WHITE PAPER:
How Lean improves your Performance
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What is Lean?

Lean is an improvement practice that considers the expenditure of resources for any goal other than the creation of value for the end customer to be wasteful, and thus a target for elimination. To put it simply, Lean seeks to create “more value with less work”. Lean tools and concepts provide a proven methodology for the systematic elimination of waste and wasteful activities. They prove to be extremely effective for:

- Improving business performance by focusing key team members on the elimination of non-value added activities (waste) in key business processes and work-flows, then improving value added activities
- Identifying strategies and specific alternatives that will improve processing times and realise cost reduction
- Providing a new lens for reviewing customer requirements and improving customer satisfaction
- Leans “all inclusive” nature is the only business solutions that bridges the gap between those on the ‘production line’ and management

This whitepaper is focused on understanding what Lean is and helping you to apply Lean tools and concepts into your organisation.

A History of Lean and the Toyota Method

Lean is a generic process management philosophy derived mostly from the Toyota Production System (TPS) and identified as "Lean" only in the 1990s. The TPS evolved from Taiichi Ohno's use of Deming's PDSA. It is renowned for its focus on reduction of the original Toyota seven wastes in order to improve overall customer value. The steady growth and success of Toyota has focused attention on how it has achieved this.

The term states that Lean evolved from Kaizen - the Japanese tool used within the TPS. Lean is Kaizen modified to fit the American – and now western - culture. For many, Lean is the set of "tools" that assist in the identification and steady elimination of waste. As waste is eliminated, production time and cost are reduced. At the same time quality is improved. Workflow is another essential element of a Lean Initiative, in which the focus is upon improving the "flow" or smoothness of work through the system and not upon 'waste reduction' alone. Techniques to improve flow include production leveling, "pull" production. This is a fundamentally different approach to most improvement methodologies.

Lean can be seen as a loosely connected set of potentially competing principles whose main goal is cost reduction by the elimination of waste. These principles include: Pull processing, Perfect first-time quality, Waste minimisation, Continuous improvement, Flexibility, Building and maintaining a
long term relationship with suppliers, Autonomation, Load leveling and flow and Visual controls. The disconnected nature of some of these principles perhaps springs from the fact that Lean has grown since 1948 in response to problems within production facilities and more recently in a broader range of work settings. Lean today is the result of a 'need' driven learning to improve.

Toyota's view is that the main method of Lean is not the tools, but the reduction of three types of waste: muda ("non-value-adding work"), muri ("overburden"), and mura ("unevenness"), to expose problems systematically and to use the tools where the ideal cannot be achieved.

After the initial conceptualisation at Toyota, Lean has progressively evolved as a key continuous improvement practice adopted by leading organisations throughout the world. Early adopters were often manufacturing companies who were able to apply the principles to a similar set of challenges within their organisations. Leveraging the tools and concepts developed by Toyota, many leading organisations around the world have integrated Lean into their continuous improvement toolkit, often using Lean in parallel with Six Sigma, PDSA and Process Management practices.

From the early adoption within the manufacturing sector, Lean has evolved over the years to be a continuous approach adopted broadly across all major industries from large public sector organisations to small community care organisations. The elimination of waste in processes has widespread applicability in all sectors where repeated processes are a core feature of business.

**Why Lean?**

Lean focuses on removing waste from your processes. In the current economic climate no organisation can afford to be expending unnecessary resources. By focusing on the value adding component of processes Lean allows you to quickly identify what should be improved and what should be removed from existing processes. Additionally Lean is less reliant on data than statistical based solutions such as Six Sigma or Statistical process control. Using data reliant methods can cause delay while the data is collected and analysed, Lean does not suffer as heavily from such delays because Lean data collection relies on the "as is" observation of the process.

Lean can be applied by front line staff and management. It is not as heavily reliant on technical or complex methodologies. As a result the personnel who will be implementing the solution can be involved or lead the improvement. This generally speeds up the time taken for implementation as frontline personnel have bought into the solution already. While all accepted improvement processes have aspects that improve performance Lean is best suited to today’s conditions.

Lean’s focus is on the components of the process that add value. Lean tools are used to identify and then remove wasteful activity. In the current economic
climate of low revenue and scarce finance, organisations cannot afford to be wasteful in their processes. Lean achieves this.

