you've only really shaved half a day off it. It's not a fundamental improvement.

Again, it's important not to lose sight of the benefits you're expecting to achieve. To reach a specific goal it's vital to include and align subject matter experts from multiple areas across the whole manufacturing, supply, and delivery chain. The key to success is to integrate them all under that guiding principle while at the same time delegating enough authority so that they can develop the right optimizations individually.

What do those two examples have to do with each other? They both deal with uncertainty and the requirement to break down unplannable processes into small and agile pieces (across time and organization) that provide the necessary conditions so that changing conditions can be adapted to without losing sight of that important guiding principle.

Industry 4.0 is all about using digital technologies and data intelligently to transform the entire scope of the manufacturing sector. It's not focused on the production line only, or even on the use of IoT to track products, deliver predictive maintenance, or change business models so they become more service based.

It's not a plan, it's how you deal with the unplannable

Each business has to react to the unexpected. And, yes, it's the digital tools you have available which help you do that. But at the same time, they also contribute to the unexpected, like new disruptive technologies such as AI, Distributed Ledgers, and even Quantum Computing which are opening new opportunities despite the fact that concrete business outcomes can't be precisely predicted. In the end you need the right approach. The technology won't do it for you, however clever (or automated) it might be.

If von Moltke was in charge of a supply chain I think I know what he would do. Apart from allying himself with Fujitsu – forgive me, but I really think he would choose the right partners, that's what good strategy is all about – he would step back and look at the entire supply chain as one thing: a set of processes, people, and things which are interconnected in very fluid and changeable ways. And he would not see the supply chain in isolated terms.

He would recognize the supply chain as a highly complex entity embedded in an even larger entity (the E2E process) that can only be mastered by accepting the fact that no precise plan to optimize it is available. Instead what are needed are guiding principles that will help everyone involved to align themselves with each other while they develop ways of optimizing their individual processes free from top-down control.

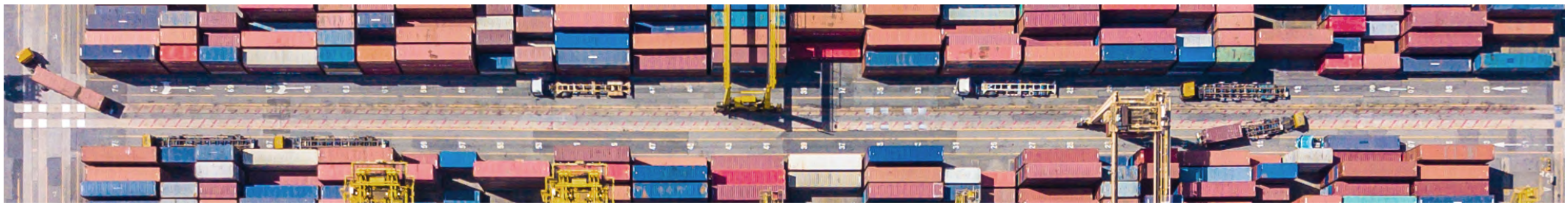
To do that you need a total view. Don't concentrate on individual pieces at the expense of the entire picture. Base your guiding principles on a holistic view that always includes the way your manufactured products are perceived by the custome and don't expect that everything will result in a business plan which has precise implementation instructions. Accept that anything can happen and probably will happen and that you will only be able to react at the time things happen and be prepared for change at any time. Your ability to respond to that 'engagement with the world' to paraphrase von Moltke, is the key to success in a disrupted environment.

Industry 4.0 is all about using digital technologies and data intelligently to transform the entire scope of the manufacturing sector.

I think that many manufacturers do understand the need for elasticity and agility. They are on high alert. They can see business models changing. And it's important that they don't fall into the trap of shying away from the challenges by focusing too much on one domain so that they end up seeing only what they want to see; what's in front of them right now. You also need – like any good general – to react to what's coming over the hill. Which is why you need to think and act in an agile way.

