

# Smart manufacturing for pharmaceuticals

Enhance the readiness, efficiency, and responsiveness of your operations

## Urgent challenges in the pharmaceutical industry

To meet the challenges due to evolving patient demographics, innovative product types, intensified regulatory scrutiny, and performance pressure, pharmaceutical manufacturers must emphasize:



## Increasingly complex production landscape

Uncertainty related to several interconnected factors can make it difficult to anticipate production needs.

Uncertain **approval timeline**

Demand **variability**

**Quality risks** from scale-up, process variability, and equipment malfunctions

Regulatory **compliance** and **traceability** issues

**Excessive** raw material, water, and energy **consumption**

Growing **cybersecurity threats**

## Where is there room for improvement?

Digitalization has emerged as one of the most effective ways to ensure regulatory compliance and quality, while also increasing production agility and cost efficiency.

However, despite the advancements in pharmaceutical manufacturing technology, there continues to be significant room for improvement:

**31% projected CAGR** of digital twin technology in pharma manufacturing from 2024-2034

Source: GlobeNewswire

Only **35% overall equipment efficiency** currently in pharma

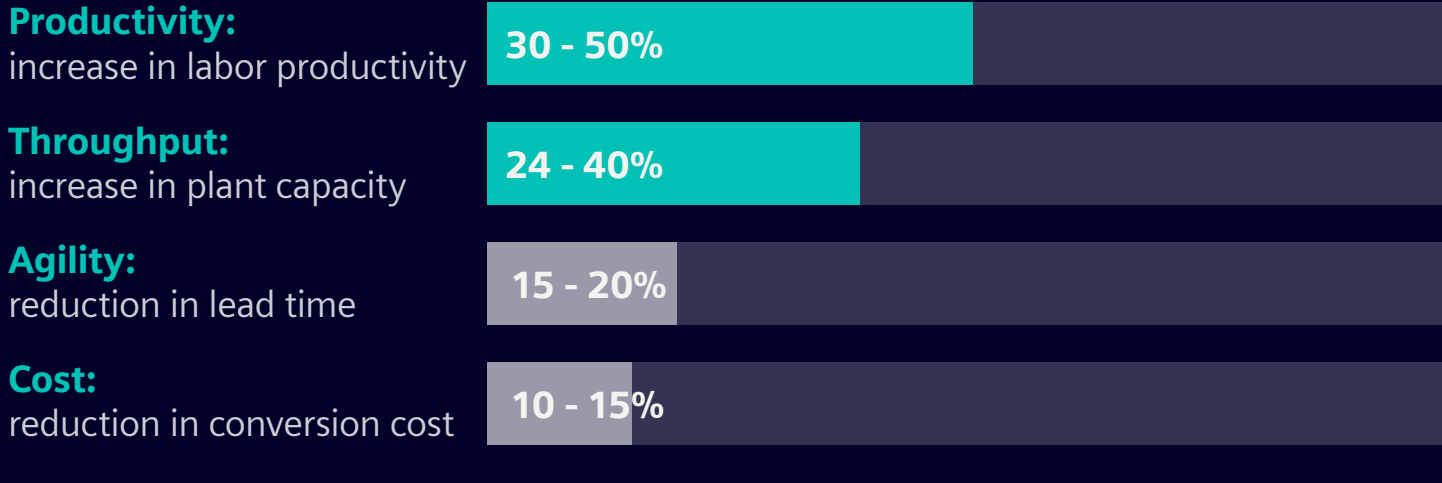
Source: McKinsey

Fewer than **20% AI adoption** in pharma manufacturing

Source: Roland Berger

## Digitalization's impact on pharmaceutical manufacturing

The strategies that worked in the past are no longer viable. Digital transformation is key to unlocking next-generation pharmaceutical manufacturing operations.

