

To lean or not to lean? (that is the question!)



Trish Melton examines the benefits of using 'lean thinking' on business processes and project management

'LEAN manufacturing' and 'lean thinking' have become buzzwords in the chemical and pharmaceutical manufacturing industries in recent years. As companies have become more knowledgeable about these concepts, they have started looking at their other business processes.

"To lean or not to lean?" has been the common question. While the benefits of lean manufacturing are obvious, the case for applying lean thinking to other business processes seems to require further justification.

In manufacturing operations, lean thinking is well established and the benefits are well understood. Lean manufacturing allows companies to operate with reduced inventories, allowing companies to save working capital; reduced manufacturing lead times, which translates into a quicker response time to customer requests; less waste, ie process effluent or rework of out-of-specification material; and improved quality (often dubbed "right first time"). This makes 'lean' a very real and physical concept.

The two biggest problems with the application of 'lean' to business processes are the perceived lack of tangible benefits and the view that many business processes are already efficient. Both assumptions can be challenged.

where's the benefit?

There are many tangible benefits associated with lean business processes. A lean business process will be faster, eg the speed of response to a request for the business process will be faster, and as most business processes are linked to organisational supply chains, then this can deliver significant financial benefits to a company. A lean business process will also be a more compliant process as the level of errors and associated re-work (business process waste) is reduced, supporting both increased speed and reduced operating costs for the business process. There are also benefits related to people development and knowledge management within a lean business process, due to the way that such concepts are built-in to the 'lean' way of thinking.

my business is already efficient!

The perception that a business process is already efficient is all too often an illusion. Functionally, many business processes may appear very efficient, however the application of lean thinking forces us to review the whole supply chain in which the business process sits, and this frequently reveals bottlenecks and pockets of inefficiency.

For example, in an engineering project there is no benefit to designing one element very efficiently if the remainder of the design process remains unchanged. The overall design is only completed as efficiently and effectively as the least efficient or lowest capacity function – the bottleneck.

Many business processes have been merely optimised when a complete re-design or deletion would have been the most appropriate option. Thinking lean makes us think 'out of the box' because it relies on the identification of the root cause problems rather than the solution of symptoms. To illustrate the point, most businesses generate a large amount of project progress information each month in order to assure senior stakeholders that they are in control, yet the very act of collecting and analysing this data and then translating this progressively up an organisation hierarchy could be a very efficient process of moving around 'waste' – all the non-valuable, unimportant information.

To really get this issue across, one can lay out the benefits of applying lean thinking to a number of different business processes. Key among this is lean project management – the business process by which we deliver projects, both in the engineering and non-engineering world, which aligns with the needs of the business.

agile project management

Any project manager knows that a project should deliver value to a customer as a part of the overall product supply chain. Despite this, many project managers when developing project delivery strategies begin to treat the project like an island, divorced from the business going on around it.

This leads to a series of undesirable effects (UDEs). Firstly, there are frequently misunderstandings of the real business drivers; understanding why a project is required is fundamental to the definition of value.

Secondly, projects often follow a standard process which contains waste when applied to a specific business need, eg in the pharmaceuticals industry, the separation of validation from engineering tends to duplicate activities and lengthen overall project programmes. Thirdly, typical project processes allow various parts of a project team to behave like separate entities with no proper connection to each other – each engineering discipline behaving as a 'silo' and separated from the flow of value to the customer – this impacts the flow of information and decisions. Finally, the way that engineering contracts are set up (management contracts, sub-contractors and contracts with equipment vendors) can lead to suppliers focusing on their value chains, not those of the eventual customer.

Working within this standard process and these standard contractual agreements, many project managers dislike change and see it as a problem. This means that all too often change is blindly avoided without considering the potential benefits that it could bring. The risk adverse way that project managers and team members operate also impacts the flow of information and decisions, ie a tendency not to release information until it is 100% correct drives decision making. No consideration appears to be given to the impact of this way of working on the project bottlenecks, ie those parts of the project whose capacity is less than the demand placed upon it.

Lean thinking starts with the customer and the definition of value. Therefore, as a project is ultimately a vehicle to deliver value to a customer, the principles of lean thinking should be applicable to project management and the project management processes.

We can remove waste from many steps in the project process, from how we develop the technical aspects of the project, via how we assure compliance,

to how we design to operate a completed facility. However, to be truly lean we have to link all these elements within a robust business process – we need to ensure the flow of value. This leads to a 'lean' project

management process, which we have called agile project management.