Have the big picture in mind but act incrementally

You need to think big. Don't constantly go after small, incremental improvements of sections of your supply chain. That's not good enough in



today's environment. You need to have the big picture in mind and expect significant changes over time with respect to new disruptive technologies, the way your competitors will use them, how your customers will adopt them and so on. Disruptive changes, however, will typically lead to higher investments which don't have a clear ROI. That's why you need to focus on a guiding principle as I mentioned earlier, as well as a clearly defined business outcome. Make incremental changes, challenge assumptions and then you can achieve fundamental changes while minimizing risk. It's what we're trying to do at Fujitsu. After all, we need to practice what we preach as a manufacturer in our own right.

For instance, we took one area of our business – the production of system boards for our own products – and we decided to think-outside-the-box or, as I like to put it, think-outside-the-factory. We opened up our business to manufacturing companies that needed their own system boards so that we could access wider markets. This clear business goal served as the guiding principle and based on this we developed a step by step plan for our production and our supply-chain to become more flexible in covering the more heterogeneous demands of our manufacturing customers. We adopted disruptive technologies like AI and applied them to the way we manufactured our products so that we could address the market in a more agile way.

The secret was collaboration. In order to achieve our transformation goal, we had to bring subject matter experts from various areas around one table (data scientists, production line experts, machine vendors who supplied vital technology for our shop floor), and last but not least edge computing experts. This gave our planning more nuance and agility. It's a human-centric approach – one that's always been in our DNA. And it's embodied by our Digital Transformation Centers – DTCs – which are physical spaces with digital tools focused on bringing the right people together to have great ideas.

Every business sector is driven by ideas. Technology is a tool. People make things happen. Only people can really understand the entire set of process within a supply chain and how they interact. Only people can take the data from those processes and turn them into insights and, ultimately, wisdom. And wisdom depends on getting the right people involved. Which is why our DTCs are useful: they are neutral spaces (intelligently equipped and planned) where experts from a broad range of fields can share experiences and insights to produce a much more holistic outcome. The core of our DTCs is driven by a methodology, it's professional execution, the technology that supports it, and our own subject matter experts in fields like AI, Quantum inspired Computing, Distributed Ledger Technologies, and Edge Computing / Cloud Orchestration. But what is most important is the know-how and expertise of our customers and partners.

Be ready for uncertainty

No one knows the future. Every engagement with a market is uncertain. That's why the von Moltke quote resonates, and why I'm grateful to that British consultant for bringing it to my attention. You need to expect the unexpected. But you need not do it in a haphazard way. You can deal with uncertainty because if you expect it, you can be ready for it. No one can guarantee the success of any project – not even Fujitsu – but one thing is certain, no business can continue to be run in the old ways anymore. Rigid planning, central control, sticking to strategies in the hope the market will turn around to match your expectations. That never really worked anyway.

It's all about collaboration and strong guiding principles. Have people who see the big picture talk to people who are experts in specific aspects of it. Share the big picture (for instance, in our DTCs) and create guiding principles which enable every member of the team to react intelligently to unforeseen circumstances. Align capabilities and ideas, match the right technologies to your goals, and then learn from experience to inform how your strategy evolves.

That's the secret of a truly end-to-end supply chain that's elastic enough to cope with an uncertain world.

Achieving the Smart-Factory-Continuum

A smart factory is where two supply chains intersect: intellectual and physical. A fact that illuminates the Fujitsu commitment to putting innovative technologies and business practices in action while developing new ways to push the boundaries of what's possible in the sector and creating real business value.

A discussion between

Alok Sahu and

Greg Pincar

"Smart factories are exciting places, even though they often feel very calm and ordered." Says Alok. He's right. Many modern factories can feel more like university campuses.

"What Fujitsu has been doing in its own factories is to change the day-to-day reality of what manufactures do and can do," says Greg. "If you brought back Henry Ford and let him tour a smart factory production line producing thousands of high-value items each week, he wouldn't believe you," says Greg.

"It's almost as if we were creating a new physics for manufacturing, instead of understanding the space-time continuum, we are actively creating a smart-factory-continuum," says Alok.

The image is a vivid one. The Space-Time Continuum is about bringing space and time together to add a fourth dimension to physical reality. That's what Alok and Greg believe is happening to manufacturing.

