Systems Thinking and…

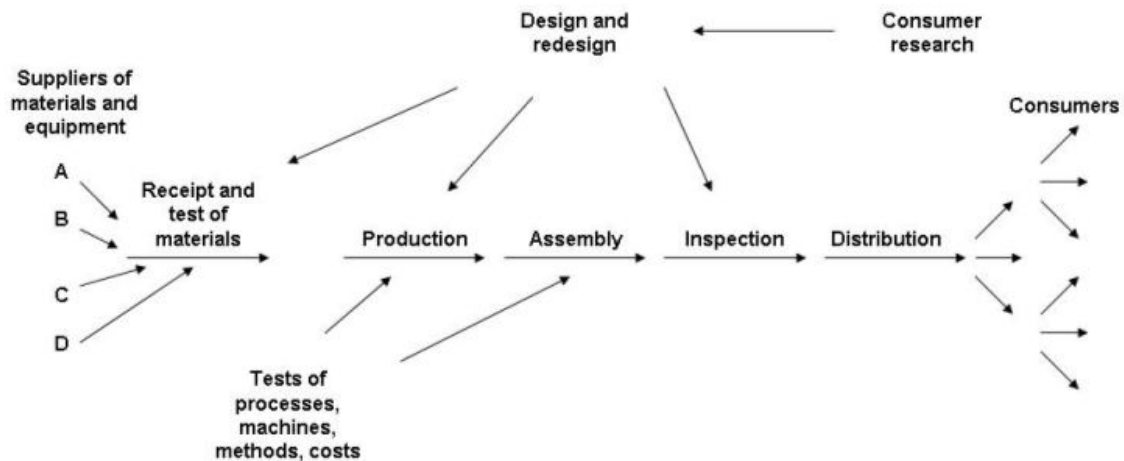# Designing and Managing Services

Making 'The Work' Work

W. Edwards Deming argued that organisations should be managed as systems, not functional hierarchies. He gave powerful illustrations of the ills of conventional management thinking and introduced managers to one of the most important tools for their decision-making: the statistical process control chart. I call it a capability chart. It helps managers and workers avoid thinking things have changed when they have not and alerts them when things do genuinely change. It is a method that passes what I describe as the test of a good measure: *does it help us understand and improve performance?*

Deming's contribution was enormous. Before you can address the question of measuring performance you have to understand the organisation as a system; the prerequisite for choosing the right measures. Deming used his famous 'figure 1' – a picture capturing the flow of work through manufacturing organisations – in his 1982 book *Out of the Crisis* to illustrate what to pay attention to when choosing measures: measuring and managing the flow of work through the system as opposed to measuring and managing work in functional activities.

The first organisation to catch the world's attention for managing the work as a system, challenging management conventions, was the Japanese motor firm Toyota. Taiichi Ohno, the man who invented the Toyota Production System (TPS), learned many counterintuitive things. He believed in command-and-control ideas until he learned otherwise. Having studied motor manufacturing in America, he built his own plant under severe resource constraints. The adversity led to innovation. He learned that the optimal way to produce variety was to put variety in the production line, an astonishing rejection of convention, which dictates that the way to cope with variety is to mass-produce different products or parts in batches.

He came to reject the idea of unit cost and to see cost as associated with flow – the worse the flow, the higher the costs. More than that, he saw the advantage of only making what customers wanted to buy, so the flow had to work to the rate of customer demand. To manage such a

system – one designed to produce cars at the rate of demand – he made people central to the action: control, learning and improvement were designed into the line. He put design in the process, an alarming proposition – when they first hear it – for the vast numbers of managers who work in management factories.

