



# Flow Simulation

## The Essential Weapon for Lean in the Age of AI

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### **Context**

The global simulation market is growing at 12.9% per year (\$56B by 2032). 86% of industrial executives consider digital twins applicable to their organization (McKinsey). Yet how many Lean teams still rely on stopwatches and spreadsheets?

### **13 reasons to act**

- This article presents 13 concrete reasons why every Lean team must step up their simulation capabilities. Grounded in field experience, benchmarked against McKinsey, BCG, Deloitte and PwC.

## What simulation reveals

**#1 Spot the blind spots in flow rules**  
Building a model forces you to formalize every rule. The model tolerates no gray areas. Randomness should only exist if it is a deliberate choice.

**#2 Force real shop floor observations**  
To feed a reliable model, you must understand the true decision logic, tacit rules, and informal practices.

**#3 Make the invisible visible: the assembly case**  
Every factory with an assembly workshop shares the same trait: an abysmal void of organization for assembly. No formalized assembly sequences, no time allocated to tasks. The designer draws the top part first, the assembler works with gravity. Result: clusters of idle workers waiting at assembly. Simulation makes this collective inefficiency concrete. It does not condemn – it illuminates.

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# What simulation transforms

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## Key quotes



*Source: competitive intelligence from top consulting firms 2025-2026*

**McKinsey: simulate thousands of production sequences to identify bottlenecks and constraints.**  
**BCG X: +30% forecast accuracy, -50 to 80% fewer delays.**  
**Deloitte: simulation unlocks the true value of the digital twin.**

PwC: by 2028, 65% of large manufacturers will integrate intelligent agents into their simulation tools.

## What simulation transforms (continued)

### #4 Deliver objective answers

Simulation settles debates. It is no longer an opinion — it is a reproducible, data-driven demonstration.

### #5 Understand decision impact before acting

Visualize domino effects before experiencing them. The end of "wait and see".

### #6 Break the "don't touch what works" syndrome

How often do we hear: "it works fine, don't touch it"? A factory will often want to optimize only the struggling workshop, without questioning those that "work well" upstream. Optimizing downstream without integrating upstream is like tuning the carburetor without looking at the engine. Simulation forces this systemic view: the local optimum is almost never the global optimum.

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# What simulation multiplies

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### #7 Foster cross-site synergies: clear the fog

In environmental services, teams keep saying flows are complicated. Simulation doesn't simplify them, but makes interactions visible. The archipelago becomes a managed network.

### #8 Spark curiosity

Operators, technicians and managers see their factory come alive and challenge the model's answers. A powerful engagement lever.

### #9 Make teams autonomous

Simulation democratizes experimentation and shortens the Plan-Do-Check-Act cycle.

### #10 Free up your teams' brainpower

Simulation absorbs computational complexity. Example: a steel plant with 1,000+ references — the model automatically manages all manufacturing orders. Once the sequence is properly described, it won't forget it.

### #11 Explore solutions at scale

Test as many configurations as you want. First explore to clarify your constraints. Then raise your bar and seek a robust solution with a demanding confidence interval.

### #12 Design of Experiments + simulation

Without factor interactions, simulation solves multi-factor plans at unmatched speed. With interactions, return to traditional methods (Taguchi). This is what we practice at Lean'Art.

# Tomorrow's superpower

#13 In the age of AI, simulation becomes a superpower

AI doesn't replace simulation – it amplifies it: real-time data, reinforcement learning optimization, invisible pattern detection. BCG: AI-driven digital twins push factories beyond the traditional limits of Lean.

The trap to avoid

Only 14% of "smart factory" initiatives are deemed successful. The reason: technology without a Lean foundation means digitizing waste.

Simulation without Lean is a GPS without a destination.

Lean without simulation is a compass without a map.

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## Ready to take action?

Take 30 minutes to discover how simulation can transform your industrial performance

[Book a slot.](#)

[Contact us for a personalized demonstration](#)

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### Conclusion



A Lean team without simulation skills is a surgeon operating without medical imaging. You can do it. But why take the risk?

These 13 reasons come from the field and are validated by market data. The question is no longer "should we invest?" but "how long can we afford not to?".

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