Watch out for the toolheads!

Everything you need to know about lean manufacturing tools and why they won't work in service organisations

Foreword

I gained an antipathy to change by tools training and projects in the early 1980s while studying TQM programmes that failed. In essence, the theory in the toolbox was diametrically opposed to the theory of the firm, so what would you expect to happen? Of course, people do get improvements with tools, but they are insignificant when compared to the benefits from changing the system, as Deming and others observed and as Taiichi Ohno proved beyond doubt.

I took the view that it is better to teach perspective — how to think — and if tools help, people will 'beat a path' to the cupboard door. For example, it is more important to teach the value, importance and issues associated with managing flow than teaching how to map a flow. I am still of that view. What's more, teaching tools very rarely results in a change to the system.

Command-and-control managers like to buy change by training and projects, unaware that change really requires changing the system and unaware that *that* means first being prepared to change the way they think about the design and management of work.

John Seddon

[1] In this paper we discuss only those tools that we have seen employed in service organisations. There are many others. For a comprehensive guide to lean manufacturing tools, I recommend John Bechino's book: *The New Lean Toolbox*, PICSIE Books 2004, ISBN 0 9541 2441 3

Overview of content

A brief history of 'lean' **page 3**

'Lean' was (and remains) the first fundamental challenge to traditional command-and-control thinking. In order to understand the nature of the challenge we look at the history of command and control and the advent of 'lean'. The history helps us understand where the tools came from and how they and 'lean' got their labels.

An essential guide to the lean manufacturing tools **page 8**

'Lean' grew up in manufacturing, but some of the tools are increasingly being promoted to service organisations. These commonly include 5S, takt time, Poke Yoka and Value Stream Mapping. We explain how these tools were developed, what they do and the benefits they can bring to manufacturing organisations.

One philosophy — two methods **page 17**

We will then contrast service and manufacturing, to make the case that in practice the two are significantly different. The essential distinction is that service is subject to inherently greater variety in demand; the customers are involved in production. Because of this, for a service organisation going 'lean' the rationale for what to do and how to do it changes. The philosophy is the same. But to improve outcomes, cut costs, increase revenue and improve morale in a service context, you need to apply completely different methods.

The Vanguard Method **page 19**

Vanguard has developed a unique method for applying Taiichi Ohno's ideas to service organisations. We will demonstrate the approach with practical logic; you will be able to see the common sense of the Vanguard Method.

Toolhead excesses **page 21**

We then illustrate how the unthinking application of lean tools from manufacturing actually works against lean principles, risking the creation of waste in both production and human terms.

Conclusions **page 25**

We conclude by arguing that not only do the toolheads risk losing the opportunity to improve our service organisations, they make it less likely that even manufacturers who employ the tools will achieve truly lean systems.

A brief history of ‘lean’

Mass production

The roots of mass production go back to Adam Smith who, in the 1750s, started experimenting with breaking down craft work into simple repetitive tasks. He separated out the activities required to manufacture a pin from a single craft-based job into a number of simple, standard tasks. These tasks could then be carried out by unskilled workers. As he anticipated, the benefits were greater consistency and lower unit costs.

In 1841, Joseph Whitworth had a different problem. He manufactured parts in a world where no two bolts would fit the same nut. Every machine shop cut its own threads to suit the application. The result was a complete lack of interchangeability and no standard parts or replacement parts. His solution was to create a standard thread that meant replacements parts could be sourced with minimum effort. The Whitworth standards are still with us today.

Wind the clock forward to 1920s, and we find Henry Ford using both of the above ideas. He built the first mass-production system: standardised production and assembly, yielding high volume at low cost (economies of scale). Henry Ford famously halved the cost of manufacturing and doubled the workers’ wages and, moreover, made good profits. Standardisation solved Ford’s production problems and was instrumental in dealing with the challenges he faced, ie creating and maintaining the methods for manufacturing and assembly using a multilingual workforce.

The scope and value of standardisation is illustrated by the fact that you can swap a Model T 1932 carburettor with a 1908 carburettor and it will fit and work just as it was designed to, even today.

But what was the consequence for the workers?
What had Ford done to craftsman-like activity?
What was the impact on morale under this regime?

East goes West

After the Second World War, Taiichi Ohno was given the task of making cars in Japan for Toyota. He visited the US to study how cars were manufactured in the world’s largest and most efficient manufacturing plant, Ford’s Highland Park plant in Detroit.

Ohno studied Ford's approach intensively for three months. What Ohno saw was:

A mechanised assembly line, a core flow of work, with sub-flows feeding into the core flow on the track. Every 20 minutes a car came off the line.

He thought of the 20 minutes as a 'pulse' or a 'heartbeat', representing the flow through the whole plant. In essence, Ohno assumed the secret to effective production was flow. What he 'saw' was not the way the Americans thought about manufacturing, as he was to discover later.

Back in Japan Ohno faced a series of constraints. He did not have the same target-rich market in which to sell his cars. He also knew that making large volumes of the same model would not suit the Japanese market, since people buying his cars would want them for different purposes. He needed variety. Moreover, with only limited cash to invest, Ohno could not replicate Ford's huge investment in many dedicated lines and multiple giant presses (used to shape car body parts from sheet steel). With only a limited number of presses, Ohno had to find a better way of using them to produce a variety of different models.

