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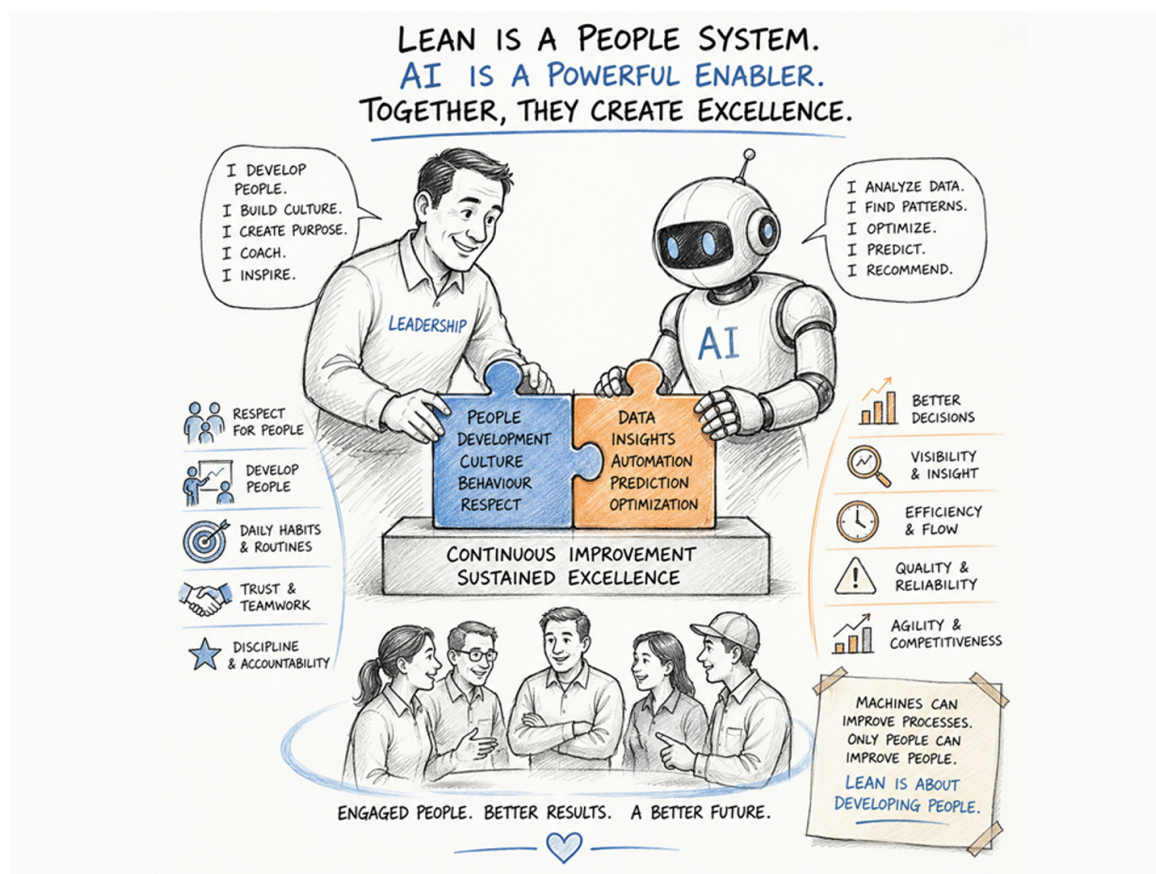
OPINION

Can AI implement Lean Manufacturing?

AI can enhance Lean tools and analytics, but leadership, culture and people development remain fundamentally human responsibilities.

by *Sanjeev Baitmangalkar, STRATMANN CONSULTING* June 24, 2026

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The question is being asked in boardrooms everywhere:

“Can AI implement Lean Manufacturing?”

The answer is both yes and no.

Yes, if Lean is viewed merely as a collection of tools and techniques.

No, if Lean is understood in its true sense.

Today, Artificial Intelligence can analyse vast amounts of data, identify patterns, predict failures, optimise schedules, monitor quality, automate reporting, and even recommend solutions to recurring problems. It can perform many of the analytical tasks that traditionally consumed managerial time.

It may be possible to integrate AI to help organisations eliminate waste, improve flow, reduce variability, and make better decisions faster by designing the proper backend.

But there is a fundamental limitation.

Lean is not primarily a problem-solving system. It is a people-development system.

The most successful Lean transformations are not built on algorithms.