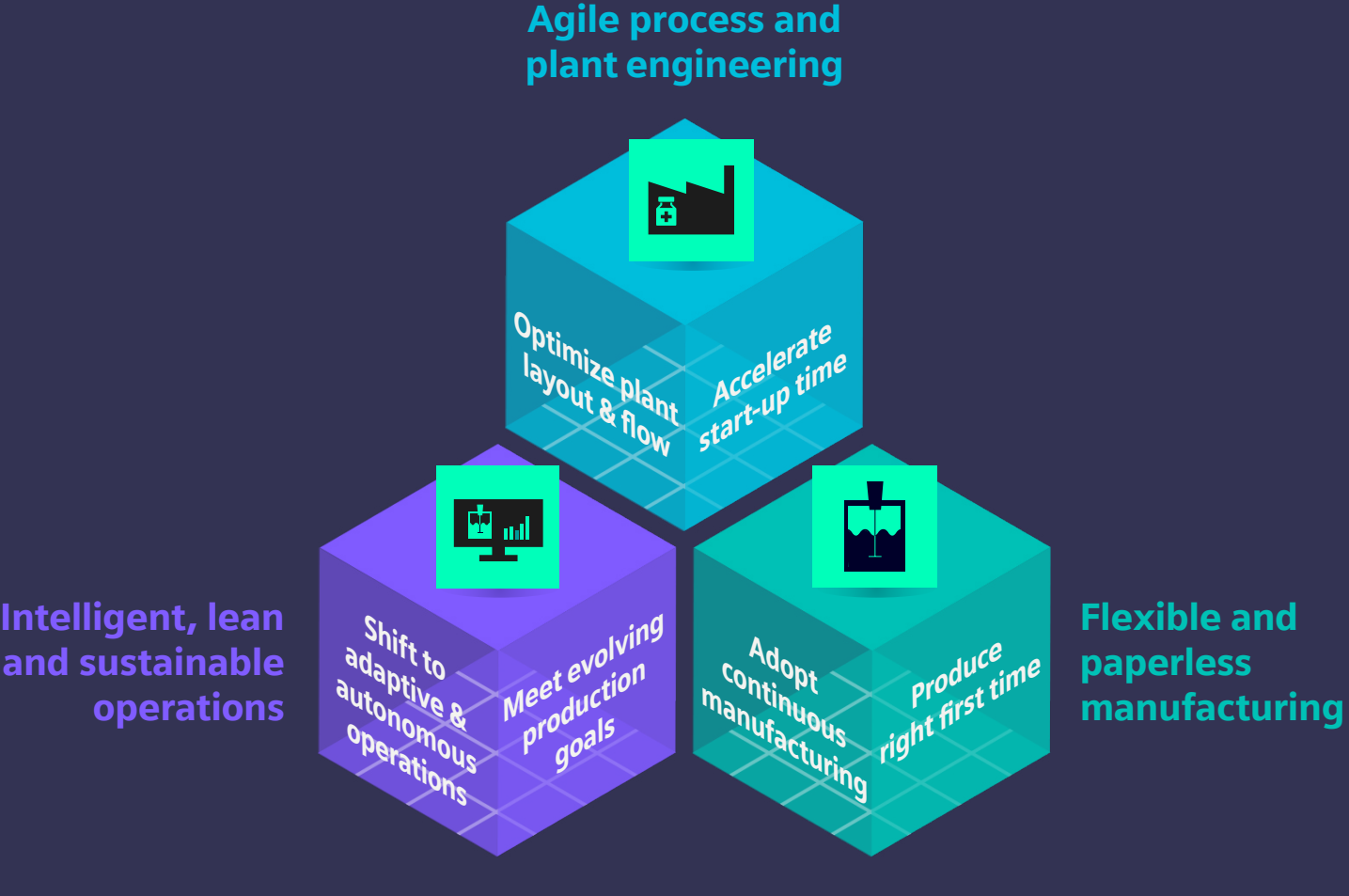


■ Increase  
■ Reduction

Source: McKinsey

## Smart manufacturing for pharmaceuticals

A comprehensive approach that enhances operational readiness, efficiency, and responsiveness.



