

Unlocking the Potential of Drug Discovery Labs with Automation

Trying to achieve more without increasing costs, sacrificing quality, or slowing down growth is a constant mission for any expanding business or industry – but it is particularly acute when it comes to drug discovery. The COVID-19 pandemic highlighted the pressing need to rapidly develop effective drugs and treatments, and the growing industry has made remarkable progress in recent years – with the government recently investing £227 million into the sector. Areas like precision medicine, novel vaccines, cell and gene therapies and synthetic biology are all driving healthcare forwards – but there are challenges for drug discovery companies to effectively scale and bring new cutting-edge products to market.

The three main challenges are the finite amount of lab space for expansion in the UK, manual processes impeding scaling and reproducibility, and scientists spending too much time on manual tasks rather than research and discovery.

Consultancy firm, Bidwells, recently found that the demand for lab space in Oxford and Cambridge is significantly surpassing what is available – with 10 thousand sq. ft available in Cambridge compared to two million sq. ft of demand. This means that drug discovery is at risk of facing a slowdown simply because there is not enough space to conduct cutting-edge research – and investors may turn their heads to other cities, such as Boston in the US, that have millions of square feet in lab space readily available. To meet this demand, there has even been a rise in the number of non-traditional spaces being converted into labs – such as refitting closed high-street shops.

The ability to scale throughput can also be difficult. As drug discovery labs seek to expand, manual processes struggle to keep pace and maintain accuracy. Being able to reproduce highly accurate results is vital when researching new drugs, as is the ability to test out as many leads as possible. With scientists carrying out many processes by hand, there is a limit to how fast it is possible to scale.

And finally, highly skilled and intelligent scientists in drug discovery aren't fully utilising their expertise due to the need to perform routine tasks in the lab, rather than spending time designing new experiments.

However, there are ways to combat these challenges and drive drug discovery forwards. Automation is one tool which has been used in laboratories for several years and is continually evolving. Increasingly, labs are embracing automation to help scale, free up scientists time and work more efficiently.

Achieving More in the Same Space

Expanding into additional lab space is not always an option for biotech and life sciences businesses for two reasons: firstly, the scarcity of available lab space, and secondly, the cost of doing so. They need to make their existing resources work harder now more than ever. Thus, the ability to optimise existing space becomes a crucial alternative for scaling up, especially for smaller or oddly-shaped labs – the latter of which is more common in re-purposed buildings such as shops and older buildings.

To scale-up, workflows need to be flexible and able to adapt depending on the needs of the lab. Therefore, flexibility in implementing automation to lab benches where and when it's required for each specific segment of a lab experiment can help ensure that automation can operate across multiple functions and processes, and achieve efficiency, accuracy, and throughput. With recent developments in automation technology for flexible lab benches, labs can now reconfigure and modify facilities to suit any space as their needs and functions change – no matter the stage of their automation journey – enabling them to efficiently perform multiple processes – from liquid handling to thermocycling – and maximise equipment capabilities, helping to scale without manual intervention.

One organisation that has been able to boost throughput and maximise space through automation is the Advanced Sequencing Facility (ASF) at the Francis Crick Institute. Genomics sample preparation is ideally suited for automation, given the need for the process to be robust and scalable.

The ASF has successfully automated three essential workflows for genomics sample preparation. This has enabled the facility to eliminate manual touchpoints, increase walkaway time, and improve sample quality – which has allowed it to work at a faster pace, scale up, and expand its genomics research for early-stage drug discovery within its existing space more efficiently.

Relieving Scientists' Workload

Automation is also valuable in drug discovery as it can reduce the manual workload that scientists must carry out each day, like plate handling and data uploading to LIMS systems. Instead of manually retrieving and reading data from the equipment, automating the process allows scientists to directly access data from a plate via cloud software, freeing up more time to focus on tasks like experimental design and data analysis, which require the skill of a trained scientist. This increased walkaway time can be a game-changer in the lab, allowing scientists to dedicate time towards making significant strides in drug discovery.

Although some automated processes require human interaction, many can also run entirely independently. This can relieve scientists from having to come into labs out of hours and means that experiments can run continuously over extended periods. For example, drug discovery organisations may need stem cells to test new compounds or potential new drugs on – but these are very needy and must be tended to every day. With an automated process, scientists are freed up from tending to them every day while still being able to deliver results at pace.

Boosting Accuracy and Repeatability

Finally, automation has an important role to play in maintaining accuracy and repeatability – a critical aspect of scientific experimentation – such as during cell manufacturing which is an important part of early-stage drug discovery when testing how small-molecule drug compounds would respond in human cells.

Replicating experiments with precision remains a challenge that can hamper drug discovery. This is where automation



can really bring value – by facilitating the replication of complex experiments multiple times, generating more extensive and well-documented data than a person could in the same timeframe. This not only increases the quantity of data available, but also its quality and reliability, reducing the risk of human error, standardising workflows, and leading to more robust scientific findings. This is essential to drug discovery, as scientists need strong and well-supported conclusions to develop safe and effective drugs.

Automation also allows labs to ‘widen the funnel’ when developing new treatments and cell therapies, which could be transformational to R&D efforts. Typically, a lab might start with thousands – or even millions – of potential leads in the discovery process. Current approaches are aimed at quickly reducing this to a small number in order to move forward to the next phase as efficiently as possible. This means that

potential leads that did not meet some limited criteria may be missed, or those that are taken forwards might have characteristics that might make them unsuitable. Either scenario may mean stepping back in the process in order to move forwards.

Instead, automation makes it possible to keep the funnel wider for longer, testing out a higher number of leads in the same amount of time in order to qualify the best drug options, while also gathering deeper and broader datasets for potential hits. This allows scientists to generate a larger pool of leads with greater data attached and ultimately transform the drug discovery process for the better.

Closing Thoughts

Empowering labs with modular, integrated automation can help leading life science companies in the UK within the drug discovery industry to scale without compromising on

accuracy or speed, make the most of existing lab space and equipment, free up scientists to work on more skilled tasks, and unlock untapped value within their business. With a modular approach, automation can be applied flexibly and adapted when needed to be the right fit for every lab space at any point in their journey.



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