Ohno's only option was to shorten the length of time it took to change the presses to make each model, so that he could operate economically with more frequent changeovers and smaller batch sizes. This flew in the face of economies of scale, but Ohno found that it was actually cheaper to operate this way.

How could fewer units and greater variety translate into lower costs? Seeking to understand this counterintuitive finding, Ohno made two critical discoveries. First, the true costs of production were end to end. Second, having more variation in the line left fewer parts tied up in inventories and work-in-progress. The combined effect was that although the unit cost of each vehicle was higher, the total costs of production were considerably lower. He learned that economy of flow was superior to economy of scale.

The assumption of the mass producers was that the smaller the manufacturing batch size, the more costs would rise. Ohno on the other hand saw a batch size of one as the ideal. He learned that working on the flow of work end to end and cutting the time needed to reset machines improved throughput. At the same time, lead times and inventory fell while quality increased. Ohno's quick-changeover approach to production was ideally suited to the market: people wanted variety, and he was able to build variety into the system.

A further problem facing Ohno was the loss of skilled workers departing for the Korean war. Faced with losing those who knew the jobs best, he decided to capture the knowledge that would enable semi-skilled workers to produce as productively and to the same quality levels as skilled ones. This required standard methods for carrying out specific tasks. With a standard work approach and standard products, Ohno was able to analyse the system in very specific terms and improve design, machines or method accordingly. The variation in output would no longer be hidden behind different work methods of individuals.

When a car is ordered from Toyota, it triggers the plant to manufacture the car — regardless of the make, model or indeed colour of the individual vehicle. It is a 'pull' system — nothing happens without an order. Ohno saw management's role as working across the whole system to ensure that all the tasks of manufacturing fitted together to allow the production line to work to the 'beat of the heart': the demand of the customer.

The most important lesson from the Toyota Production System is that the methods employed by Ohno were developed in response to defined problems, and, in turn, those problems were framed by the way he thought about the design and management of work.

West goes East

Struck by the 'economic miracle' of the Toyota Production System, Western business leaders visited Japan to uncover its secret. Their hosts were perplexed when the visitors asked how they did it. They replied: 'But we learned it from you!'

When they looked at the Toyota Production System, Westerners found to their amazement a way of working that made perfect sense in its context. They saw solutions so well tailored to specific situations that tooling, for example, could be changed with a speed they could scarcely believe. They saw workplace organisation of a type that tamed the shop floor, making it into a safe and tidy place to be. They saw products designed for assembly in such a way that they could only ever be put together correctly, and they saw workers and managers huddled around problems working to solve them using interesting techniques. Not surprisingly, they thought to themselves… 'We'll have some of that!'

Tools – the codification of method

It was in this environment that the 'lean manufacturing tools' emerged. What had developed as elements of the Toyota Production System were codified as methods with individual names: SMED (Single Minute Exchange of Die), 5S, Poke Yoka and so on (we will explain what they mean later). Hence the standalone tools were born. But the codification of method missed just one important issue: thinking. While the tools were and are accurate descriptions of what happens in terms of method, it is the context that is more important.

To Ohno, the approach was intuitive, a way of behaving when faced with problems that needed solving. It was both conceptual — for example, focus primarily on flow not function — and behavioural — if you found a problem it was normal to talk about it, get data about it, share it with colleagues and experts, learn the right way to fix it and then apply the solution in a way that was focused on this 'learning'. It was based on both knowledge and empiricism. When another problem cropped up, the same principles would be applied. It was what we might call a learning and knowledge culture.

From codifying methods it was a short step to choosing those that appeared to be making the big difference and describing them as a series of tasks or steps to be undertaken. Codification itself suited the command-and-control culture. Tools could be taught, directed at problems (as defined in the current view), and reporting on progress could be institutionalised through the hierarchy. Thus we have a stark contrast in leadership: learning and method through active involvement, versus tools training and projects with involvement limited to specifying (the wrong) problems (or specifying them wrongly) and receiving reports on progress.

Ohno's culture was one of learning how to make the work work better in order to create value for customers. To work this way needs reliable methods to produce products that can be assembled and function faultlessly, otherwise waste appears. But the more important part of the phenomenon was perspective, the way the work was approached. It was that which lay behind the tools and, ironically, because of tools remains hidden to managers of a different mindset.

The intent of the codifiers was and is honourable. They want others to gain the same benefits. But their mistake is a mistake of intervention. The solution does not lie within the toolbox; it lies in the way we think about the design and management of work. We now see organisations investing in tools training and project reporting. We should be investing in changing thinking.

It is for this reason that we developed the following comparison:

Command and control thinking		**Systems thinking**
Top-down	**perspective**	Outside-in
Functional specialisation	**design**	Demand, value and flow
Separated from work	**decision-making**	Integrated with work
Output, targets, standards: Related to budget	**measurement**	Capability, variation: related to purpose
Contractual	**attitude to customers**	What matters
Contractual	**attitude to suppliers**	Co-operative
Manage people and budgets	**role of management**	Act on system
Control	**ethos**	Learning
Reactive, projects	**change**	Adaptive, integral
Extrinsic	**motivation**	Intrinsic

Figure 1: Command-and-control thinking versus systems thinking

The Toyota Production System was labelled ‘lean’ by Womack, Roos and Jones in their seminal work, *The Machine That Changed the World*. The word represented the ideas of economy of effort, minimising waste and joined-up thinking in terms of working hand-in-hand with suppliers to manage flow; the consequences were low cost, low inventory and fitness for purpose.

