



The CEO files: Each month, CEO Europe shares its expertise and presents you an expert synopsis of a specific topic.

What can RFID & Emerging Technologies offer our European CEO's?

RFID (Radio Frequency Identification) has been described as the oldest new technology! It has been around for about fifty years, its value in identifying Aircraft in flight during the Second World War was quickly realised by the British Air force. The following forty years the technology was mainly used in security applications, building access, road tolls and key fobs.

RFID is an infrastructure technology, which will have a impact on almost every business process. However RFID is still a new technology, and thus we are waiting to see where it will lead in many applications. The case for RFID is well documented within specific business scenarios, but the benefit to the consumer are still little known apart from Londoners with their Oyster cards and Parisians with their Navigo cards. However, most people have used RFID without realisation it in their key-fobs, and one or two have found this facility so convenient that their home doors are locked the same way.

What is sure however is that RF is here to stay, with major pilots and positive proofs of concept across many industries: food and drink, aerospace, libraries, government, transport, retail, pharmaceutical, healthcare, logistics, auto industry, security etc. The IT and Building Industry have an enormous opportunity here.

Because of the need to identify vital equipment quickly, the Military were naturally interested in technology that could help take the guesswork out of inventory and logistics. Wars fought in foreign lands create massive logistic problems; soldiers need bullets, food, etc when necessary, regardless of price or location. Battle readiness is key to military success.

RFID use by the US Military was identified quickly by major retailers like Wal Mart, Metro Group, Target and Tesco who felt that the ability to "see" stock in their supply chains would help eliminate delivery error, stock-outs, shrinkage, human error etc and also help in building consumer driven demand chains. Inventory cost money, and uncertainty causes stock build up by all stakeholders in the supply chain. High stock levels, or empty retail shelves simply reflect a lack of knowledge. Awareness of goods flying off the retail shelf by manufacturer is extremely useful when creating production runs. However for now retailers are focusing on the benefits of pallet and case-level tagging. Manufacturers and retailers are working very closely together to remove inefficiencies from their supply chains. This helps consumers by keeping the right stock on the shelf at competitive prices, and in America where item level prescriptions are being rolled out by a major pharmacy group (CVS Pharmacy), it will enable better management and control of drug stocks. Hence if a drug in one pharmacy is within three months of its shelf life it can be dispatched to another pharmacy where demand for that specific drug is greater. Also it will flag up any unusual drug sales or errors.

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But to speak only about RFID in terms of supply chain is to miss the point.

Emerging technologies: sensors, (mots or smart dust), Nanotechnology and community-wide wireless broadband, GPS, are changing the landscape for business applications and life style generally. Some argue that this is the biggest technological transformation of the 21st Century. It will transform our Cities, our work processes and our lives.

A number of RFID applications together with innovations such as EPCGlobal and standardisations around wireless spectrums are actually enabling cyberspace to interface with the real world. Concepts such as the expression "Internet of Things" will mean that every object in our physical environment can be identified and its status confirmed in real time. Soon everything that you own including your household assets will be aware that you own it! Theft is going to be difficult!

We are witnessing the rise of "Real World Awareness", which will have massive implications for us all. This is not just about identifying a packet of frozen peas in a walk-in freezer, but enabling the freezer to tell the operator its status in real time.

Does the freezer need maintenance? Are the doors shut, lights off, stock accounted for. Are there fresh raspberries in that freezer? The ability to flag potential problems, remove errors, cut costs and drive efficiency.

RFID sensors are playing a big part in airline safety. Airbus and Boeing have endorsed RFID wholeheartedly and mandated their supply chains to incorporate this technology into their product offering. If you ever glanced at the first aircraft cockpit you will see a couple of dials on the dashboard. Early pilots required the help of flight engineers, navigators and radio operator to fly. Pilots flew "by the seat of their pants", using their skill and experience. Look now at the latest Airbus 300 series! Around 600 sensors all automatically working in harmony to insure engines and aircraft are all in good working order. Risk are constantly being reduced. Pilots alone would not be able to deal with all the complexity currently handled by wireless sensors and onboard computers.

To be able to identify a foreign object like a bird caught in an aircraft engine following a successful flight can also save massive amounts of fuel. Again, to identify a minor fracture on a rotor blade prior to a major crack can prevent a nasty accident. After every flight a full log of the aircraft engine activity is downloaded to a preventive maintenance crews who search for irregularities.

This data is key to safety and efficiency in the airline industry.

These sensor innovations are also happening in Formula 1 racing. McLaren Mercedes have around 50 sensors throughout their car engine and chassis to help them improve performance. Cars racing along at 200 mph plus are giving their mechanics back at the racetrack vital data about their engines performance. Mechanics are even aware that drivers are about to change gear! This new sensor technology works well despite a very difficult environment with massive security challenges.

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The British Nuclear Group is deploying Ubisense sensor solution to map and identify radiation levels and the location of each worker to increase employee safety and efficiency.

