# Managing productivity

Collinson Grant

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Produced and published by:

Collinson Grant
Ryecroft
Aviary Road
Worsley
Manchester
M28 2WF

ISBN 978 0 9564337 3 2

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Printed in the United Kingdom using paper produced from sustainable sources.
Design, typesetting and production – Centrix Q2 Limited www.cq2.co.uk

# Managing productivity

Collinson Grant is a management consultancy that helps to improve the performance of employers in the private sector, in Central Government and in Healthcare. Our work focuses on costs, organisation and people. Helping clients to understand productivity and all the means available for measuring and improving performance has been an important feature of our work for many years. Increasing the productivity of direct labour in manufacturing was one of our first tasks in the early 1970s. Since then we have applied many different approaches, including the adoption of Lean principles and continuous improvement. The notes at the back summarise what we do.

**www.collinsongrant.com**

Collinson Grant

# Contents


| Section | Subject | Page |
|---|---|---|
| **1** | Introduction | **1** |
| **2** | Why is productivity such a problem? | **5** |
| **3** | What improves productivity? | **11** |
| **4** | Managerial controls and measures | **21** |
| **5** | Lean and its focus on the customer | **31** |
| **6** | Running a Lean programme | **43** |
| | A short history of a long march | **63** |
| **7** | Understanding change | **69** |
| **8** | A Lean approach to measuring change | **77** |
| **9** | Managing the cost of payroll | **97** |
| **10** | Productivity of assets | **109** |
| **11** | The need for continuous improvement | **115** |
| **12** | Summary – 'Why not?' | **131** |

**Some supplementary notes**

Productivity in the UK now

Notes on quotations

# Raising productivity

**1**

The first and worst waste is over *production*. That generates the second worst waste, *inventory*. And these create or mask all the other wastes in your organisation

**2**

Assume that the current processes and operations are the worst. Throw out the accepted norms. Reject the status quo. Do not accept excuses

**3**

The only way to understand a problem well is to observe it directly, then ask 'Why?' five times to find out its cause

**4**

All programmes of change encounter resistance, so it is better to use the ideas of many people than the knowledge of one

**5**

When making improvements, use people's wisdom, not the firm's money. The cheaper and simpler the solution, the sooner it will be adopted

**6**

Once something has been changed, go back and improve it again. Insist on generating the same results, but in half the time

**7**

The only way to stop people reverting to the 'old ways' is to make physical changes

**8**

Keep thinking 'double the good, and half the bad'.

# 1. Introduction

*This book is about productivity and how to increase it: how to get better returns from the application of finite assets.*

# 1 Introduction

*This book is about productivity and how to increase it: how to get better returns from the application of finite assets.*

To get more (or the same) for less is the Philosophers' Stone – for managers, politicians and economists, and in any enterprise or system that measures inputs and outcomes, from national economies to the smallest workshop. This review concentrates on practical steps that operational managers can take to improve results in all types of business and in the public sector. It brings together good practices from different disciplines and pays particular attention to the theory and application of Lean.

## Background

The emerging economies are enjoying enviable growth, as their larger and mainly younger workforces improve their education, skills, and abilities to acquire and use tools and techniques. But in the developed world, falling birth-rates and ageing workforces are making it increasingly difficult to sustain what Adam Smith called 'the natural progress of opulence'.

The countries of the West can only hope to keep on increasing their wealth if the higher costs that result from rising living standards are matched by increased productivity. For the paradox is that only if more is produced by fewer people can employment be sustained or improved. This presents managers with a difficult and enduring challenge. A recent report by the McKinsey Global Institute has highlighted this phenomenon and the implications for businesses in the United States.[1]

Collinson Grant has helped lots of firms renew themselves. These have included large manufacturing and service businesses in most industrial sectors, government departments and not-for-profit organisations.

Some companies have been competing in expanding, profitable markets: others in declining sectors, where margins have been squeezed hard. Yet more are threatened by rapidly changing technology, or by large, unforeseen increases in the cost of materials – let alone international shifts in economic and political power. Frequently managers have to act quickly to restore profitability and investors' confidence. Falling productivity can be difficult to turn round.

[1] 'Growth and renewal in the United States: Retooling America's economic engine' – McKinsey & Company 2011.

> *“Since we live in an age of innovation, a practical education must prepare a man for work that does not yet exist and cannot yet be clearly defined.”*
>
> **Cicero - Roman Statesman and Orator**

Our work has gone under many descriptions: improving gross margins, restructuring, reducing costs, applying Lean, and turning companies round. But the basic goal has been the same: to achieve better financial results by improving effectiveness, removing wasted effort and making fundamental improvements in productivity to help cope with new, more challenging, circumstances.

Because this book concerns productivity, it has a lot to say about Lean. That practice now pervades many efforts to improve. It complements and strengthens established methods, sometimes re-interpreting them and applying its own language. Lean introduces powerful new ways of thinking, but also reinforces the sound managerial practices that we have advocated for many years. It has been adopted by some of the most successful businesses in the UK and elsewhere.

We also set out a few notes on the eventful history of productivity and on its importance to national economies.

## 2. Why is productivity such a problem?

*Why do inputs always seem to grow faster than outputs? How is it that managers always seem to need more members of staff?*

# 2 Why is productivity such a problem?

Managers trying to boost productivity find that the problems lie with people: that their initiatives meet resistance from instincts that lie deep.

The average manager sees productivity as a batsman sees the ball. He knows that a straight bat down the line of the ball is the way to stay in and build an innings. But the natural instinct is to swipe across the line; which can produce a big hit if he gets it square, but is risky if he misses.

The manager knows that organising work to minimise inputs and costs and maximise outputs of goods and services is the right way to reduce unit costs and speed up delivery. Up go the company's profits and everyone's living standards. So why do most of them play a cross bat – taking every risk as they add people to the team, increase complexity and build up inventory? They must know that this raises costs and lowers productivity, when they should be improving the productivity of the assets they already have.

