



Using AI/ML to Accelerate Development and Operations in Life Sciences

April 2025



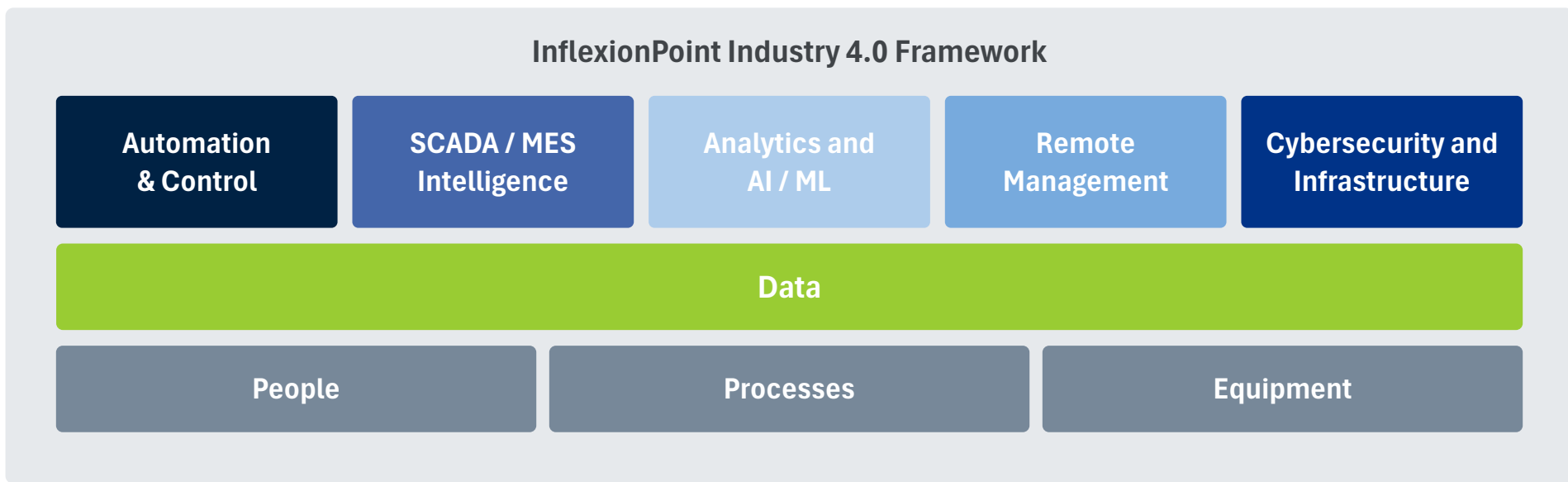


We believe in the power of technology,
fueled by care and passion, to drive
operational excellence.



Delivering on the Promise of Data-Driven Operations

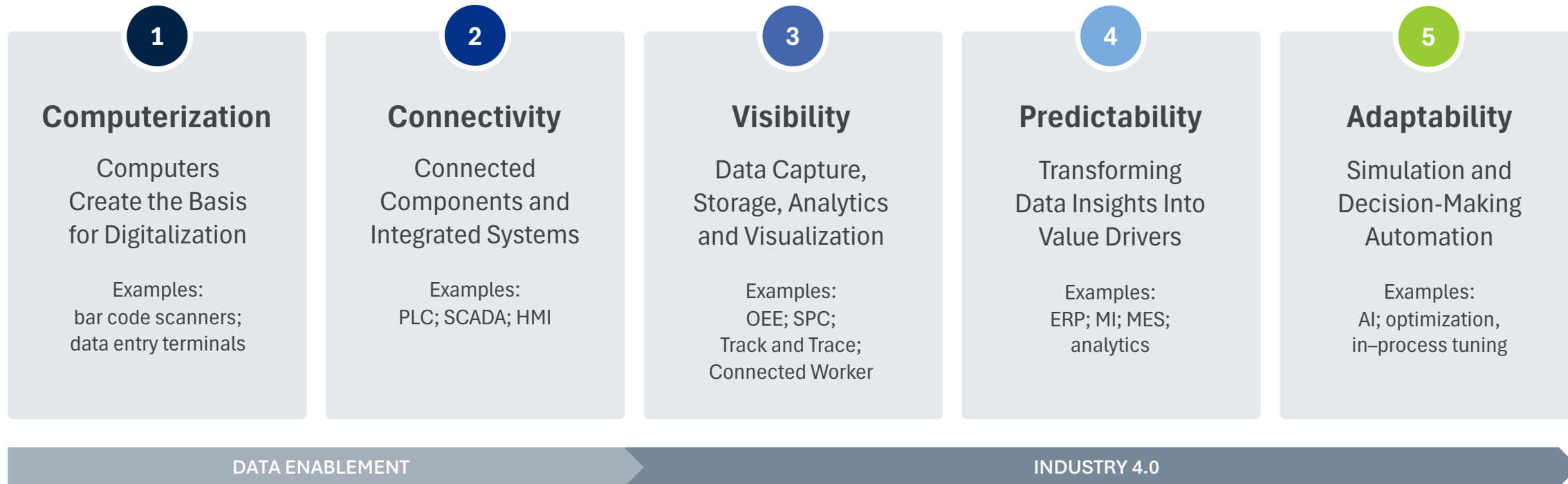
We help you run more efficiently and effectively through the deployment of integrated systems that harness the power of data and automation.