Effective improvement of process is a fundamental philosophy of Lean. The aim is to improve the flow of the process optimising throughput and creating an operating environment that supports the customers’ demand for the product or service ‘pull’ as opposed to a ‘push’ strategy that will always produce unnecessary inventory and work in progress. A ‘pull’ strategy allows an organisation greater flexibility to meet customer requirements while still reducing the cost of production. Within a Lean organisation work is completed to meet customer requirements.

Many improvement processes are heavily reliant on data. Six Sigma and Statistical Process Control cannot effectively be applied without historical data. While data is important for Lean techniques, the methodology is not as reliant on the availability of historical data for effective application. Consequently delays are not experienced while data is collected and reported. This means more rapid improvement.

Lean focuses on the actual steps in the process and consequently can generate immediate improvement in performance. Lean improvement projects often directly involve frontline staff and management because Lean is less complex, therefore, all inclusive. Lean does not rely on difficult terminology or calculations so is much easier for an inductee to apply immediately. Consequently the personnel directly involved in the process are often directly involved or even leading the project to improve the process. By supporting direct involvement lean techniques often generate solutions that are relatively easy to implement because front line staff have already bought into the solution.

All improvement processes have aspects that provide value to any organisation. Six Sigma can help identify opportunities for improvement that may not currently be visible without the aid of statistical analysis. However in a time of significant economic shock the emphasis needs to be on efficiently addressing the obvious opportunities for improvement and to deliver rapid improvement to performance. ¹

What are the key techniques of Lean?

Lean is defined as the elimination of wasteful activities. It seeks to deliver rapid improvement outcomes by the effective integration of key techniques that are targeted at continually improving the processes by using less;

- Time; reduction in lead time, cycle time,
- Inventory; reduction in inventory by working to customer requirements
- Space: more efficient utilisation of work space, free up area for future expansion of product
- Labour: effective utilisation of resources within our organisations and realisation of the ability to work more efficiently with less
- Money: Cost savings through waste reduction

Lean facilitates effective improvements by leveraging some key techniques that are targeted at eliminating wasteful activities focusing on the above key areas of a process. Although Lean leverages various tools in the continuous improvement toolset, it also adopts some unique techniques that include:

- Value Stream Analysis and Process Mapping
- Process Mapping
- Takt Time
- 5S
- Kanban and Visual Management

Lean practitioners use the above techniques to drive the rapid elimination of waste in the process. The application of these techniques and their timing depends on the nature of the improvement. The challenge often is to define the optimum use of techniques to deliver the right outcome.

**Value Stream Analysis and Process Mapping**

The key to Lean improvements is to rapidly identify and eliminate wastes. Value Stream Analysis is a used to analyse the flow of materials and information currently required to bring a product or service to a consumer. This technique is commonly used in Lean to identify opportunities for improvement in the process.

At the heart of Value Stream Analysis is the Value Stream Map that uses a simple graphical format to capture and present the whole process from end to end in a method that is easy to understand by those working the process. It captures the current issues and presents a realistic picture.

Following the identification of the areas of opportunity within Value Stream Analysis, a more detailed process map of these areas is then created. Highlighting areas of waste within these processes would be the next step in order to enable the organisation to eliminate these activities. This activity also has the benefit of categorising process activity into three main areas: VA-value add, VE-value enabling and NVA-non value add (waste).
A Process Map, is the simplest tool to identify both the value adding steps, non value adding steps as well as value enabling steps of a process. The non-value added activities become the core focus of a Lean Practitioner in eliminating wastes and are separated into the three value categories.

The future state (a diagram showing an improved and altered process) can then be formulated and defined. Lean Process Analysis encourages a team approach and through the capture of performance measurement data provides a mechanism to constructively critique activity. Participants in the activity are encouraged to suggest improvements and contribute towards and implement an action plan. The future state becomes the basis of the improved workflow.

**Takt Time**

Takt time is the time you have to produce your product, not the time it takes. Takt is a German word meaning “beat”. It can be compared to the beat of a conductor's wand. Takt time can be defined as the maximum time allowed to produce in order to meet demand. Lean sets the pace of production flow to this takt time. Flow is expected to fall within a pace that is less than or equal to the takt time. This technique is commonly used by Lean Practitioner to identify wasteful work categorisations within an organisation and to implement a reorganised work structure that optimises the future process.

In Lean, Takt time is used to determine the allowable time for completing individual steps in a production process. This is the case for both steps that modify the product and also the steps that observe and control the process. Takt time also includes both value added and necessary non-value added steps in the process. The quicker that a non-value added step can be completed, the less constraint is placed upon value added steps.

