Organisational Automation: The Ultimate Integration

By Chris Molloy at IDBS

To grasp the opportunity presented by the data deluge, we must treat data as a capital asset, make data and process interoperable across the enterprise, and make researchers 'social' again

I set my HDD recorder for the series finale of Downton Abbey. I used my smartphone. It felt good. On the train, I caught up on what's going on at work and at home using FlipBoard – possibly the best app I've ever used on my iPad after Chemjuice! Thank the stars I did. My discovery of the day was that my anniversary dinner reservation was at a restaurant the world seemed to hate – so I dodged a bullet and re-booked online. So what? We can all do that. We are all high-tech creatures now: connected and ready for a 4G upgrade. But does today's power of managed data extend into the professional world of the brightest and best minds in pharmaceutical R&D? Has it really got us connected, integrated and able to consume real-time enterprise data? Can we make agile and distributed decision-making and social integration work today? No, and this is not just a CIO's problem – it's a CEO's problem; it's everyone's problem.

Keywords

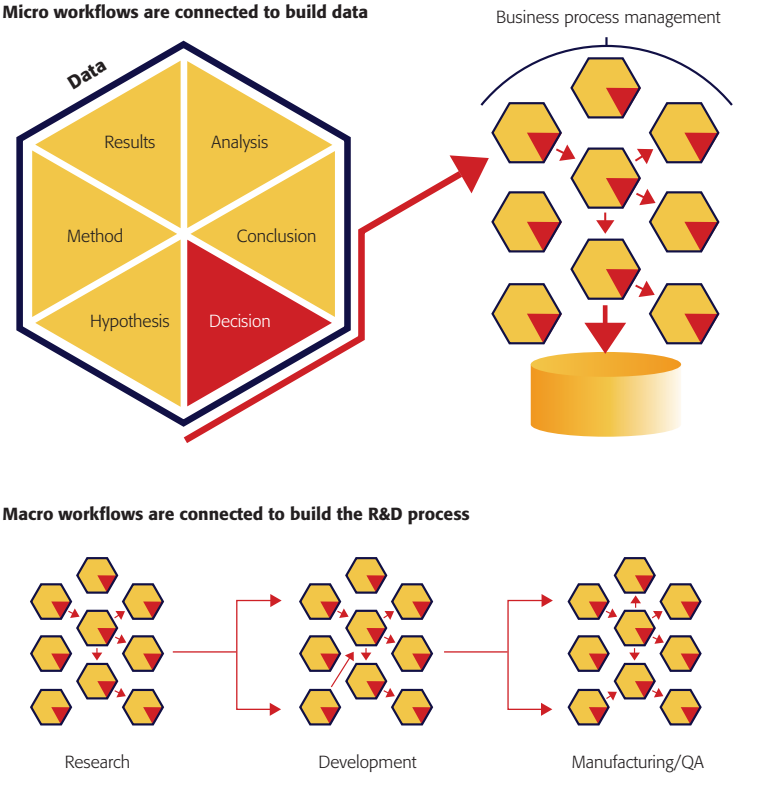
Data deluge
R&D information system
Data ecosystem
Electronic notebook

According to IBM, 90 per cent of humanity's data has been generated over the last two years (1). Even though much of it may be of dubious value – unless you want to find out how best to tie a reef knot underwater or juggle hammers – the trend is clear, and the value of managing data and processes across an organisation is clear too. Just like cardiovascular disease, there is no single intervention – just a combination of changed awareness, lifestyle and technology. To grasp the opportunity presented by the data deluge, we must treat data as a capital asset, make data and process interoperable across the enterprise, and make researchers 'social' again.

Treat Data as a Capital Asset

R&D-centric companies create, use and monetise information. Across all sectors, from pharma to food, there is a realisation that

Figure 1: Scientific workflows combining to make scientific enterprises *Source: IDBS*



the raw asset – data – has value. As the corpus of data is added to, interpreted and shared, it becomes increasingly more complex and valuable. Today, data really is 'the new oil' (2).

Understanding how and where the assets are really created is critical. Traditionally, R&D has been considered a linear progression through a multidisciplinary set of teams chained together to provide basic research, new product discovery, regulated trials and manufacturing. This heritage concept does not reflect the way that these teams really generate the information asset and in fact serves to entrench a siloed mentality, often reinforced by separate historical management and informatics structures. In reality, the process is a complex inter-dependent community of projects, supported by various teams, each providing skills and guidance to move products from inception to delivery – an ecosystem of ideas, data and information (see Figure 1).

A recent survey of 682 researchers by IDBS and Scientific Computing reviewed the ability of researchers to work within that data ecosystem (see Figure 2). The results show that today's researchers wish to, but fail to, collaborate effectively. In many cases, this is simply because they cannot efficiently move data from one person to another. The survey demonstrated that 91 per cent of researchers could not align data from internal or external collaborators effectively.