By being agile we can connect the projects back into the organisational supply chain. This helps fully deliver the business benefits from that project.

The case studies aim to demonstrate what the lean principles, successfully applied within manufacturing organisations, have to offer, and why they should be applied to the project management process.

Case study 1 – Project controls

A young project engineer is writing his monthly report, which includes some metrics to track safety. He has had a few minor incidents on his project this month, including one employee who cut his finger on some insulation cladding at the end of his shift. The report template is onerous and asks for lots of data, such as safety data. Three weeks after he has issued his report to his manager the corporate safety vice president makes a surprise visit to the site. It emerges that

therefore also has a 50% waste content as it has summarised and collated the data from lots of such reports; this process of transferring waste continues up the management chain. The space between each activity is the travelling time which is also wasteful. This gives an excellent visual representation of the overall process – if all the red and white is removed then the process could be reduced from three weeks to three days.

Overall the analysis showed the

incorrect interpretation of project and therefore site situation.

As a result, the following actions were taken:

- Progress reports were changed to stop the 'flow of waste'. It now take a few hours to compile the report as less data is collected but this data is more valuable to the organisation, eg specific safety or performance data which links to measures which are important to the whole organisation.
- Organisational key performance indicators (KPIs) have been reviewed and modified so that data can be robustly summarised at project, site and corporate level.
- The project engineers now understand more about the data they are collecting and how it should be collated into project measures eg the difference in severity and impact between lost time accidents and minor incidents on their project.
- Project reporting used to be a significant monthly activity due to the extent of data collection and analysis. Now the project engineer uses a simplified template, which can be completed more quickly, leaving more time to interpret the data.

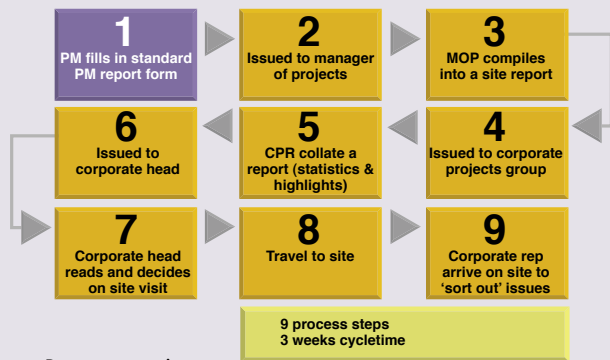


Figure 1: Process mapping

he is here to sort out the serious safety issues on site! The disruption costs the company – and the project – time and money.

Here the lean tools were used to ask “what happened?”

The visit was the result of the corporate safety VP reading the collated report which showed that this particular site had the worst safety record within the group. When the data was analysed a different picture emerged – the site actually had an average safety record.

As a part of the analysis the reporting process was mapped and the amount of waste noted.

The process flowchart (Figure 1) analyses the data moving from step to step. It looks at how data was collected and summarised as it moved from project to site to corporate reports. The data collected during process mapping was then converted into a time-value map (Figure 2). This type of analysis denotes 'value'-added activities as green and 'waste' as red, ie the original project report generation activity (one day) is shown as 50% wasteful because half of the data collected was never really required. The site report (one day)

amount of waste that was flowing through the project reporting process: time wasted waiting for reports, travelling time, plus all the data that was collected and analysed and either never used or used inappropriately. The data was being collected with no understanding of the metrics subsequently calculated, leading to

Key message – Waste can flow through your business processes just as fast as value if you let it

