# 5 HIDDEN COSTS OF NOT AUTOMATING

That automation is linked to significant cost savings and high return on investment is both widely proven and acknowledged. Whether you are working with PCR prep, NGS, biobanking or simple volume transfers like normalization, dilution, cherry picking or aliquoting, there are many hidden costs which make automated liquid handling a cheaper solution in the long run.

This article explores 5 concrete costs of not automating:

#### **Cost 1: Hands-on Time and Low Throughput**

Low throughput is a direct cost of not automating. Especially if you have customers relying on your services or important deadlines. Lab automation empowers labs to process larger volumes of samples in less time.

Most of our customers report that they process at least twice the number of samples compared to manual pipetting and, in addition, they have less hands-on time they can use for more valuable work.

#### The PCR Experiment

To get a bit more specific, we performed an experiment to measure the time saved in a standard PCR protocol on flowbot ONE.

In the protocol, Genomic Escherichia coli DNA was diluted to eight different concentrations for use with the reaction template, and two independent master mixes were prepared using two different ready mixes.

The flowbot ONE was programmed to assemble each master mix by initially pipetting the reaction components into an empty tube. From there, the flowbot ONE transferred the master mix to an 8-tube PCR strip before distributing it into the 96 well PCR plate. The reaction mix was subsequently completed with the addition of the template DNA to the appropriate PCR plate wells.

Running 96 samples on flowbot ONE took 41 minutes 8 seconds. An equivalent manual setup took 1 hour 8 minutes. That means you'll save 27 minutes per plate as well as getting time to do other things while the robot is working.

#### Cost 2: Strain injuries & Stress.

Fewer strain injuries mean reduced employee downtime, minimizing disruptions to critical research projects and experiments. This increased operational continuity not only accelerates project timelines but also enhances the overall productivity of the lab.

Moreover, a focus on preventing strain injuries contributes to a decline in healthcare costs. By investing in lab automation, businesses can significantly mitigate the risk of strain injuries. As a result, employees are more likely to remain healthy and engaged in their work, leading to higher retention rates and decreased recruitment and training expenses. The longterm financial benefits of a proactive approach to preventing strain injuries in labs extend beyond immediate cost savings, fostering a sustainable and thriving research environment. If you have to aliquot ou

If you have to aliquot out several 96 well plates per day, you expose yourself to hand fatigue as well as mental fatigue. I used to experience daily fatigue and stress, but the flowbot® ONE has removed both symptoms. Once the software is set up, you can just press 'execute' and the flowbot will do everything else.

- Robert Ertsey, Sr Manager at Ensigna Biosystems.

#### Cost 2: Reagents & Kits.

Some NGS and PCR kits cost hundreds of dollars and getting as much out of them as possible is a major cost saving. However, this can be difficult when pipetting manually. By automating with a system like flowbot ONE you can ensure that you use as much of your reagent as possible due to unique software features.

#### Software features to ensure low dead volume:

Here are a few flowbot ONE features, ideal for ensuring low dead-volume in eg. ELISA prep., PCR and NGS.



# Bottom Touch

In bottom touch, the pipette tip touches the bottom of the target vessel after it has dispensed liquid.

This is great for pipetting small volumes into dry vessels as it ensures that the liquid doesn't stick to the tip – thereby ensuring a low dead-volume.

## Contact Aspiration

In contact aspiration, the pipette tip touches the bottom of your source and moves up a number of millimeters of your choice before it aspirates.

This enables you to aspirate small volumes in various tubes and wells of different sizes without the need of manual volume calculation – thereby reducing the material used.

A company that has seen significant cost savings in material used after implementing flowbot ONE is Numab Therapeutics. Following the implementation of the extended biophysical characterization on the flowbot ONE, Numab Therapeutics has doubled their amount of obtained data while only using a fifth of the material which would be required in manual pipetting.

We can work with lower concentrations and volumes in our assay, which were enabled by improvements in pipetting accuracy and reliability. The volume and concentration savings were responsible for most of this, with additional savings due to reduced dead volumes.

- Marc Thomas, Research Associate at Numab Therapeutics

## Cost 4: Low Accuracy & Bad Reproducibility

Once the master mix is ready, you can add your samples to The precision and accuracy offered by liquid handlers like flowbot ONE are unparalleled. This enhances the quality of data and ensures that you get the most out of your experiments and tests, and that they are reproducible. The advantage of enhanced data quality extends beyond immediate cost savings. It fosters a culture of trust in the organization's data-driven decision-making processes, instilling confidence among stakeholders and customers alike.

For Numab Therapeutics, the ability of the flowbot ONE to accurately pipette highly viscous PEG solutions is key for the high data quality obtained.

They implemented protein solubility and chemical unfolding assays on a 384-well plate format for high throughput screening. Furthermore, the aliquotation of protein samples for internal distribution to other groups for functional and biophysical assessment in 20  $\mu\text{L}$  aliquots is performed by the flowbot ONE.

The result is output data that duplicates very little, and there is a clear sigmoidal response curve.

Thus, the implementation of biophysical assays in 384-well format at low volumes allows to screen more molecules using the flowbot ONE.

Our results with the flowbot ONE are reproducible and we need less material, enabling us to make use of the assays for an increased number of test scFvs. We can determine the desired biophysical parameters without the need for the reproduction of our molecules. This directly translates to cost savings.

- Marc Thomas, Research Associate, Numab Therapeutics.

### **Cost 5: More human errors**

There is always a risk of human errors in an extensive manual pipetting routine.

In fact, it is estimated that pre-analytical errors account for up to 70% of all mistakes made in lab diagnostics, making it the most error-prone part of the workflow.

Every human mistake generates high costs in terms of lost samples and arrays. With flowbot ONE we can keep our timelines and the clients can rely on our services. – Marta Gozdek, Lab Manager

Typical errors include inconsistent pipetting, incorrect volume measurement, contamination, and sample-switching. Automated liquid handling reduces the likelihood of errors and ensures reliable results. In turn, this reduces the need for costly re-testing or redoing experiments with expensive reagents and mastermixes.

Having good traceability is key for avoiding sample switching, and automated sample tracking solutions have proved their worth many times over. At Flow Robotics we ensure safe processing of samples with the scanID scanning solution which can be used both with and without a liquid handler. ScanID scans an entire rack of 1D barcoded tubes or SLAS racks with 24, 48 or 96 tubes in seconds.

Sample switching can occur when scanning and pipetting is done manually. Having an inadequate data tracking solution can have very critical consequences. That's why we've been so happy with the ScanID. As we don't have to move the samples individually to scan them, we can trust the results. – Claus Juel Jensen, Chief Physician, Hillerød Hospital

If you're looking to automate liquid handling in your PCR workflow, your next step is to:

 <u>Book your free demo today</u> to see what flowbot<sup>®</sup> ONE can do for you.

h		
a.	<b>Figur</b>	
•	•	

flow robotics