should not codify method (create tools); instead we should focus on thinking. Which brings me to the epilogue, an appeal to return to valuing knowledge in operations, the essential prerequisite to creating an adaptive service system. While I use some public-sector examples in the book, I return to the public sector in the Addendum: 'The better way to improve public services'. Government ministers have adopted the tenets of command-and-control management in their pursuit of public-sector improvement with disastrous unintended consequences. There is an urgent need to review policy and practice.

My hope is that this book will provide readers with the desire to increase their awareness and, more importantly, behave in ways that further their understanding of how to act on their organisations for improvement. The challenge is to be prepared to change the way you think. The reward is to discover a better way of managing. That can only be good for yourself, your management colleagues, all those employed by the enterprise and for society in general.

Chapter 1

Once upon a time in manufacturing

More than 50 years ago something occurred at Toyota and a small number of other Japanese manufacturers that has still to make its impact in the broader organisational world. Taiichi Ohno[6] developed a radically different approach to the design and management of work. He inspired others with his results.

> *The number of man-hours it takes to make a Lexus is less than the man-hours used in reworking a top-of-the-line German luxury car at the end of the production line, after it has been made*[7].

The research that reported this incredible result was published 10 years ago. People say the Germans are catching up. But would you imagine that Toyota has stopped improving over the last decade? How much further is it likely to have gone? And how much easier is it for the company to continue to progress when its supply chain is inculcated with the same philosophy? How difficult is it for a traditional mass-production motor manufacturer to switch from managing function to managing flow? We have seen many manufacturers make extensive use of quality tools and problem-solving teams, but have they changed their systems?

Toyota has not achieved its exemplary status (about to overtake Ford as the second-largest motor manufacturer in the world, its market value is greater than that of General Motors, Ford and Daimler-Chrysler put together) by managing in the way that might be considered normal – setting targets and driving people to meet them. Instead of top-down command-and-control management, Toyota has learned how to use local control – control at the

point where the work is done. The philosophy is fundamentally different. It represents a seismic shift in organisational culture. The attitude is no longer 'make these numbers', but 'learn and improve'. To Western minds, 'learn and improve' is a problem. It is not very macho. It is 'soft'. It requires openness, enquiry and co-operation – all things our organisations claim as values, but rarely practise. They are hard to practise because they run counter to the underlying hierarchical philosophy.

To a command-and-control manager the change in locus of control looks like anarchy. Nothing could be further from the truth. Paradoxically, 'learn and improve' gives more control, not less. Equally paradoxically, as I shall demonstrate, command-and-control methods not only afford little real control, they are a major cause of business escaping it. By causing managers to lose sight of their customers, they can ultimately contribute to putting the organisation out of business altogether.

So what happened in Toyota?

Thomas Johnson and Anders Broms[8] tell a story about a meeting between the executives of Ford and Toyota in 1982. It is reported that when the Americans visited Japan to find out how Toyota could produce better quality at lower cost, they were astonished to receive the response, 'We learned it from you.' Before building manufacturing facilities in Japan, the Japanese had studied American plants. In particular Ohno spent time at Ford's Highland Park[9] plant. Built during World War I Highland Park produced 15 million model-T Fords by 1927 with remarkable efficiency. Highland Park was the original mass-production system. Production costs were cut through standardisation – it was the era of 'any colour as long as it's black'. Henry Ford halved the costs of making a car and doubled his workers' wages. His system was a genuine landmark of modern management.

When Ohno studied the plant, what he instantly perceived was flow – simple, standardised and unchanging. As each car rolled off the line it represented to him a 'heartbeat' that dictated how everything moved (was 'pulled') through the system. Ohno put that principle to work throughout the Toyota Production System. Today the customer order triggers flow; nothing is made without an order, and the customer receives the car within days. Remarkable: low cost and high quality. But the Americans did not 'see' flow; in their way of thinking work was 'pushed' by the schedule rather than 'pulled' by the customer. They thought of the management task as increasing speed and

volume. As each increased, costs fell. Ohno on the other hand saw the management task as improving flow.