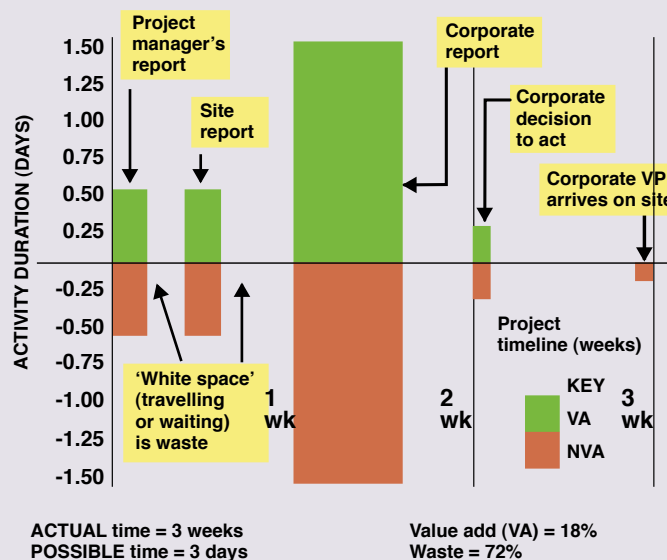


Figure 2: Time-value maps

Case study 2 – Funding approval

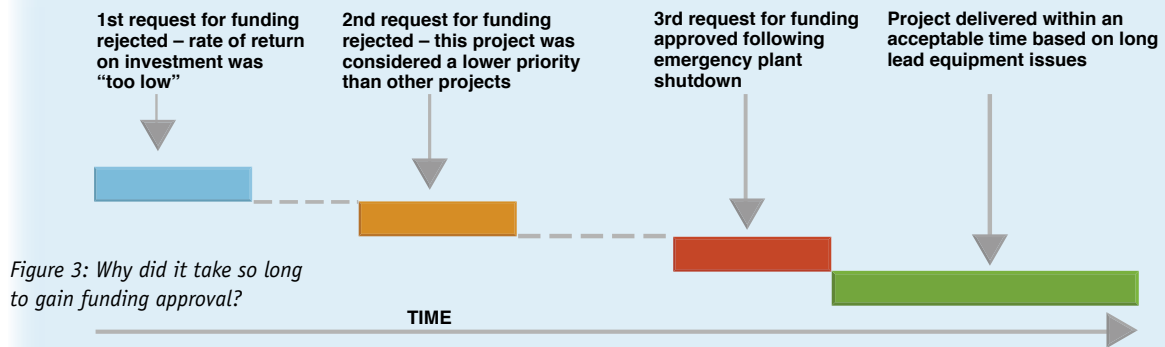


Figure 3: Why did it take so long to gain funding approval?

At a recent project close-out meeting the operations director wanted to know: “Why has the project taken so long?” The project team was amazed – compared to other benchmark projects this project was implemented quicker. But from the customer’s perspective this project was needed six months ago.

Once again the lean tools were used to ask: “what happened?”

The project was related to the upgrade of a very old facility, which was delivering high quality product to a steady market. Although this was a well-established product, there were few competitors and so this facility brought in a considerable revenue and profit; in other words it was the company 'cash cow', bringing in the funds for developing new products.

The analysis commenced with the funding process being mapped (Figure 3); a number of UDEs were noted.

The UDEs were:

- The project was rejected twice before successfully getting approved funding even though the plant was old and already operating well above its stated capacity. The rejection decisions were 'non-value added' because they did not consider the effects of NOT having the plant available, ie lost market share and reduced company revenue.
- Because of the above there was significant duplication of work to justify the project (three times). Although the situation may have changed over the duration of the approval process significant waste was identified, such as too much detail which wasn't required so early in the project lifecycle and unnecessary repeat work.
- The funding process operated by passing the project

justification document from technical to financial functions in series. Functional behaviour was seen in that the first rejection was purely related to a financial target which was not appropriate for this project – which was about security of supply NOT increase in revenue of profit.

Other UDEs showed that the funding approval process had very little to do with understanding what the customer wanted and even who the *real* customer was. The marketplace wanted a continued and secure supply of the company's product; the operations director wanted a reliable plant that could provide this.

But undesirable effects are only a symptom of an underlying problem. Figure 4 shows a root cause analysis for one of the undesirable effects (functional behaviour) leading to the identification of the real problem, that the process wasn't linked to external measures of customer value.



Figure 4: Root cause analysis

The overall analysis also showed that the eventual approval didn't actually follow the approved process – if the 'emergency' hadn't occurred (plant shut-down causing market stock-outs) then it probably would've been rejected a third time!

