Bringing Better Data Management to the Food Industry

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Eliot Randle, Principal Analyst at IDBS, explains how Electronic Laboratory Notebooks (ELNs) benefit the food industry: driving productivity, improving quality and supporting collaboration in new product development.

Successful food companies drive for increased efficiency while maintaining safety and quality standards. This puts greater demands on employees responsible for monitoring and reporting business critical information. In addition, these companies depend on data throughout new product development (NPD), but it is only helpful if it is secure, accurate, current and accessible. Electronic Laboratory Notebooks (ELNs) have witnessed rapid uptake in data-intensive domains, such as the pharmaceutical industry, and they can offer many benefits in the food industry too. As well as securing data, ELNs improve quality, foster collaboration and accelerate development timelines.

Improving Productivity

Many companies focus on gaining efficiencies through lean manufacturing and reducing waste. Effective data management is generally not treated with the same importance, despite being vital to overall efficiency.

Over-reliance on paper-based information and spreadsheets ultimately inhibits progress. Maintaining accurate and current information becomes laborious, with valuable time spent locating data to inform decisions. Capturing and contextualising data directly within an ELN supports process optimisation and reduces administrative burden. Data-centric ELNs transcend simple paper replacement and provide users with self-service access to the information they need, when they need it, avoiding costly re-work. They simplify the collation of data across batches and projects, such as rapidly combining QC and sensory data from a shelf-life study, reducing reporting times by hours or days.

Managing IP and Data Security

NPD is the lifeblood of innovative companies, but much specialist knowledge resides with individuals. When commencing a project, reviewing prior work and understanding what worked well and what didn't is beneficial. Worryingly, it's often easier for a technologist to develop a product from scratch because trawling through historical documentation is prohibitively time-consuming. The opportunity to learn from past experiences is lost, wasting both time and money.

Knowledge only has value when effectively documented and protected, but reliance on paper exposes security risks, as highlighted by cases of trade secret thefts [1].

ELNs reduce the burden on employees to record innovations, resulting in the capture of more comprehensive information and the generation of a valuable, secure IP resource. ELNs with comprehensive searching capabilities also enable users to learn from past experiences and avoid wasteful repetition.

Regulatory Compliance and Traceability

High-profile contamination crises mean food companies face increasingly stringent regulations, the need for more rigorous testing and greater transparency. An integrated approach to data management, ensuring compliance across the organisation, has become a necessity. The concept of traceability can be extended to decision-making. The rationale for decisions, such as recipe changes, is often not recorded and can lead to downstream issues, such as last-minute re-developments.

In spite of the importance placed on traceability, many food companies still rely on paper-based systems. The generation of documentation detailing the development of a product to support its launch is time-consuming. Tracing all activities and raw materials is onerous, particularly when multiple people were involved. The error-prone manual curation and cross-referencing of data across disparate silos can take days or weeks and is frequently a bottleneck in product progression. Often the required information cannot be found, resulting in further delays.

ELNs provide inherent traceability, supporting the prompt identification of quality issues and ensuring adherence to legislative and customer standards while retaining the flexibility required for NPD. The ability to access data also quickly becomes a powerful competitive advantage in the event of a food contamination event.

Supporting Collaboration

Successful NPD requires effective communication between business units and with supply chain partners. When relying on paper records and standalone files, data is disconnected making it difficult to find key information and to share it with colleagues and collaborators.

The requirement for more stringent testing produces larger quantities of increasingly complex data that needs to be assessed, reported and actioned. Projects may cross organisational boundaries, involving laboratories specialising in areas such as microbiological analysis or nutritional testing. Critical information may be difficult to identify within the sheer volume of data generated. Out-of-specification results may not be communicated effectively, resulting in a failure to identify safety issues.

When deployed as an organisational data management platform, an ELN can provide a centralised environment to share product and process data. If extended to third party testing laboratories, ELNs remove the organisational barriers associated with transferring information between companies.

ELNs provide a platform to support the exchange of ideas, enabling colleagues to provide suggestions and solicit advice. ELNs also offer the opportunity to expand the view of employees beyond their own department, keep them better informed, provide insight across the business and enable companies to react rapidly to maintain and improve quality.

Selecting an ELN

Food companies can face an overwhelming choice when reducing reliance on paper but must avoid implementing a 'data dump'.

Major quality improvements can be achieved with ELNs that go beyond simply storing data, and provide workflow support with equipment interfaces to enable data capture at the point of process execution. Some ELNs provide real-time error prevention capabilities and flag deviations. An ELN should provide the flexibility to accommodate the dynamic nature of NPD - technologies evolve rapidly and can necessitate process modifications.

Finally, by taking a holistic view of organisational data, valuable insight can be gained to form the basis for continuous improvement initiatives.

Summary

Food companies can derive significant benefits from an ELN. Originally designed as digital 'sticker-books' to replace paper-based systems, some ELNs have evolved into data-centric, enterprise-class platforms, becoming valuable tools for business improvement.

Those food companies that have deployed data-centric ELNs, such as IDBS' E-WorkBook, to secure their data are witnessing increased collaboration and are realising significant quality improvements and tangible time savings of up to 8 hours per person, per week.

References

1 For example, see 'Chinese Scientist Jailed for Trade Theft', 22nd December 2011 http://www.bbc.co.uk/news/business-16297237

About the Author

Eliot Randle is a Principal Analyst at IDBS. He joined IDBS in 2005 and focuses on providing solutions for development, manufacturing and quality organisations. Eliot has spent over 10 years consulting in the data management space. He completed both his BSc and PhD at the University of Manchester and holds an MBA from Warwick Business School.