Good sportsmen have learned to curb their natural instincts. That demands time and practice. It is hard, just as the acquisition of managerial skills and disciplines is. Cricket and management are simple activities with well-known techniques. But they are not easy to do well, because the best way is not the natural way.

There are many insightful aphorisms to remind us of the shortfall in productivity. It is a truth universally acknowledged that:

*'Work expands to fill the time available',*

and its companion too is rarely challenged:

*'It is the busiest person who has time to spare'.*

Experience shows that, without managerial attention, the workforce can grow faster than the work it is employed to do.

This may be because:

*'Managers are always looking to enlarge their teams'.*

Managers see bigger teams as the route to better jobs with more responsibility, money and security. What is more, they do not want rivals near any of that.

Employees have frailties too:

*'Employees make work for each other'.*

And at Collinson Grant our experience has often been that:

*'People naturally elaborate work rather than simplify it'.*

Left alone, work always evolves into more complex forms. Well aware of this, Tesco started to put all proposals for change to the test of:

*'Does it reduce cost? Does it simplify? And is it good for the customer?*

These generalisations are supported by evidence. Left unchecked, employees multiply. Efficiency and effectiveness slump. Productivity dwindles. That is why advocates of 'lean thinking', such as Tesco, want the customer, not the employee or manager, to define 'output value'.

Every healthy organisation will have a policy and a method for removing those activities and costs that gradually accumulate but which, on checking, are seen not to add value from the customer's perspective.

This book draws on our diverse experience. It offers advice on how to improve productivity, avoiding common pitfalls. Lean thinking is a powerful tool for attaining improvement and sustaining its momentum. We introduce its basic concepts and show how they should be applied in practical settings. And we consider other mechanisms for controlling the costs of labour and increasing productivity.

---

> *"Any intelligent fool can make things bigger and more complex. It takes a touch of genius and a lot of courage to move in the opposite direction."*
>
> **Albert Einstein**

---

# 3. What improves productivity?

*For such a 'simple' concept, productivity has many manifestations. Its origins can be traced back to well before the industrial revolution, since when war and the motor car have driven it on.*

# 3 What improves productivity?

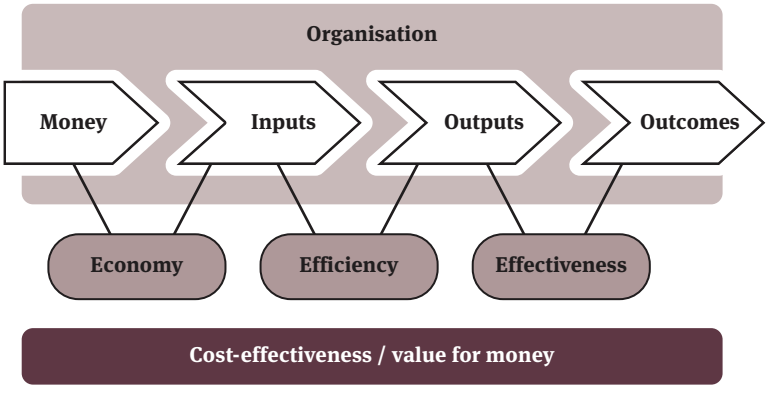
## Background

In any enterprise, productivity – at its simplest – is output for input.

$$\textbf{Productivity} = \frac{\textbf{Output}}{\textbf{Input}}$$

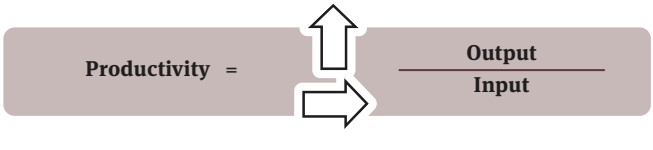
Outputs and inputs should be measurable and related to costs. Each element should be under managerial control. Managers should be responsible for productivity and command the means to improve it.

This model expands the definition to include money and outcomes. It introduces other measures: economy, efficiency and effectiveness. Utilisation (of people and assets), waste and quality are other factors.

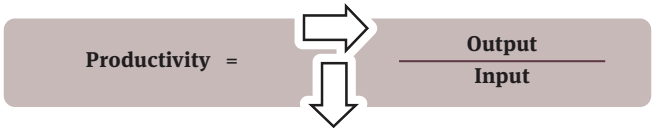



If productivity is the ratio of outputs to inputs, there are three general approaches to boost productivity:

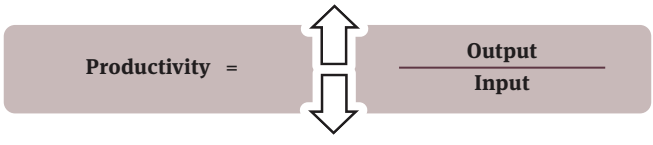
**Action one:** Increase output without increasing input



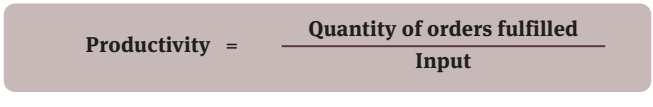
**Action two:** Decrease input without decreasing output




**Action three:** Increase output and decrease input




Lots of people suppose that raising productivity means increasing output. It ain't necessarily so. Higher output is only a gain if customers buy it. So output needs defining carefully. Making more products or providing more services than are required is 'overproduction', leading to (wasted) inventory. A better equation for productivity might be:




Because all managerial activity can (and should) be linked to productivity, there are lots of ways to start describing how performance can be improved. In the first instance, and ignoring any potential overlap, we shall consider five elements:

- Managerial and financial controls
- Lean – the productivity of processes and organisations (and much more)
- The productivity of labour, and related controls on the costs of employment
- The productivity of assets
- Continual improvement.

## Factors of productivity

A number of factors contribute to these five main elements.