‘Lean’ was the term coined by Womack, Roos and Jones in their book The Machine That Changed the World to describe Toyota’s system. Taiichi Ohno did not call it ‘lean’.

Creating the label ‘lean’ (what it is), leads naturally to the notion of tools (how you do it), obscuring the importance of perspective (how to think about it). Obscuring the importance of perspective leads to a failure to realise that Ohno’s ideas represent a philosophy for the design and management of work that is diametrically opposed to today’s norms.

An essential guide to the lean manufacturing tools

In this section we explain the tools being promoted as 'solutions' to service organisations, illustrating how they are used in manufacturing. For each tool we address the questions:

- What is it?
- How does it work?
- What benefit does it bring to manufacturing?

Five S

What is it?

5S is a tool that is used to provide a standard workplace environment, enabling standardised work and helping to remove waste. 5S provides visualisation of the work and waste; it enables you to see flow. 5S involves employees in maintaining an organised, efficient, safe and clean workplace.

5S is known as many things: 5S, 5C, Cando, Work Place Organisation (WPO), illustrating the fact that codification often results in a struggle properly and accurately to describe the purpose.

Below are translations and pronunciations for the steps in 5S, with a brief description of each:

Seiri	'Say-ree'	Sort	Instant disposal of unnecessary things, arrangement or reorganization
Saiton	'Say-ton'	Set in order	Put things in order
Seiso	'Say-soo'	Shine	Clean to original condition, do clean work positively
Seiketsu	'Say-kit-sue'	Systemise, standardise	Clean, pure, untainted workplace. Free from bad habits
Shitsuke	'Shit-zuk-ay'	Sustain	Be well mannered, use polite behaviour, be disciplined. Maintain what has been achieved

The philosophy behind 5S is: order, organisation, discipline, elimination of bad habits and wasted effort.

Looking at 5S this way illustrates the link between the language, the meaning of the words, and their application. These words are inherent in the Japanese language. For example, three of the four words above contain the word *sei*, which means 'to arrange, to create sequence'. The Japanese word for production is *seizou*, meaning organising into a whole. In this sense, 5S is an intuitive aspect of the approach to working. Command-and-control thinkers would say they too are concerned with organising into a whole, but in practice their methods and measures are concerned with the management of parts, not the whole.

How does 5S work?

The idea is that through a systematic approach, people will feel more ownership of the workplace. This encourages self-discipline and the improvement of the quality and safety of the working environment. It also ensures the workplace is well organised and the workflow can be easily seen.

The 5S or 5C activities are as follows:

Sort	Clearout and classify	Bin what you don't need — free-up space. If not sure, use a red tag — ask: Who owns it? Can we bin it? Store other things not needed Often short blitz sessions
Set in order	Configure	Set in order — a place for everything and everything in its place, eg shadow boards / fixed capacity shaped shelves Order what is remaining according to frequency of use Create a standard layout — easy to see if everything is in its place
Shine	Clean and check	Ensure equipment is fit for purpose
Standardise	Conformity	Establish best way to do things and format. Make this the standard and communicate it
Sustain and Improve	Custom and practice	Make it a habit and review frequently

The benefits of 5S in manufacturing

Standardisation and 5S go hand in hand. In manufacturing, 5S is a solution to problems of organisation, order and safety in the workplace. By enabling you to see flow clearly, it helps to improve visual management in the workplace. Seeing and

standardising flow are essential prerequisites for improving manufacturing operations. For this reason 5S is generally something you do first.

Takt time

What is it?

Takt time is the demand (units of production ordered by customers) divided by the time available to produce them. It is an essential method for understanding at what rate parts need to flow to meet the requirement of the whole, and the requirement of the whole is driven by the rate of customer demand. In simple terms, takt time is mathematics for managing flow throughout the system at the rate of demand.

In German, 'Takt' means 'heartbeat' or 'rhythm'. It is not a Japanese word.

In the 1950s, Ohno had a problem. Toyota's trucks and tractors were in high demand because of the Korean war, but because of the war it was difficult to bring in raw materials. As a result Ohno found he often ended up trying to complete a month's production in the final two weeks of the month.

Ohno set out to deal with this problem by seeking to understand what the system would need to do in order to meet demand. He took the expected demand over a given time and divided it by the time available to meet that demand. This gave him the 'takt' time, which allowed him to understand if the system was producing enough or too much at any given time and in any place.

Ohno did not use the label 'takt time'. He saw the 'heartbeat' as a way to manage production.

Example: Bottled Water Co.

The number of bottles of water a shop sells will vary enormously.
A large supermarket will sell much more than a corner shop.

What will affect sales?

The weather – if it's a hot day the shops will sell more
Promotions
Health scares…etc

How does a bottled water company deal with this variation in demand?

Hold stock. In this case, costs rise with inventory and warehousing.
Forecasting.

The problem is variation in demand, which will lead to variation in production and thus inefficiencies. If you make too much, it costs you in raw materials and storage; and lost profit if you use promotions to get rid of the excess. If you make too little, it costs you in lost business and, possibly, penalties with major customers.

