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Flying the cold chain through the smart barrier

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Digital diagnosis: many emerging technologies are being applied in the healthcare sector

By Clive Bryant and Richard Wood

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Logistics packaging companies are bracing themselves for a digitisation influx

So here we are, on the cusp of witnessing drones equipped with thermally packaged aerial shippers, delivering time- and temperature-sensitive medicines to doorsteps in the remotest parts of our planet. Could you honestly have foreseen such a scenario, even 20 years ago?

This, though, is the cold supply chain – a space synonymous with transformation. And for good reason. A burgeoning middle class in developing markets, an ageing population in many developed ones and a profusion of public expectation have all put pressure on the value chain. But in response to new global demands, it is not just the drones that are taking off – innovation is positively flying, right across the board.

The material revolution is up and running. New temperature-control packaging systems combine vacuum insulation panels and phase change materials to protect the integrity of biopharmaceuticals. They freeze and thaw during transit to keep product environments regulated. Being recyclable and offering high performance, they also satisfy the essentials of the pharmaceutical industry’s sustainability initiatives.

“The patient is the trigger and digitisation is the enabler. It is we who will be sitting at the centre of proceedings rather than the pharmacy or hospital”

Recycling programmes, too, have emerged: old pallets, foam panels and corrugated components are being given fresh

purpose in life as coat hangers and garden furniture.

While innovation may have kindled interest in alternative materials, it is also eliciting the application of emerging technologies. Intelligence portal Statista expects the internet of things market in healthcare and life sciences alone to increase from \$520bn (£396bn) in 2014 to \$1.33trn (£1.01trn) in 2020, attaining a compound annual growth rate of 17pc.

The Council of Supply Chain Logistics report also spells it out loud and clear. The word on everybody's lips? Transparency – across a new super-connected supply chain that can handle distance and complexity.

In healthcare terms, the patient is the trigger and digitisation is the enabler. It is we who will be sitting at the centre of proceedings rather than the pharmacy or hospital, receiving diagnoses and treatments at home.



Just what the doctor ordered: drones are already delivering time- and temperature-sensitive medicines to the remotest parts of the planet

This all sounds rather cosy. But patient-centricity will create complexity in the supply chain, stimulating a hike in decentralised manufacture and distribution activities. Expect packaging and network designs to become more specialised too, as they are fashioned for specific drugs.

The upshot? Rigorous regulatory barriers will need recalibrating. New ways to ascertain product quality, safety and data security will have to be implemented. Structures and strategies will need rethinking.

Cold chain packaging and logistics companies have already recognised visibility and traceability as top priorities. A generation of temperature-monitoring products and practices have emerged: smart boxes and smart sensors can map anything from variations in shipment temperatures, humidity, air pressure, light and shocks.

“According to the World Health Organisation, around one million deaths each year are attributed to counterfeit and falsified drugs in the supply chain”

Subsequent data can be made available to authorised parties via information dashboards. Powered by cloud solutions, this brings enhanced transparency, accuracy and responsiveness to the whole delivery cycle.

The level of assurance and protection afforded to consumers, however, faces some perpetual challenges. According to the World Health Organisation, around one million deaths each year are attributed to counterfeit and falsified drugs in the supply chain.

Serialisation – the practice of assigning unique, traceable numbers to individual saleable units – is leading the charge against counterfeiting, as well as diversion and theft. Progressive track-and-trace systems offer consumers a lifeline, sometimes quite literally.

By 2023, the Food and Drug Association in the US expects manufacturers to have implemented electronic systems capable of tracing all prescription drug packages through the entire distribution channel. Advances in cryptography, where combinations of private and public keys protect data, are also building a robust security layer.

Then there is the rise of blockchain technology. First shown the light of day by bitcoin, this open ledger stores blocks of

data and preserves them in their original format. The entire decentralised user-network shields them from amendment or tampering.

The security capabilities are clearly there to allow digitisation to accelerate and optimise the cold chain safely, granting us our place at the centre of it all.

But marching into a new, open frontier with confidence will depend on the willingness of companies to embrace and implement innovation, in the face of that perennial bugbear – cost. Those first-in-liners who take the leap are likely to be far more successful than those who linger.

Clive Bryant and Richard Wood

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Formerly head of life sciences at DHL, he has been involved in developing innovative customer solutions that ensure cold chain maintenance and regulatory compliance.

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