SPOTLIGHT feature

LIMS & Lab Automation

Putting Collaboration Data at the Core of Scientific Endeavour

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Collaboration is at the core of the new model of R&D. The requirement to share ideas, information and experimental work remains intrinsic to the scientific process.

In today's communications-driven world, the ability to collaborate across time zones and nations has made organisations eager to access external talent and resources that were, until very recently, kept firmly behind the high walls of multinational organisations. The wires are humming with new expressions of this trend: externalisation, globalisation, virtualisation, open collaboration and open innovation. In the world of Web 2.0 this concept is infectious. Significant time, effort and business development are used to develop networks of global relationships but is it sufficient just to increase the network of collaborators without thought to the end product of all this collaboration - the data? Research shows most scientific data in collaborative networks is shared via documented reports or rudimentary, summarised data. Trading documents when you should be trading data reduces the effectiveness of collaboration and can lead to loss of the very IP the collaboration was designed to create.

The practise of science – a search for truth – has always enshrined co-working and collaboration; the sharing and challenge of ideas leading to a valuable discovery. Crick, Watson, Watkins and Franklin each contributed to the data and insights necessary to bring about the genomic revolution through which we are now living; Banting and Best brought an end to Type II diabetes as an untreatable condition and every good scientific presentation ends with justifiable thanks for the collaborative team.

In past times, collaborators were limited by travel and communication channels. Those boundaries have been removed by the internet – itself a collaborative tool – and researchers may now access talent and resources in every region of the globe. Once it was only biotechnology companies, which rely upon focus and know that they can't do everything and academics, to whom collaboration is a natural state, which used to seek out value-adding collaborations. For the last 5 to 8 years everyone has joined the party. Externalisation and virtualisation in multinational R&D companies has developed from small exploratory 'outsourcing' groups or departmental business development efforts into full-blown corporate strategies such as Lilly's PD^2 initiative [1]. Collaborations harness global talent and assets and can also leverage regional economic advantages or IP-unencumbered locations to perform science. Collaborations are also a recognition that even the largest companies should focus on what they do best. A very useful concept was voiced recently by Chris Thoen, MD of External Innovation and Knowledge Management at P&G: "Only do what only you can do" [2].

The rise of the collaborative state brings with it a number of additional tasks: finding effective collaborators who can help you, negotiating fees and IP assignments and then executing the work. This all sounds very straightforward and formulaic. It is not. Finding effective collaborators, both internally and globally, has often been a hit-and-miss affair, and those relying solely upon Google and websites, trade missions or word of mouth have often been left little but amusing war stories for nights around the camp fire. A shining light in this darkness has been the aggregation of information and development of brokerage platforms such as Assay Depot [3]. This innovative service enables researchers and outsourcing groups to identify, compare and contact those who can offer a range of commodity or niche services. Once scientific contact is established, meetings or videoconferences held and due diligence undertaken, then comes the negotiation. If my personal experience – and those of my former biotech colleagues – is representative, negotiation around full-time employee (FTE) rates dominates much of this. Under a fee-for-service arrangement IP is often straightforward, although increasingly fee-for-service operators are inclined (and in a good enough negotiating position) to ask for a risk-share element and therefore some trailing ownership or option to the IP generated. And then it's on with the work? No. The purpose of the collaboration is to generate data, either in a discrete, shared or open way. So what happens to this data? In so many cases this is an afterthought – or a late one.

Various approaches have been taken to address the issue of data transfer, however many of them have looked to improving the movement of documents or their storage. These include secure network shares, document management systems, dropboxes and bespoke in-house collaboration management systems. What is required is something altogether more modern and actionable: The ability to allow discrete, real-time access to data securely controlled and partitioned across multiple collaborators and with linked access to the originating data for IP and data integrity purposes.

The default position for data transfer has been – and remains in many places – the report: a crafted document taking up to 25% of the elapsed time and effort (and FTE rate) to generate. As part of this consolidation raw and interpreted data are often condensed into documents so vital context, necessary for the recipients to consume and trust, is lost. In a validated environment, such as good laboratory practice (GLP) or good manufacturing practice (GMP) report generation takes on even greater significance, requiring more effort from the data generator and more time to wait for the data consumer.

In today's world of real-time access to a wealth of information, this document-driven approach is outdated and inefficient. Data is the asset, not the structured report, which should be able to be generated 'just-in-time' if you have all the data available. With the underlying data you can make better decisions and secure collaboration IP more effectively. Also, the more data you can work with and analyse, the better the insight.

In some cases pharma organisations have extended their chemistry Electronic Laboratory Notebook (ELN) across a link to a collaborator. This is an approach that can work in that domain. However, it can fall apart in multi-party collaborations if there is a single log-in approach. Single log-in systems can only be used on a one-to-one discrete basis, otherwise every collaborator can see every data item. Where increasingly collaboration is a multi-party, multinational effort with strict covenants regarding data access and data sharing between the parties, security becomes an overriding concern. *Figure 1* describes some of the styles of collaboration and the data sharing that may be required.