An implication of using takt time can be that work packages get reorganised. The key focus of Takt time is to ensure that all distinct work packages fall within the parameters of the defined Takt time. If a single work package performed by a worker is greater than the Takt time, then reallocation of the package components, using level loading, may be required to ensure the smooth flow of the process.

This kind of capacity replanning is not something that will be desirable every week. It is therefore important that the future state be defined before this kind of work replanning is undertaken. This style of capacity modification should be undertaken to meet long term customer demand changes and not weekly forecasts.
5S

This technique – 5S - was developed in Japan in the 1950’s to increase productivity and utilise the limited space found in Japanese factories. It is seen as the foundation when setting up lean processes and as a powerful tool to ensure the adoption of the improved process by aligning the workplace to optimise the new process. It can range from changes in an employees own work area, to the more radical reorganising or redesigning of the workplace and work activities.

5S comes from five Japanese words:

- Seiri (Sort)
- Seiton (Straighten)
- Seisho (Shine)
- Shitsuke (Standardise)
- Seiketsu (Sustain)

Modern Lean Practitioners also add a sixth S: Safety. The sixth S incorporates key aspects of workplace safety that contribute to reduced lost time due to injury.

The principle of 5S is that to do an effective and quality job you need a clean safe environment and good rules on how to behave. You do this by setting up a housekeeping system that focuses on organisation, cleanliness, standardisation and control.

<table>
<thead>
<tr>
<th>5S term</th>
<th>What</th>
<th>How</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sort</td>
<td>Housekeeping</td>
<td>Sort all items and remove the unnecessary</td>
</tr>
<tr>
<td>2. Straighten</td>
<td>Workplace</td>
<td>Set in order the items, set limits and indicate where they are kept</td>
</tr>
<tr>
<td>3. Shine</td>
<td>Clean up</td>
<td>Clean everything, using cleaning to inspect area and equipment</td>
</tr>
<tr>
<td>4. Standardise</td>
<td>Keep clean</td>
<td>Set up visual displays and controls to standardise the first 3S</td>
</tr>
<tr>
<td>5. Sustain</td>
<td>Discipline</td>
<td>Keep winning through self-discipline, training, communication and the full involvement of all employees</td>
</tr>
</tbody>
</table>
5S can use less time, inventory, space, labour and money by:

- Reducing wasted time and materials;
- Improving daily or shift start up times;
- Reducing maintenance and down time;
- Promoting a safe workplace;
- Improving employee morale; and
- Simplifying the work environment.

**Kanban and Visual Management**

Working in partnership with 5S to sustain the change, visual management works in an organisation to provide visual aids to enhance the workflow and to provide real time information about the process performance. In a visually optimised workplace you will be able to determine:

- What the process is
- Who the customers and suppliers are
- Where and what resources are being used in the process
- What the deliverables and goals are
- How is my individual performance contributing to these goals
- How the process is performing to deliver on these goals
- What is inhibiting the achievement of these goals
- The system of measurement in place to monitor the process effectiveness

True visual management goes far beyond having a clean and well-organised workplace. Visual management provides real-time information and feedback regarding the status of the processes. It is a organisation-wide "nervous system" that allows all employees and management alike to understand how they affect the organisation's overall performance. It allows people to align their actions and decisions with the overall strategic direction of the company. It is also an open window to organisational performance, and it provides the same unbiased information to everyone, whether owner, manager, operator, or visitor.
How does Lean work?

A Lean Practitioner will seek to deliver rapid improvement outcomes by the effective integration of core Lean techniques and leveraging a broader set of continuous improvement tools. This makes Lean a powerful and effective way to improve process performance. Key concepts that are leveraged in any Lean initiative include the following:

1. Waste (Understand it, measure it, then reduce it)
2. Process/Value Stream Analysis (Understand how work really gets done)
3. Takt time (Produce at the rate that meets customer needs)
4. Flow (Design processes to reduce waste and errors)
5. Pull Systems (Produce based on customer demands)
6. Standard Work (Develop and follow internal “Best Practices”)
7. Setup Reduction (Faster equipment/machinery changeover)
8. Visual Management and the 5S (Use visual/auditory indicators to control processes)
9. Performance Measurements (Measure the right things to drive improvement)
10. Kaizen (Method to rapidly implement Lean in a process)

By applying these concepts, organisations achieve significant performance improvement, and develop a sense of process ownership among employees that fosters ongoing improvement.

The application of Lean concepts can be incorporated at a process or cellular level or at the enterprise or organisation wide level. Both approaches yield key benefits and the decision is often a strategic one that includes the organisational direction.