- They are built on habits.
- They are built on daily routines.
- They are built on discipline.
- They are built on leadership behaviour.
- They are built on respect for people.
- They are built on developing the ability of ordinary people to achieve extraordinary results.

A true Lean enterprise is one where people continuously learn to identify waste, solve problems, improve processes, work as teams, challenge existing assumptions, and take ownership of outcomes. This requires coaching, mentoring, encouragement, trust, accountability, and leadership by example.

- AI cannot create commitment.
- AI cannot demonstrate humility.
- AI cannot inspire ownership.
- AI cannot build trust.
- AI cannot develop character.
- AI cannot create a culture of continuous improvement.

These are profoundly human responsibilities.

Toyota's legendary success was never built merely on Kanban, JIT, TPM, SMED, or any other Lean tool. It was built on a culture where every employee was encouraged to think, learn, improve, and grow. The tools were only the visible part of the system. The real strength lay in the behaviours and values that supported them.

This is where many organisations make a costly mistake. They attempt to implement Lean by introducing tools while neglecting the human aspect. Now there is a risk of making the same mistake with AI, believing that technology can replace leadership.

It cannot.

The future belongs to organisations that understand the complementary roles of both.

AI can accelerate problem-solving only if the methodology by which it captures data is designed correctly.

One might argue that AI can provide insights that humans may miss. But in true Lean companies, people strive to develop a value stream perspective while solving a problem, and the brainstorming step ensures that nothing goes amiss.

AI cannot replace the leadership commitment, cultural transformation, and people development that lie at the heart of Lean.

The companies that will achieve extraordinary results in the coming decade will not be those that simply adopt AI. They will be those that use the human power of Lean leadership.

Because in the end, machines can improve processes only based on inputs, not by themselves.

Only people can improve people.

And Lean has always been about developing people.

Can AI identify waste?

AI can identify certain forms of waste, but only if the waste leaves a detectable digital footprint.

For example:

AI can identify

1. Waiting Waste

- Machines standing idle
- Orders waiting in queues
- Delays between process steps
- Long approval cycles in office processes

AI can analyse timestamps and workflow data and highlight bottlenecks.

2. Inventory Waste

- Excess stocks
- Slow-moving inventory
- Overstocking trends
- Inventory ageing

AI can detect patterns from ERP and warehouse data.

3. Defects and Rework

- Quality deviations
- Process variations
- Customer complaints
- Recurring failures

Machine learning can identify patterns.

4. Transportation and Motion Waste (limited to sensors)

- Excessive movement of material
- Inefficient routes

- Forklift travel patterns
- Warehouse congestion

Provided sensors and tracking systems exist.

5. Energy Waste

- Unnecessary machine running
- Excess power consumption
- Utility inefficiencies

AI is very useful here.

But AI struggles with the most important wastes

Suppose a supervisor spends every day fire-fighting.

A Lean practitioner immediately sees:

- Poor standardisation
- Lack of capability development
- Weak leadership
- Inadequate problem-solving skills
- Fear of exposing problems

AI may only observe: "Supervisor involved in 42 interventions per day."
It cannot understand the cultural root cause.

The greatest waste is often invisible to AI

When I have conducted Lean transformations, I have found that the largest waste was rarely material, machine, inventory, or time.

It was:

- Underutilised human capability
- Fear of decision-making
- Lack of ownership
- Lack of teamwork
- Absence of accountability
- Poor leadership behaviour
- Failure to develop people
- Lack of CEO and top management commitment, etc.

Toyota itself refers to this as the waste of human creativity.

This is the one waste AI is least equipped to detect.

A machine can count activities.

It cannot easily judge:

- Commitment
- Trust
- Respect
- Learning
- Motivation
- Initiative
- Cultural maturity

A deeper question

In traditional Lean, waste is identified by people going to the Gemba.

- They observe.
- They ask questions.
- They challenge assumptions.
- They understand context.

Two operators may perform the same activity.

AI may classify both activities as “non-value-added.”

An experienced Lean leader may conclude:

“One activity is waste. The other is actually developing capability and preventing future problems.”

The difference lies in human judgment.

Therefore, can AI identify waste?

Yes. But primarily the symptoms of waste only.
Lean leaders identify the causes of waste.

And only people can address the deepest forms of waste, the waste embedded in culture, habits, behaviours, leadership practices, and undeveloped human potential.

That is why AI may become a partly useful tool, but it cannot become a Lean Sensei.

A Sensei develops people.

AI develops algorithms.

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