"Manufacturing is a series of processes. Each depends on the other," says Greg. "If a single part malfunctions or is missing, then the rest suffer. The product doesn't get made on time, and the customer doesn't get what they need. Digital technology is enabling us to unlock the one thing that enables all those processes – inside and outside the factory – to work more seamlessly. And that is data." Data that can be used to improve quality, reduce cost, improve yield, impact customer satisfaction – the business benefits are significant.

"Manufacturing is about constant movement and flows of data. The supply chain is a vital part of that," says Alok. "You can't achieve success on the factory floor if the supply chain isn't working properly. The flow of materials and data into the factory, and the flow of goods and data out of the factory."

"And then it flows back again to inform every part of the process," says Greg. "That's why it's a smart factory. Actually, just as out in space, the sequential flow of events isn't really relevant. It's the relationships between processes, machines, people, and data, that creates the continuum and those relationships are constantly evolving and improving."

"If you create the smart factory continuum you get that flow of intelligence and insight in real-time, and that helps you see more," says Alok, "And, in turn, results in opportunities for continuous improvement."

"It helps you see into the future," adds Greg. "You create the conditions where you can predict things much more accurately using sophisticated analytics. The rise of IoT means that you can add sensors to just about anything, and you can automate a lot of processes using RPA and AI, but the real benefit comes when you put it all together with smart humans to transform the power of the supply chain in real-time."

"On a practical level that means being able to anticipate problems and avoid them so you always make your delivers on time," says Alok. "So, today, we know that we have to produce X number of items for delivery on January 3rd in, let's say, France. OK, so being able to see the whole picture across the entire supply chain beyond the factory, in the factory, and right up to the customer making use of the items we're making, means we can predict problems before they arise."

Alok's description encompasses potential points of failure in terms of sourcing raw materials – what if there's a problem in a country where they originate? If that's going to cause a problem can you switch supplier to a place where there are no problems?

It covers weather conditions for the delivery of those items – and then beyond the factory in terms of delivery to the customer. Is the weather forecast in either direction going to cause delays? That might mean changing the way they're shipped.

"It's real-time interconnected intelligence," says Greg. "It's the fourth dimension to both the supply chain and the production line. We have a diagram which we call the Smart Factory Wheel. At first it looks complicated. It covers everything you can think of across the entire set of processes, from raw material to the end customer or consumer and back again. But, the two arrows in the middle form a perfect circle: data and processes working in harmony."

"Much of what manufacturers actually do all day is about planning – getting more accurate data about demand, the state of supply of all kinds of materials, staff, customers, market numbers... you could go on and on," says Alok. "The point is to avoid any kind of fragmentation, or even the temptation to focus on one metric at the expense of another. That's where you get problems and bottlenecks, or when you miss signals that you need to understand." The idea of a smart-factory continuum is a compelling one. Especially when you realize it's not actual rocket science. "Far from it, it's logical," says Greg. It's about the technology that's available today, and the new digital ways of collecting, analyzing, and actioning data which exist and are getting better all the time. We need to stress that the Smart Factory enables a pragmatic approach to achieving tangible business results. It's how you can I realize both small and significant benefits on your journey."

But, how do you put it into practice?

"First of all, it's not about dismantling your current business and starting over," stresses Greg.

"It's about applying the technology in clever ways, step-by-step, though a co-creation approach that evolves over time," adds Alok.

"We create a Digital Twin," says Greg. It's a concept that, at first, sounds like something out of a science fiction story. "It's a digital representation of your processes from beginning to end. It uses the data you're getting from all kinds of IoT sensors, as well as retailer data, scan data, market numbers and so on, to model how your processes work now and how they can be modified to work better, more efficiently, for less cost, and achieve higher quality outputs."

"Simply, it's your business in the digital realm," says Alok. Digital Twin Technology was listed as one of Gartner's Top Ten Strategic Technology Trends in 2017 and SAP's Senior VP of IoT claimed that "Digital Twins are becoming a business imperative... companies that fail to respond will be left behind."

"A lot of technologies arrive with similar warnings," says Greg, "But, though the point is correct, the sense of urgency isn't. We are ready and able to deliver Digital Twin insights right now. The point is to do it cleverly so that you gain quick wins, and then build for the future. It's not an all or nothing approach."