The organisation wide adoption – often referred to as the Lean Enterprise – encompasses every aspect of the organisation from the strategic leadership to the detailed processes. Process or cellular level adoption – often driven by Lean Implementation Events - is more common with organisations that leverage Lean to deliver specific and rapid improvements to their core processes. These more limited initiatives can be integrated into a broader improvement journey – e.g. Six Sigma or Business Excellence – or be adopted in isolation. Lean Implementation Events or Kaizen Events are often used to kick start an organisation's continuous improvement journey by delivering rapid results and demonstrating value to the key stakeholders.
The Lean Enterprise

Because Lean looks at processes, Lean is applicable to any organisation – service, manufacturing, hospitality, government, and healthcare to name but a few. At an organisation wide level Lean can be defined in a number of ways:

- As a measure of quality within an organisational process and or an organisation as a whole
- As a highly disciplined process for continual improvement that helps organisation focus on eliminating waste
- As an enabler or vehicle for cultural change, influencing how organisations understand themselves

The effective implementation of a Lean Enterprise requires organisation wide participation in Lean initiatives and defines key roles for its successful implementation.

- Executive Leadership includes CEO and other key top management team members. They are responsible for setting up a vision for the Lean implementation. They also empower the other role holders with the freedom and resources to explore new ideas for breakthrough improvements.

- Champions are responsible for the Lean implementation across the organisation in an integrated manner. The Executive Leadership draws them from the upper management or process owners and the Champions often act as sponsors for Lean initiatives.

- Lean Practitioners, identified by the Champions, act as in-house expert coaches for the organisation on Lean. They devote about 25% of their time to Lean, drive Lean initiatives, conduct Lean assessments and work with the Champions to ensure the integrated deployment of Lean across various functions and departments.

- Employees throughout the organisation will require an awareness of Lean techniques. They will be expected to use Lean concepts within their day to day work processes and to provide subject matter expertise in relevant Lean initiatives.

The Lean Enterprise is typically deployed through a combination of training, discussion forums, improvement events and assessments.

Discussion Forums

Discussion Forums are critical in establishing a single set of criteria to guide behaviours and decisions for Lean Enterprise which enhance the values and behaviours required for a core focus on waste elimination. This is a critical component in ensuring that the organisation maintains the improvement momentum and sustains Lean principles.
Training
Lean Improvements will be led and driven by Lean Champions within the organisation. Although external support can be used in the initial stages of a Lean Enterprise, sustainability is only achieved through the internalisation of the capability. The organisation will invest in Lean Champions who will learn – through structured learning and action learning sessions – the lean toolkit and continuous improvement principles. The goal is to equip the Lean Champions with the capability to address identified problems with the most appropriate techniques, to accelerate improvements within the Lean Enterprise and recognise effective outcomes and high impact results.

Improvement Events
These improvements are key to eliminating waste and will work within the Lean Enterprise to tackle opportunities in a priority order determined by the Executive Team to achieve rapid returns to the organisation. Each Improvement event will be tailored to address a specific opportunity and to deliver a pre-defined improvement outcome. Lean Implementation or Kaizen Events have become a popular approach to deliver improvements within Lean Enterprises.

Lean Assessments
Sustaining the improvements and ensuring the organisational adoption of Lean are verified through scheduled and impromptu assessments conducted by Lean Practitioner. Lean Enterprises often adopt an approach for scheduled assessments supported by external verification and continuous inhouse assessments driven by the Lean Champions in partnership with the Executive and Management teams.

Lean Implementation Events
Lean Implementation or Kaizen Events can be implemented in isolation to address a specific opportunity or can be deployed as an integral part of a Lean Enterprise as defined above. These events are designed to deliver rapid improvements to selected high priority processes within the organisation delivering quantifiable benefits at the end of the event. These events also serve to reinforce the learning among the Lean Champions and to increase organisational awareness of Lean by involving a broader group of subject matter experts within the organisation.

The event involves an extremely dynamic process that includes interactive training and work sessions that will enable participants to:

- Develop an understanding of Lean concepts, including: waste awareness and value added vs. non value added activity, value stream analysis, takt, time, visual workplace, 5S, performance measurements & pull systems
- Improve business performance by focusing key team members on the elimination of waste in a selected process
• Identify strategies and specific alternatives that will improve processing times and quality for the identified process
• Identify additional issues outside the scope of this event that may need future improvement
• Provide a new lens for reviewing customer requirements and improving customer satisfaction
• Conduct a close out meeting with management to discuss the results and need for further events

Although events vary in structure from one organisation to the next, a typical Lean Implementation Event is illustrated below:

Lean Implementation Events enable the Lean Enterprise to further develop the capability of the Lean Champions and apply Lean techniques and tools to an identified process, which will be redesigned and implemented during the week, delivering fast and powerful results.