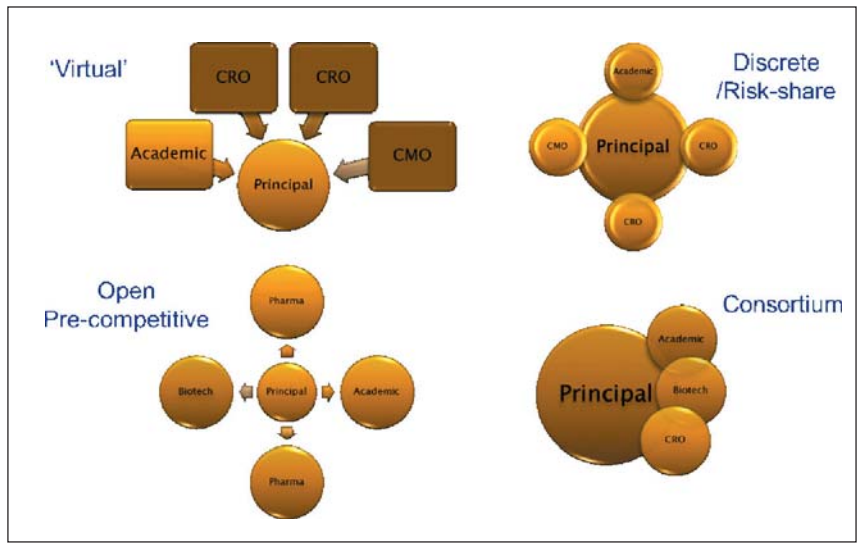

Figure 1. Collaboration styles requiring various data sharing provisions

Across all segments of R&D organisations, there is a desire to improve collaborative information flow. A survey of 682 researchers by IDBS and Scientific Computing in 2011 asked what issues were on the minds of R&D organisations. The response was uniform across all sectors of R&D, from pharma to food and beverage.

Figure 2 shows the response to the question 'What issues give you the most concern?'

A majority (55%) felt unable to collaborate effectively and a large proportion believed that there were systems issues that left them reliant on an underperforming, fragmented portfolio of current systems with inadequate internal resources.

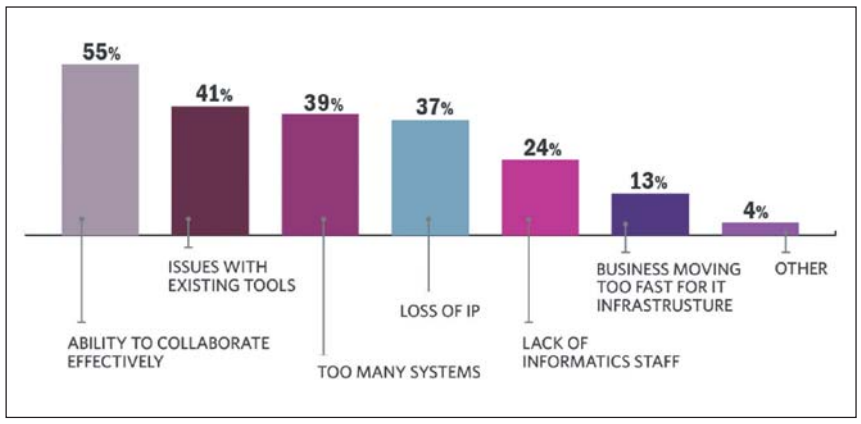

Figure 2. What issues give you the most concern?

In trying to solve this problem it is important to understand some of the issues behind the difficulty in collaborating. Of those 55% who responded:

- 91% had problems managing data for consistent results and avoiding rework
- 80% had problems with sharing, collaboration and access control
- 78% had problems recording and tracking activities to manage IP
- 75% had problems maintaining and providing proof of compliance

This represents both a frightening reality and a genuine opportunity to make a positive difference.

Today organisations are looking for a more holistic solution, with granular security and scalability that manages multiple domains, diverse data types and multiple collaborators. As one leading expert expressed it, "A complete 'Informatics' solution hosted in a secure manner so that we can work in a fully collaborative manner with our partners". This should be a data-centric system where documents can be generated on demand and data can be accessed securely by each member of the collaboration, in line with their rights under the contract and – most importantly – in real (or near real) time. In a world where you can set your computer or TV from your smartphone or tablet, and bank online, should we not expect to be able to collaborate in the common currency of science: data?

Fortunately such platform systems do exist and are in use at leading collaborative multinationals such as Shire plc. and contract research organisations (CROs) such as AIT, Pharmalegacy and HD Biosciences. They can leverage effective data management to provide just-in-time report generation, a scalable infrastructure that is cloud-ready and incorporate highly granular security.

