

### Internet of Things: commercial meltdown or brave new world?

Journalistic articles written to describe the impact of the "internet of things" (IoT) often focus on the connected refrigerator – easily portrayed as a domestic appliance equipped to sense and transmit the need to buy more milk or cheese. That is certainly one application, but from a business perspective it must be among the less significant. Consumer applications will increasingly feature in home life around the world, but the most far-reaching effects are likely to be met in the context of business organisation, supply chains and in the assessment of commercial risk.

Dynamic purchasing or procurement, driven by IoT-enabled devices, already promises a fundamental shift in supply chain relationships. At its simplest, dynamic purchasing streamlines ordering procedures in existing bilateral supply contracts. Rather than providing for regular or occasional orders using manual forms, dynamic procurement uses IoT-enabled sensors to monitor and transmit in real time details of raw material, components or stock levels. Existing levels are checked against orders, with algorithms driving orders on a machine-to-machine basis to ensure that they are placed on a "just in time" basis. Commercial benefits include the ability to maintain stocks at the leanest level consistent with production or distribution needs, promising substantial savings in inventory and warehousing.

Dynamic procurement goes even further. Rather than merely streamlining elements of existing contracts, fully dynamic procurement would result in the formation of a fresh contract for each transaction, potentially breaking the link between supplier and purchaser. The purchaser's requirement would be transmitted, either directly to a range of existing suppliers or via an online platform accessible to a much wider range of potential suppliers. As well as clear specification of the required goods, key parameters might include price, current location, guaranteed delivery date. Relevant data might be gathered from suppliers' IoT-enabled facilities. For example, an IoT-enabled shipping container could draw on GPS data to feed information about its current location, direction and speed of travel. Sensors might also gather and transmit data concerning environmental conditions within the container – potentially very significant if the contents are perishable. From there, prices might be provided by way of data feeds from each supplier, with the contract going to the supplier whose data best meets the purchaser's requirement.

Each scenario is credible. IoT is not a future prospect, but a current reality. It is an increasingly valuable element of supply chain and contract management. It is also a crucial driver for the development of "smart contracts".

#### **What is a "smart contract"?**

A smart contract is fully "self-executing", which means that it is written (or, perhaps more accurately, coded) using a series of "IF/THEN" statements to describe every relevant state of the contract. For example:

IF [Advertising Network #564445] sends [1,000,000 clicks] that [convert to purchases at a rate of 15% or more] THEN release [[\$0.002] for each of those clicks] to User/Account #899782392

Performance – here defined by the number of clicks and the sales conversion rate – would be verified by data feeds respectively generated by the Advertising Network and the User. Where that data is gathered and transmitted on a machine-to-machine basis there would be no need for human intervention once the contract has been set up, and it would be an easy matter to apply a further element to the IF/THEN statement so that it becomes a recurring/periodic procedure.

The key to “smart contracts”, then is to break the commercial elements down into a series of IF/THEN statements and to agree on data feeds that will verify performance.

In the simple example, payment would be “released” immediately on satisfaction of the conditions contained in the “IF” element of the provision. That suggests a radical change in the practice of many businesses – particularly large-scale purchasers – whose current invoice procedures often impose as long a period as possible before payment is made. For a fully “smart” contract, payments might be placed in escrow, or access might be given to the paying account. However, given their commercial leverage, large-scale purchasers might simply incorporate their usual payment terms into the “THEN” element of the provision, perpetuating the imbalance in cashflow terms that often characterises the relationship between large organisations and their suppliers.

### **Why is Bitcoin relevant?**

The technology underpinning Bitcoin is often referred to as “blockchain” or “distributed ledger”. An element of value is identified and given a unique identifier known as a “hash”. That hash is carried into the next transaction involving transmission of that element of value. Each subsequent transaction is added to the original “block”, giving a complete, unalterable and objectively verifiable record in relation to that element of value. The blockchain is open to inspection, and is the “public” element. The detailed contents of each “block” or transaction remain confidential, protected by a private key.