Metro Group's Future Store Initiative in Germany is providing a glance of retailing tomorrow. Shoppers do not notice anything unusual except that each shopping trolley has a PDA which can help shoppers find products. Item level tagging is still a bit away, but the ability of the smart shelves at Metro to identify when an item is removed from the shelf is very useful for back-office staff, and the ability to identify goods about to go out of date and reduce their price helps maximise profits. Additionally there is a whole new industry of marketing and promotional ideas coming together as shoppers walk past products for sale.

Replacing inventory with information is key to improved retail efficiency and enhanced client shopping experience.

Around 7000 American gas stations are enabling clients to fast fuel their vehicles by the simple wave of their RFID fob. Simply fill up and go! The fuel fobs have been so successful that their use is now been considered in fast food outlets where convenience and service are key to happy and loyal clients.

With new sensors based in houses, smart kitchens, hospitals, factories, public parks, highways and parking spaces what will this all mean to Society, to our privacy and to sorting out some of our major social and economic problems?

Are we able to pull these emerging technologies together strategically for The London Olympics to show the world that Business UK is fit and ready?

China is currently building fifty smart cities with sensors embedded everywhere. Sensors to help improve traffic flow, bridge structure, water management, and improved transport networks. At micro and macro level where are the benefits for both industry and citizens. If everything is tagged (people and assets) then a building site can become a safer place to work. Project planners can insure at a glance that materials and tools are in place prior to bringing in the builders. Chemicals can flag attention if positioned with dangerous materials or incorrectly positioned. We can control Air, Water and Waste by tiny sensors, or at least remotely monitor public safety in real time. We can perhaps drive better greener strategies and energy improved housing.

Dentalab are making dental molds with radio frequency tags so that dentists can be alerted if an incorrect dental crown is offer to a client. Implicit here are enormous benefits for efficiency and safety. TrentStar, the beer keg asset management company, deploying RFID, made a fivefold decrease in beer kegs maintenance costs. Imagine if every public utility meter was self read? Would that reduce rates? What if parking meters could chat with cars to update parking charges? Singaporeans use their car tags to pay for parking and road use. Big Brother Technology can be convenient if

managed without abuse. Laws are required that protect the public. Would we like to carry a tag with us everywhere which for example enabled our mobiles to be an oyster card or credit card and booted up our PC when we entered the ground entrance of our 15th floor office? Would that increase productivity for employers? What if employers paid our transport fees in recognition?

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The American FDA have endorsed the use of RFID for item level prescription use.

Now "Unit of Use" medicine can be automatically matched to patient at POC (point of care).

The ability to insure the correct drug is dispensed to the correct patient is key.

US hospitals record 7000 deaths per year on average because of medication error.

In addition, 750,000 adverse medical events happen each year causing massive suffering and anxiety to citizens and caregivers. Counterfeit drugs are a major concern for everyone. How can technology remove this menace?

There are countless example of positive proof of concepts showing where Broadband, RF and smart dust-sensors can improve the way our healthcare is managed.

According to most press statements, our Hospitals are in serious financial crisis.

But do you know healthcare supply chains are run like businesses in the 60's!

We have eCommerce and barcode standards, which will soon give way to automatic data-capture for all inventory movement within our complex hospitals, but we are still a long way away from making emerging technology save us money in healthcare.

We have great technology, but sometimes lack wisdom. Globally Healthcare has incredible economies of scale, but with numerous Local Trusts managing from their individual perspectives we will continue to have massive complexity and inefficiency in the foreseeable future. What is required, in my opinion, is a "monopolistic committee" which can mandate some good economic principles to insure long-term patient safety and the adoption of best RFID business practice. RFID healthcare standards will enable a truly efficient medical supply chain, enabling assets, maintenance, resources and people to be better-managed and scarce resources deployed where necessary. The patient will experience a much improved, cost effective and safer service.

Technology however is not separate to Society. No technology exists outside the influence of people, culture, policy, and economics. Everyone "sees" according to their personal environment, their education, their family values etc. Increased awareness of our cultural mindset is important. We could look at this as a "prison mindset". A self-locking mindset makes us think a certain way and thus creates our thoughts and confirms our reality. It is a cosy place to be and change is not always invited in!

A friend of a friend once phoned in a panic to request assistance because her car-key fob was flat and she was locked-out of her car. It was explained that the key could be inserted manually in the keyhole of the driver door! She could not believe this and was amazed to find a hole in the door that she had never seen in four years!

The point is our reality is driven by what we do and experience every day; we all have blind spots just like the Ice Merchants of yesteryear who never thought that fringes and freezers would arrive to destroy their business overnight. Anyone hear of innovations where tomorrow's fridges will be running on sound waves? Goggle thermoacoustic refrigeration!

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Smart Granite worktops will soon be in vogue. The granite will carry a number of transponders and a extra large embedded antenna to insure that all food items placed on the worktop will sync with all the other smart utensils, enabling everything in the kitchen to automatically communicate: washing machine, fridge, cooker, extractor, toaster, microwave, radio, lights, central heating, wall tiles, floor, all door locks etc etc. See Do Stone Smart Granite worktops at www.dostone.co.uk. Nasty bacteria on the cutting board will self clean as will the sink and recycle basket. No child in this kitchen will ever pull a boiling pot of rice upon herself. In-build safety / security will be a standard module in every smart kitchen. Energy efficiency also should save household fuel costs by 20% .

