

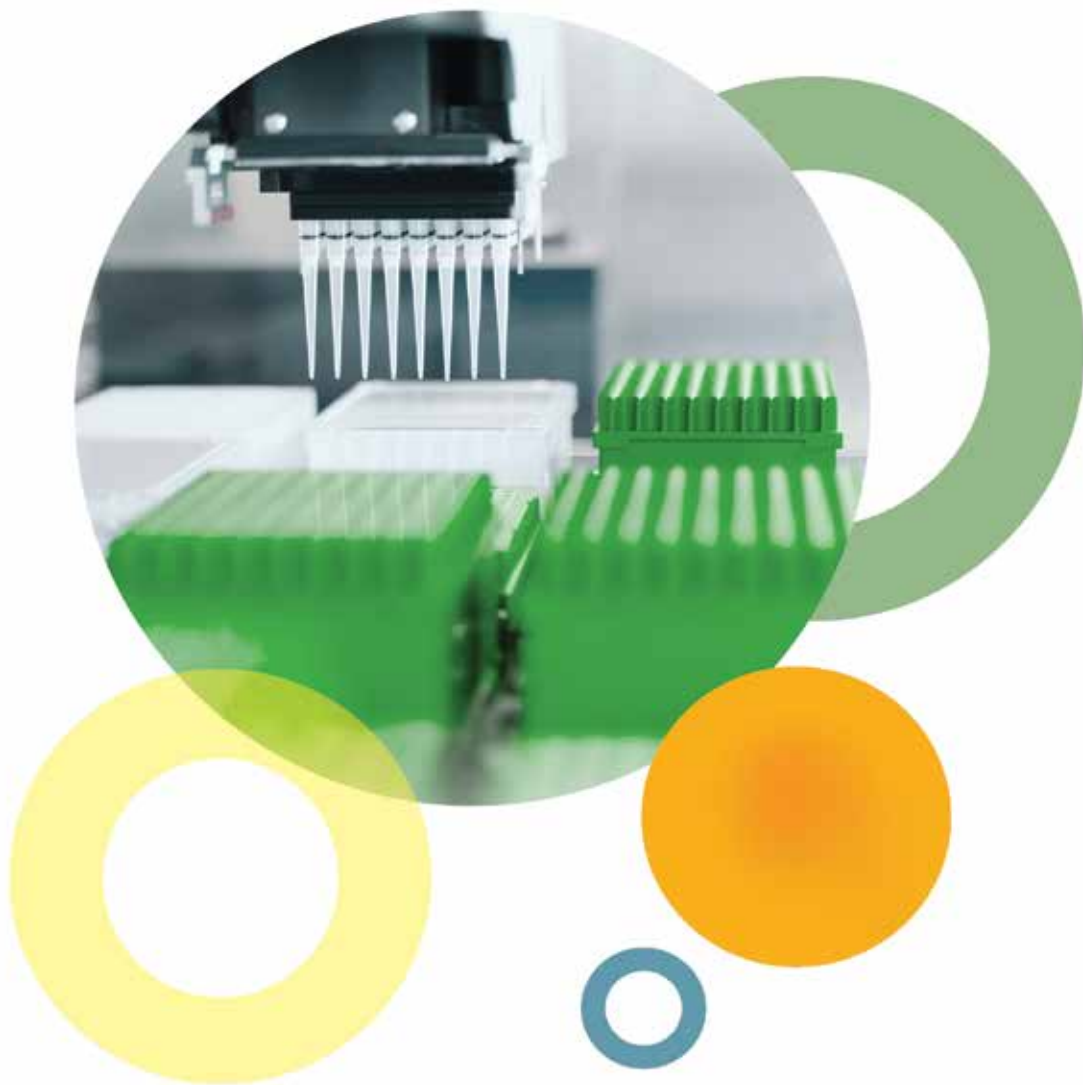


ZYMO RESEARCH

The Beauty of Science is to Make Things Simple®

Removing Roadblocks and Scaling Business with Laboratory Automation

Transitioning to laboratory automation may be the key to business growth



Labs that are experiencing throughput issues should not fear the transition to automation. Automated processing infrastructure can be the key to maximizing a lab's full potential. The switch to automation can be smooth when equipped with the proper information to succeed. Labs can use an operational process that includes liquid handling instruments¹ and magnetic bead transfer devices² to improve their capability. Implementing automation can solve immediate throughput issues and provide the perfect opportunity to scale by increasing lab capacity through sustainable development.

The Zymo Research Automation team breaks down how to determine the correct time to implement automation with the three "T Challenges":

1. The Technical Challenge
2. The Throughput Challenge
3. The Turnaround Time Challenge

These challenges address three critical characteristics of the lab's workflow and service: product innovation, business growth, and customer needs. A thorough assessment of these areas is essential to determine if automation is the right course of action.

THE TECHNICAL CHALLENGE: **Can you automate?**

Highly technical and skilled labor presents a great advantage to a lab's processing capability. This kind of labor is flexible and good at dealing with highly challenging sample types or workflows. Having a highly skilled labor pool is essential for challenging samples or methods that are difficult to reproduce.