### *Scale, markets and external factors*

The first consideration for productivity is scale. If the inputs and outputs under consideration are to be found at a national level or in a single sector or industry, initiatives may involve government, industrial consortia and the trades unions in such action or investment as might ultimately affect Gross National Product.

These scenarios exceed the scope of this book. But the Appendix compares the performance of the UK and other economies. It highlights the influence of:

- an ageing population (as we have already mentioned)
- the regulatory framework in which companies operate
- the dominant sectors in an economy (how fast investors tend to move into expanding and out of declining industries)
- fluidity in the labour market – competitive forces and cultural norms.

These all point to the importance of productivity in the company.

### *Managerial controls*

Some managers know little about what is actually going on in the operations for which they are accountable. Others become complacent, hiding behind the high margins in soft markets that so often conceal poor or deteriorating productivity. Accurate and timely information is the starting point if managers are to control effort properly and take action to improve productivity.

*Productivity in the United States: the challenge*

As populations in developed economies level off, the effort to sustain growth and prosperity depends more and more on increases in productivity. The McKinsey Global Institute recently[2] listed seven priorities for the United States:

- to achieve better productivity in the public and regulated sectors (including education and healthcare)
- to reinvigorate innovation
- to develop talent and the full capabilities of the population
- to build better infrastructure
- to enhance competitiveness by reducing regulation and creating a better environment for business
- to face up to the challenge to use energy more productively
- to foster best practice by harnessing and sharing the capability in different cities and regions.

The researchers concluded that these challenges, though daunting, were realistic. Productivity had to increase or youth would see its standard of living barely rise. Yet there was confidence that the US economy would maintain its strength.

*Lean – processes and operations*

Lean is the name for a set of tools, techniques and values, initially involving specialists who work with other managers and the staff to take diverse measurements and integrate them into a broad assessment of the whole business. The aim is to make it self-sufficient in continuous improvement.

Lean is the heir of Method Study, Work Measurement, and Value Chain Analysis; of manufacturing engineering and of workplace design; and of some behavioural techniques developed continuously since the 1930s. These tools have had three aims

- Economy – to reduce the cost of inputs to processes
- Efficiency – to reduce the time and cost per unit from processes
- Effectiveness – to increase the value added to the output – its utility and quality from the customer's perspective.

[2] 'Growth and renewal in the United States: Retooling America's economic engine' – McKinsey Global Institute, February 2011.

Lean, the latest and most focused of all efforts to boost productivity, places a distinctive emphasis on defining waste and wastefulness, aiming also to reduce inputs and increase outputs to match customers' demands. It often starts rather than finishes with such fundamental questions as

- 'Should we be doing this anyway?'
- 'What does the customer really want from us?'
- 'How much of what we do is not being sold to the customer?'

*The structure and composition of teams*

Productivity is often expressed as output per person or per hour worked. So the size of the workforce for any given output determines productivity. How teams are put together to organise and share their work affects the number of people and hours needed.

Ways of evaluating and changing how organisations are designed to work are touched on in Chapter 9 and given a more thorough examination in the companion volume, *Managing indirect costs*.

*Departmental methods and measurement*

Lean emphasises how the *entire* process adds value for internal or external customers. But efforts towards efficiency and effectiveness in separate departments should not be ignored. Chapter 8 advises departmental managers in factories and offices to standardize work (in units), measure outputs, search for lower unit costs and track reductions.

*Motivating*

Tools and techniques alone will not effect improvements: imaginations must be fired. Chapter 9 reviews different approaches and shows how changes in rewards can work.

> *“In innovation as in any other endeavour there is talent, there is ingenuity, and there is knowledge. But when all is said and done, what innovation requires is hard, focused, purposeful work.”*
>
> **Peter Drucker**

*Terms and conditions of working*

Unless higher productivity lowers unit costs, an organisation cannot collect the financial payback that alone justifies all initiatives and improvements.

So the cost of inputs matters. Later we discuss how to manage pay and premiums, and the costs of absenteeism and of the payroll in general.

*Materials and utilisation*

As manufacturing processes have become more efficient and direct labour has become a smaller part of the costs of production, raw materials and components have become a larger one. But now the cost of the goods, though important, may even be exceeded by the costs of procurement – of selecting suppliers and of processing the requisition, purchase order and goods receipt. But while reports on purchasing continue to focus on price, buyers will train their efforts on that alone, ignoring the total cost of acquiring and using materials and components.

*Maintaining improvement*

Continuous, organised effort to improve productivity will find its reward. A better way can always be found. But if that effort falters, progress can stumble and productivity fall.

In Chapter 11 we look at how improvement can be maintained.

# 4. Managerial controls and measures

*Measurement and control are fundamental managerial activities. Little can be achieved unless these disciplines can be applied rigorously and consistently.*

# 4 Managerial controls and measures

If managers are to be ultimately accountable for productivity, they need to be able to measure and control it. But productivity, like Newton's apple, seems destined to fall. Sensitive and timely measures are required to force it up.

Managing by walking about the office, service centre or factory floor to see and touch day-to-day activities reveals a lot, but not enough. Only tracking the few, vital indices will alert a manager to potential trouble and create the opportunity to intervene before it is too late.

Measures of performance should be like beacons: the visible signs of what managers think important. They should shine a light on financial incentives, but certainly not on them alone. Inappropriately defined or badly administered measures can distract attention and distort effort.

The many possible measures of performance can highlight different aspects of productivity, depending on how a service is provided or a product made. What follows will focus on the effectiveness of people; on the application of equivalent units; and on the overall design of controls. Measurement also forms a crucial part of Lean.

## Measuring the effectiveness of people

Productivity was originally associated with machines, manufacturing processes and outputs. But it is equally applicable to services. Here the emphasis tends to be on people, since the application of other tangible assets may be much less in comparison. (Some services, however, particularly in finance, rely heavily on complex IT and automated processes, and devote considerable time to measuring their productivity.)