While each way of thinking sets out to achieve the same goal, better quality and lower costs, the limitations of the American paradigm became apparent when the market changed. Customers began to want variety. The problem was how to meet that demand at mass-production prices. The Americans and Japanese addressed this problem quite differently.

The American approach to the 'variety' problem

The American approach was to mass-produce in batches to maintain economies of scale. To do this they needed to create what Johnson and Broms call 'an information factory'. I prefer the label 'management factory' and shall use it here. While there is a lot of information (and often of the wrong sort) in management, there is also a lot of behaviour, so 'management factory' is in my view a better term. The management factory manages inventories, scheduling, planning, reporting and so on. It sets the budgets and targets. It is a place that works with information that is abstracted from work. Because of that it can have a phenomenally negative impact on the sustainability of the enterprise.

People who do the work become cogs in the machine. Decisions about work times, scheduling, parts and so on are removed from the work and are used to control the work and the worker. But the 'control' is illusory. Production in this environment is unlikely to match customer demand because there will always be problems of availability of the goods customers want to purchase.

> *In the early 1990s I was working with a new telephone-sales operation selling computers – at that time a radical move. I found significant lost opportunity in the shape of unfulfilled customer demand. With the client we worked our way up the hierarchy to the place where decisions were made concerning inventory – i.e., what we could sell. En route we saw that the planning numbers were translated from products into money and back again. What was driving the system was production. When we presented our data and showed the lack of fit between what was being produced and the nature of demand, we were told: 'Read my lips: we make, you sell'.*

The direct sales operation was no more than an outlet or channel for the

manufactured products. It was never thought of as a means to build relationships with customers, giving them what they need.

The 'make-and-sell' model creates waste. Its most obvious manifestation is inventory evident in fields all over Europe – unsold cars waiting for a market. The responsibility shifts to the people in marketing who must provide special offers, resulting in lower margins. To work this way amounts to make it, keep it and then give someone something to encourage them to buy it. The better way is sell it, make it, take the money.

In January 2002 I received this e-mail from a fellow systems thinker:

> *My brother-in-law works for a UK car manufacturer. He has just purchased a car for my sister. She ordered a base car with a factory-fitted sunroof; what she received was a car with factory-fitted sunroof and full electrics (windows, doors, mirrors and power steering). The reason is that the only cars they have available with a factory-fitted sunroof are cars that are due out to the market in four months time, which will have the higher specification. The questions I posed to my brother-in-law were: How much cost have they given away to my sister? What is the cost of storing all these cars? And how did they plan to sell the two things (electrics and sunroof) together? 'Marketing' was the answer: 'We'll do a special deal on this car in May'.*
>
> *I said that this was just adding another cost in chasing demand that wasn't there. He started to open his eyes. 'How would you do it another way?' was his question. My answer: I would only build cars that people wanted to buy.*

In the same month I learned that one of the 'big three' motor manufacturers was reluctant to remove the 'revenue-out-the-door' metric (i.e., what is made as opposed to what is sold) by which it measured the performance of its factories. Unless it does it will never escape its current predicament – despite paying huge sums to recruit some Toyota-trained *sensei*[10] to work there. According to my informant, top management did not believe that the financial analysts would understand the move. Inventory of course appears on the balance sheet – but even bankers can be persuaded of the folly of that idea.

Ohno once remarked that manufacturing should be thought of as a simple

supermarket. As a customer 'pulls' a product off the shelf, a little factory behind the shelf makes another and puts it in the vacated space. Sounds crazy? Maybe, but the fact is that working this way gives you less inventory, less time, less waste of other sorts and, most of all, good customer service.

So it comes down to a choice: use marketing to stimulate demand for what we have made, or build relationships with customers to deliver what customers want – push versus pull.