Production viewed as a system

Ohno's innovation represented a challenge to management conventions. The TPS developed new methods to manage unconventional ideas: balancing demand, managing flow, 'pulling' materials through the system. For outsiders unfamiliar with the system as a whole, it was easier to think of these new methods as tools: *takt* time, 5S, value-stream mapping, *kanban*, *poke yoke* and so on.
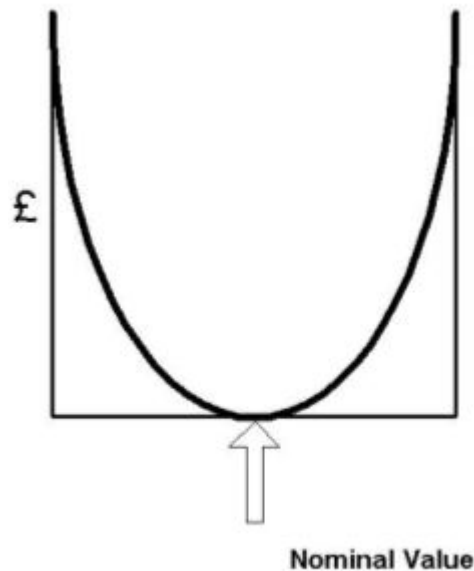
The public sector in the UK and in many other countries has become familiar with these tools as they are employed by consultants to improve processes. The use of these and other tools *will* improve existing processes to a small extent in the short term because, thanks to official guidance, many processes are so poor and fragmented. However, Ohno insisted you should not codify improvement methods or embody them in tools. For example, he believed that 'just-in-time' offered a manufacturing advantage to Toyota. But, for many years, he would not allow anything to be recorded about it. He claimed it was because improvement is never-ending – and by writing it down, the process would become crystallised.

To codify method is to impede thinking. Ohno knew that what matters is how we conceptualise problems; thinking is the key. The opportunity for improvement is much larger than will be achieved by applying (more often misapplying) tools: the greatest leverage for change is achieved when the organisation is understood as a system, as Ohno's innovation demonstrated unequivocally in manufacturing.

Service differs from manufacturing. Aside from the obvious lack of physical plant and goods, in services the customer is involved in production; the service agent is involved too. There is, inherently, much more variety of demand. So instead of thinking of the system as one that pulls physical things together to manufacture at the rate of customer demand (the essence of the Toyota system), you have to think of the system as one that brings (largely) intangible expertise together in response to the variety of customer demands. This different purpose leads to

different methods, because there are different problems to solve. Solving these problems teaches how to design services from which customers can 'pull' value – in other words, get what they want.

In manufacturing, quality is improved and cost reduced by reducing variation. But variation in what? It was the Japanese engineer and statistician Genichi Taguchi who challenged the idea of working to 'standards' or 'blueprints', which meant 'working within tolerances'. Instead, he argued that setting any (nominal) value and working to continually reduce variation would result in better quality and lower cost.

Costs of variation from the nominal value

When making things, the further anything is from the 'nominal value', whatever it is, the greater the economic loss to the system; in simple terms, the more things go wrong or break down. Doing *more* than is required, i.e., overspecification, is another potential loss. That's how Taguchi taught manufacturers to think about variation. In manufacturing, thinking like this leads to less variation in components, parts and sub-assemblies, and thence to better quality. However, Taguchi's idea needs translation for service organisations, since: *In service organisations it is the customer who sets the nominal value.*

In the language of systems thinking, a service organisation needs to be designed for customers to 'pull value' from the organisation – get exactly and only what they want, in the most expedient fashion. 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 (least-cost) way.

If, for any reason, the organisation does not recognise and respond to what matters to you, (your nominal value), your service experience is poorer (you have to put up with hassle); and the organisation by definition consumes more resources in providing the service than it needs to, since it is giving you things that you do not want. If the experience is poor, it may also cause you to go away. Unfortunately, many people can't go away from public services, even though, having been designed as command-and-control hierarchies, these services are insensitive to their 'nominal value'. It is because of this that public-service organisations are sub-optimal; full of

waste. It may well also be because of this that people are so disengaged from local issues and local politics generally.

Just as Ohno seized the opportunity to revolutionise the design and management of automotive manufacturing, we have the opportunity to revolutionise the design and management of services, providing better service at lower costs. And just as Ohno had counterintuitive moments en route to his innovation in manufacturing, managers of service organisations who take the systems approach experience counterintuitive moments, too.