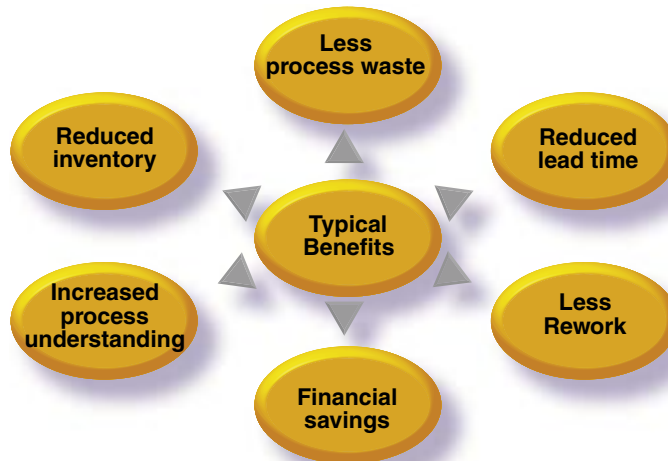
As a result the following actions were taken:

- The company project funding approval, justification and prioritisation process has been amended, in order to focus on maintaining value to customers whilst achieving business success. Project categorisation recognised that 'security of supply' was a valid justification for a project when that supply was critical to maintaining market share and company revenue.
- Reduced front-end design work was required for initial funding approval to minimise 'wasted work'.
- Key stakeholders were involved much earlier in the process. If the operations director and his plant staff had been involved the company would have realised the risks that the company was taking by NOT approving the funds earlier.
- The company started to listen to the voice of the customer, and began to identify what the customer needed from the company in order to remain a customer. The late funding *did* cause supply problems in the marketplace and some customers were lost to competitors.

Key message – A sound business decision is only sound if it delivers value to your customers

The examples given show how lean tools can be used to support troubleshooting. They have also been used proactively on the delivery of projects, where they have demonstrated many benefits – project lead-times were decreased, contractual issues at project end were eliminated, technical or quality/compliance problems at commissioning and start-up were reduced, a cultural change took place within all stakeholder organisations, and the amount of waste flowing through the entire process was significantly less.

Agile project management is not just a concept, it is a real methodology for developing your project management business processes. It introduces the concept of a standardised lean process, which requires lean thinking as a key part of the 'normal' process so that strategies to deliver projects and associated business benefits are customised for the delivery of the specific value proposition (what your customer needs).



Typical benefits of lean manufacturing

Lean thinking can be applied to any process and deliver significant benefits. However, a data-rational, structured approach is needed if the key principles of value, waste and flow are to be rigorously applied along the supply chain.

- The process can be summarised as:
- Document current business process performance – how do we do it now.
 - Define value and then eliminate waste.
 - Identify undesirable effects and determine their root cause in order to find the real problem.
 - Solve the problem and re-design or eliminate the processes.
 - Test and demonstrate that value is now flowing to the customer of that business process.

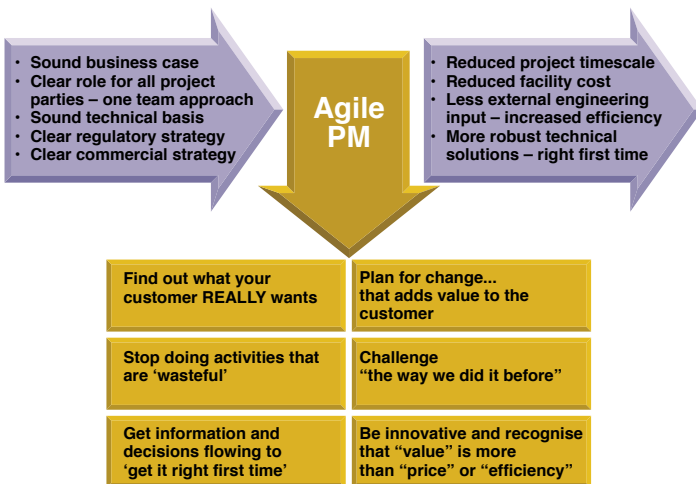
Lean thinking is applicable to *all* business processes. The challenge, if we decide we want to be lean, is whether we know enough about our ways of working, what customers of the business processes truly value, and how our businesses operate and need to operate.

AGILE PROJECT MANAGEMENT

How we deliver the right projects – for the business
How we deliver them right – to support the business

- **Aligning project delivery within an organisation to business needs**
- **WASTE is seen as:**
 - projects which aren't necessary
 - late completion of project
 - projects which are over budget
 - Projects which are not able to realise the business benefits

Applying lean thinking to project management



Agile project management

Trish Melton is the managing director of MIME Solutions, an engineering and management consultancy working within the chemical and pharmaceuticals industry. She is the founder chair of the IChemE Project Management Subject Group and the author of the soon-to-be published *Project management toolkit*; an entry-level project management book which will be the first book in a new IChemE series on project management. She has lectured on agile project management for some years as well as being an experienced practitioner.