Take a typical summer period when we expect the demand to be about 25 million bottles:

The period is 16 weeks
The company works a six-day week, using the other day for cleaning and maintenance, on a 24-hour shift pattern
16 x 6 x 24 = 2304 hrs available
Demand / time available: 25,000,000 divided by 2304 = 18,851 bottles per hour

18,851 bottles per hour is the what the heartbeat or rhythm of the whole system needs to be; it is the primary guide for production.

Now that we have this figure, suppose it rains? What happens if a machine stops? What about variation? The answer is that the takt time is varied to react to changes as required.

The production must be a stable, standardised flow, otherwise takt time will be irrelevant. Takt time works like a faster / slower control on the system, allowing you to produce in accordance with variation in demand. The system is, therefore, flexible and responsive. Without takt time other problems within the process and the demand would be hidden by production variation and tampering by the managers. With takt time, bottlenecks within and outside the process can be understood and managed.

Benefits of using takt time in manufacturing

Takt time gives you a volume control for the management of production against demand. It is essential in managing flow against demand. The benefits in manufacturing are the ability to produce to demand with better control and predictability. Like so much of the Toyota Production System, its effect is to clear away the chaff of management's 'created variation' so that the real causes of variation can be addressed.

Poke Yoka

What is it?

Poke Yoka is a tool for error prevention and mistake proofing. The idea is to design products and processes to detect errors before they become defects, thereby improving productivity and reliability

Poke Yoka is the label used generally, but if you look at Ohno's written work he describes the idea as *Baka Yoka*. Changing *Baka* to *Poke* was driven by a combination of political correctness and Western interpretation. *Baka* is a mild word for 'chump/idiot/fool' and *Yokeru* means 'to avoid bad situations', or 'move out of the way to avoid being in danger'. Translated into English, *Baka Yoka* literally means 'fool proofing'. It would seem that this was not palatable, so a similar word was used which translates as 'mistake proofing' (although *Poke* has not been listed as mistake anywhere we have looked).

How does it work?

A machine has a built-in automated stopping device to prevent it from doing the wrong thing. The effect is to allow one operator to man several machines, since the machines will signal when someone is required to fix a problem. Making problems loud, visible and obvious guarantees that they are dealt with.

In command-and-control designs, we build in inspection (which only leads to more errors), whereas in *Baka Yoka* the next process is inherently a quality check. If there is a fault the process stops; the problem then gets rectified at source and never returns.

Examples of the application of Poke Yoka include gauges where everything but the 'OK' reading is blanked off: if you can't see the needle on the gauge, there is a problem.

Benefits of Poke Yoka in manufacturing

Poke Yoka prevents errors moving forward in the production line. In this way it is a method for controlling and improving the flow of production. Note that the control is designed into the work, sending a signal to the worker to act.

Value Stream Mapping

What is it?

Value Stream Mapping (VSM) is a method for visualising and thus understanding a flow, end to end. In many manufacturing environments the end-to-end flow is difficult to see. In their book *Lean Thinking*, Womack and Jones define five key steps for going 'lean': Identify the value stream, understand value, flow, pull, perfection. VSM is primarily concerned with the second and third steps: understanding value and flow. Without managing value work through a flow, it is difficult if not impossible to make any real steps towards a true 'pull' (make-to-order) system. The ability to identify key product flows and understand them from end to end is central to the improvement of manufacturing flows. VSM can be used to illustrate problems and trigger solutions or to build information required to redesign a manufacturing flow entirely.

How does it work?

VSM requires gathering the following data:

- inputs
- processing times
- waiting times
- batch sizes
- value-adding time
- waste

The idea is that you build the whole picture before you decide where to act.

Here is an example of a value stream map:

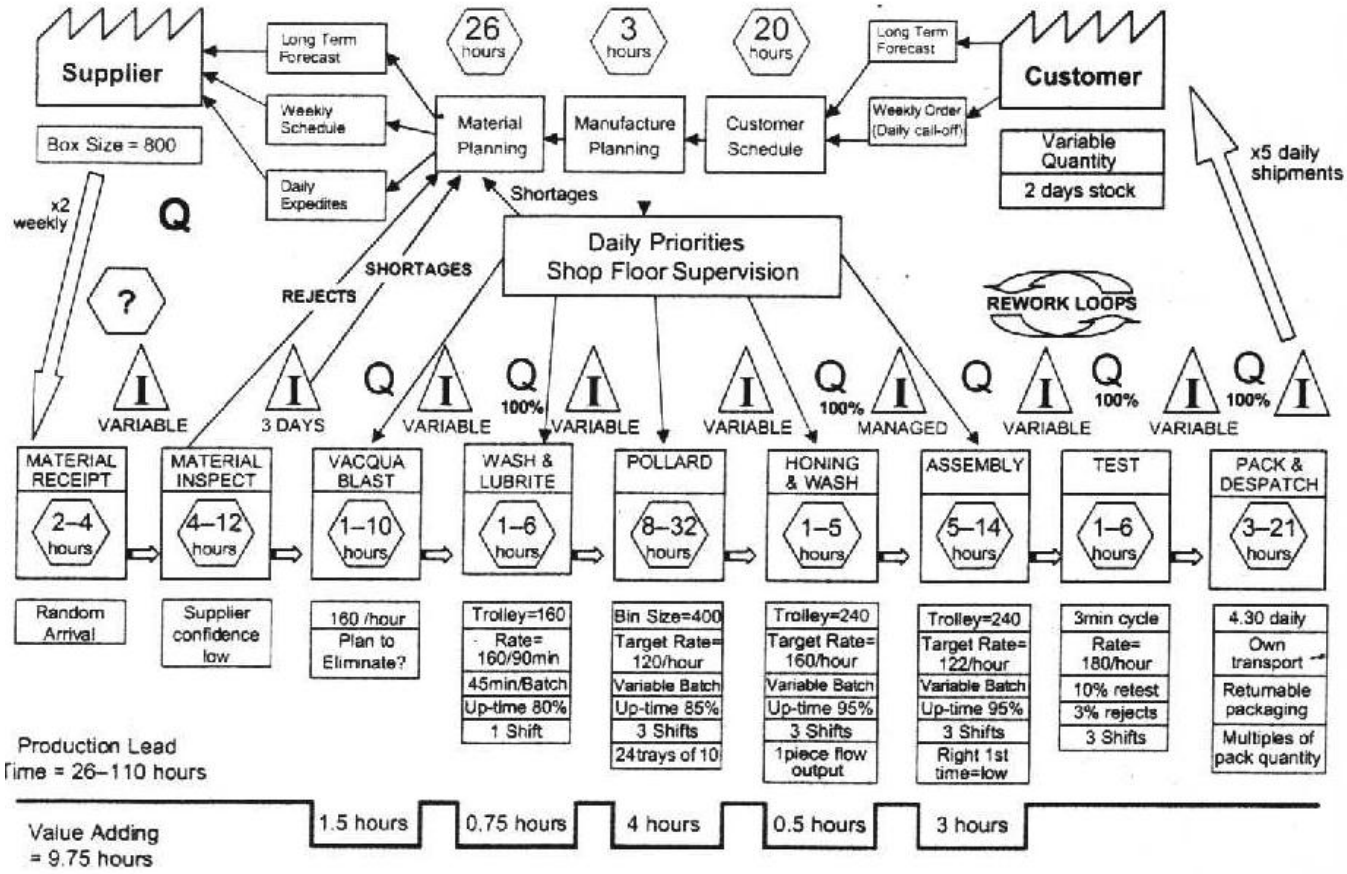

Figure 2: Value Stream Map

In building a value stream map, the first step is to map the physical process, described above in the rectangles running horizontally through the middle of the map. The hexagonal shapes within the rectangles detail the cycle time for each process. Below this, you add information relating to batch sizes of incoming goods, machines speeds,

downtime and uptime percentages for machines and so on. This information gives a detailed insight into what is actually happening on the shop floor.

The next important rows are the 'Qs' and triangles above the physical process. These detail the quality check points and the typical inventory found between each process. Above this are the management activities, describing the nature of control within the organisation, planning methods and frequencies both at shopfloor level and above. It also contains information about the frequency of customer orders and typical order characteristics. The current method of planning and communication is also detailed here, with different styles of lines for electronic or non-electronic approaches.

The final and perhaps most important detail is the value-adding ratio, found at the bottom of the map. This is the ratio of time spent on value-adding to non-value-adding activities. It should be remembered that typical manufacturers struggle to achieve better than 5 per cent value-add; world leaders such as Toyota operate at around 20 per cent. It should be understood that the value-add ratio is never an impressive figure.

Benefits of VSM in manufacturing

VSM can be used to identify and target some or all of the seven kinds of waste:

- output quality/defects
- overproduction
- inventory
- transportation
- motion
- waiting/delays
- processing time

By visualising the process with this level of detail and quantity of information, tackling problems becomes substantially easier. Any activities undertaken will be from an end-to-end (systems) perspective rather than specific to activities, so there will be no downstream negative impacts of local solutions. That is, solutions will be undertaken in terms of impact on flow, rather than activity improvements for their own sake.

Merely building this map would give a sufficient understanding of the flow to trigger some improvements. But VSM also provides the opportunity to redesign the whole flow. The understanding gained from this exercise can be used to build a future-state map, based on optimising end-to-end flow.

To do this, the map is analysed to identify where bottleneck activities are, ie processes that have slower cycle times than the rest and/or are less reliable or are subject to other restrictions. From this the flow capability can be compared to the takt time for demand. If the activities globally take longer than the available takt time, then there is a capacity issue. If not, the activities will have to be balanced around the takt time.

To illustrate: Figure 3 shows two examples where activities exceed the takt time. In the first, the solution could be to separate some of the assembly work and attach it to the previous painting process. In the second, however, it would be hard or impossible to relocate part of tempering process to the previous activity. The flow therefore has a bottleneck around the tempering activity. Previously the problem would have caused constant difficulties and panics; since it is now understood in terms of flow, it can be designed out or at least worked around in the knowledge of its effect on the whole.