In a less automated environment it is useful to focus on three inter-related factors:

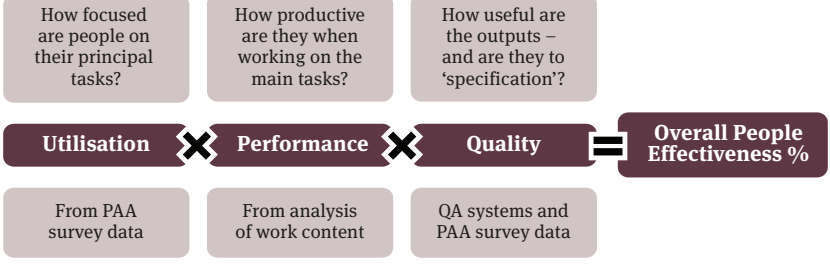
| | |
|---|---|
| **Utilisation** | **How focused are people on their principal tasks?** |
| **Performance** | **How productive are they when working on these main tasks?** |
| **Quality** | **How useful are the outputs – and are they 'to specification'?** |

*Collecting data*

What are the best ways to measure utilisation, performance and quality? Process activity analysis (PAA)[3] categorises each activity as 'core', 'improvement' or 'support' and indicates how much time people spend on it. It highlights overlapping and duplicated tasks, and wasted and over-concentrated effort. A separate analysis of work should reveal the outputs and determine capacity, rework and any redundant products. Other means of measuring quality are used to adjust the desired outcome to the final customer.

The data can be combined to provide a powerful index of:

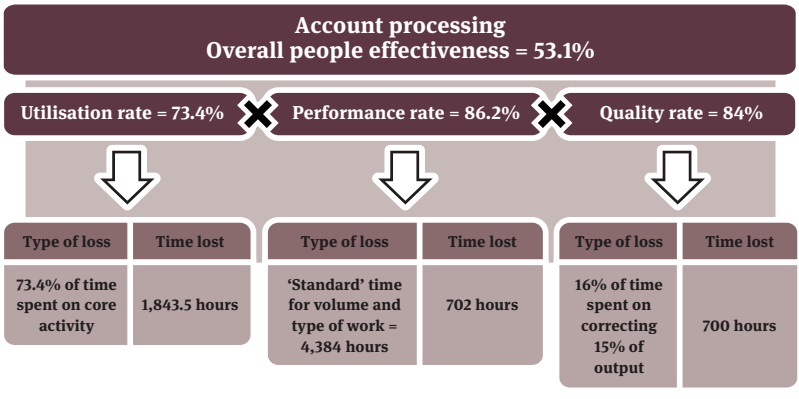
**Overall People Effectiveness (OPE)**




OPE should be the first means of assessing the current performance of a unit and the scope for improvement. It can be used at the start of zero-based budgeting to measure an organisation or to indicate the available spare capacity if demand is increasing.

The analyses provide copious information (that should be verified) about the method of work, the time lost, and the managerial and supervisory control. They find anecdotal evidence of the opportunities for increasing productivity – usually welcomed by the staff that is already aware of the weak points in a system. The presentation of data by department (as shown below) provides a useful graphic summary of current performance.

[3] Managing indirect costs describes Process Activity Analysis more fully.




The outputs can be used for internal benchmarking, to set priorities for action and for plotting progress.

*How much have we produced?*

Collinson Grant was commissioned to examine working practices and find the best way to reduce costs at nine factories of a sector-leading batch manufacturer. New and consistent managerial controls enabled local managers to recognise and eradicate a relatively straightforward error in calculating the amount of output in each production run. The annualised savings at the first plant where the mistake was found were £0.7 million. The Group as a whole is now saving £3.4 million each year from reduced expenditure on materials and machine running time.

## Equivalent units as a measure of productivity

Equivalent Units are a common 'currency', in which the conversion cost of different products can be recorded to provide an accurate figure of manufacturing output and efficiency, independently of the mix of products. They are useful in measuring the movement in unit and labour costs.

EUs supplement rather than replace accounting and control systems. They can be used as part of an integrated approach to managerial controls and margin improvement, but are still effective as a stand-alone control, provided that the organisational structure supports them.

The adoption of EUs may also, but does not have to, involve the introduction of transfer pricing between operators (factory managers) and traders (sales managers).

EUs are established by calculating a ratio for the unit conversion cost of each product. The major product in the group is given a value of one. To calculate the total conversion costs for each product, direct costs are applied to products, wherever possible, and the techniques of activity-based accounting are applied to the allocation and apportionment of indirect costs.

The costs of operations are then monitored. The equivalent value for products processed is calculated by multiplying actual volume for each product by its EU and then totalling the EUs. The financial transfer value of the output is the actual volume of the product multiplied by the standard transfer price for each product. Comparisons are then made between current and base periods for apparent change in volume, actual change in volume (based on EUs) and change in transfer value. The costs of labour are monitored through the use of target hour values for various products.

*Applying equivalent units*

Over the last fifteen years we have supported a multinational manufacturing business in its drive to maintain market leadership in costs and productivity. The organizational model is based on value-chain principles, flat structures, strong managerial controls and powerful incentives. It is designed to improve profits while managing declining volumes.