How can Lean help your organisation?

The application of Lean concepts provide easily quantifiable benefits to any organisation. A key fact in a modern organisation is that financial results are key organisational driver. The key focus of Lean on data provides an opportunity to easily identify and quantify the benefits delivered. The key benefits of Lean can be segregated into 5 key components:

• Improved process workflow
• Reduced inventory
• Improved quality
• Motivated teams
• Satisfied customers
**Improved Process Workflow**

A key organisational benefit derived through the application of Lean concepts is an improved process workflow. This is achieved by eliminating non-value adding activities, optimising the workplace layout and minimising process handoffs.

The illustrations of a functional and cellular layout vividly demonstrate many of these material handling benefits. Fewer moves, shorter travel distances, and simpler route structures add up to impressive savings. These characteristics also contribute to savings in inventory, coordination and quality.

The product-focused cellular layout has fewer interdepartmental moves compared to a functional equivalent. This reduces handling frequency and cost by as much as 90%. The cellular layout also reduces the queuing, delays, tracking effort, and confusion that accompany material movement.

Travel distances are shorter in the cellular layout. In addition to reducing the cost of long moves, this improves communication and often enables visual control systems.

**Reduced Inventory**

Inventory and work in progress is a form of waste and inefficiency. Lean techniques hone in on both to improve efficiency.

**Improved Quality**

Focusing resources on the components of the process that add value and reducing the distraction of the non value adding components will typically produce a better quality product or service.

**Motivated Teams**

Team should be involved in improving the processes they need to apply. In some other improvement methodologies the techniques are too complicated for everyone to be fully involved. Lean avoids this by using techniques that have proven to be accessible to front line staff and management. In this way the team buys into the solution that they have helped generate and are consequently far more likely to implement the solution effectively.

Teams and individuals get frustrated when the need for improvement is identified but complicated improvement techniques either prevent something being done or require that external experts come in and reinvent their processes for them without their participation.

**Satisfied Customers**

Lean is focused on providing processes that are optimised to the customers requirements.
Proven results

Toyota is broadly recognised as the author of Lean methodologies and has for many years enjoyed a lofty position at the pinnacle of the automotive industry, taking significant market share from the United State and European manufacturers and remaining competitive in an extremely tight local market. Regardless of the impact of the current economic conditions on the automobile manufactures Toyota's performance cannot be ignored. It is the largest car manufacturer in the world and universally accepted as the market leader in improvement and quality.

In an interview with the head of Lean Six Sigma at GE, the CIO Gary Reiner spoke candidly about improvement in the “GE Money business [which] offers private-label finance to retailers. We are the financing behind jewellery stores and pharmacies and the like. Sad to say, it was taking 63 days from when a retailer contacted us saying it wanted to consider using us as a private-label financier until it could conduct the first transaction with our financing. No one had calculated this before we went on this journey.

We did a number of what we call lean workouts, where we get everybody in the room to map out the process, and they got it down from 63 days to one day. The leader of that business was able to go out and have as his marketing campaign, "Enroll today. Transact tomorrow." When we did that, sales doubled. And there are 30 examples of that throughout the company."ii

SAI Global has extensive experience applying lean techniques in concentrated and valuable events. This experience has been earned in the United States, Asia and Australia. Indeed our expert, Donna McIlduff has been brought out to Australia to share her experience in applying lean in the medical devices and pharmaceutical sector in the United States. Donna's
inclusion in the team supplements our considerable experience applying Lean techniques throughout Australasia.

Our experience is gained from creating value for clients from diverse industries, including:

- Logistics
- Medical
- Aged care
- Not for profit
- Government
- Large scale and small primary production
- Aerospace
- Food industry
- Banking
- Administration

The success of our Lean events relies heavily upon the skills of our facilitators who work tirelessly to maximise the impact that the solution will generate for our clients.

For instance when improving the service delivery planning process for an aged care facility in Australia. The team, through the guidance of SAI Global's facilitator was able to identify 91% improvement in the time taken to complete the process, from 35 to 3 days!! This translates to an estimated annualised saving of $264,000.

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1 [www.lean.org](http://www.lean.org)