So, how does it work?

"We work with you to create the Digital Twin," says Alok. "We need three to four months of data to ensure that the model is a robust and accurate one. It takes time to mature – the Twin, that is – but even while it is getting deeper you get quick insights into problems which are about to become urgent."

Who looks after the Twin once it's matured? "We help you pilot the concept and deliver improvements to whichever elements of the current supply chain need to be looked at, and then we step-back once the Twin is an accurate representation of your processes, end-to-end," says Greg.

The Digital Twin thrives on data, and so it's important to provide it with as much data as possible from every source that's relevant. "There are usually quick wins, but this is a long-term thing," says Greg. "It's important to understand that the visible value of the Twin will come over time."

"That's because the more data you feed it, the healthier, and more intelligent the Twin becomes," says Alok. "You're putting in more and more data so the predictive power of the technology becomes more valuable. You can act on what you're seeing much faster in the real world because you are seeing the continuum right there on your screens. Not only will you improve your business results, you will also have the ability to predict and avoid costly problems before they become real."

"You need to do this now," stresses Greg. "It's a catalyst for change. The Digital Twin will show you what data you're missing, so you can act to ensure that you get it. That might mean adding more sensors to your supply chain or production line or even your products themselves. It will reveal that you don't know as much as you thought you did about your suppliers' supply chains, or your customers' needs. You can act to see more of what's happening beyond your traditional boundaries."

"It's a tool. We're not claiming it's the ultimate solution," says Alok. "Manufacturers have to fix and grow their business while they're running their business – and that's a challenge. It always has been. This new approach to approaching and improving the entire supply chain that spans every element of what you do, is the best way to achieve constant improvement, innovation and business value."

Blockchain in manufacturing:

Don't think outside the box, throw the box away!

There are a few people who can't really see the point of the 'blockchain' – the leading economist, Nouriel Roubini, called it a 'glorified spreadsheet' – but perhaps he's still thinking inside the box of how we used to do things, especially in manufacturing. Our sector is changing fast. In fact, it's at the forefront of industrial digital change. Manufacturers have always pioneered new technologies – from the moving production line to robotics – and so it should be no surprise that many are looking to transform the effectiveness and security of their supply chains through the blockchain.

By Frederik De Breuck

Blockchain may sound complicated to many people. That's because it's associated, predominantly, with Bitcoin and other cryptocurrencies. Bitcoin isn't blockchain, and blockchain isn't Bitcoin. Bitcoin relies on the blockchain, but the blockchain is a concept that transcends it and every other similar product. So, what is it? Simple, it's a more efficient way of rapidly securing, and efficiently recording and exchanging data. Its records are immutable, they can't be tampered with, and last forever. It eliminates non-value adding intermediaries and offers total traceability of each record and its deep history.

Pretty good. Very useful. And it offers the chance to be more secure and know more about what's happening across many areas of your supply chain. But we do need to step back and take an honest look at how blockchain can work in manufacturing. After all, manufacturing is not a cryptocurrency. Bitcoin is an easy concept to understand: it's a marker of value. It's money, And, in the end, money is a pretty simple concept. You either own it or you don't, and when you exchange it, it's usually a two-way deal.

Supply chains, especially in manufacturing, are highly complex. They are multi-layered and involve many different parties and operate over wide geographies and, usually, critical timescales. So, maybe Roubini has a point; Blockchain is just another spreadsheet. Well, if it is, then it's a very sophisticated and secure one.

I believe we need to start thinking outside the box, and then realize that we need a new box. Key to ensuring that a supply chain works is data. Much of it is, currently, unstructured. That means we're not able to make the most of it to achieve efficiencies and to generate insights which can lead to new, better ways of doing things. Blockchain will give us the power to harness that data, make it work harder, and to reveal patterns which help us innovate.

Blockchain will help us ask new questions, question industry orthodoxies and conventions and find new ways to execute functions that are vital to the health of our businesses and the entire sector. It won't happen quickly, but it needs to happen. And you need to be part of that evolutionary process. And we mustn't get carried away: blockchain technologies are a supplementary platform, not and end-to-end solution for entire business ecosystems.