Equivalent Units have been a big part of the manufacturing strategy. We have helped line managers to understand their underlying principles and apply the rules consistently. This has allowed the company to ratchet unit costs down as volumes have declined or stagnated. As the company has expanded by acquisition throughout Europe and in Africa, we have used Equivalent Units to maintain rigorous controls. The commitment of senior executives to a sustained approach has been rewarded by steadily increasing profitability in what remains a highly competitive market

## Maximising yield

Improvement is frequently about asking the right question:

| Uncertainty | Opportunity |
|---|---|
| Is the specification of the material or component still appropriate? | Processes are being continually improved. Different materials with improved properties at lower cost can result in cheaper specifications. Who is responsible for new specifications? How are changes tracked? What improvements do purchasing reports show? How recently has the specification been reviewed? |
| Has the product undergone value-analysis in the last two years? Was it ever value-engineered? | Selected value analysis of crucial products, materials and components can trim costs and boost reliability. Reports on purchasing and engineering should reflect this type of continuing programme. |
| Are we getting the best from our suppliers? | Suppliers can introduce new materials without telling their customers. They may also be able to reduce prices if there is mutual benefit in reducing costs. Managerial control reports should reflect actions and progress. |
| Is too much material being wasted during set-ups or changeovers? | Many organisations do not adequately measure, let alone control, how much material is wasted when preparing a process or machine. Well-established, statistically-based disciplines are not understood or applied. So simple measures of time and materials can yield significant benefits. |
| Has the performance of the process begun to decline? | The performance of processes deteriorates over time, if they are not managed and maintained. Different techniques can be employed to prevent this, to maintain effective control, and to determine the causes of problems. Statistical Process Control, Inspection and Taguchi are the most obvious starting points. |

Some of these factors will be influenced by initiatives on Lean, as described later.

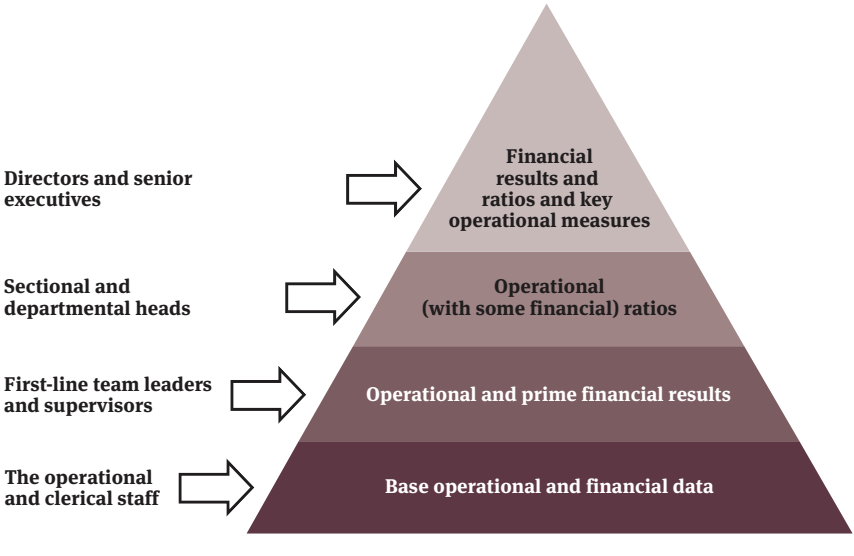
## Some comments on controls

To exercise sustained, positive pressure on productivity, managers need to understand how to design and apply effective managerial controls that integrate power with responsibility, encourage the staff to perform better and reward excellent performance.

In a balanced organisation:

- the line structure is designed to be capable of managing the organisation's processes and functions properly
- in that structure, each job has relevant and meaningful measures for which the jobholder can be held accountable
- the effective measures for managing processes and functions are the same ones for which managers are held accountable.

Measures should form an integrated hierarchy that reflects the structure of the organisation. At the highest level, measures are primarily financial; at the lowest they are operational. Integrating them properly makes it possible to understand variances and the action that should be taken. This is most easily illustrated in a simple triangular diagram:



# 5. Lean and its focus on the customer

*Good managers in well run enterprises are instinctively close to their customers and eschew waste. Lean is a reinterpretation of these central values and much more.*

# 5 Designing cost-efficient organisations

Productivity in a Lean context can be summed up in three simple statements:

- To improve productivity is 'to enable organisations to satisfy customers in a way that minimises the application of effort'
- It is up to employees throughout the organisation collaboratively to 'recognise,' 'categorise,' and 'eliminate' all forms of waste; to tackle its causes (not the surface effect); and to stop it recurring
- To increase productivity, do not think about making people or machines work harder; rather find ways of eliminating non-productive effort or replacing it with value-adding activity.

Lean always defines value or output from the perspective of the customer. An activity that adds value is any operation that directly and positively changes what is done to meet customers' demands.

Conversely, any activity that does not add value is deemed wasteful. Practitioners in Lean learn how to distinguish between activities that do and do not add value for the customer.

## Waste

Waste is a key concept in Lean. It takes many forms. People and processes waste time, space, buildings, products, services, and so on.

In any business that is failing, the waste may get so dense that it 'strangles' the organisation. Once employees and managers absorb and act on the notion that waste is

'everything and anything that does not add value'

all kinds of waste can be revealed. People who could see no waste before begin to see excess in the way most operations are performed.

Take a simple illustration. The value of screwing two pieces together lies in fastening them so that they will not come apart. Everything that does not serve this function is potentially waste: the way items are counted, the way the screws and screwdriver are picked up, the rotation of the tool, the way the screwdriver is replaced.

Only the final turn of the screw actually achieves the fastening.

## Classification of waste

Defining different types of waste helps to focus action on where it will have most effect.

*Waste can be classified in three ways:*

**'Muda'** or **Operational waste** – capacity exceeds load
**'Mura'** or **Waste arising from unevenness or inconsistency** – capacity exceeds load or vice-versa
**'Muri'** or **Overburden waste** – capacity is overtaxed by an unreasonable load.

Operational waste can be further sub-divided:

### *Over-production waste*

This is processing what is unnecessary, when it is unnecessary, and in an unnecessary amount. Costs rise, and resist recovery. This, the worst form of waste, contributes directly to the retention of inventory, and naturally leads to all the other forms of waste.