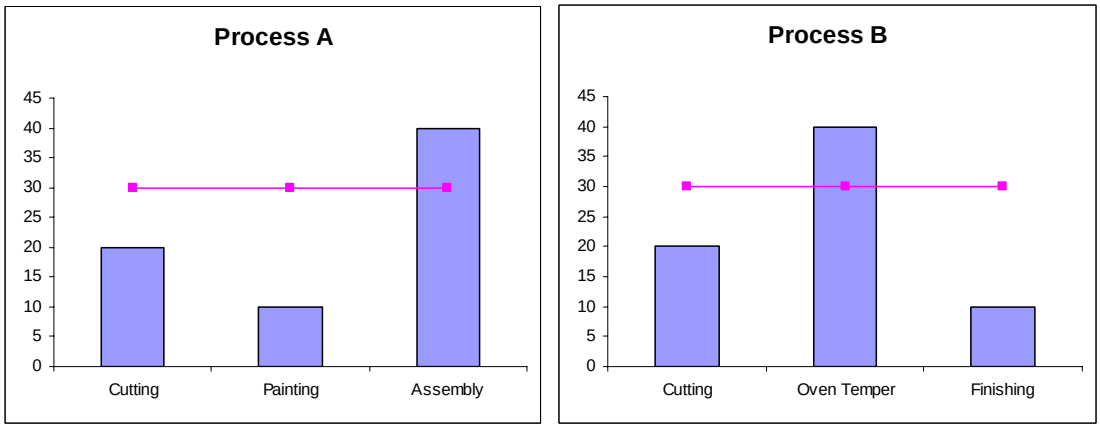

Figure 3: Two examples of activities exceeding takt time

VSM makes it possible to redesign the manufacturing process to optimise flow. Without establishing and managing flow, it is impossible to achieve sufficient balance and control to implement a pull system: a system that makes to order.

Summary

The tools that have resulted from the codification of Ohno's methods have valuable uses and can certainly solve problems in manufacturing. But it is the philosophy behind the tools – how managers think about the design and management of work — that is the key.

'In the beginning there was need' – Taiichi Ohno

The methods developed in the Toyota Production System were responses to identified and understood problems. The methods were developed to eliminate these problems permanently. The choice of method was based on an understanding of the problem. 'In the beginning there was need,' was the way Ohno put it. Deming said or at least implied the same thing with his cycle 'Plan Do Study Act', Vanguard likewise with 'Check Plan Do'.

The danger with codifying method as tools is that by ignoring the all-important context it obviates the first requirement to understand the problem, and, more importantly, to understand the problem from a systems perspective. The problems managers articulate from a command-and-control perspective are often different (and wrong) ones.

All of the methods (tools) described above were developed to solve problems associated with managing flow at the rate of demand in manufacturing. 5S gets things in order and enables you to see flow, takt time is an essential measure for managing the components of a flow such that they work in harmony, Poke Yoka prevents errors moving forward in a flow, and VSM enables a detailed overview of the end-to-end flow in order to determine where to act.

One philosophy — two methods

When the Vanguard team first read Taiichi Ohno's work, we recognised the challenge to translate his ideas for service systems. We knew that service differed from manufacturing in several important respects:

> Nothing is 'stored' in the way products can be stored
> Service is not 'made' by physical (making things) means
> Service happens at the points of transaction (we used to call these 'moments of truth')
> The service agent is part of the service delivery
> The customer is involved in the service delivery

It occurred to us that turning Genichi Taguchi's insight on its head was the key. In manufacturing, Taguchi challenged the idea of working to 'standards' or 'blueprints', which meant 'working within tolerances'. Instead, he argued that setting any (nominal) value and working continually to reduce variation around it resulted in better quality and lower cost.

Taguchi explained his ideas with a diagram (see figure 4). When making things, the further anything was from the 'nominal value', the greater the economic loss to the system; in simple terms, the more things go wrong, break down or take longer to deal with. Doing more than is required, for example overspecification, is another potential loss.

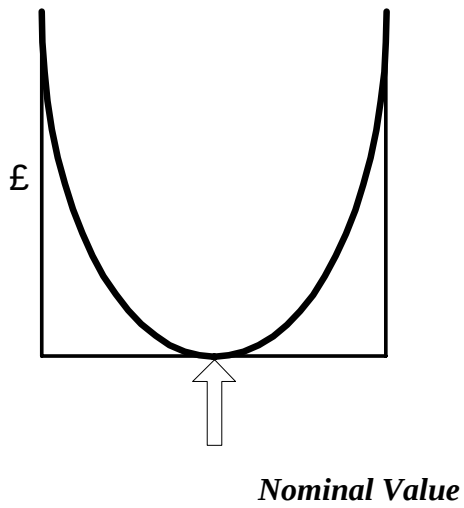

Figure 4: Costs of variation from the nominal value

So, to translate Taguchi's idea for service organisations:

In service organisations it is the customer who sets the nominal value

Think of any service you encounter. If the organisation understands and responds to what matters to you (your nominal value), you experience good service and the organisation is likely to be delivering it in the most economic way. If for any reason the organisation does not recognise and respond to what matters to you, your experience of the service is poorer and the organisation consumes more resources in providing or rectifying the service. If the experience is poor, it may also cause you to go away. Unfortunately, because many service organisations are designed as command-and-control hierarchies, service agents are told how they are to behave. When the specifications they work to ignore the 'nominal value' of customers, as they most often do, the result is suboptimisation.

In translating Ohno's ideas for application to service organisations, it is therefore essential first of all to understand the nature of customer demand. Ohno's 'demand problem' was, 'which model?' and/or, 'how many?' The demand problem in service organisations is quite different.

The Vanguard Method

Because the customer is 'involved in production', in service organisations we need to understand the variety of customer demands and then design the system to absorb that variety. While the methods we developed in Vanguard are entirely consistent with Ohno's philosophy, they are completely different from the methods developed in manufacturing, because they are designed to solve different problems.