***Design. Build. Manage.** We work with you every step of the way, from initial requirements through design, implementation, and management.*

Your Goals. Our Guidance. Shared Success.

Proactive, data-driven operations is the culmination of a multi-stage journey.
We pursue an incremental approach that fits your company's capabilities and goals.

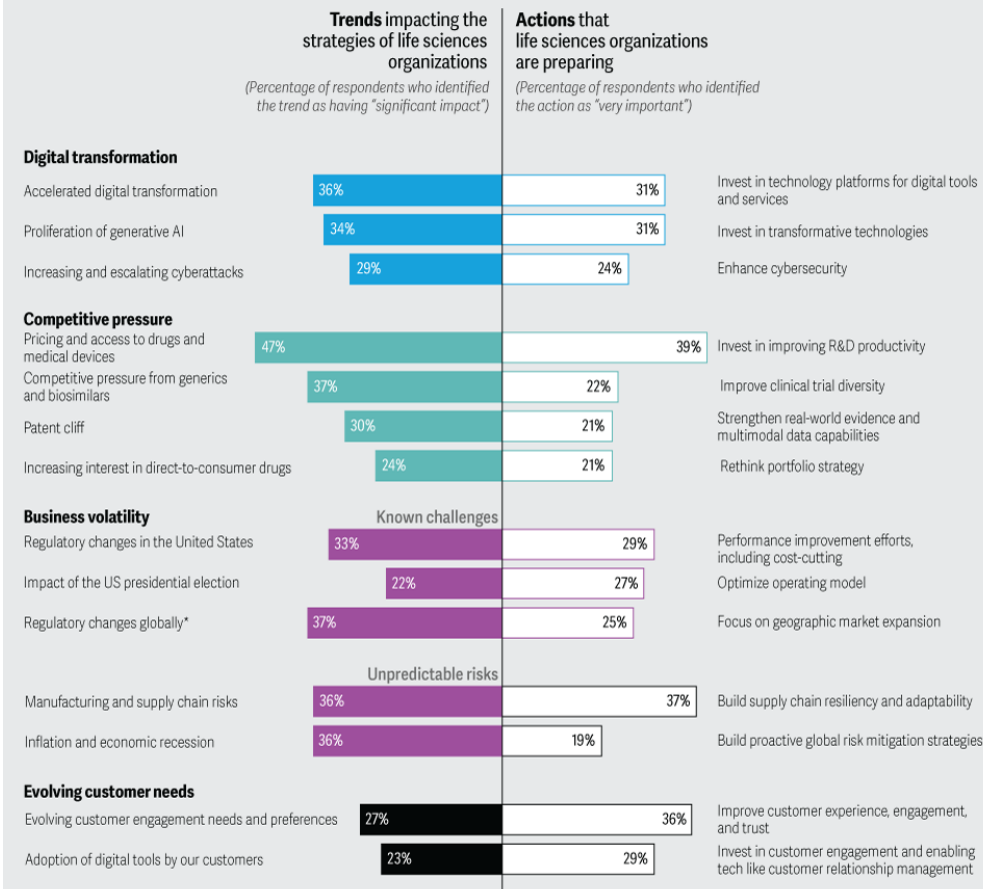




AI a Strategic Priority for Life Sciences

- According to Deloitte, AI is being deployed to accelerate drug discovery, streamline operations, enhance the customer experience, and more
- Nearly 60% of companies surveyed are moving beyond pilot projects and are beginning to realize substantial value from adopting these technologies at scale
- Investments by biopharma companies over the next five years could generate up to 11% in value relative to revenue across functional areas
- To fully realize this potential, life sciences leaders should prioritize strategic issues that can most benefit from gen AI

Life sciences trends and actions for 2025



Notes: Unless otherwise noted, n = 150 (including 100 biopharma and 50 medtech respondents from several global markets). Survey question (for column 1): What impact do you expect the following industry trends will have on your organization's strategy in 2025? Survey question (for column 2): How important do you think it is for your organization to take the below actions to prepare for the trends mentioned above?

*This option was exclusively shown to respondents from France, Germany, Switzerland, the United Kingdom, China, and Japan (n = 90), excluding US participants. The total cohort comprises 150 responses, including both US and global respondents.