### *Inventory waste*

Inventory shows the health of an organisation: the less the better. Unfortunately, managers like the comfort of inventory, and tend to hoard it, pleading the demands of lengthy runs and schedules. Creating inventory avoids dealing with operational problems. And the cost of the capital it absorbs, and of the other waste it camouflages, not being itemised as a head of cost in the operational manager's budget, easily go unnoticed.

### *Conveyance waste*

Moving things in and between facilities, picking them up, shifting them around, setting them down and stacking them depresses productivity and takes up space. And an item can incur idle time waste or defect waste each time it moves.

*Defect waste*

Human error causes defects, and defects generate activities that do not add value: rectification or disposal work; resolving complaints; more inspection; and disruption to the normal flow of goods or services.

*Processing waste*

People used to a job can lose sight of its original function and 'sleep walk' through it – a habit particularly common in administrative tasks. It is always worth asking about the basic function of the operation, which will or will not justify its continuation. For example, an expensive, computerised enterprise planning (ERP) system may be less effective than a few white boards.

*Operational movement waste*

Most movement, largely caused by problems of space and layout, adds no value but does add to the costs of products and to the fruitless movements of people during the working day. A Lean approach concentrates on reducing the movement required: by the feet; then by the hips, shoulders, arms, hands, and fingers. On a higher scale, occupying more space than needed wastes money and may be a cause of other wastes such as operational movement. Space should not be used just because it is available.

*Idle time waste*

People or equipment that are waiting to work cannot be adding value: idle time disrupts the flow of effort and slows productivity.

## Applying imagination to the search

Good managers think objectively and analyse rationally. Modern industrial and commercial life continues to throw up new problems of waste associated with what managers and employees do.

Some examples may be arguable or look superficial, such as tea and coffee breaks in designated but distant staff rooms instead of at or near the workplace. (In Italy, though, urban office workers often take mid-morning coffee at the corner café. This is said to be justified by a need to support administrative processes with close interpersonal exchange!)

New technologies can be a serious cause of waste. Sending copies of e-mails to everyone you know dumps your banalities on others who do not need to know, and wastes their time. Copying all e-mails to the boss usually indicates an ego trip, a political play, or a serious lack of self-confidence. Companies should have protocols to deal with this epidemic of wasted time and money.

To recognise waste requires some liberation of the imagination. Waste exists everywhere: from transformational production in manufacture to administrative management; from machine down time to the production of reports on performance that do not get read.

*Boosting productivity in the public sector*

Some private companies recognise the achievement of tough targets by paying handsome rewards to the big fish and performance-related bonuses to the minnows. But public bodies rarely pay bonuses that really influence behaviour, and may well pay what they do for no compelling reason. In productivity, the public sector lags behind the private.

But many public services are highly transactional – payment of benefits, assessment of taxes etc. It would be easy to assess inputs (how much labour is used and its cost) and outputs (calculations done in a certain time). And there will be a 'process' that connects the two, however inefficient it might be to begin with. So examination should quickly highlight waste, duplication of effort, unnecessary delay and unacceptable quality. Many middle managers in the central Government and in the health service have been introduced to Lean – with, frankly, mixed results.

After investigating how work is done, managers are faced with options on how to improve processes, reduce materials and effort, and increase productivity. There is usually less urgency to take action than in a private company where financial results are normally published monthly. Public bodies are institutionally lethargic. Decision-making can be painfully slow, subject to perverse conclusions and prone to unexplained delay.

And when a conclusion to act has finally been reached conditions may have moved on. Despite all this, successful Lean initiatives do take place in the police force, some parts of local government, the

NHS and a few large government departments. They overhaul working practices and train the staff to eliminate waste and strive for continuous improvement.

'Local' productivity can be boosted measurably, but might not cut cost for the organisation as a whole. To avoid redundancy, and to maintain the staff, the status quo and the belief that any employment, however inefficacious, is better than none, public servants are often moved sideways, or given artificial or unproductive duties. It remains to be seen whether the current economic crisis will result in a 'real' increase in their productivity.

## Inventory

Inventory is a recurring theme in Lean. Many organisations and their managers consider it a necessity and show it in their accounts as an asset. Its cost is not a profit and loss item. When markets are booming and sales brisk, it may be tolerated. But when stock is dead or turning slowly, and demand slack, it is too late to offload the heavy burden. To write it off does hit the profit and loss. From a Lean perspective, though, inventory is always a waste, whatever the business conditions.

The only exception is a business that holds stock as a service for customers prepared to pay a premium for rapid supply from stock. Other customers have no wish to pay more for what has sat on a shelf for months.

It is well known that Dell Computers organises supply to customers from a factory that carries no finished goods; and that Toyota has long been famous for having no inventory of parts but a just-in-time process that was almost the first and finest example of lean thinking.

The problems of inventory can be enumerated.

*Inventory requires capital investment* – plus the cost of interest.

*Inventory uses space* – it can cramp work or demand investment.

*Inventory has to be moved* – and movement is not free.

*Inventory invites damage* – the more it is handled, the more likely it is to be defective. And dealing with returned goods is very expensive for a company, involving physical and administrative activity.

*Inventory creates unnecessary managerial costs* – storage, transportation and administration all soak up managerial time.

*Inventory eats up energy* – not much can be safely left at ambient temperature at all times of the year.

These effects may be only the tip of the iceberg. Inventory conceals other problems, harder to spot, analyse and solve.

Holding excess stock allows managers to disguise their failure to satisfy customers; to streamline the supply chain; to match capacity with demand; to keep machines running; to optimise products' life-cycles; and to meet the myriad other problems that beset the company. Think of a problem and the chances are that a manager's immediate solution is to create some inventory to cover the tracks.

### Lean's 5S principle – a revolution in the workplace

The principles that underlie all Lean improvements are known as the 5S.

In theory, factories and offices devote 70% of their space to storage, making them largely wasteful warehouses. Employees, confined to the small space left by all that clutter, are less connected, walk farther, and spend more time managing files and work in progress.

