

Guest Editorial: The Digitalisation of Data at Johnson Matthey

NON-PEER REVIEWED FEATURE

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Introduction

Over the last decade, the term ‘digital transformation’ has become prevalent across a wide variety of organisations. It refers to converting existing manual processes to create a more efficient and agile business environment. In 2018, >70% of organisations were reported as having a digital strategy or working to implement one (1). Johnson Matthey has established both key innovation programmes and the Digital Johnson Matthey programme to bridge between IT and the business to deliver ‘digital spearhead’ initiatives to meet this goal.

Digital transformation initiatives are part of a global shift towards so-called Industry 4.0 programmes. Evolving from established industrialisation practices, this future way of working builds upon the foundations of streamlined value-chain operations and automation by embedding data, modern smart technology, artificial intelligence and robotics in a seamless manner.

In order to stay competitive, organisations need to improve their internal processes to deliver faster innovation across research and development (R&D) and manufacturing, while accommodating the shifting needs of customers and macroeconomic factors. Additionally, companies are increasing external collaborations with networks of partnerships and innovation centres, to access new technology and capabilities that complement in-house competencies (2). A modern digital infrastructure can facilitate this by providing effective exchange of information alongside a culture of continuous improvement, with an emphasis on operational agility and experimentation to drive the desired outcomes.

Expected benefits of recognising that data is an asset are operational efficiency gains, with the ability to improve product quality and reduce development time and cost. This directly yields an improved competitive position in the marketplace. Moreover, there may also be opportunities to develop new revenue streams by aligning physical product offerings with ancillary software optimisation applications. The Johnson Matthey Levo™ application for plant optimisation is a good example of this.

The global impact of COVID-19 was widespread and transformative in its own right, as organisations rapidly adapted. With remote working and a need for business continuity, companies accelerated digitisation of systems supporting all manner of business functions. The response to the pandemic and mitigating actions to ensure business continuity have helped to speed the adoption of digital technologies. Many of these changes are embedded and expected to be long lasting. The value of the digital strategic initiative is recognised: 53% of companies plan to cut or defer capital investments because of COVID-19, but just 9% will make cuts in digital transformation efforts (3).

Driving Value from FAIR Data

Data is the new digital fuel that is the heart of the Industry 4.0 initiative. Both legacy and current research data are used to create and power the artificial intelligence algorithms and modelling approaches that lead to break-through product innovations.

Historically, attempts at mining legacy data were challenging because data was often in disparate systems and formats, which took time to find, and transcribing information from paper records was cumbersome and error prone. Across many organisations, there has often been fragmentation of ownership of data across disparate groups, as

well as segmentation across the organisation, creating barriers to shared information.

The industry-recognised approach is now for data to adhere to Findable, Accessible, Interoperable and Reusable (FAIR) guidelines. By moving to electronic records and systems that allow for structured data capture, i.e., with well-defined metadata and results fields, data scientists and modellers will have near real-time access to a wealth of research and process engineering records.

Culture of Change

As technology plays a more pivotal and crucial role in creating an agile business environment, organisations need to recognise that embracing digital tools and analytics helps to unlock the full potential of data. This in itself requires a shift in mindset, necessitating behavioural changes and learnings to manage data more effectively on a day-to-day basis. The community needs to store data in a meaningful manner, to open data repositories and to apply data governance and agreed practices that make the data accessible and clear for other people to use. This task is not insignificant, and conscious effort is required to align to this new way of working and for people to recognise the opportunities that their data presents.

The transformation process is essentially facilitating communication and exchange between stakeholders i.e., between different research, analytical, development and manufacturing departments, to those that ultimately service the external customer. As an organisation transitions from paper to spreadsheets to smart applications for managing these interactions, there is an opportunity to reconsider how processes are performed and how information is communicated, using digital technology.

As organisations work to overcome obstacles and drive operational efficiencies towards improved competitiveness, it is important to recognise that a digital transformation initiative cannot simply be solved by introducing a suite of new tools and applications. In a 2016 survey, 87% of companies thought that digital would disrupt their industry, while only 44% felt prepared for these potential digital changes, and little has changed since then (4, 5). As such, there needs to be a company-wide shift in thinking and process, alongside training and support. With CEO and senior management encouragement, the culture of change across the entire organisation

needs to be prioritised. Importantly, there is also a converse 'bottom up' alignment, with engagement from end-users who recognise inefficiencies in current practices and who are enthusiastic and contribute ideas about new ways of working.

Conclusions

The challenges of creating a world that is cleaner and healthier, today and for future generations, will only be solved by engaging with disruptive innovation that is driven by digital transformation. As a result, organisations are rapidly developing, adjusting or accelerating strategies to provide the required technical and business agility. This extends from how their employees work and collaborate to how they engage with partners, suppliers and customers. The technology disruptors of today will help make the workplace a data-driven organisation, leveraging technology and culture change to drive business strategy in ways that help promote growth, spur innovation, reduce costs, streamline operations and create satisfied, loyal customers.

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