Invest Northern Ireland

Lean Thinking Tutorial

1. What is lean thinking?

What is lean thinking? The core idea is to maximise customer value while minimising waste. Lean means creating more value for customers, while using fewer resources.

Operate more efficiently

A lean organisation understands customer value and focuses its key processes to continuously maximise it. The ultimate goal is to provide maximum value to the customer through a perfect value creation process that has zero waste.

A popular misconception is that lean is suited only for manufacturing. But that's not the case. Lean applies in every business and every process. It is not a tactic or a cost reduction programme, but a way of thinking and acting for an entire organisation.

The term 'lean' was first coined during the late 1980s to describe the practices pioneered by the Toyota Production System - a system steeped in the philosophy of the complete elimination of all waste. At its most basic, Toyota's 'just-in-time' system makes the vehicles ordered by its customers in the quickest and most efficient way, in order to deliver them as quickly as possible.

This system of just-in-time, has also been called the 'supermarket method' because it's widely believed former Toyota Vice-President, Taiichi Ohno borrowed the idea and applied it to the factory after observing the process in American supermarkets. Ohno observed that supermarkets only stock the items needed by its customers when they are needed and in the quantity needed. When a customer takes goods off the shelf for purchase, the store restocks the shelf with just enough new product to replenish the shelf space.

Putting it into practice, Toyota developed a process of making only what is needed, when it is needed and in the amount needed, thereby delivering its vehicles to customers as quickly and efficiently as possible. This is how they created 'flow'.

Working intelligently. Eliminating waste.

It's easy to look at the Toyota Production System and just see low inventory levels as a key outcome. In fact, even though the system has been widely copied both inside and outside of Japan, many businesses simply set out to reduce high inventory levels without understanding the importance of the philosophy behind it - working intelligently to eliminate all forms of waste.

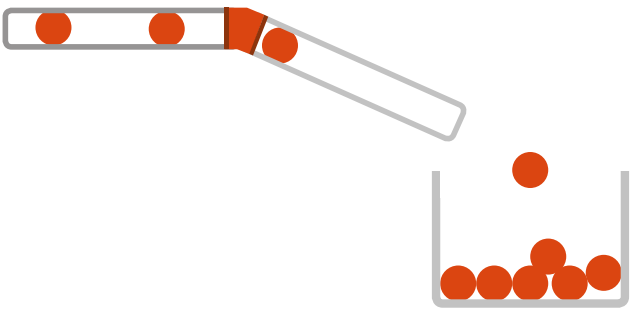
Often the act of imitating without understanding leads to failure and increases the misconception that lean thinking is only suited for manufacturing. As we'll discover in the coming sections, the benefits of lean actually spread much further than that. Current applications can be found in support and administrative functions, as well as service, IT and public sectors.

2. What is a value stream?

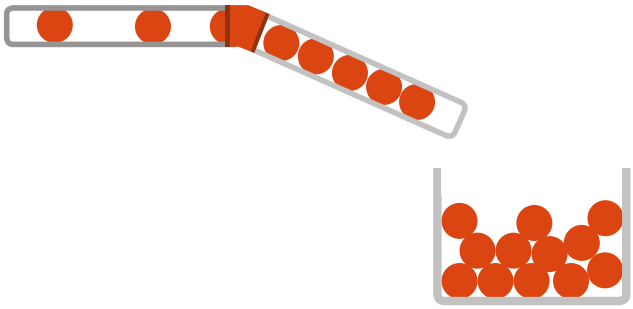
Lean thinking is a way of working that eliminates waste and creates continuous flow in a value stream to deliver improved value and service based on identified customer requirements.

The pipeline you can see here represents the value stream - all the tasks and activities that your business performs in delivering a product or a service to your customer. This essentially is how you deliver value.

At the supplier side of the value stream we're using marbles to represent the goods or services your customers want.



When making and delivering those goods and services you want the marbles in the pipeline to roll through the value stream continuously and effortlessly, ensuring they're delivered quickly to the customer.



However, we all know the world of business never operates that smoothly. Obstacles can quickly appear and create bottlenecks in the flow. If the value chain stops moving forward for any reason, then waste will be occurring. The trick of course is being able to see the bigger picture and identify this waste through lean thinking.