5S aims to cut the mess down to what is really necessary.

There are five simple principles.

**Sort** – to separate the 'essential from the non-essential'

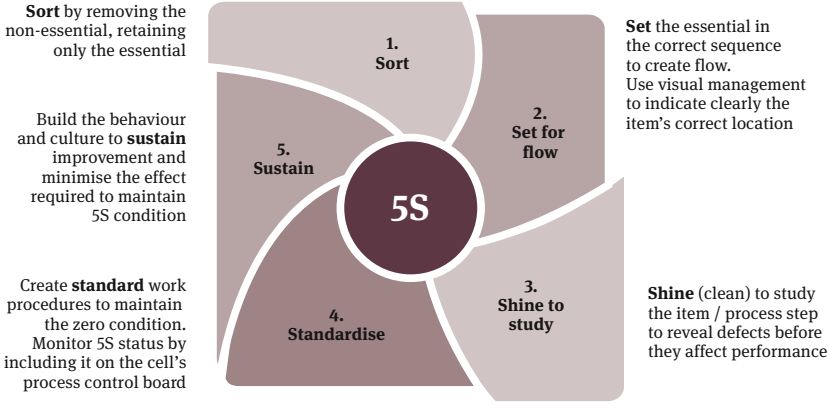
**Set** – to configure the essential to eliminate waste

**Shine** – to restore essential items to perfect condition

**Standardise** – to ensure essential items remain in perfect condition

**Sustain** – to embed and improve the new conditions.

The most fundamental of these are 'sort' and 'set', as success there provides a gateway to the other three.




Although 5S usually starts on the shop floor or the office block, it is not purely a campaign to clean or organise the workplace. It is a powerful lever for improvement, which can be applied physically to a workplace or conceptually to a process, to an organisational structure, or to a design.

Consider, for example, an organisational structure. The first 'S' (sort) reveals the essential and non-essential positions of jobs in the structure. The second 'S' (set) invites the task of restructuring the essential positions to create better organisational control over flow. The third 'S' (shine) re-examines and cleans up the positions' roles, responsibilities, and accountabilities to suit the new organisation. The fourth and the fifth 'S' put systems in place to stop the structure from getting out of kilter with the organisation's needs.

## Work flow

Once the application of 5S has reduced waste, higher productivity often comes via the associated techniques of managing 'flow', 'levelling' and 'standard operations'. Work should flow through a process continuously, without waste, idle time, rework, or activity that adds no value.

If employees or machines are working at different rates, producing an unbalanced flow, the corrective action is not to adjust the flow at departmental level, but to visit the point of the process where the customer's need for a delivery schedule can be seen and rationalised.

Then it is possible to work backwards, setting monthly schedules and daily outputs from processing times. In this way the customer, not the organisation, determines how many items are processed and how fast. Then all operations should be standardised to ensure robustness and consistency of performance.

A productive organisation is able to orchestrate its employees, materials, and equipment to work in the most efficient, waste-free way, which becomes known as the standard operation. The consequence is that all the Lean and productivity bells are rung – minimum inventory, and maximum processing economy, efficiency and effectiveness.

*Characteristics of a highly productive organisation*

| Approch to improvement | Primary impact on waste | Secondary impact on waste |
|---|---|---|
| Single-piece flow | Over-production and inventory | Conveyancing and processing |
| Levelling and synchronisation | Idle time and defects | Inventory and over-production |
| Standardised operations | Processing and operational movement | Defects and idle time |

The examples of the Lean approach described in this section should indicate the comprehensive approach to improvement that characterises the design of Lean processes.

Traditional, departmentally focused productivity still has its place. But it may end up not achieving the expected benefits because the focus is too narrow.

For example, there is limited benefit in improving the productivity of a team generating invoices if another department that supplies the data is bedevilled by interruptions, or if a later operation is dilatory in getting them into the post.

Lean seeks not only to reduce the effort and cost of billing but to streamline the whole process, so that invoices are raised and submitted and remittances received more quickly.

In the next chapter we expand on how each of these techniques can be combined and applied in a systematic programme.

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> *“The great leaders are like the best conductors – they reach beyond the notes to reach the magic in the players.”*
>
> **Blaine Lee**

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# 6. Running a Lean programme

*To make better use of assets and increase productivity, processes must be made more efficient and operations streamlined. Numerous techniques – some simple, others more advanced – can be applied to optimise performance and achieve a lean organisation.*

# 6 Running a Lean programme

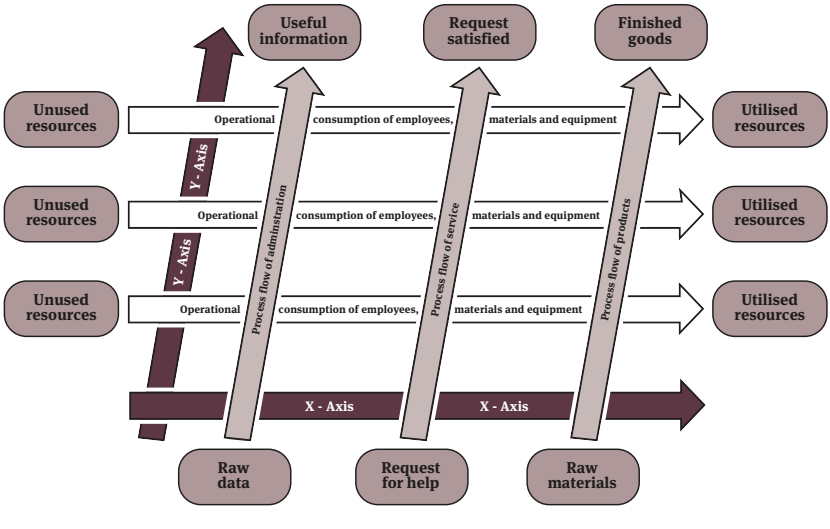
## A network of 'processes' and 'operations'

A distinction must be made between the flow of products and services (the *process*) and the flow of work (the *operation*). Most managers understand the main processes in the business, and how to analyse and improve them. But to increase overall productivity they need to focus equally on how operations work.