Blockchain is a distributed ledger. Yes, a bit like a spreadsheet. But, it's immutable. A transaction is initiated and it generates data. That this then stored in a cryptographic block which is transmitted to a network where it becomes an immutable part of a chain of nodes within that network. Then the person or company on the other side of the transaction receives the data and it's validated. That's it. It's there forever.

The key word is 'trust' – and that's always been the key word. You need to be able to trust the data that drives every transaction. In the world of cryptocurrencies that's all about ownership of a coin that represents a specific value at the time of exchange. Within the supply chain it's about the product or material, its price, integrity, quality, production, delivery, and value. More complex but still focused on trust. Manufacturers rely on their supply chains to ensure that they produce the goods that their end-customers want. Any breakdown in that chain and the knock-on effects can be catastrophic.

So, you need to not only feel in control, you need to be in control and have visibility across the supply chain so you can work with confidence. Blockchain, though its sounds complex, actually makes the relationships between different players within the simple less complex. There are no intermediaries, as I mentioned before, because it's a peer-to-peer system. It can be private or public (Bitcoin and other cryptocurrencies are necessarily public), and you can create your own blockchain. It's not something that an outside authority needs to do.

This isn't a revolution. It's an evolution. There has been a lot of hype around blockchain but that's to be expected. At Fujitsu, we're taking it slow. Gartner's research shows that around 90% of organizations have dabbled with blockchain projects. But, only 20% of them have produced any kind of blockchain solution. In the end, blockchains are as much a social and business experiment as they are technical ones. People want to see if it can help them drive their digital futures. And it's happening in all sectors, public and private.

It will take time. And it can't be done alone. It requires co-creation. The only way you can build a truly useful blockchain is through collaboration. Which is why we've created a Blockchain Innovation Center in Belgium. It's the logical thing to do for a company like Fujitsu which has always been committed to developing new ways of dong things in collaboration with its customers. And blockchain can only succeed and deliver value if it built based on the specific needs of each business.

The Center is focused on matching blockchain to specific use-cases, then developing projects that enable manufacturers to rethink their business models. That's important because digital technologies – from IoT to AI and robotics – are changing business models whether manufacturers like it or not. We want to get to scalable, business-ready solutions fast, but not so fast that they fail to deliver the value they should. That's why it's important to have a place where we can think deeply and prove concepts before they're used within the existing supply chain.

The aim is to structure unstructured supply chain data, ensure it can be recorded, accessed, secured, and become actionable fast, and then use the blockchain to leverage the potential of cost-savings, efficiency, and deliver end-to-end frictionless flows of the things that are vital to your business.

It's important to start small. Iterate ideas, find out if they work, and then scale them up. That works with the blockchain just like it does for any other kind of solution. It's a way of testing out what can be done, and how you can go beyond the need to utilize complex systems which represent a lot of cost and effort. You have to be able to integrate the blockchain throughout your business – into the back-end systems as well as those at the front-end – and ensure that you really do get a total vision of the supply chain, end-to-end, from mines to mills to roads, factories, distribution networks and customers. That's where the true value of blockchain resides: total vision, total trust, total control, and accountability.

Thing One, Thing Two, Thing Six Hundred Thousand and Three:

How tracking your assets gives you the freedom to be creative with your supply chain

By Nikolai Duschek

Not so long ago, a schoolchild was asked what she thought the Internet of Things was about. She thought for a moment and then said, "It's when Thing One and Thing Two get together and take over the world."