It's a Different Way of Thinking

Command-and-control thinking		Systems thinking
Top-down, hierarchy	**Perspective**	Outside-in, system
Functional	**Design**	Demand, value and flow
Separated from work	**Design-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 the system
Control	**Ethos**	Learning
Reactive, projects	**Change**	Adaptive, integral
Extrinsic	**Motivation**	Intrinsic

Command-and-control versus systems thinking

To take a systems thinking approach is to think about the organisation from the outside-in, to understand customer demand and to design a system that delivers to it. To enable control in this high-variety environment, it is necessary to integrate decision-making with work (so the workers control the work) and use measures derived from the work. These 'real' measures are of much more use than arbitrary measures like targets and standards. The role of management shifts from an adversarial, hierarchical role, to a complementary role: working on the system. If workers are

controlling the work, they need managers to be working on the things beyond the control of the workers which affect the system conditions: the way the work works. The consequence is an adaptive customer-centric system. If demand changes, the system changes. Ohno's innovation was to design a system that produced cars at the rate of demand; in service organisations the challenge is to design systems that absorb the variety of demand and thus deliver better service at lower cost.

This is a counterintuitive idea. Command-and-control managers automatically associate improvements in service with higher costs; their worldview is one of resource management. Ohno taught that focusing on demand and flow optimises resource utilisation because it exposes waste and the causes of waste. Back to the paradox: focus on flow and costs fall, focus on costs and costs rise.

Taking a systems thinking view, the practical starting-place is to understand the nature of customer demand. From there, you need to study the flow of these demands through the system. As you follow the flow, you discover that in most service organisations there are many features (I call them 'system conditions') that prevent variety being absorbed; and most of them are things that managers regard as 'best practice'. As managers pursue this logic they learn, as did Ohno, that our 'normal' ideas about the design and management of work – command-and-control ideas – are seriously flawed.

Understanding Customer Demand in *Customer* Terms

If you want customers to 'pull value' from the system, you need to know the nature of the demands that customers place on the system *in customer terms*. A customer typology of demand is essential to the design of the system. I stress this because a common mistake is to classify demand by 'internal' – 'what we do with it?' – categories, not 'what does the customer want?'

To recap: at the highest level there are two types of customer demand: 'value' and 'failure' demand. Value demands are those you want customers to place on the system; they are the reason you are in business. Failure demands are those you don't want: *demands caused by a failure to do something or do something right for the customer*. It follows that failure demand, being created by the organisation, is entirely under the organisation's control. Turning off the causes of failure demand is one of the most powerful economic levers available to managers; it has an immediate impact on capacity.

As I have said, it is common for public-sector service organisations to show high levels of failure demand, and equally common for managers to be entirely ignorant of the fact. As with their private sector command-and-control counterparts, their mistake is to treat all demand as 'units of production', work to be done. Understanding demand moves managers away from familiar territory – offices remote from the work, where they focus on matching resource to activity – and into the work. In this new world managers begin to appreciate the fundamental truth that strategy lies in operations: designing against demand will lead to new and better services; in short, a new and better strategy.

Design against Demand

Before managers act on demand, it is critically important to determine whether demand is predictable or unpredictable. Managers usually doubt whether customer demands can be predictable and are always surprised to find that they are. Predictable failure demand can be turned off, by acting on its causes. When failure demand falls, customers experience better

service and costs fall. At the same time, capacity – the number of things you can do to deliver what matters to customers (their nominal value) – increases.

When service delivery is designed to meet customers' ('nominal') value demands, service improves as costs fall. Customers get what they want, and because it is *only* what they want it is delivered by the most economic means. In *Systems Thinking in the Public Sector* I have shown how this works with housing benefits and letting properties. In both cases the customers' nominal value was the focus for the design. And to design work that way required a change to the system.

The System Governs Performance

Changing the system (measure, roles and other 'system conditions') means removing the dysfunctional aspects of command-and-control thinking and replacing them with the requirements for managing the work as a system.

Managers who understand the systems approach now confidently label as harmful the things they used to do in the name of good management. For example: a systems solution requires that measures derived from the work are used by those who do the work, for control and improvement. It involves removing all arbitrary measures such as targets and standards from the system and dismantling 'performance management' frameworks which are doing anything but managing performance. Managers will only take such 'radical' action – I use inverted commas because, once they understand it, the idea is not radical at all – when they know for themselves that their current beliefs are flawed. It is also worth saying at this point that 'understanding' is, for managers, as it was for Ohno, something that is more likely to occur if they are in the work rather than sitting studying abstractions in the management factory.