Exercise

How many times does the sixth letter of the alphabet appear in the following text? The output from the task is a number. This is not a trick, and the answer is not zero.

Let us consider the recent report on the frying of fish particularly the frying of Flying Fish. We have been told officially to refrain from the formal frying of Flying Fish until further notice. Apparently Flying Fish don't like to be formally fried, frayed or freed. As we don't fray or free our Flying Fish the only action we can refrain from is the formal frying of our Flying Fish; indeed the fraying and freeing of fish in general is highly unusual as such we should desist from it forthwith and fully. We call for all our colleagues to formally finish the preparation and process of formally frying Flying Fish in any format.

How did you do? How many f's did you count? Do you think you got them all? Did you find that you were under time pressure in completing the task? Did it matter how you identified and counted them?

Let us consider the recent report on the frying of fish	**3**
particularly the frying of Flying Fish. We have been told	**4**
officially to refrain from the formal frying of Flying Fish	**9**
until further notice. Apparently Flying Fish don't like to	**3**
be formally fried, frayed or freed. As we don't fray or	**5**
free our Flying Fish the only action we can refrain from	**5**
is the formal frying of our Flying Fish; indeed the fraying	**6**
and freeing of fish in general is highly unusual as such	**3**
we should desist from it forthwith and fully. We call for	**4**
all our colleagues to formally finish the preparation and	**2**
process of formally frying Flying Fish in any format.	**6**
	Total = 50

There are 50 f's. If you didn't spot them all, you're not on your own. There's a mix of upper and lower-case f's here. The number of times the letter appears in each line also differs, making it difficult to complete the task in time. In some instances, our brains ignore the f in 'of', as it is phonetically similar to v. Even though our eyes see it, the brain fails to register its importance.

The point is, to be a 'lean thinker' you have to find new perspectives and new ways of seeing processes. You need to develop, in essence, a lean eye.

3. The five fundamentals of lean

Let's look at the five fundamental principles of lean.

1. Value

Specify what creates value from the customer's perspective.

2. Value stream

Identify and eliminate waste along all steps of the process chain.

3. Flow

Make the value process flow by linking all activities and processes into the most efficient combinations.

4. Pull

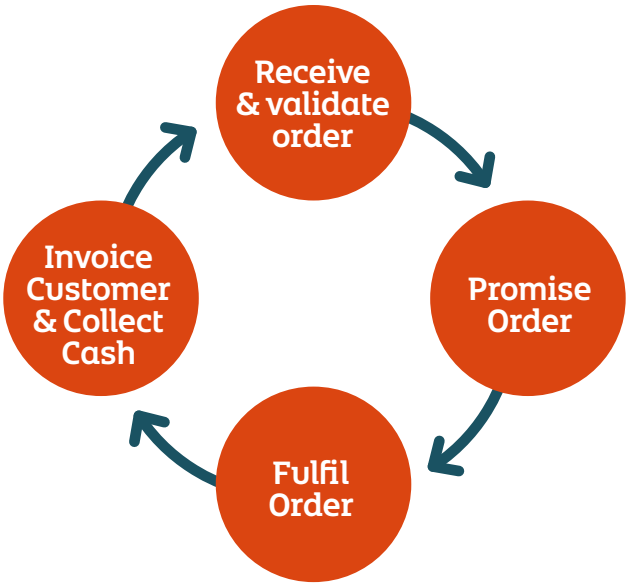
Make only what is needed by the customer, as demonstrated by Toyota's just-in-time principle.

5. Perfection

Strive for perfection by continually improving and producing exactly what the customer wants.

These lean principles show us that your starting point is always with the customer. Understanding what the customer values, wants and expects. More importantly, it is about how to deliver – or flow – this value to the customer.