Blockchain is being incorporated into smart contracts – for example, providing a verifiable record of transactions affecting a particular asset, such as a parcel of land. Confidence in the ability of the current owner to transfer value stems from the blockchain or distributed ledger, rather than from a record maintained and updated by a central authority or agency. Consequently, where smart contracts are based on blockchain, the way is open for a radical shift in the relationship between assets such as land and the role of State bodies such as Land Registries or (possibly) Revenue authorities.

### **Are these developments commercially viable?**

Greater efficiency in transactions bring obvious advantages – not least through reduced transaction costs. However, the developments discussed in this article reach much further than that, and may require a radical rethink of key commercial relationships.

It is worth considering those developments in a broader context, bringing in the perspective of lenders and potential investors. When deciding whether to provide banking facilities, ranging from accounts to loans, guarantees and performance bonds lenders are rightly concerned to assess business prospects and revenue projections as part of any overall security package. Healthy order books and multi-year contracts provide good evidence to support lending decisions. In a world of dynamic purchasing, and even more in a world of dynamic procurement, those elements are likely to fall away – perhaps even taking with them contractual protection such as “take or pay” clauses.

That does not necessarily mean that businesses would lose viability from a lender’s or investor’s perspective. However, it does require substantial recalibration of the factors that underpin lending

or investment decisions. If every contract – or even a significant proportion of contracts – becomes “smart” and agile, assessing business performance will inevitably become more difficult: but then risk assessment is a fundamental part of lending and investment, and when they must do so, markets are well-able to adapt to new conditions.

Any widespread move towards smart contracts also has clear implications for lawyers and legal services. If smart contracts were to be adopted across sectors, one result might well be a substantial reduction in the volumes of transactional work requiring legal input. Contractual disputes might also diminish where contractual performance is verified by objective data feeds. That is not to say that all deals could easily or cost-effectively be rendered into smart contract form, or that contractual disputes would become a thing of the past. It does, however, support the view that an increasing proportion of the work traditionally carried out by law firms might be commoditised or dealt with on a “do it yourself” basis by clients. In response, law firms may well have to re-examine and overhaul their business models – perhaps even making a long-overdue attempt to close the gap that has opened up between law firms, largely still locked into a model dominated by specific transactions and disputes, and the broader advisory practices that have emerged largely uncontested from the major accountancy practices. IoT, blockchain and smart contracts might well compel law firms to reconsider what it means to be a lawyer, and to focus on areas in which legal input genuinely adds value.

**Article by Malcolm Dowden, Director, Gwentian Consulting Limited.**

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Suzana Ahmad

Phone: (65) 6318 4795

Email: [suzana.ahmad@thomsonreuters.com](mailto:suzana.ahmad@thomsonreuters.com)

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## **About The Author And Workshop Speaker**



**Malcolm Dowden**

**Director**

**Gwentian Consulting Limited**

Malcolm an experienced commercial, regulatory and telecoms lawyer, and also an internationally accredited legal training provider and law tutor with a strong background in commercial law and practice. He currently combines a role in legal practice as consultant to City law firm Charles Russell Speechlys LLP with the design and delivery of legal and professional training courses as Director of Law Programmes at Law2020.

He has delivered courses and workshops on contractual drafting and contract management in various parts of the world, including India, Singapore, Vietnam, Dubai, Bahrain, Nigeria, Kenya, Uganda and Tanzania. During the summer of 2015, he was commissioned by UKTI and British Expertise to design and deliver PPP training workshops to government and private sector stakeholders in South Africa, Zimbabwe and Zambia. Within the UK, he regularly delivers courses, workshops and webinars on commercial contracts, real estate, environmental and infrastructure issues.

In 2014, he co-authored (with Colleen Theron) Strategic Sustainable Procurement (DoSustainability). In September 2015, returning to his real estate roots, he contributed a chapter on environmental clauses to the Solicitors Journal Special Report, "Commercial Property Practice: An Expert Guide".