Today's data ecosystem is unstable. It is highly fragmented, with researchers having to use multiple, often disjointed systems to capture, compute and structure their data. Notable is the prevalence of legacy in-house systems. These represent niches

Figure 2: IDBS and scientific computing survey

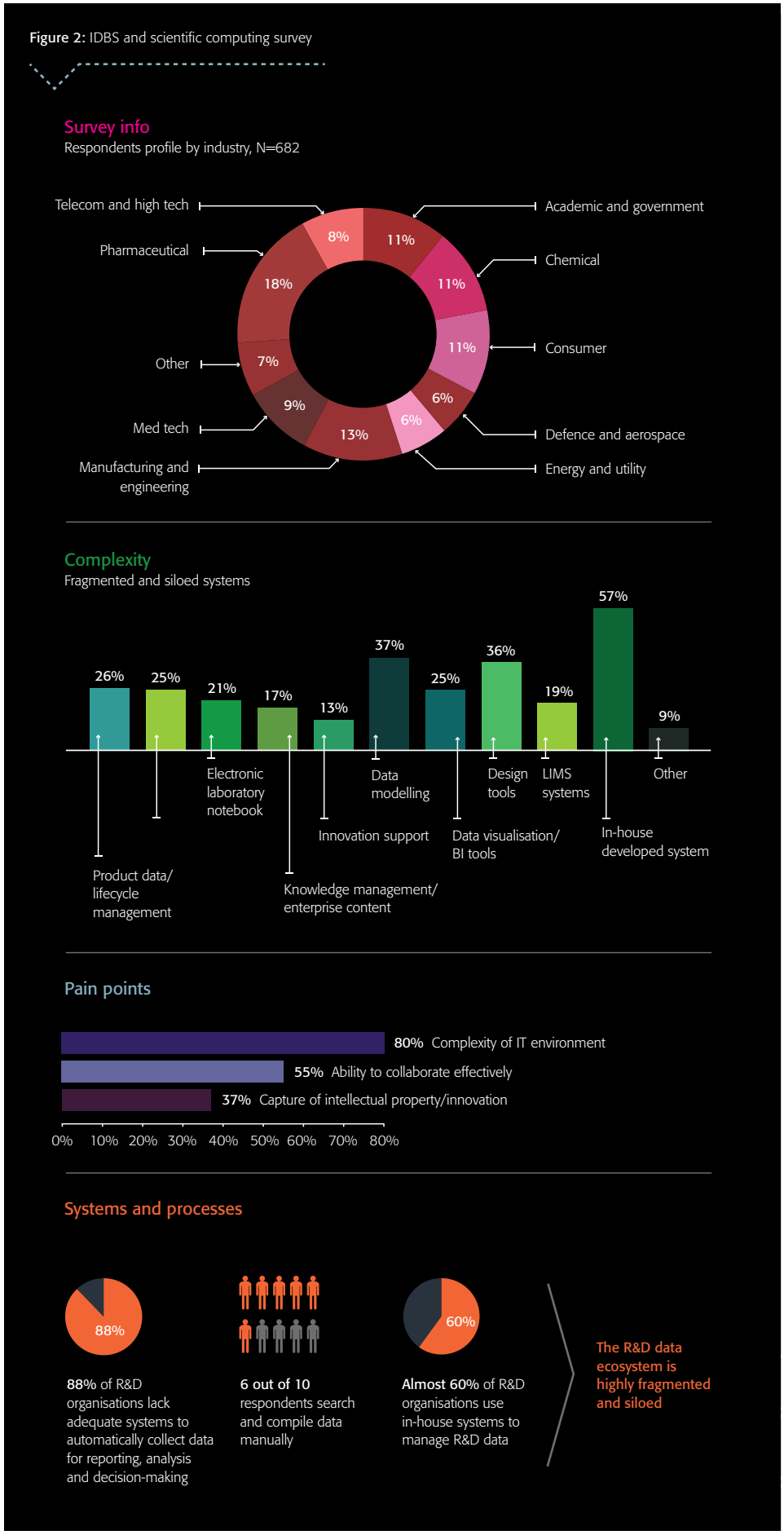


Figure 3:
Scientist working with an IDBS E-WorkBook

within the ecosystem that are often vestigial: an important work-around from some time in history that is now an impediment.

Make Data and Processes Interoperable

Leaders in R&D believe that data and processes should be interoperable across the enterprise and use this as a vision to change their culture. Siloes of activity and of thinking often build up through a simple lack of visibility of one another – and this breeds mistrust. Once a real-time data connection can be made between them, it is possible to start aligning decision-making and process steps. This enables organisational change, process insight and innovation, similar to the revolution in cellular manufacturing systems adopted in the 1990s and 2000s. These replaced the monolithic manufacturing models of old to create dynamic manufacturing cells with unparalleled flexibility.