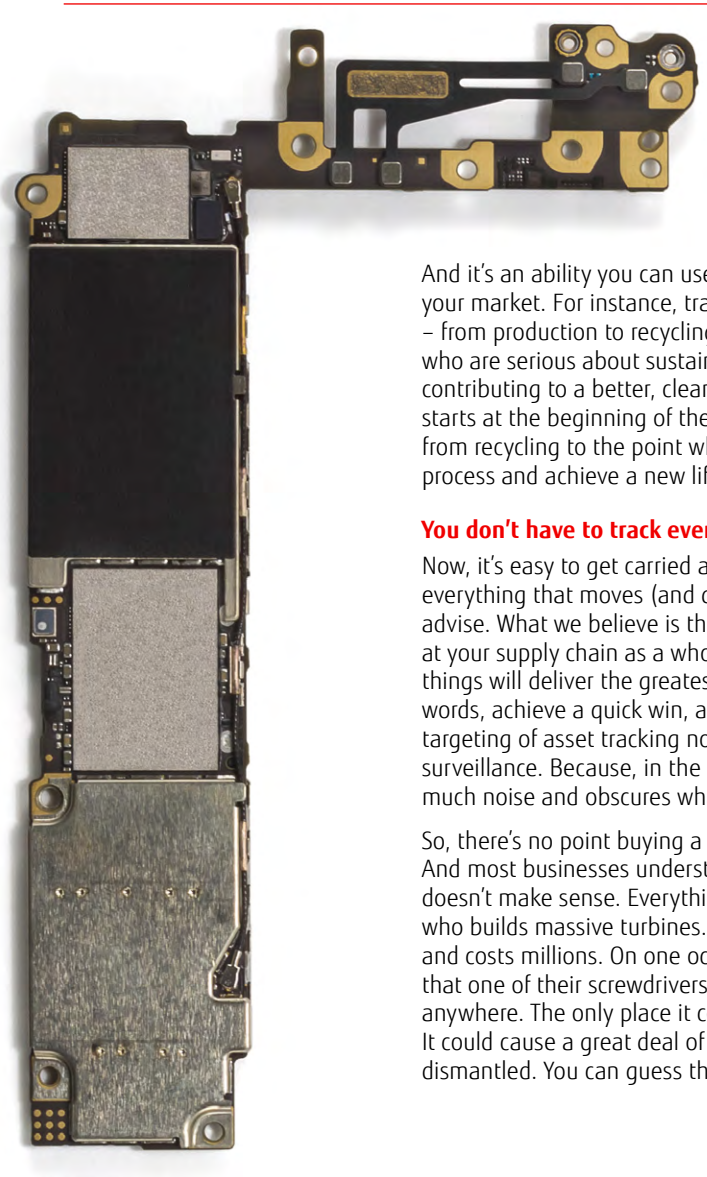
She was, of course, referring the world-famous Dr Seuss book, The Cat in the Hat, and the strange creatures that turn up amid the mayhem and are enigmatically named, 'Thing One' and 'Thing Two.' The Internet of Things – IoT – is, as the name suggests, all about things. Any things. All things. Our digital age allows us to track everything and everyone. That has creepy connotations, but it's also good for business when it's done in the right way.

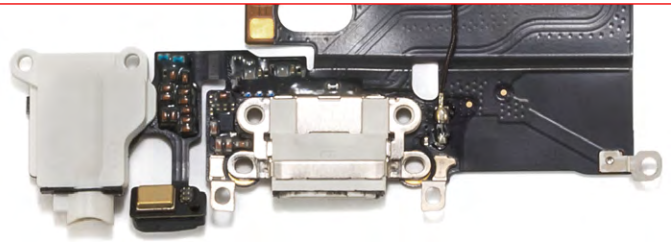
At GlobeRanger we've been in the business of putting RFID tags and other technologies into things one, two, and 600,003 since 1999, so we know a thing or two about tracking assets. And our entire experience has shown that the benefits of getting a real time, holistic view of where your things are, what state they're in, what they're doing, and how they're doing it, is of invaluable benefit to any kind of business.

As other articles in this Spotlight show, the ability to see more and look deeper means that you can make better decisions about how you run your business and, most fundamentally, get the right products to the right customers at the right times. It also means you can extend you reach into the customer's world and offer new kinds of services as well as features which deepen your relationship with them and can generate new revenues.

It's all about the data

The key to achieving that new world of smart manufacturing is relevant, timely data. In the end, the reason for tracking anything is data. Information. Knowledge. Something you can track and then organize into a set of statistics, locations, temperature readings, and so on. That gives you the ability to make decisions. You can automate certain decisions and you can give humans what they need to make wiser, more creative decisions. The point is to turn the data that comes from a humble RFID tag or sensor into real-time actions that make a difference to productivity, costs, customer service and, just as importantly, safety and sustainability.