Source: Deloitte's 2025 Life Sciences Outlook survey.

Source: [Deloitte 2025 Life Sciences Outlook survey](#)



Harness Your Data. Unleash Your Operation.

AI provides life-sciences companies with unprecedented power to enhance their products, services, operations, and strategic decision-making.



Drug Discovery

- Drug discovery is accelerated by the ability to efficiently analyze large datasets to pinpoint potential drug candidates more accurately
- Clinical trials can be streamlined, resulting in quicker commercialization



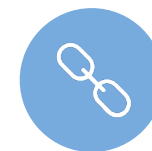
Production

- Production processes are monitored and improved in real-time
- Issues are detected earlier, allowing time to resolve. The result is minimized defects and deviations
- Proactive maintenance using actual metrics vs duration-based activities increase efficiency and reduce downtime.



Regulatory

- Automate compliance monitoring and reporting
- Predictive models can identify and address risks related to product recalls and supply chain disruptions, protecting patient safety and brand reputation



Supply Chain

- Predictive models facilitate real-time demand forecasting, improve inventory management, and enhance supply chain visibility, reducing stockouts and lowering holding costs while increasing resilience



Incorporate AI/ML at Every Stage of Operations

Add AI/ML and increase your productivity exponentially in key areas of your lab and manufacturing operations.