On the other hand, if a lab's workflow is robust and coupled with well-defined sample types, then laboratory automation can be a great fit. When a workflow is routine, a highly skilled workforce is unnecessary. Utilizing personnel for the development of additional workflow pipelines allows innovation development and expansion of product offerings.

In one case study, the Zymo Research Automation team collaborated with a Microbiomics Services laboratory that specializes in Next-Gen Sequencing (NGS) profiling of gut microbiome for direct-to-consumer "for informational purposes only" profiling results. The group had a routine processing workflow and sampling methodology where there were little to no errors; however, many research and development personnel were involved in the direct processing of customer samples.

When the lab switched to laboratory automation infrastructure, it was able to fulfill the demand for routine testing and expand. Once they disencumbered their labor, they were able to expand their product offerings to a larger array of harder-to-process sample types. This change also provided an opportunity to increase their research efforts for environmental testing and pathogen surveillance. Automation provides immense opportunities for the growth and innovation of new technologies and service pipelines.

THE THROUGHPUT CHALLENGE: **Should you automate?**

Manual labor can fulfill low-volume processing, but without room for increased capacity, a company will always struggle to grow commercially. Technical challenges are one matter but being unable to meet demand due to a backlog of samples is not a great excuse. Customers that are turned away because a lab does not have the capacity to process their samples are unlikely to return in the future.

Take the case study of a California Microbiome Services laboratory for example; they employed individual to process batches of 24 samples, amounting to roughly 96 samples per day. Thus, with a team of four, 384 samples could be processed each day, costing approximately \$400,000 in labor per year.

After implementing automation, which costs about \$450,000, the laboratory was able to increase its processing capacity to 1,536 samples per day. This change invigorated



commercial outreach and increased the number of customers and sample volume.

In another case, a “for information purposes only” epigenetics lab critically suffered from its sample processing bottleneck. Due to the highly technical nature of the assay, the group could only process up to 96 samples per day. This caused two major roadblocks, idle waiting and max lab capacity. The assay technology required a high-throughput NGS instrument that was routinely left waiting, and the max lab capacity squashed any chance of commercialization.

To solve these issues, the lab invested in laboratory automation in the form of a magnetic bead transfer instrument, costing \$65,000. The investment increased the lab’s capacity from 96 samples per day to 288 samples per day.

The Zymo Research Automation team assisted the lab in optimizing its NGS processing capacity, which allowed the group to lower sequencing costs by 50%. Laboratory automation once again changed the trajectory of commercialization efforts by increasing capacity and opening the doors for business growth.

At the end of the day, commercialization is only feasible if a company has a high-throughput. Laboratory automation is an excellent solution for those looking to fill current demand and scale.

THE TURNAROUND TIME CHALLENGE:

Why Automate?

Regardless of the product or process, the final output is delivering results to the customer. This is only possible with an efficient delivery time of the assay result, which is necessary to maintain customer trust and keep the company’s commercial promise.

Turnaround time assesses a company’s operational consistency. Shifts in the labor pool and sample number load can affect the ability of a company to deliver. However, an improved and robust infrastructure can mitigate the effects

of these major sways in operational capacity. A healthy, routine operational capacity for a lab is 50-60% of its total allowable capacity.

In the past, labs had multi-functional labor pools to mitigate labor costs and maintain this high capacity. Today, allowable capacity can be gained through “walk-away” laboratory automation solutions. This mitigates training and labor costs and allows the company to comply with its promised turnaround time.

If a company’s operational capacity is stretched, then it will be hindered by fluctuations in the labor pool and customer demand. Laboratory automation is a game-changer for any company aiming to maintain a healthy operational capacity.

Automation Team Background

In 2018, Zymo Research’s Automation Team came to fruition with the goal of helping customers and internal service groups to refine and optimize their processing workflows through laboratory automation. The team is comprised of high-throughput processing specialists, laboratory automation instrument specialists, engineers, and application scientists. However, during the COVID-19 pandemic, the Automation Team expanded to establish systems for collecting and detecting SARS-CoV-2 from an array of input sample types and downstream detection applications and methodologies.

Today, the Automation Team continues to provide technical and operational expertise to customers, laboratory instrument providers, and internal Zymo Research groups. The team is working full steam ahead to ensure others can establish optimal automated workflow solutions that help them reach their experimental and processing objectives.

Zymo Research’s automation specialists are ready to consult with labs and businesses looking to implement automation:

[Schedule Your Free Consultation.](#)

Footnotes:

¹ Liquid Handling Instruments are those that utilize fluid displacement to transfer and manipulate liquids. Such systems include, but not exclusively: Tecan Fluent, Hamilton ML STAR/STARlet, Opentrons OT-2.

² Magnetic Bead Transfer devices are those that utilize magnetic rods or a similar method to transfer and manipulate magnetic beads. Such systems include, but not exclusively: KingFisher Flex/Apex, IsoPure/Auto-Pure, Chemagic 360.



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