When they get out to study the work, managers discover many other features of their organisations that are hindering performance. For example, managers learn that using activity measures increases variation ('tampering', to use Deming's term). Similarly, things like workflow and work-allocation systems, while introduced to control the work, are found to actually decrease control of the work. Standard costs, standard protocols and the like also drive costs up, even though they were introduced to control costs. These are all examples of methods in use that prevent the system absorbing variety. They have to be removed before the performance of the system can be improved.

It Starts with Changing Thinking

In the public sector, one impediment to change is the reform regime. The other – common to all sectors – is the challenge that a systems-thinking approach provides to the current norms; these ideas are an affront to current beliefs.

For example, systems designs challenge the current norm of 'dumbing-down' service (hire cheap people, give them scripts and computer-based diagnostics). Instead, the systems approach can be characterised as 'smartening-up'. People who deliver services need the expertise required to identify and deal with the variety of customer demands. The command-and-control thinker's first reaction to this idea is 'we couldn't afford it'. They think smarter people mean more cost. But the consequence of 'smartening up' is a fall in costs, which seems to them, because they are obsessed with cost, a paradox. Yet the reason is obvious: as the organisation learns to do the 'value work' (the thing that matters to the customer) and only that, non-value work (waste) is driven out of the system. As a consequence, service improves and costs fall.

The second automatic reaction of command-and-control thinkers to the idea of smartening-up is, 'I will need better people'. They are always astonished to discover that improvement can be

achieved with the same people. They have no idea of the extent to which the current system inhibits their people's contribution. It's not the people: it's the system, stupid.
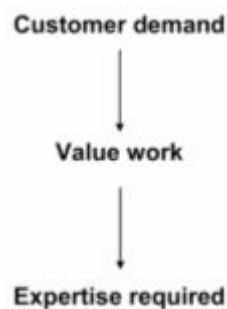
Some Principles for Systems Design

The systems approach to service design follows some practical principles. I shall illustrate them by reference to the simplest system, a call centre:

Train against demand

Having studied demand, systems thinkers know the type and frequency of both value and failure demands. They can then ensure that workers are trained to respond to high-frequency predictable demands. For most organisations, the practical consequences are that time spent in pre-job training is much reduced, and the worker is more productive when he or she begins work. At some call centres, training has been cut from eight weeks to two, while workers are able to handle more calls when they start work. After eight weeks of training, workers typically could only handle a small range of calls and as a result spent their first few months passing them to others, hardly a motivating environment. Given the gains, you might wonder why all managers don't train against demand. The answer is that it is not how they think about the work. Instead, they train people in procedures, subjects and rules; which is why, despite the time it takes, training often leaves people poorly equipped to answer calls and understandably nervous.

When managers study demand in customer terms, they begin to grasp the expertise that call-centre workers will need to enable customers to get what they want. Engaging the workers in solving this problem ensures it is the subject of continuous improvement. This is another simple part of the systems logic: demand dictates the value work, and the value work dictates the expertise required at the front end of the flow, at the point of transaction.

Customer demand

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Value work

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Expertise required

Designing against demand

In *Systems Thinking in the Public Sector* I show how important this is for housing benefits and house lettings. Equally, the failure to appreciate the importance of this logic worsens services as costs rise. Every customer 'knows' this; every one of us has regular experience of talking to call-centre workers who are unable to solve our problem.

Make the worker the inspector

If people have jobs for which they are responsible, they behave more responsibly. As the psychologist Frederick Herzberg said: 'If you want people to do a good job, give them a good job to do'. People's work should not be inspected; people should be their own inspectors. Having been trained against demand, staff know they know what to do with the calls they have been trained to handle, and know how to get help for calls for which they are not trained. In such designs, the worker is responsible for his or her own development. Training is, as a consequence, much faster and more efficient. This is to focus on 'prevention' rather than 'inspection'. It is a challenge to conventional beliefs about control.

Measures for control and improvement

Systems-thinking designs put the workers in control, rather than controlling the workers. In a systems-thinking design, the use of all arbitrary measures ceases. Instead real (actual) measures are used which are derived from the work and its purpose. For example, instead of using targets to try to control the time people spend doing things, the actual time it takes to do things is used both to plan and improve the work. The most important measure is capacity – the amount of things you can do. Ohno made the observation that the capacity of a system is the sum of the value work and the waste; so as waste is removed, capacity improves.