And it's an ability you can use to differentiate your business within your market. For instance, tracking things across their entire lifecycle – from production to recycling means that you can offer customers who are serious about sustainability the certainty that they are contributing to a better, cleaner, and more rational world. That also starts at the beginning of the cycle, where materials can be tracked from recycling to the point where they re-enter the manufacturing process and achieve a new life as something else.

You don't have to track every 'thing'

Now, it's easy to get carried away and add tags and sensors to everything that moves (and doesn't move). But that's not what we advise. What we believe is that you need to step back, take a look at your supply chain as a whole, and find the points where tracking things will deliver the greatest advantage in the short-term. In other words, achieve a quick win, and then look for more wins. It's strategic targeting of asset tracking not wholesale surveillance for the sake of surveillance. Because, in the end, too much surveillance creates too much noise and obscures what you really need to see.

So, there's no point buying a 100k solution to solve a 10k problem. And most businesses understand that a $2 sensor on a 10c item doesn't make sense. Everything is relative. We had one customer who builds massive turbines. They take a long time to complete and costs millions. On one occasion, the team working on it realized that one of their screwdrivers was missing. It couldn't be found anywhere. The only place it could be was inside the turbine. It could cause a great deal of damage. The turbine had to be dismantled. You can guess the costs and delays that caused!

Putting a sensor on the screwdriver might look like a bad financial proposition on paper if you only compare the cost of the sensor with the cost of the tool, but it makes complete sense when you stand back and look at the entire picture. In the end, the Internet of Things applied to supply chain management is all about weighing up costs and benefits.

> You need to look at your business, find specific problems that you need to solve, and then address them with tracking technologies that provide you with the data in real-time to achieve an advantage.

Your supply chain is the foundation of your business models

What we're really talking about here is your business model. Or models. In the digital era, organizations need to operate more than one model. That's because the needs of the customers are changing fast and you need to stay ahead of their evolving demands. Only access to data can enable you to do that. But rapidly changing business models is scary. It suggests a lot of change at all levels of the organization. That's why we advise a more measured, targeted approach. For instance, we worked with a police force in the United States which was worried about the chain-of-custody of the weapons they issued to officers. Each weapon had to be appropriate to the individual officer's training and expertise.

It was a single problem which we solved in an intelligent way. We tagged the weapons and linked that data to each officer's identity badge. So, when an officer checked out a weapon the two bits of information were put together: this weapon needs a certain level of training and certification, and this officer either has that certification or not. If they do not, then an alert goes off when they attempt to leave the premises. Simple.

Apply that simple solution to a warehouse or any other kind of premises and you get a much more intelligent way to ensure that the right people are handling the right equipment or products. It's being applied to medical facilities, pharmacies, as well as other places where dangerous materials or things are handled.

Tracking things enables you to transform the way you work and how you engage with customers and that, in the end, is how new business models evolve. And you can see it evolving in real-time on our iMotion platform. Any sensor with an IP address and attached to a thing or a person can be viewed on the platform. It integrates with any ERP system and enables you to create richer, more responsive workflows.

It energizes your supply chain. It makes it a dynamic asset that feeds back data that can be used in multiple ways to benefit the business. And you can automate a lot of processes so that just happen when they need to. For instance, we have a customer who works with expensive carbon fibers which need to be within a specific temperature range. When they're taking out of the machine that keeps them cool their temperature is tracked and if it gets too warm an alert reminds the worker to either work it or put it back in the fridge. That saves costs, of course, but it also make the production process more efficient.

An empire of things

Tracking assets enables you to be in charge of your entire estate. You become the emperor of all things. Literally. You achieve control and visibility. And you can use the insights you get to deepen your relationships with customers. There are many examples, many of them repeated by IoT specialists in publication after publication. But the point I want to stress is that you should build your empire step-by-step rather than going for a full-scale revolution.

That's what we help our customers do. We consult, explore, find pinch and pain points, and then prove the concept of tracking in terms of costs, productivity, efficiency and innovation. Then we build the empire of things, from one to two, to many millions if that's what you need.

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