The Japanese approach to the 'variety' problem

Ohno's solution to the variety problem was to put variety in the line. The same assembly line needed to be able to produce different models. His priority was therefore to determine what the people who did the work required to handle the variety, to do what was needed as each (different) car moved through the line. The result was the development of a system that managed flow, using the people within the work flow as the principal agents. This simple act, integrating decision-making with the work, produced a wholly different management infrastructure and a new *lingua franca* for management. The purpose of the system is to produce against demand – to make the car only after receiving the order.

In Ohno's philosophy each person's work is connected to the needs of customers, as opposed to arbitrary and counterproductive measures of activity. In command-and-control organisations it is usually the case that the measures used are derived from the budget – for example, the requirement to make so many items a week or month to fit periodic sales targets. But this introduces variation, making production performance worse and less stable. The result of production variation is variation in ability to service customers, variation in costs and, ultimately, variation in the probability of the system's ability to stay in business for the long term. Moreover, connecting work to arbitrary measures creates the need to have additional people processing information – scheduling work, reporting on work, making demands on those who do the work. Separation of decision-making from the work is the defining rationale for the management factory. The Toyota Production System has no such management factory.

By removing the need for the management factory, organisations can make immediate and sustainable cuts in their operating expenses. The bonus is that they also achieve an immediate reduction in variation. But to remove the

management factory without replacing it could cause the whole enterprise to fall. Before it can be dismantled managers have to establish the better alternative. For this reason we need to have a clear understanding of what the Toyota solution entails.

If the American solution exemplifies economies of scale, the Japanese solution represents economies of flow. The system is designed to produce to order, so the focus is on flow rather than function. All the information needed to do the work is integrated with the work itself, not in separate systems. The consequence is that variety can now be managed in the same process. This increases interest in the work for those who do it; it changes the locus of control, from external to internal, and, consequently, has a positive impact on motivation.

What Ohno saw

Ohno did not view low cost as attributable to scale, throughput, speed and cost targets. Instead, he saw a pattern permeating every part of the system, as though the work were 'joined up'. He recognised that work should flow continuously through each part of the system at the same rate that finished units flowed off the line. He could see that if every step in a flow operated at the same rate, then any moment in any step should consume only those resources required to advance a customer order one step closer to completion. In that way, costs would be as low as they could be. He saw that optimising flow would lead to low costs because you only do what you need.

To tackle the variety problem Ohno saw the need for the worker to design and control the steps so that he or she would be able to perform different operations according to what is needed. In this way, he concluded, variety could be achieved at no greater cost than if all units were identical. As we shall see, this is a profoundly important issue for the design of service organisations, for they exhibit much greater variety: the customer is involved as a co-producer in what is 'made'. In service organisations the *only* way to solve the variety problem is to 'put variety in the line'.

There is another story told about Ohno[11]. He had returned from America having studied motor manufacturing, and his job was to create a plant to make cars in Japan. Toyota couldn't afford the number of pressing machines the Americans had; in fact it could only afford one. So his first task was to cut down changeover times – the amount of time it takes to change a machine

from doing one thing to doing another. In a matter of months he had cut the time from the American standard, 10 days, to 10 minutes. Then he had a counter-intuitive moment – his costs went down. He, like others, assumed that smaller batch sizes would mean higher costs. But he realised that his costs had gone down because he had less inventory. Moreover, if something was wrong it would be seen at once and corrected; it did not appear much further down the line having consumed more resource. The time any parts spent in his system was shorter. There was less time between the order and delivery. Ohno realised that costs must be viewed end-to-end, and that time was predictive of costs. If he had focused on functional or 'unit' costs, as the Americans did, he might never have discovered the importance of managing and improving flow: the end-to-end work from receipt of the customer's order to receipt of the customer's money.

Having learned that the key to achieving efficient variety of output was to reduce individual changeover times, Ohno saw that he had to make the changeover times conform to the rate at which finished products flowed out of the factory. He theorised that if every changeover time were less than the time interval between units flowing off the line, then it would be possible for every unit coming off the line to be different; yet still the unit costs would be nearly identical to those if all units were the same.