Management's job: to act on the system

In a systems-thinking design, management's role is complementary. If the work can be controlled by the people who do it, why do we need managers? The answer is to act on the system, to take responsibility for all the things outside the control of the workers that have a bearing on how the work works.

A different view of human nature

When you change the system, putting people in control, they are motivated by the work. The motivation is intrinsic; people enjoy going to work to improve the work they do and feel proud of what they deliver to their customers. Here a housing benefits officer talks about working in a systems-thinking design – a good example of how motivated people talk about their job:

> *We're so much more involved in the work now. Before we just did our jobs and if you came up with an idea you wouldn't have thought of saying to somebody, 'Can we do this?' But now if we think of something we'd just roll it out and do it. But the best thing is, we know now whether it's good for the customer or not and we're doing everything we can to make it so the claims are processed as quickly as possible, because we know that's what the customer wants, for their claim to be processed. Basically, if you're interviewing on that front line, and you can give a service that you're proud of, then you're so much happier, in everything you do. And it's nice because you feel like you're doing a worthwhile job, and we also feel that we're now offering a straightforward service that we can be proud of.*

When managers hear people talking like this, they think something must have happened to them. 'What did you do to the people?' they ask. It is indicative of the way they think. People behave this way because the system changed. In Herzberg's terms, they were given a good job to do. We should not think of this as 'empowerment'. Empowerment is a preoccupation of command-and-control managers, who design systems that *dis*empower people, notice the problem and send their people on empowerment programmes. And then put them back into a system that disempowers them.

What did happen to the people is that they were instrumental, along with their managers, in redesigning the system. The place they started was 'Check' – understanding the 'what and why' of performance as a system. Before I describe how Check works, this is how people talk about the experience of doing it:

> *When we did Check we found a lot of things that you wouldn't even have thought about – how many times we rewrote to customers, the amount of duplication that was in the work, how many different people that one single piece of work went around, before it actually got dealt with.* (Worker)

> *What we identified through Check was that there was a hell of a lot of batching of work, queuing of work, sorting of work, a lot of rework and duplication. Each bit within the separate parts of the process was tending to do things that had been done elsewhere in that process – until you see it as a system, and there's a picture of that system, you don't understand really how it works from end-to-end.* (Manager)

> *When we went through to look at what was value work, we found there wasn't much value work at all, the only value work was, 'Can I make a claim for benefits?' or, 'I've had a change of circumstances'; everything else, people phoning up for claim progress, 'When will my claim be dealt with?' or people coming in with [only] part of their claims and not all the information we needed for their claim, was all failure that we were adding. So the actual value work that we were doing wasn't very much – there was so much waste in the system that this was bogging down the value work that we should have been doing, really.* (Worker)

If you put design in process, as here, you need the workers and managers to have a common means of understanding how the work works. This language and understanding is built as they learn together how and how well their organisation works – as a system. The results – as with the TPS – are profound. Not just in terms of performance improvement: cooperation between managers and workers improves, because they have complementary roles; cooperation between agencies improves, because their joint activities are based on knowledge. The change to systems thinking requires 'unlearning' as well as learning. Because the ideas are counterintuitive, they are best learned by doing – by taking action.
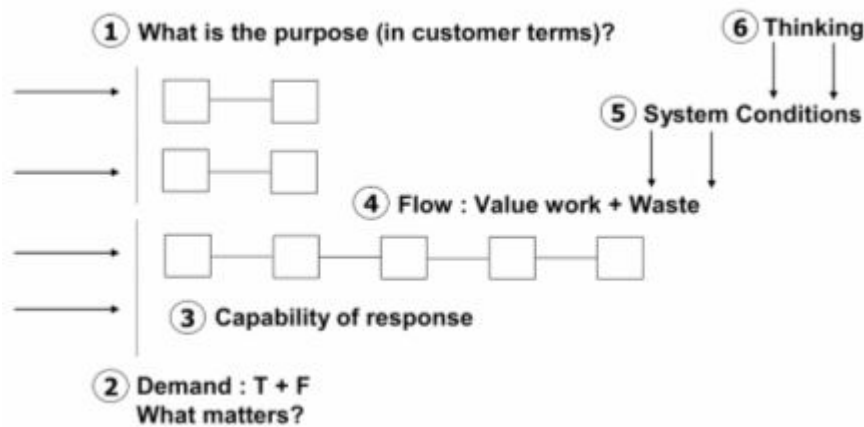
Change Starts with 'Check' – Get Knowledge

Starting with 'Check' represents a challenge for command-and-control thinkers. Command-and-control thinkers expect change to be preceded by cost/benefit analyses, projects, deliverables, timescales and milestones. Change always starts with a 'plan'. And there is an awful lot of planning; projects are broken down into constituent parts, interdependencies identified, time-lines agreed and so on.