Accelerating Bench Scale Process Development

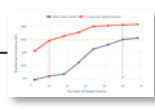
Process Design & Simulation



Process Monitoring & Control



Real-Time Testing



Automating Pilot Scale Manufacturing

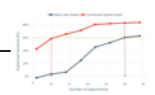
Process Optimization Simulation



Process Monitoring & Control

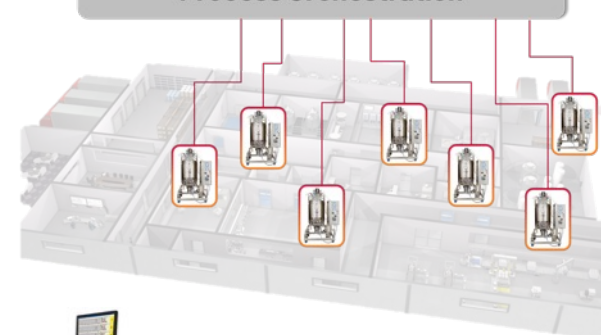


Real-Time Testing



Enabling Agile Scale-out at Commercial Scale Manufacturing

Process Orchestration



Agile Modular Plant Orchestration

Real-time testing & Supervised Closed-Loop Control

Digital Twin



Process Development

Pilot Programs

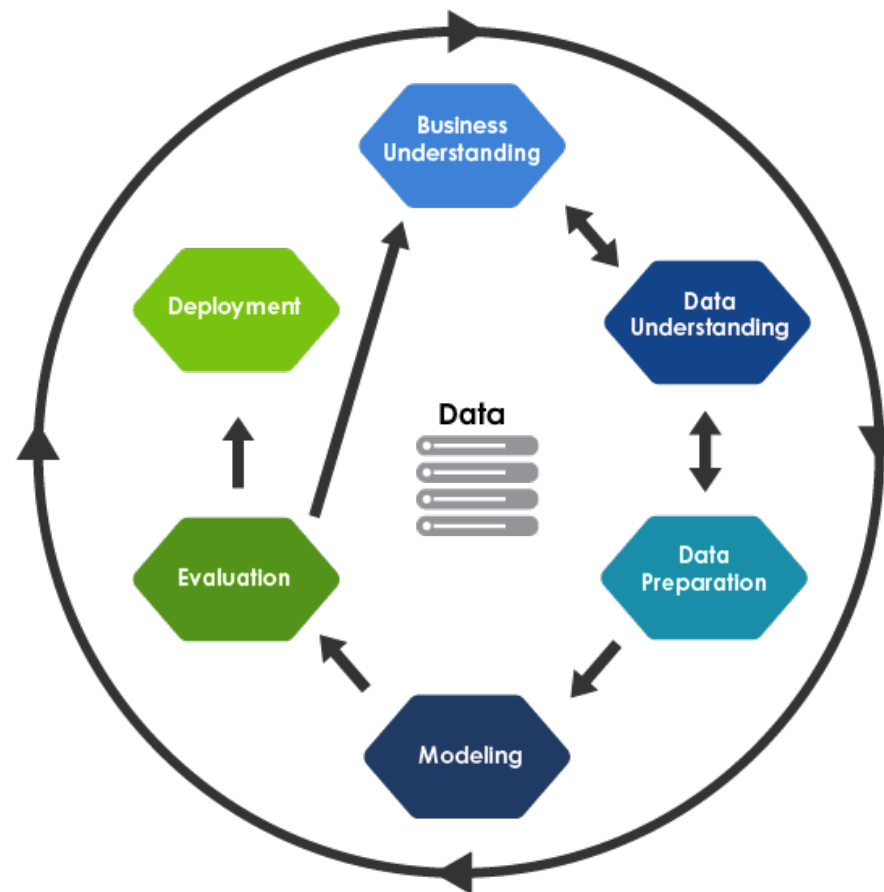
Compliance

Commercial Manufacturing



How to Begin: Focus on a Use Case and Data

- Work with experts to gain a complete business understanding of the initial use case(s)
 - Value generated, GM Optimization, ROI metrics
- Complete an inventory of all the data required for the initial use case
 - Map the data hierarchy and structure
 - Focus on a reusable ecosystem that has high data reuse from use case to use case
- Train the model and evaluate the results
- Learn, improve, scale



Published in 1999, Cross-Industry Standard Process for Data Mining (CRISP-DM) has become the most common methodology for industrial data mining, analytics, and data science projects.



Use Case: Cellular Cultivation in Oncology

Challenge

- Apply AI/ML to various aspects of CAR-T therapy to enhance the understanding, development, and optimization of these advanced therapeutic modalities

Solution

- Track process parameters, set points and sequential actions into a time-series historian with data sets identified by tag name and timestamp from 1-to-15-minutes
- Clustering model for categorization of data sets drives anomaly detection when future data sets behave differently than past data