It is extraordinary that these advances in management theory should have taken place in motor manufacturing, one of business' most complex organisation forms. In service organisations similar benefits can be achieved in a much shorter time, for little is physically 'made'. On the other hand, service organisations also have another crucial, countervailing, difference – the inherent variety of demand. Customers make customer-shaped demands; if the systems cannot absorb this variety, costs will rise.

In manufacturing you can 'get away with' command and control (at a cost) because, after all, the products you make are standard; there are economies of scale. To adopt the same scale-economies approach for a service organisation, however, is to court failure. When applied to service organisations, the traditional command-and-control design responds to the variety of customer demands by establishing procedures, standard forms, functions, levels, specialised 'factories' and the like to deal with them. The consequence is enormous amounts of waste. To eliminate the waste you need to dismantle the functional structures and 'put variety in the line'.

Managers imagine this will take time. It is partly because of how they think about change. It is also because of what it implies for their past identity and effort. In the name of 'service' many of our organisations have been built as mass-production factories subjected to detailed programmes of activity directed by managers. Often this is a significant investment in human and financial resources. To undo or redirect this effort represents a significant challenge.

Maximising the ability to handle variety is central to improving service and reducing costs. The systems approach employs the ingenuity of workers in managing and improving the system. It is intelligent use of intelligent people; it is adaptability designed in, enabling the organisation to respond effectively to customer demands. Workers are connected with customers in self-organising relationships – diversity of flow is the hallmark of good service design. In managing flow the work itself is the information, and this in turn comprises the information required to direct operations in the work.

People are good at handling variety; computers are not. As managers develop the systems approach, they learn to use computers for the things they are good at and *a contrario* avoid using computers for things that people are good at. The consequences are fewer computer systems and more control. I shall return to some of the problems we are having with computer systems in Chapter 8. But in essence their value lies in supporting those who deliver service; today, too often they hinder. Computers have become the cement for command-and-control management. It is an unquestioned assumption that managers should have and set targets and then create control systems – incentives, performance appraisals, budget reporting and computers to keep track of them all – to ensure the targets are met. In Toyota these practices simply do not exist. To make our service organisations work better, they need to be taken out.

Economies of flow

By the early 1980s Toyota was producing output at the rate needed to satisfy demand – as Ford had done in 1925 – but with the difference that Toyota also produced variety. The Toyota Production System (TPS) used smaller machines, and each step was performed at a slower rate. The Toyota system exemplifies economies of flow, a quantum leap beyond economies of scale. The concepts associated with economies of scale have governed managerial thinking for the last century or more, whether in the macro sense – mergers,

structure and so on – or the micro sense – the design of work functions and methods. Economies of flow represent a challenge to current beliefs. It is a challenge of such scale that this – the challenge to current beliefs – becomes the most important hurdle for managers to get over, for as I shall show the ideas themselves are simple, logical and practical. However, they are different and unfamiliar; as a consequence they are often perceived as a threat. They are certainly counterintuitive to the 'command-and-control' mind-set.

The focus of this book is the translation of the principles behind the Toyota Production System for service organisations. The TPS provides a means to manage the work of making cars; it needs to be translated to apply the same ideas to understanding and managing customer service, a completely different kind of work.

> *The good news – for those of us working in service organisations – is that we don't make cars. The TPS has taken over fifty years of patient development, led by the late Ohno and now by many of his students. Since service organisations don't 'make' anything, the work that fulfils a customer demand can be easily redesigned. Change can be rapid: 50 days rather than 50 years. But why should it be redesigned? Because the current system of management is flawed, creating waste and suboptimising service. In our service organisations costs are high and service is poor. As we have noted, the problem is that managers cannot 'see' the real costs, because their means of management acts like a blindfold.*

I shall show how command-and-control management has created service organisations that are full of waste, offer poor service, depress the morale of those who work in them and are beset with management factories that not only do not contribute to improving the work, but actually make it worse. The management principles that have guided the development of these organisations are logical – but it's the wrong logic. The better way has a different logic. To explain the better logic I shall start with the simplest organisational form – the customer service centre.