The Vanguard Method involves:

- ***Studying customer demand in customer terms***
- ***Distinguishing between 'value' and 'failure' demand***
- ***Understanding whether demand is predictable or unpredictable***
- ***Redesigning services against customer demands***
- ***Changing the system (measures, roles and other 'system conditions') to remove the dysfunctional aspects of command-and-control thinking and replace them with the requirements for managing the work as a system***

We will briefly look at the importance of each of the steps in the Vanguard Method.

Studying customer demand in customer terms

If you want customers to 'pull value' from the system, you need to know the nature of demands customers place on it. If you don't know this, you risk giving poor service at high cost.

Distinguishing between 'value' and 'failure' demand

Value demands are those you want customers to place on the system. Failure demands are those you don't want. We define failure demands as: **demands caused by a failure to do something or do something right for the customer.** A complaint about a wrong bill or a call to find out why a service appointment has not been kept are examples of failure demand.

It follows that failure demand is entirely under the organisation's control. Turning off the causes of failure demand is one of the greatest economic levers available to managers.

Understanding whether demand is predictable or unpredictable

But before managers act on demand it is critical to determine whether demand is predictable or unpredictable. The secret to effective design is the knowledge of demand and its predictability.

Redesigning services against customer demands

When failure demand falls, customers experience better service and costs fall. When service flows are designed against customers' (nominal) value demands, service improves as costs decline.

Changing the system (measures, roles and other 'system conditions') to remove the dysfunctional aspects of command-and-control thinking and replace them with the requirements for managing the work as a system

It is as Ohno taught: it is the system that delivers performance. To manage the organisation as a system requires the removal of harmful practices and the establishment of helpful practices. To take one important example: a systems solution requires measures that are derived from the work to be used by those who do the work for control and improvement. It means removing all arbitrary measures (for example targets and standards) from the system.

Of course, managers cannot be expected to remove the things they are familiar with and have (albeit less successfully) managed with, without first developing understanding. A change of this order requires informed choice.

The Vanguard Method ('Check Plan Do') starts at 'check': understanding the 'what and why' of current performance as a system. 'Check' gets you knowledge and hence leads to change that is both predictable and based on informed choice.

Just as Ohno set out to understand and manage the whole manufacturing process as a system, the Vanguard Method does the same for service organisations. Ohno's methods were developed to solve problems associated with managing flow at the rate of demand. Vanguard's methods were developed to change the characteristics of demand and absorb the inherent variety in customer demand.

There are many examples of applications of the Vanguard Method in 'Freedom from Command and Control' and the various guides available on the Vanguard web site.

Toolhead[2] excesses

Unthinking toolheads promote their tools to the detriment of the system. Instead of being focused on what questions to ask and how to think about problems, the toolheads do as they have been taught. They apply the tools in an unthinking way. Here are some examples of wrong-headed application for each of the tools we have introduced:

5S

5S is generally thought of as the way to start.

A local authority appointed a consultant to help it implement 5S. He instituted 'black-bag Friday' and got people to clean up the office and put things in their correct place. Although every Friday was 'black-bag day', after the initial purge there was not much rubbish to be collected, and files were neatly arranged, After the 5S completion, some senior managers were not convinced that anything had changed. They asked our advice.

We told them that as a result of 5S there was not much mess, but that didn't mean there was no waste. There was lots of it — much of it now sitting in computers where it was even harder to see.

5S in service organisations may give the impression of doing something, but nothing really changes.

A typical 5S office solution might be a row of box files on a shelf with a readily identifiable pattern drawn across their spines to indicate the order in which they belong. If someone removes a file, it is thus immediately evident where it needs to go back.

This raises the questions: when might this help? Are the resources available in the files important, and does accessing them constitute value work? In other words, marking up the files for the sake of an exercise in tidiness could be failing to ask the important questions. It is to return to the theme: what is the problem you are trying to solve?

Behind 5S is the idea that 'everything has its place'. The idea is a good one and may be important in sorting out a manufacturing line, but it is less so in an office where the same considerations of safety and routine do not apply. We have seen instances where in the cause of 5S workers have been required to mark out their desks with defined spaces for Tippex, sellotape, scissors, stapler and paper clips. Can you imagine the

[2] 'Toolheads' is used to signify an unthinking approach to change; people who 'follow the book' rather than ask the right question.

impact on morale when people are told to do this? In service organisations, keeping yourself or your desk a bit tidier will have little impact on the system.

Is 5S the place to start? No, the place to start in service organisations is 'check' — studying demand. The question you need to answer is, 'to what extent does the current system absorb variety?' To solve this problem you need to study demand in customer terms and the capability of the system to meet it.

Applying 5S in service organisations is solving the wrong problem. Indeed, rather than solving problems it can actually create them.

Standardise first?

The toolheads often start with 5S, quoting Ohno as saying you cannot improve without first standardising work. That may be true in manufacturing, but it is wholly wrong in service organisations. Indeed, the impact of standardisation in service organisations is to damage the system's ability to absorb variety.

Standardisation in the Toyota Production System is essential — it is a manufacturing system. Ohno valued standardisation, but not for itself. He and his workers valued standardisation as a means for learning and improvement. For example, if something 'non-standard' occurs, both the worker and manager would assume there was something that needed attention in the work. Command-and-control thinkers value standardisation for different reasons. First of all, if something 'non-standard' happens the manager assumes there is something wrong with the worker; it is axiomatic in command-and-control thinking that the workers should be held responsible for the work they do. Further, command-and-control thinkers value standardisation because it helps them in their planning and resource-management tasks. They are unaware of the need to separate their planning and operations management activities.