Results

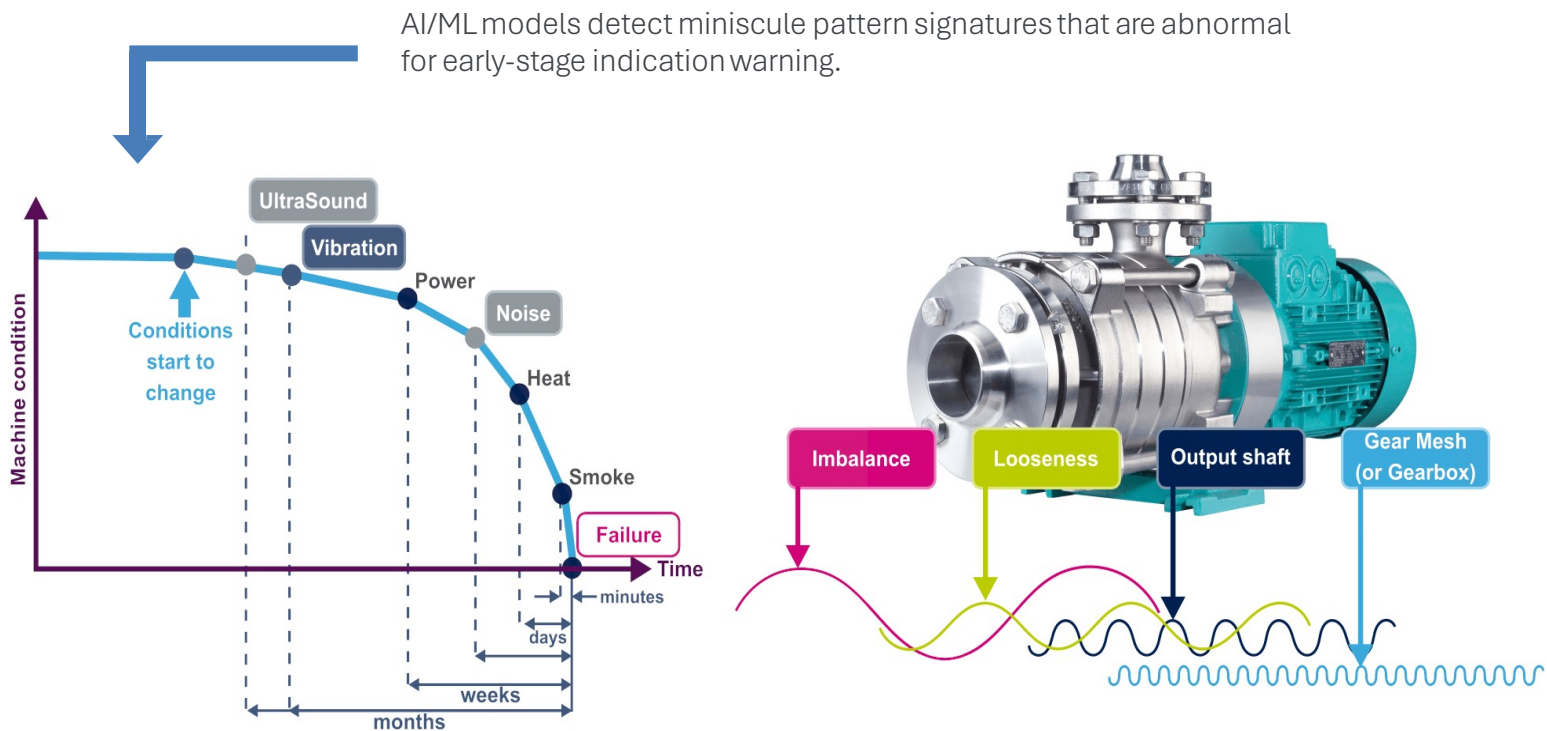
- A properly trained AI/ML engine can monitor conditions to adapt the bioreactor environment to the cells changing needs during different growth phases, maximizing cell yield
- Machine Learning can predict, based on analysis of complex variables, in real-time the conditions needed for maximizing cell yield





Use Case: Predictive Maintenance

AI provides the ability to predict anomalies and reduce maintenance events.



AI detects complex patterns and combinations of variables that cannot be detected by humans or seen in any single variable trend.

A Unified Operation

AI and Digital Twins facilitate better collaboration among departments and stakeholders by offering a unified platform for data exchange and decision-making, marking a significant improvement in pharmaceutical manufacturing that fosters efficiency, flexibility, and competitiveness in a challenging market.



Serving Life-Sciences Leaders for 40 Years

For 40 years we have served leading companies in life sciences, providing cutting-edge solutions that harness the power of automation and data to accelerate operations.





You Have Challenges. We Have Solutions.

In life-sciences operations today, it seems as if speed is paramount. But precision is just as important. And complexity is inevitable. That's why you need an experienced systems integration partner to guide you.

We have 40+ years of experience designing, implementing, and managing integrated solutions for data-driven operations.

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 **Thank You**