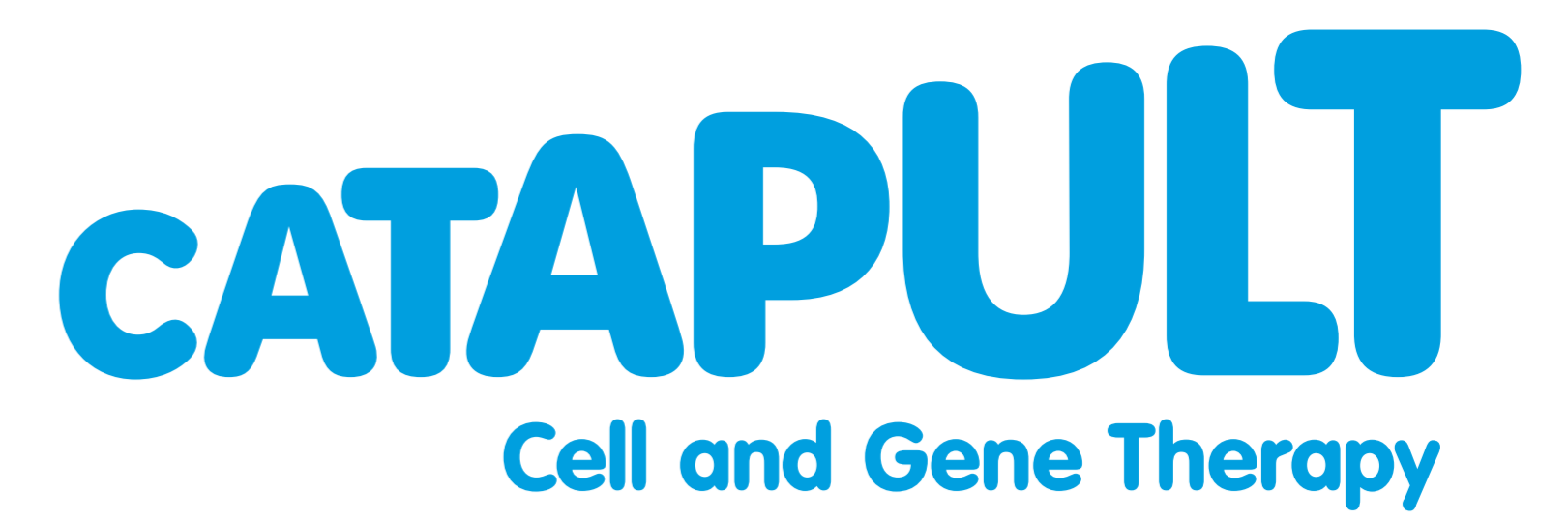


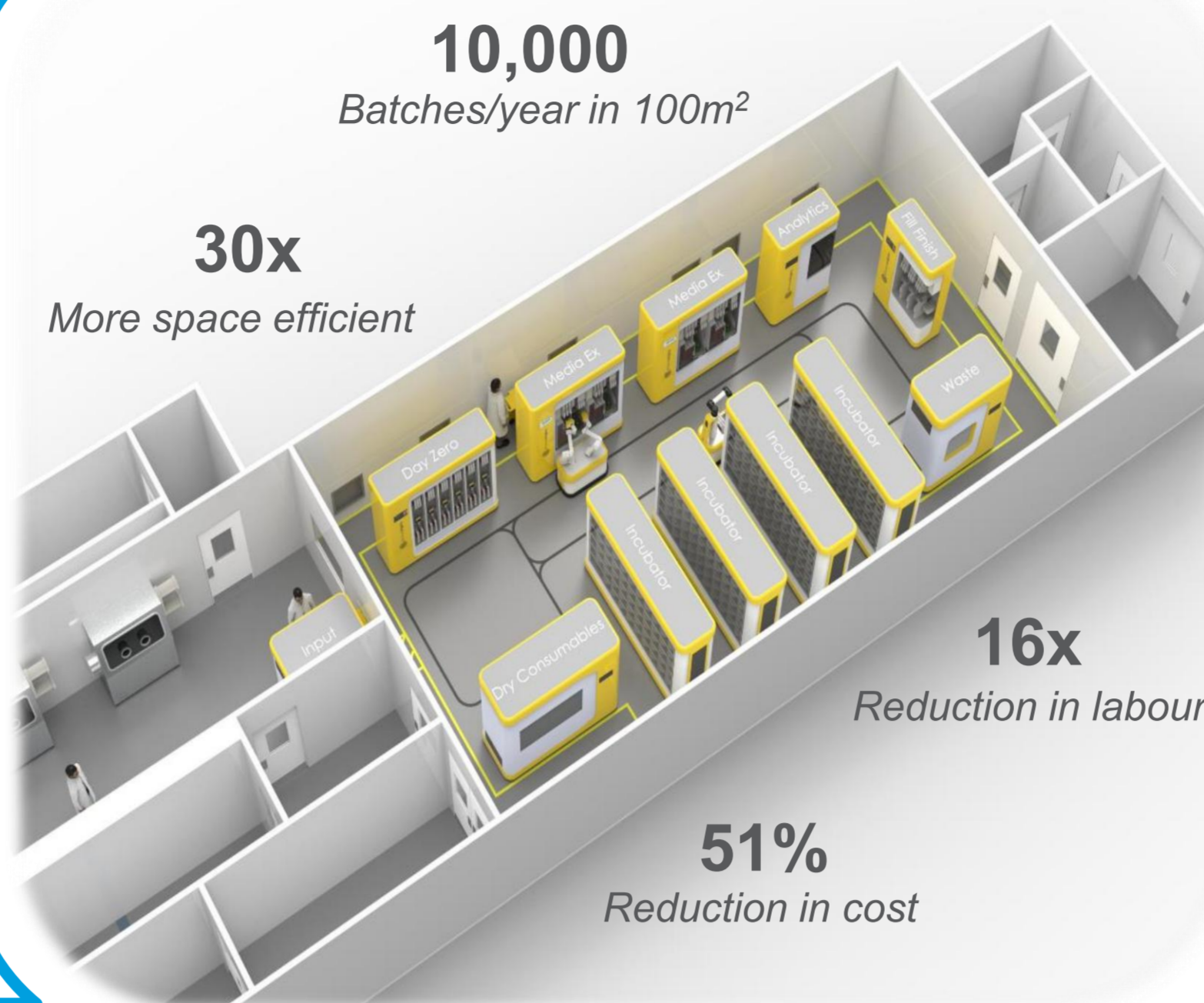
# Advancing Automated Manufacturing for Cell and Gene Therapies: Deployment and Evaluation of the Constellation Robotic System at the Digital and Automation Testbeds



M. Shaeri<sup>1</sup>, C. Harrison<sup>1</sup>, M. Jan Sayed<sup>1</sup>, W. Li<sup>1</sup>, A. Sergijenko<sup>1</sup>, P. Statham<sup>1</sup>, P. Dewhurst<sup>1</sup>, R. Macown<sup>1</sup>, S. Jayakody<sup>1</sup>, S. Howe<sup>2</sup>, D. Marshall<sup>2</sup>, D. Strange<sup>3</sup>, J. Jones<sup>3</sup>, H. Black<sup>3</sup>, C. Johnson<sup>3</sup>, J. Glover<sup>3</sup>, A. Rajkumar<sup>3</sup>, W. Fahme<sup>4</sup>, A. Blain<sup>4</sup>, A. Craciunescu<sup>4</sup>, M. Ciesielska<sup>4</sup>, **D. Marsh<sup>1</sup>**, M. Mata<sup>1</sup>  
<sup>1</sup>Cell and Gene Therapy Catapult, <sup>2</sup>Resolution Therapeutics LTD, <sup>3</sup>Cellular Origins, <sup>4</sup>Autolomous

## 1. Background

Cell and gene therapies (CGTs) offer potential cures for diseases once considered untreatable. Around **30+ CGTs** have regulatory approval worldwide, and over 2,000 candidates are in clinical trials, demonstrating their growing impact. However, **complex** and **expensive** manufacturing still limits scalability and timely patient access, meaning many individuals cannot yet benefit from these advanced, potentially life-saving treatments.



## 2. Aim & Objectives

A collaboration between CGT Catapult, Cellular Origins, Resolution Therapeutics, Autolomous and ScaleReady is defining end-user needs for future automated manufacturing. The Constellation mobile robot automates and scales cell therapy production, increasing space efficiency **>30-fold**, cutting production costs by **51%** and labour **16-fold**. It is now being tested in a GMP mirror facility with **integrated electronic batch records**.