## Industry proof points of realized benefits

**- 8 to 12%** engineering savings<sup>1</sup>

**- 50%** conversion time for brownfield project<sup>2</sup>

**4,000 data tags** extracted in real time<sup>3</sup>

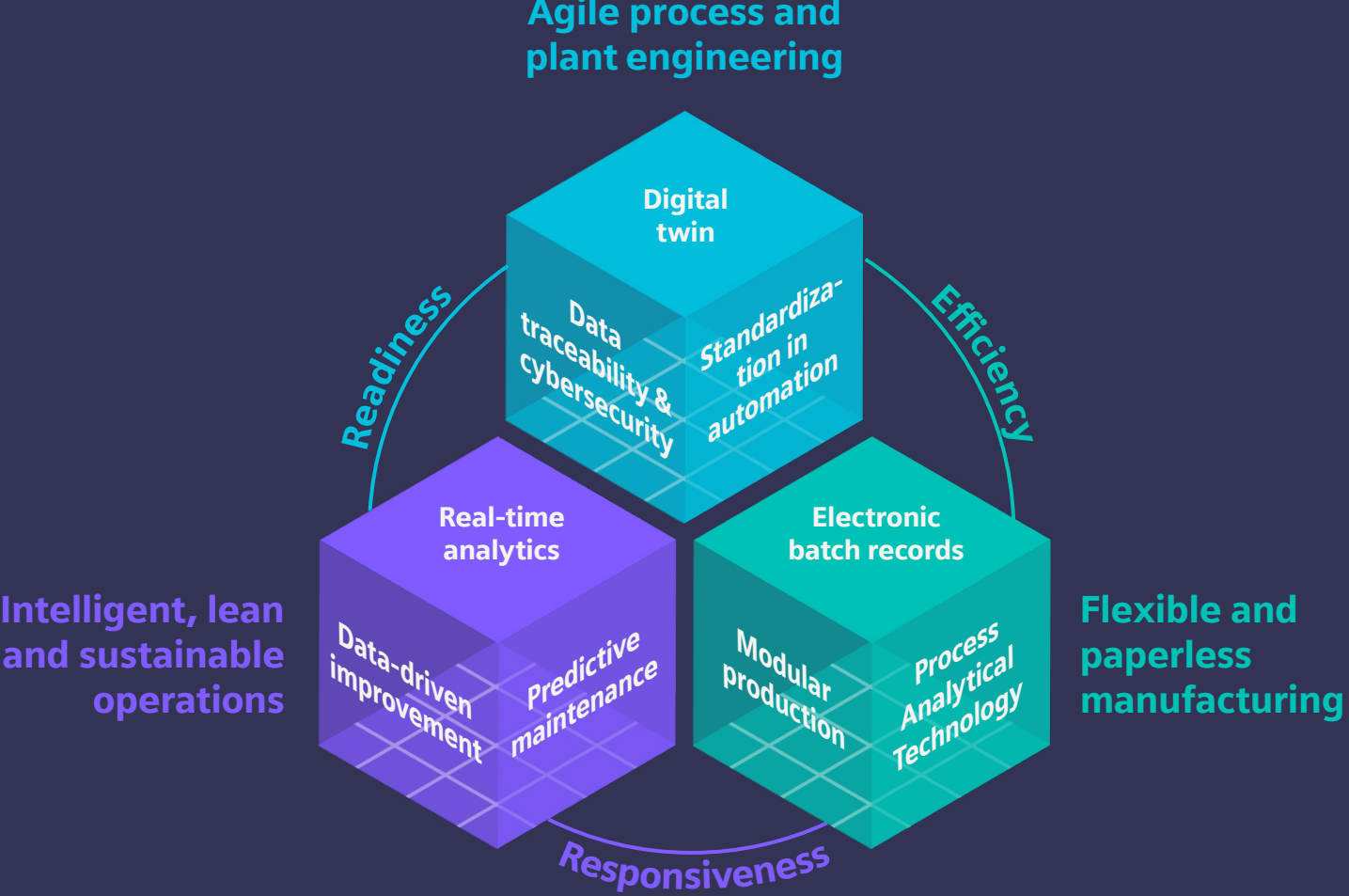
**3 - 6 weeks** to model all automation processes<sup>4</sup>

**- 80%** time and effort for MES integration<sup>4</sup>

**+ 40%** more energy-efficient plant<sup>5</sup>

Sources: 1 Novartis | 2 BioNTech | 3 AGC Pharma Chemicals | 4 Bayer Bitterfeld | 5 Pfizer

Siemens offers the **most comprehensive portfolio** featuring **adaptable and modular automation solutions**, seamlessly integrated with **interoperable software and expert services** for pharmaceutical manufacturing.



Siemens' smart manufacturing solution for pharmaceuticals is designed to meet the diverse needs of **pharmaceutical primary and secondary manufacturing**, from **personalized medicine** to **high-volume** and **continuous production**.



## What's next?

Make your production sites adaptable and more efficient while ensuring consistent quality

[Learn more](#)