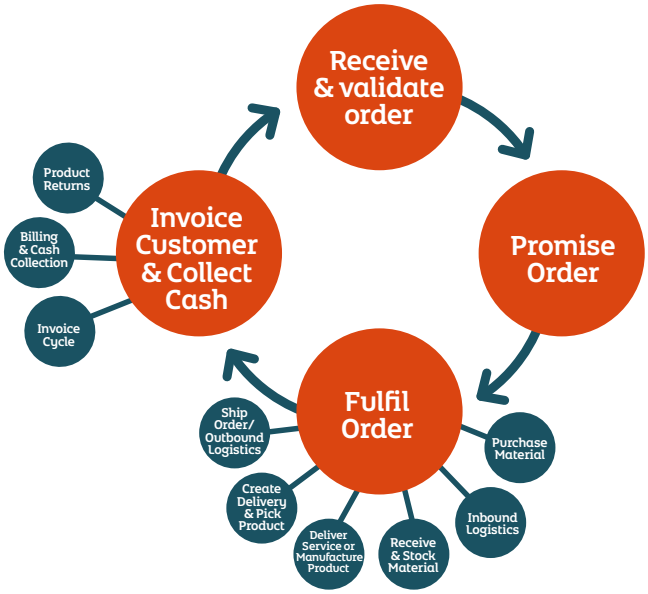
When thinking about the value stream, it can be useful to think of it as a 'customer-to-cash' loop.



There is no point in being efficient in processing a customer order if you are then inefficient at collecting the cash that keeps the business going.

It helps when depicting a value stream to use 'value stream mapping', a technique which allows you to identify each of the steps involved in your customer-to-cash loop.

A value stream map shows material and information flows, identifying key metrics such as lead times, delays and customer demand – sometimes referred to as 'takt time'. Because this is a visual tool, it's also good at getting your staff involved in identifying the issues and problems they encounter.



Thinking about the value stream

When thinking about the value stream we can classify the activity that takes place as:

Value adding: the time spent delivering exactly what the customer wants.

- An action that a customer is willing to pay for.
- An activity that transforms a product or service.
- An activity that is done correctly the first time.

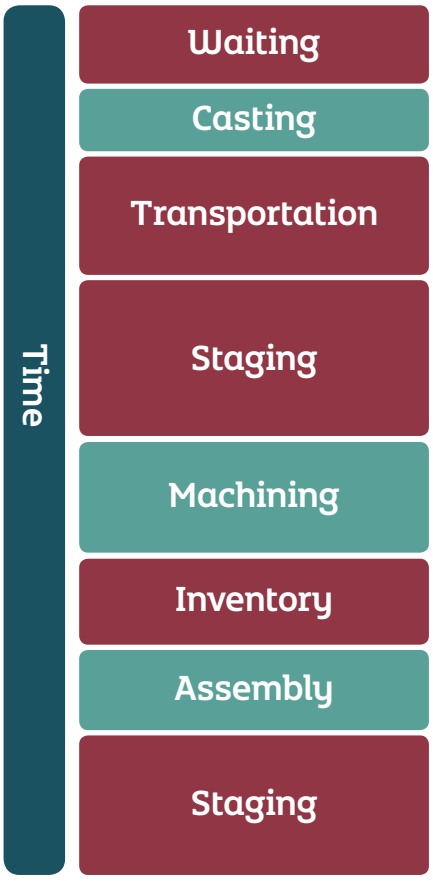
Non-value adding: activity that consumes resources without adding any value to the customer.

- An activity that is unpredictable in creating value.
- An activity that requires more time, effort or resources than necessary.

Another category is defined as **necessary but non-value adding**, or incidental work. In other words, activity that doesn't directly add value to the customer but is necessary for some reason.

In this product lead time example, the green sections represent those activities that can be considered as value adding – that's delivering exactly what the customer wants. The red sections represent non-value adding activity, or waste.

Studies and experience highlight that up to 90 per cent of a business's lead time can be classified as non-value adding. The principles of lean thinking focus us on finding ways to optimise our value adding activities, while minimising and eliminating waste, or non-value adding activities.



4. How lean thinking helps identify waste

Lean principles teach us that if we can see waste then we can either reduce it or eliminate it altogether. The easiest way to understand and detect what constitutes waste is to ask yourself – who, or what, is **TIM WOODS**?

T is the waste of TRANSPORTATION.

Usually the movement of product between processes. This wastes time and energy and is usually the result of poor layout. In general, the only transportation that the customer places any value on is when you are transporting finished products or goods to them.

I is the waste of INVENTORY.