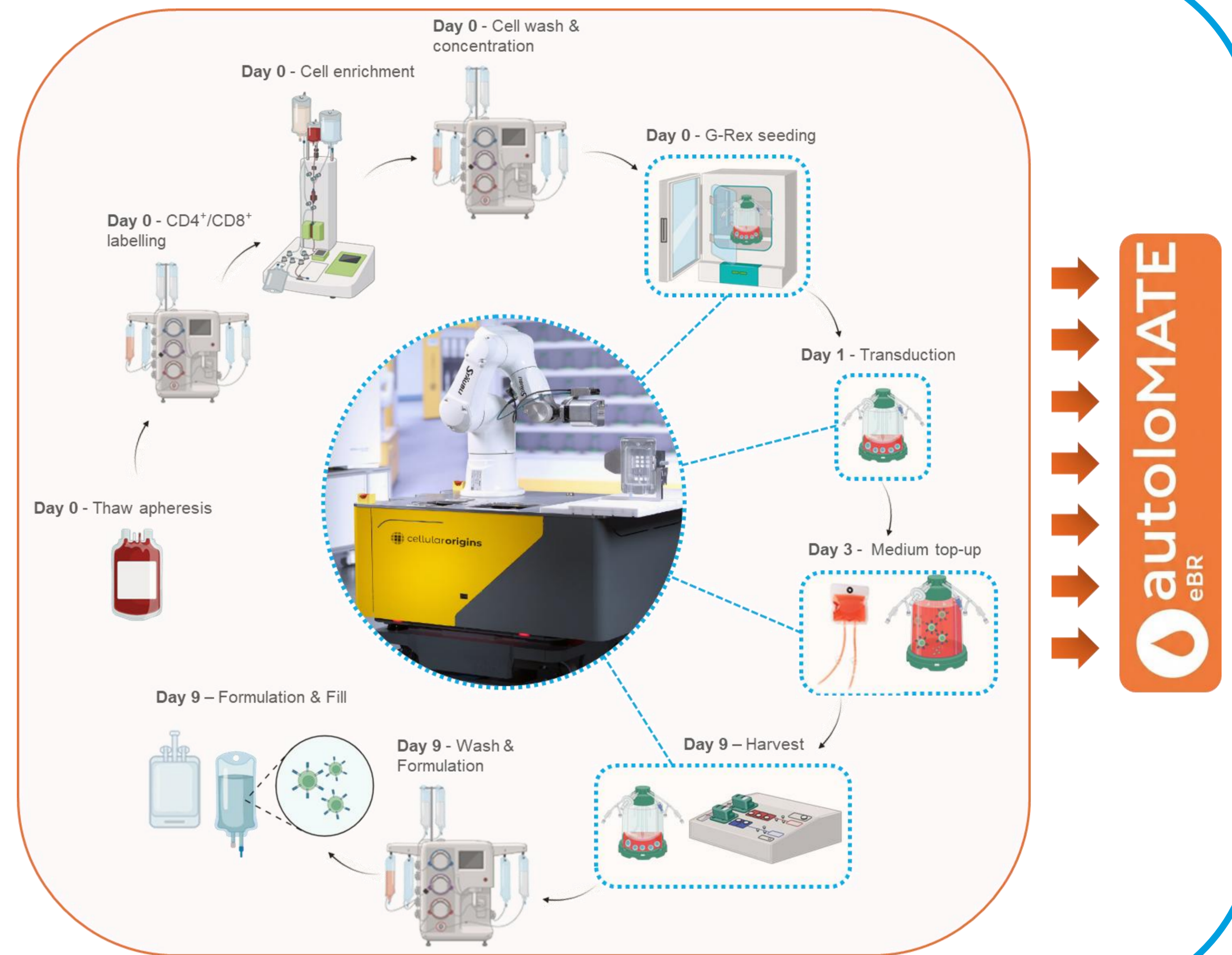
## 3. Digital and Automation Testbeds



Video: DAT Lab & Constellation



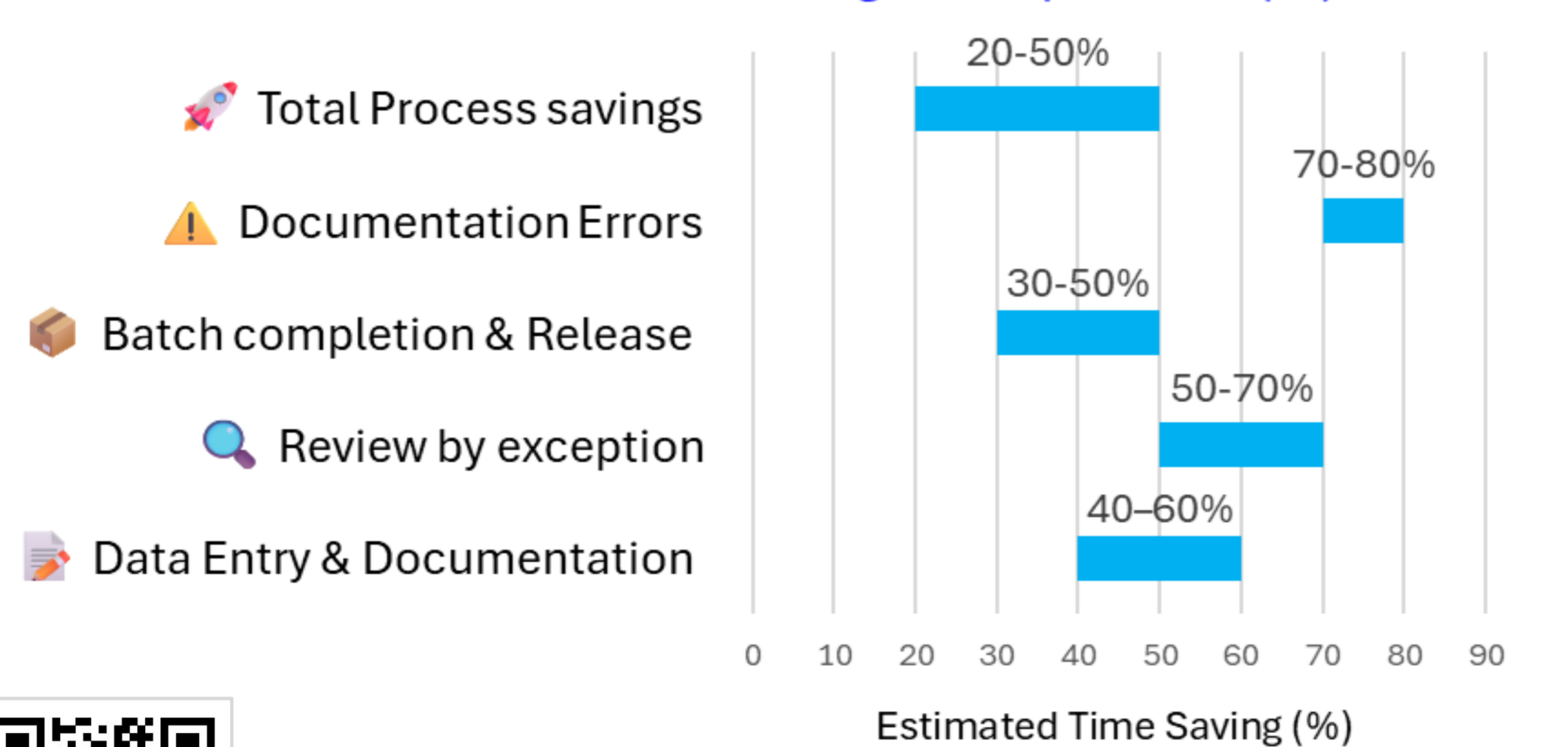
**“First-in-the-world”** ATMP-specific **GMP-mirroring** testbeds for **de-risked**, **accelerated** testing and adoption of next-generation **automation** and **digital technologies**.



## 4. eBMR Outcomes

Successfully tested the **eBMR** for the ScaleReady exemplar anti-CD19 CAR-T autologous product, confirming alignment with approved process flows and manufacturing specifications.