In service organisations we see countless examples of this error. Service 'work queues' have standard times; workers have requirements to meet standard work measures (targets). These 'system conditions' have the unintended consequence of driving waste into the system. Just as Ohno used standardisation to learn and improve, in service organisations we find it is vital to use actual data (for example, time taken to execute tasks, volumes of tasks done) for learning and improvement, not arbitrary data (which is what standard times become since they do not accommodate variation). Moreover, these measures must be used by those who do the work to understand and improve it. The consequences are not only improved service at reduced cost; morale is transformed.

If you start 'improvement' with standardisation in service organisations, you risk making service worse, driving up costs and driving morale down.

Takt time

Takt time is essential if you want to manage flow at the rate of demand in manufacturing. But does it have a place in service organisations?

A recent *Harvard Business Review* article contains a classic example of the misuse of takt time. The example concerns improving the processing of new business. Following the principles established for takt time in manufacturing, the author takes the volume of new business cases coming in and divides the number by the available resource (manpower hours). The author determines that to accommodate demand, each application would need to be dealt with in the resulting time. This is completely barmy. The consequence is management of the workers with an arbitrary measure that is unrelated to the needs of the work. This is pure command-and-control thinking, having nothing in common with Ohno's philosophy.

To improve new business processing, you would want to understand the following:

> End-to-end times for new business processing, from first contact by the customer to completion, showing capability and variation
>
> Proportion of applicants who complete the transaction (become customers), over time, showing capability and variation
>
> Causes of variation in the flow: 'dirt' in input, failure demand, process design, measures, management behaviour, IT etc.

You would then redesign the flow against the value work as defined by the customer. You would use the measures identified above to track improvement, relegating the 'old' ('lagging') measures to keeping score. In this way you remove the causes of failure demand. The result is a new level of capacity (faster processing), more sales (less 'drop out' or give up), happier customers and happier workers.

Poke Yoka

The most common application of Poke Yoka in service organisations is 'forcing' a service agent to complete a field in a computer screen. Unless the field has a value or entry, the agent cannot advance to the next screen. Because service agents are (wrongly) targeted on time taken to complete tasks, they frequently enter any value that will allow the process to move on. Typically, they will use a code or entry they can most easily remember, especially when there are many such codes and finding the right one would take time. The consequence, of course, is dirt in the system.

This kind of rule violates the principle that the worker should be in control. In manufacturing, Poke Yoka is used to send a signal from the work to the worker. In service designs, because of the inherent variety in demand the worker needs to be able to control the 'cleanliness' of the work (the input to the next step in the flow). Any rule set by managers from above is likely to make the system less able to absorb the

variety inherent in customer demands. The data required to make clean flow should be the focus of any agent's work in a service design. If the system is designed in such a way that the agent uses these and other data to understand and improve the flow, he or she will be much more likely to ensure the data are correct.

In a service design the agent must be responsible for mistake-proofing.

VSM

VSM is of little value in service organisations. The mapping work starts with the machines and worker activities in a manufacturing flow. The constraint of machinery is not relevant to a service flow; treating work functions as proxies for machinery assumes *de facto* that they are necessary functions/activities. In services, the flow is understood by working from outside in — core flows are dictated by customer demands.

Everything that is analysed in respect of the value-adding ratio (cycle time, waiting time, downtime etc) requires prior standardisation of work. As we have seen, this is an inappropriate intervention in service design, driving up costs by making the system less able to absorb variety.

The analysis of flow in service is concerned with matters such as preceding activities supplying information fit for purpose, rather than levels of inventory in front of processes. To measure inventory in service organisations in this way is to make a fundamental error.

In manufacturing applications of VSM, there is a strong focus on the management activities associated with the interface with the customer. In service designs it is far more effective to have the person supplying the service, at the interface with the customer, to be the means of control.

Conclusions

‘Lean’ constitutes the codification of method. The methods developed in manufacturing have value there, but solving the problems of service organisations requires a different approach because the context is different: service differs from manufacturing in important respects.

Much of the growth of interest in ‘lean’ for service organisations results from the application of lean tools to the ‘back-office’ services of manufacturing firms. The lean movement has been moving off the shop floor. But before we accept that at face value, we must ask: what has been achieved on the shop floor?

Whenever we see a presentation by a lean manufacturer of its work in the back office, we ask, ‘But have they taken the measure of revenue out of the factory gate off the factories?’ If the answer is no, it cannot be working as a pull system. Such organisations are employing ‘lean’ as they employed TQM, training and projects. With the size of investment they get a return, but is it the kind of return they would achieve by transforming the system?

We also see manufacturing companies using lean tools as a project-based cost-reduction exercise. While cost reduction is a natural consequence of ‘lean’, it is not its purpose. The purpose of ‘lean’ is to increase capacity by designing a system that optimally responds to customer demand.

Today our service organisations (and their customers) suffer high cost and poor quality service. Like manufacturers, they have the opportunity to increase capacity by ridding the system of waste (the natural consequence of a command-and-control design) and deliver better service at lower cost. The opportunity will only be realised by changing the system.

Watch out for the toolheads. They risk wasting the opportunity to improve our service organisations — and making it more difficult to do so in the future.

Think about it…

Ohno insisted we should not codify method.
Why?