R&D entities undertake constant organisational change to harness together multiple disciplines into logical groupings to exploit the best minds. Companies have tried grouping by region, by small business units and by discipline. There is probably not a winning model based upon this alone. Organisational structures define barriers. Therefore, the critical function of each part of the organisation is to understand how to work across these interfaces and maintain the flow of ideas.

The world's pharmaceutical giants are not the only ones taking this approach. Industrial research and development-to-manufacturing organisations (RDMOs) such as BASF, Total, Cargill, L'Oréal, Kemin, Danone, Becton Dickinson and others have recognised its importance for continuous business improvement (CBI) and are rapidly coming to value their data. Their benefits are not just institutional but quantifiable, with the soy technology company Solae recently disclosing a saving of five to eight hours per scientist per week at a recent meeting in Berlin (3).

We cannot expect to put everyone in today's distributed R&D model to work together in an orchestral arena or in Mission Control. But we can provide them with a platform of data in order for them to collaborate – providing real-time, high-context, secure access to what everyone else is doing and how they are doing it. This is the same idea as the one behind the cable channel app on my tablet and the 24/7 online banking that we all now take for granted.

Make Scientists 'Social' Again

We employ humans, not algorithms. Each of these clever people will have opinions on what they see, and what they think co-workers should see and take note of. If we can make this happen, we will take great steps forward in collaborative working. But even more important is the collection of that opinion as organisational knowledge. If we can integrate our researchers' thoughts as readily as we integrate the new instrument on the block, then we will unveil huge value.

Scientists are naturally social creatures when you put them together. However, if there is a stereotype or characteristic of R&D folk, it seems to be that they are very much better at communicating locally and personally, rather than between groups or over distances. Long distance relationships need relentless conversations, driven by high context and right-time access to each other's data. Trying to convince people to communicate by trading documents or scavenging from a drop-box reduces social interaction. What we need to do is blow open the pigeon-hole and create the virtual lab meeting.

Scientific arguments should be peer to peer, not by paper and PowerPoint. So how do we overcome these barriers? What do scientists in R&D talk about in an ideal world – concepts, protocols, process perhaps? The answer is all of these – but there is nothing quite like the twang of real data to stimulate discussion, debate and innovation, and the clash of challenge upon hard fact to generate new thinking. This is all well and good across a coffee in the canteen with everyone bringing in their lab books, but nigh on impossible if your organisation is one of today's highly diversified, externalised and collaboration-dependent companies. According to Thomas Stallkamp, Director of Baxter and Founder of Collaborative Management LLC: "The secret is to gang up on the problem, rather than each other." And if scientists are to 'gang up' effectively, we need to enable this conversation.

Yet again, this is actually all about managing data and information properly. It can be solved in part by software but its mentor is effective business change: breaking down the barriers that today are stopping scientists from being scientists and making them automatons; and recognising that the dialogue between colleagues is a valuable piece of knowledge that is as important as the data they are debating.

It's not just disgruntled investors who know that you cannot save the world through Facebook. Adapting these emerging social norms – such as tagging, commenting and sharing – into the scientific environment requires thought about how these concepts work, and then applying them with closeness and context to the data being shared. The rapid expansion of the electronic notebook environment is the key. Leading R&D information systems (such as the IDBS E-WorkBook) now allow the secure social tagging of comments, experiments and even the data within them. Telling co-workers to look at an experiment or real-time report, or check out this image, trace or graph is just what researchers do around the canteen table. Pointing out that certain work has already been done elsewhere, or that confounding data has cropped up, are also a vital part of the mix. This enables the crowd-sourcing of comment and a virtual lab meeting of opinions to be garnered and – most importantly – stored. This collation of interaction is not transactional Twitteresque noise. It is the brains of the organisation doing what they are paid to do: adding to the corpus of knowledge.

The 21st Century Information World

By the time you read this I'll have watched Downton Abbey and immersed myself in the early 20th century, where the arrival of the 'electric telephone' was disruptive and shocking. But when it finishes, I'll be reaching for the real-time, high-content data that integrate me back into the 21st century. Our vision has to be the brightest and the best if our organisations are going to have a chance to stay in their 21st century information world when they get into work tomorrow.

References
1. *The Economist*, November 2011
2. Michael Palmer, ANA 2006
3. IDBS Connect, May 2012

Chris Molloy is Vice President of Corporate Development at IDBS. Chris started his scientific career at Glaxo in 1990, leading multiple in-house and collaborative research projects; he also pioneered the introduction of industrial IT, process and automation solutions to meet the needs of drug discovery. In 2004, he moved into biotech as Chief Operating Officer of MerLion Pharmaceuticals, Singapore. Here he was responsible for business planning, partnering investor relations, fund-raising and M&A. Returning to the UK in 2008, Chris joined IDBS, where he has held a number of Board, technology and scientific advisory roles. He is currently a non-executive Director of RSA: a specialist global life sciences and healthcare executive search firm.
Email: cmolloy@idbs.com