Storing parts, pieces and documentation ahead of requirements, driving up costs and using more space than necessary. A general rule of thumb is that the more inventory or work-in-progress you have the longer your lead time will be. We have to be careful here. Not all inventory is bad. Rather, too much, or uncontrolled inventory, is what we need to address.

M is the waste of MOTION.

Any unnecessary motion employees have to perform during the course of their work such as reaching for, looking for, stacking parts, fetching tools, getting decisions and so on. Even excessive machine movements from start point to work start point create waste. These all take time, without adding value.

W is the waste of WAITING.

It usually results from a failure to synchronise activities. How often do you spend time waiting for an answer from another department in your business, or waiting for a delivery from a supplier or an engineer to come and fix a machine? The point is, any kind of waiting disrupts flow and produces waste.

O is the waste of OVERPRODUCTION.

Many say that this is the most serious form of waste - making more than is immediately required. Overproduction generates other wastes, such as over-staffing or increasing storage and transportation costs because of excess inventory.

Indeed, in the most severe cases, building ahead of customer requirements increases the risk of obsolescence, leading to significant scrap and rework.

O is also the waste of OVERPROCESSING.

Adding more value to a product than the customer actually requires is overprocessing, such as painting an area of a product that will never be seen. Unnecessary work doesn't add value but consumes your time, energy and resources.

D is the waste of DEFECTS.

These can be any part of a product or service that don't meet your customers' specification. Quality errors that cause defects invariably cost you far more than you expect. Every defective item requires rework or replacement, wastes resources and materials, creates paperwork and can lead to lost customers.

S is the waste of SKILLS.

Underutilising people's talents, skills and knowledge or not effectively engaging or listening to your employees, can lead to a loss of time, ideas, skills, improvements and learning opportunities. Similarly, employing people in the wrong position, not fully training employees or failing to delegate correctly are all ways in which we create waste.

Lean thinking is equally applicable in non-manufacturing businesses. **TIM WOODS** is also useful in a service environment.

Knowing these brief examples of the eight lean wastes, how easy will it be to see them in your processes? What can be done to identify and eliminate them? In the next section, we'll use a waste walk to help spot **TIM WOODS** in the workplace.

5. Lean thinking waste walk

Practice your lean thinking skills by *downloading a waste walk sheet*.

Watch the video *here*.

The goal of a waste walk is to identify wasted time, energy and resources in everyday activities. This is performed by observing these activities in real time, as they happen, in the place that they happen.

Watch the video and use the waste walk sheet to identify the waste you observe in the clip. When you observe instances or occurrences of waste, describe the waste on the sheet against the process step. Then classify the waste using **TIM WOODS**. Following this, try to prioritise the waste. As ever, there is no point in identifying the waste if you are not going to do something to eliminate or minimise it.

Waste Identification Sheet

CHAMPION		OBSERVATION DATE:										PAGE			OF		
PROCESS OBSERVED:			CATEGORY OF WASTE									PRIORITY			ESTIMATED DIFFICULTY TO ERADICATE		
START POINT:			TRANSPORTATION	INVENTORY	MOTION	WAITING	OVER PROCESSING	OVER PRODUCING	DEFECTS	SKILLS		HIGH	MEDIUM	LOW	EASY	MEDIUM	HARD
END POINT:																	
PROCESS STEP (Name or Op No.)	DESCRIPTION OF WASTE																

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START POINT:			TRANSPORTATION	INVENTORY	MOTION	WAITING	OVER PROCESSING	OVER PRODUCING	DEFECTS	SKILLS	HIGH	MEDIUM	LOW	EASY	MEDIUM	HARD
END POINT:																
PROCESS STEP (Name or Op No.)	DESCRIPTION OF WASTE															
Jenny	Chatting unnecessarily, waiting												X	X		
Ian	Untidy desk - too many files and papers											X		X		
Printer	Runs out of paper - stored away elsewhere													X		
Ian	Answering unmanned phone - no login										X				X	
Ian	Answers unmanned phone a second time										X				X	
Lisa	Prints too many pages													X		
Scanner	Broken, not yet fixed										X			X		
LEAN Changes	Call diversion on unmanned phone, handover of login details, fix scanner, move paper storage, tidy workplace															