Estimated eBMR Time savings vs Paper BMR (%)

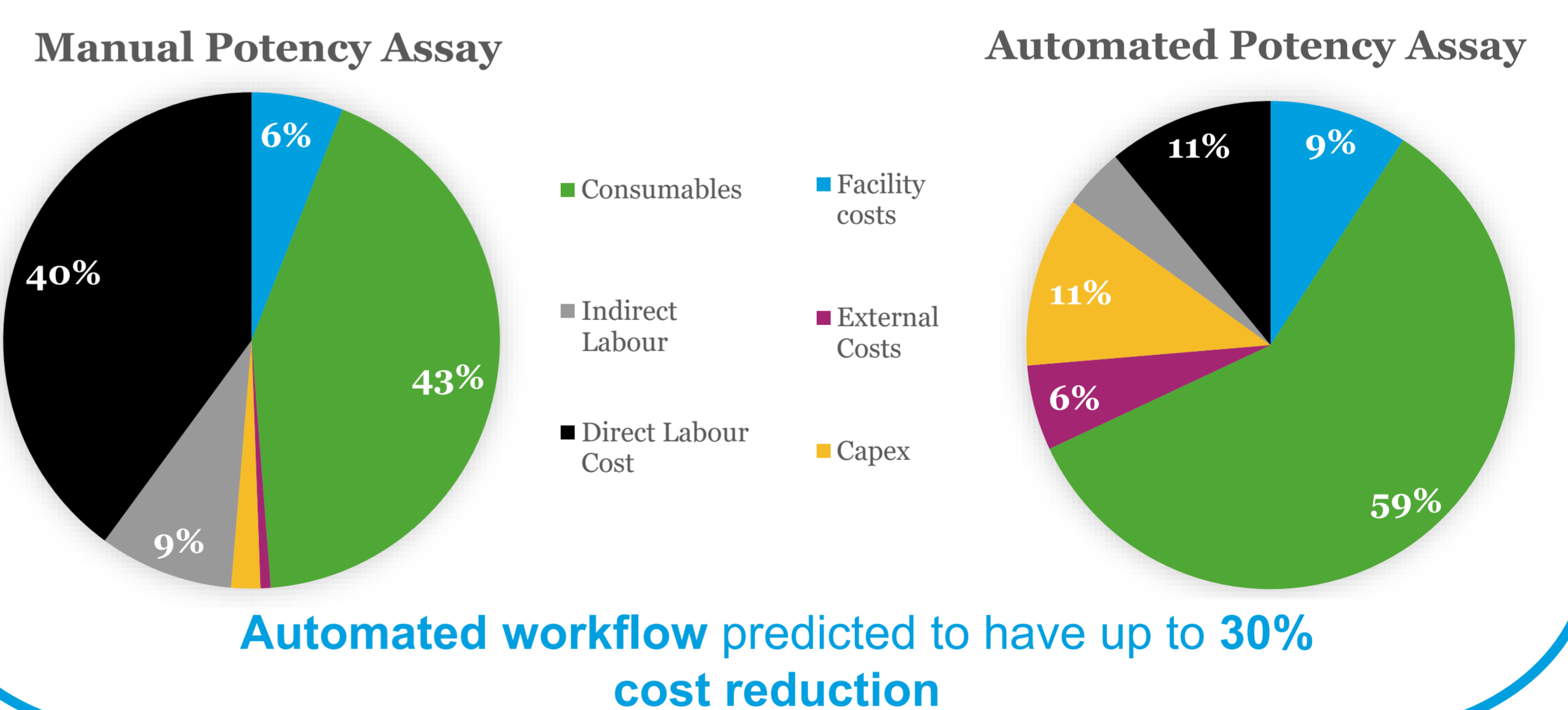


Paper: AAV digitised process

**Overall Impact 20-50% total process-related time saving**

## 5. Analytics Automation

QC release **potency** and **identity assays** were analysed and costed for a manufacturing scenario of 3500 batches per annum. Using this scenario, the analytical workflows were mapped and theoretically translated onto proposed automation technologies.



## 6. Conclusion

This work demonstrates an **end-to-end automation roadmap** and deployment framework that evaluates benefit, cost and effort for scalable CGT manufacturing. Next steps will focus on PoC runs delivering real-world data on **batch parallelisation** and autologous process scale-out, informing future design and adoption decisions.



Cell and Gene Therapy Catapult  
 12<sup>th</sup> Floor, Tower Wing, Guy's Hospital, Great Maze Pond, London SE1 9RT  
 +44 (0) 203 728 9500 | info@ct.catapult.org.uk | ct.catapult.org.uk