Systems thinking dispenses with all of this. Starting at 'Check' means getting knowledge of the 'what and why' of current performance as a system; nothing is assumed other than that we almost certainly don't know what that performance is. Command-and-control thinkers have a problem with that. They think the idea of embarking on change without predetermining outcomes is bizarre. Yet question them and they will tell you how their plans are rarely, if ever, returned to; they will tell you how disasters are buried, how milestones are extended and extenuating circumstance created. While managers will confess that their plans, by implication, are based on opinion rather than knowledge, even so, they would prefer to have a plan. I tell them the only plan is to get knowledge.

The Vanguard Model for 'Check'

The purpose of 'Check' is to do just that – get knowledge about the 'what and why' of current performance as a system. The version of the model I shall present here is useful for demand-based systems (where customers are making demands for service).

The Vanguard Model for 'Check'

Check follows six steps:

1. What is the purpose?

The first question to address is: what is the purpose of this service from the customer's point of view? In housing benefits, it is to pay the right people the right money as quickly as possible. In house lettings, it is to let applicants know whether and when. It is usually not difficult to articulate the purpose of a service from a customer's point of view but, if it is, you can park the question and come back to it after step two, which should make it very clear.

2. What are the types and frequencies of demand?

Answering this questions requires managers to *go to all the places where the organisation transacts with customers* and study demand in their terms: why do they call, what do they want, what would create value for them, what matters to them? It is impossible to move to the next stage without having a thorough understanding of the major types of value and failure demand and their predictability. Understanding predictability is essential. Designing for the unpredictable would make the system unnecessarily complex and costly.

3. How well does the system respond to demand?

Having identified demand in customer terms, you now need to understand how well the system responds in terms that matter to the customer. This is why we measure end-to-end times from the customer's point of view in housing benefits. It is this step that gives managers their first major shock. Their 'measures-in-use' will have been telling them something quite different.

4. Studying flow

Only after understanding demand and measuring achievement of purpose from the customers' point of view is it possible to move on to study the flow of work. I make this emphasis because

so many managers want to go straight to the business of mapping the process, thereby missing two vital sources of information: demand that tells you what to map, and the performance measures against purpose that tell you where the priorities lie.

When you study flow, don't ask people what they do, don't put people into a room and write out the flow on 'post-it notes' on the walls, don't read the procedures manuals, and certainly don't ask managers – they will be the least likely to know. Instead, follow pieces of work. Follow successive pieces and build up an understanding of what is happening. As you study the flow, keep in mind that there are only two things going on: value work – which is defined by customer demand – and waste – everything else. If someone tells you there are seven types of waste tell him (they are usually male) he is a tool-head. The 'seven types of waste' (defects, overproduction, transportation, inventory, motion, waiting time, overprocessing) are features of manufacturing flow; in service organisations waste takes different forms. In any event, if you were out looking for the 'seven wastes', would you learn as much as if you focused on waste as 'anything that is not the value work' – and you developed your own typology? Tools get in the way of thinking.

5. Understanding system conditions

Waste is man-made. It is a consequence of system conditions: measures, roles, process design, procedures, information technology, structure, contracts, and so on. The focus now is to understand the particular system conditions that are creating waste in this particular flow. Treating improvement as merely process improvement is folly; if the system conditions that caused the waste are not removed, any improvements will be marginal and unsustainable. To 'improve' a process in order to 'achieve a target' ignores the reality that the target and other measures might be the very causes of sub-optimisation.

6. Management thinking

Following the model for Check achieves two learning outcomes: as well as uncovering the 'what and why' of performance as a system, it shows managers that systems thinking means 'us too': it is our belief in targets, procedures, and controlling people that creates waste in the flow, constraining the capability of the system from the customers' point of view and generating large quantities of failure demand. Conducting check creates energy for action, since managers at last can see what is wrong and want to do something about it.

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