As Mei- Shui Shui, CSO of Pharmalegacy, said, "The solution has enabled us to spend more time on projects and capture our results with unparalleled security and more easily communicate across departments [4]." Such systems provide benefit for all members of a collaboration because, in addition to offering speed and real-time access to data, they can be extended to allow collaborators to share analysis and interpretation methods, plug-ins and other innovations.

Thomas Stallkamp, Director of Baxter and founder of Collaborative Management LLC said, "The secret is to gang up on the problem, rather than each other." The common language of research and development is data and collaborative networks generate more of it than ever before. If scientists are to 'gang up' effectively they must be able to share data effectively. Sharing limited summaries – often delayed by the requirement to generate reports – leads to an ineffective communication, a language less rich in context and can build up a lack of trust.

This is recognised in other areas far more experienced in collaborative working such as supply chain logistics and finance. These non-scientific disciplines have plenty to teach the R&D world; both are intensively data driven and multi-party, and both have recognised the concept that collaborative parties can only be effective if everyone has appropriate access to the highest quality data. In supply chain logistics it is described as 'the single point of truth'. The same data-driven platform thinking for both internal and external collaboration is now available and should be implemented as the support system for collaborative scientific endeavour.

References
1. https://openinnovation.lilly.com/dd/
2. The Innovation Playbook: A Revolution in Business Excellence, Nicholas J. Webb, Chris Thoen
3. http://www.assaydepot.com
4. http://www.idbs.com/pdfview.asp?pdf_id=1305

Software Tool Enables Easy Pipette Management

Integra has announced VIALINK – a new pipette management tool that allows users to simply create and manage custom programs, maintain a service history and transfer firmware upgrade details between VIAFLO electronic pipettes and your PC.

VIALINK can be used to securely manage and productively organise all pipettes in your lab. Personnel can keep track of their VIAFLO pipettes using VIALINK to record user name, serial number, service history and latest software version installed.

Pipetting protocols can be set up as custom programs with VIALINK and then copied onto your VIAFLO pipettes. Users can create a program library which can hold an unlimited number of pipetting protocols.

Up to 20 custom programs can then be stored on the pipette itself. With VIALINK, creating individual custom programs is both quick and easy.

Using VIALINK - important service information, such as date of last calibration or service, can be stored on the pipettes.

To use VIALINK - VIAFLO single and multi-channel electronic pipettes require a programming stand which not only functions as connector to a PC but also serves as a handy charging stand. To use VIALINK with the VIAFLO 96 only a standard USB cable is required.

Circle no. 95

New Powder Flow Automated Software Delivers Valuable Features

Brookfield Engineering has released the new Powder Flow Pro v1.2, an updated version of Brookfield's automated software used to control its Powder Flow Tester. The Brookfield PFT Powder Flow Tester provides quick and easy analysis of powder flow behaviour in industrial processing equipment.

Powder Flow Pro v1.2. includes a new Comparison Feature that allows the operator to combine, display and compare data from both standard and small shear cell tests in a single graph. This gives customers the ability to test and compare how powders will respond in small bins with low consolidating stress and in large bins with high consolidating stress.

Another brand new feature of Powder Flow Pro v1.2 is the Normalised Flow Function. As more product is added to the hopper, consolidation stress increases raising the potential for stable bridges or 'arching' to occur. The Normalised Flow Function enables the technician to predict this behaviour and modify the manufacturing process or hopper design to avoid the problem.

Powder Flow Pro V1.2 is available via download free of charge to customers who have purchased a Brookfield Powder Flow Tester.

Circle no. 96

Automated Consumable Stock Control with New LIMS Software

The ability to automatically control stocks of consumables whilst processing samples can be a major time saver for busy laboratory managers, which is why **Two Fold Software** is adding a Consumable Stock Control software module to its Version 1.1 release of the company's ground-breaking Qualoupe LIMS software.

The simple to use Consumable Stock Control LIMS software has been specifically developed by Two Fold Software's team of skilled programmers to ensure that laboratory users do not require any additional effort to keep control of their constantly changing stocks of consumables. The software has been tailored to enable users to avoid the stress associated with discovering they do not have a suitable consumable when processing a vital sample.

"Many test methods and analysis procedures performed on samples in a laboratory depend on the use of consumables to complete the task. For example, even a simple microbiology test often requires consumable items or materials such as a petri dish, a quantity of culture medium such as agar plus the necessary reagents," explained Clive Collier, Two Fold Software's Managing Director. Using Qualoupe's new Consumable Stock Control LIMS software all the consumables used within the laboratory can be defined and a record created for each associated consumable. The record contains all the consumable's details such as name, code, supplier, cost, shelf life and such like."

The Consumable Stock Control software is one of a trio of new modules now available as part of Qualoupe's new Version 1.1 LIMS software release. The other modules provide enhanced solutions for managing Stability Trials as well as providing a Multi-Group capability that offers complete data management flexibility for organisations and companies that not only have multiple sites but also include multiple laboratories within each site.

Circle no. 97