Who in your organisation / company or home are responsible for looking into the horizon to anticipate the changes and innovations coming fast forward? To be able to exploit technology we must be open to the idea of new technologies, new business processes, changing the way we work, think, and live.

People always come first and our perspective will determine how future technology will be adopted. Thus a big RFID / emerging technology debate needs to happen to insure we don't waste this opportunity before us. I am working with Two Four Productions to bring this debate to our TV screens, so if anyone wants to get involved please do contact me.

We need to discuss the privacy issues much more, the benefits to humanity the trade off between lack of privacy and benefit. No one for sure wants to see George Orwell's vision become reality, but ubiquitous sensor and emerging technologies have the ability if deployed correctly to make a positive contribution to our lives. And we need to appreciate that other parts of the world, hungry for success are less concerned with privacy issues and are fast exploiting these technologies.

Healthcare absorbs a lot of taxpayer's money. Globally around 14% GDP!

There is little doubt that healthcare services are moving back to the community where it used to reside. Hospitals will be places for focused operations and all other healthcare issues will be dealt with from the home perspective.

Most elderly people prefer independence and deserve dignity. But it is not always possible for relatives and friends to pop in daily to insure all is well. Imagine if your elderly Grandparents lived hundreds of miles away?

With sensors creating real world awareness, it is possible to have a traffic light system on your PC which will flag up the occasion when Mr X did not get up or make a cup of tea at 7am or any major break to the natural flow of activity in their daily lives. Any change in social interaction, for example, may indicate a change in well being, or impending illness reflected early by failure to eat.

Lights automatically coming on when a elderly person visits the loo at night, for example, can help eradicate the thousand of hip operations required per year in the UK!

Smart packaging can indicate if the correct drug is taken at the correct hour and help people to better manage their medication.

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No one will believe in ten years time that mobile phones were used for voice only.

In Sweden, Norway and Denmark RFID mobile phone are becoming an essential tool for the automatic capture of critical medical data in the community. Thus an internal sensor implant could forward key data via your mobile to your doctor.

However, improved national security safeguards are essential.

Sensors in doctor's surgical gloves can help prevent accidents or assist a surgical procedure. Most operations are carried out in a standard way and the use of sensor networks can reflect the current state of an operation, assist with options, issue reminders, alert other professionals etc. Risk and error can be reduced. Work on this is currently being done at the Danish Centre of Pervasive Healthcare and Intel Research Seattle. This may lead the way to fast track medical training and open up better on-line training to less wealthy nations.

Again in Healthcare the ability of all hospital staff to be aware of impending operations, surgical and post-operational equipment and identify people and assets

quickly is a massive daily task. Time searching for people and assets within hospitals is enormous. Decontamination needs to insure that the correct equipment is at the correct theatre and in fit condition for smooth operational delivery. The reality is that Admissions do not talk with Theatre who do not speak with Decontamination, and cancellation of an operation at around £20K a go is not an infrequent occurrence. No wonder, some Healthcare Organisations has been described as a family of hostile relatives! Against this background stock is hard to identify and some hospitals phone their suppliers to ascertain how much business was initiated the previous month! eCommerce has been around for ages with platforms like UK HealthLogistics ready to deliver value. Surely a modern supermarket approach here to supply chains efficiency is required.

Who in EU Healthcare are authorised to mandate this wisdom? Once this simple decision is mandated who is ready to deliver the first connected hospital?

It will not happen overnight, but problems like hospital cash flow, supply chain efficiency, MRSA, adverse medical events (with their massive liability payouts) may be greatly reduced by sensors and emerging technologies.

Soon we will have free community-wide broadband.

Sweden last month gave free broadband access to all their citizens, with speeds 100 times faster than that available to us in the UK. Recently Milton Keynes followed suit, and The City of London promised free business broadband to everyone within the Square Mile. This emerging infrastructure is important as we start to realise that Broadband is not just a tool for Internet access and free VOIP, but an essential infrastructure for real world awareness.

From an IT perspective one of the most salient facts of these emerging technologies will be the massive amount of additional digital data to collect and the need for new hardware, software and robust standard networks to collectively make it all work.

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A whole new infrastructure will be necessary to capture, control, provide consistency, and context to massive amounts of new data flowing faster. Global standards and interoperability of systems and data will be necessary. Again EPCGlobal, Gen2 Tags, improved Readers etc., are making great headway here.

However, we may need to rethink the way we teach our engineering, medical, in fact all students. Ten years ago it was sufficient to teach a civil engineering student about programming in addition to their core subjects. But now with massive technological change and real world awareness how do we insure our professionals are up to speed in the multiplicity of knowledge required to make strategic policy decisions.

We are at the dawn of integrating convergent technologies, and if we get it right we can offer future global cities some great solutions. Emerging environmental problems may be solved by emerging technologies. Let's just do it!



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