Processes exist to transform items or needs: to convert raw materials into finished goods; or requests for service into services provided. A change in process can affect the flow of the item, the time taken, the responsiveness of the organisation, and the quality of the goods or service.

Operations change the agents (the people, machines, equipment, etc), how they are used and the work they do on the item or need. A change in operation improves the flow and consumption of effort, the productivity and the costs.

Graphically, an improvement in process can be shown on the Y-axis and one in operation on the X-axis. The diagram below shows how assets are used, raw materials converted, needs satisfied and information transmitted.



> *To make fundamental improvements in performance, it is necessary to distinguish between product/service flow (the process) and work flow (the operation).*
>
> **Shigeo Shingo**

A process is completed through a series of operations. But improving an operation may not boost the efficiency of the whole process. Processes and operations demand different approaches. But it is also important to understand their relationships and how they interact.

## Getting processes fit for purpose

Any disruption in a minor, supporting process soon stems the flow in the primary process, just as a constricted capillary can affect a main artery. To prevent such problems, lean organisations control flow, to avoid drought or flood.

### *Pull not push*

Traditional organisations use 'push' systems to organise work. The upstream operations determine how items are moved and controlled.

But in a 'pull' system, the downstream operations fetch from upstream only the items needed, only when they are needed, and only in the required amounts. As the upstream operation is depleted, it pulls more items from the previous operation, and so on.

This principle is more radical than it may first appear. It turns on its head the whole tradition of production and process as learnt by many managers in their formative years.

### *Using Kanban to control flow*

Kanban trigger the movement or processing of items. They are the nervous system transmitting signals throughout the organisation. When Kanban inventory (work waiting between tasks) drops below its reorder point, an order is issued (through the movement of the Kanban card) for the same amount as before.

In a sense, the downstream operation *buys* from the upstream one. Hence the cards that accompany the materials and that return with the empty container to get more are called 'Kanban', which means 'shop signs'.

This can be a good way to control inventory without having to pay attention to small fluctuations in demand. It keeps costs low by minimising administration and by eliminating more sophisticated systems. In fact, purists eschew electronic or computerised Kanban, which, they claim, can lie. Cards are more likely to be accurate because visual checks are easier and not so easy to manipulate.

There are four main types.

■ Supplier Kanban

These are used to order large quantities of items from suppliers. Also known as 'parts ordering' Kanban.

■ In-facility Kanban

These are used to order items from upstream operations in the facility. Also known as 'pick-up' or 'withdrawal' Kanban.

■ Work Kanban

These give instructions to operations in a process that require no (or hardly any) change-over time.

■ Signal Kanban

These provide the extra information needed when a product or service changes and equipment needs to be reconfigured or relocated.

Example of an in-facility Kanban card

| Part Name/No. | Previous Operation | | Current Operation |
|---|---|---|---|
| T5 casing model Y 5645446 | Machining of casing | | Assembly of casing |
| **Location Code** | **Control No.** | **Quantity** | **Box number/quantity of boxes per pallet** |
| C 26 | L 9 | 10 | 2 off 4 |

This method helps maintain the operational tempo, and efficient operations. The number of Kanban can be determined as shown.

$$\text{Number of Kanban} = \frac{\text{daily output x (flow time + safety margin)}}{\text{Pallet capacity}}$$

Where:

$$\text{Daily output} = \frac{\text{monthly output}}{\text{workdays per month}}$$

Flow time = operation lead time (cycle time + retention time) + flow time for Kanban retrieval

Safety margin = zero days or as few days as possible

Pallet capacity = keep quantity in pallet small and have frequent deliveries.

A word of caution. This system should be seen as an intermediate step in transforming an organisation into a highly productive enterprise. Many firms adopted a Kanban system, only to find that it did not work as expected.

Some people think it is the essential requirement of Lean. Not so. It is just one of several tools used to maintain a lean facility. It can reduce inventory until stock is being turned over monthly or even weekly. But wherever there is a Kanban, there is inventory. And a truly lean organisation sees all inventory as waste. So the need for any Kanban should be challenged.

*Quality Assurance*

Pressure to save cost can tempt managers to compromise quality. They should resist it. Consistently high quality is essential, no matter what production system is in use. Highly productive firms tend not to be concerned with the number or frequency of defects in general. They concentrate on each defect as it occurs, asking – 'Why did that happen?' – to find the cause and make an improvement to prevent the same defect from occurring again. Quality assurance varies markedly:

- Level 1 – Inspectors are used superficially, or not at all. So next to nothing stops defects from being passed on to the customer. The organisation, reeling under customers' complaints and wasted material and effort, heads for a loss. Where this attitude prevails, the only way to eliminate defects is to abandon production and either start again or contract out.
- Level 2 – Firms receiving complaints may decide to spend more on inspectors to sort defective items from good. If done thoroughly, this will stop the complaints. But it won't stop the defects. And the high cost of inspection puts the economics of production in doubt.
- Level 3 – An inspector who finds a defect works with the employees who made it to prevent its recurrence. The aim is not to increase inspection but to make improvements and train the staff.
- Level 4 – Employees who find a defect deal with the problem immediately to prevent its recurrence. Defects are not passed on to subsequent operations. So all employees act as inspectors, and all items are checked for quality at all stages in the process.
- Level 5 – Some managers scorn the idea of 'zero defects', preferring to admit that 'to err is human'. But it is necessary to distinguish 'errors' from 'defects'. Errors result in defects. The way to achieve zero defects is to prevent the errors in the first place. So inspection seeks the source of the defects, which is usually human error.

The table below summarises the different degrees of quality assurance. Where does your organisation rank?

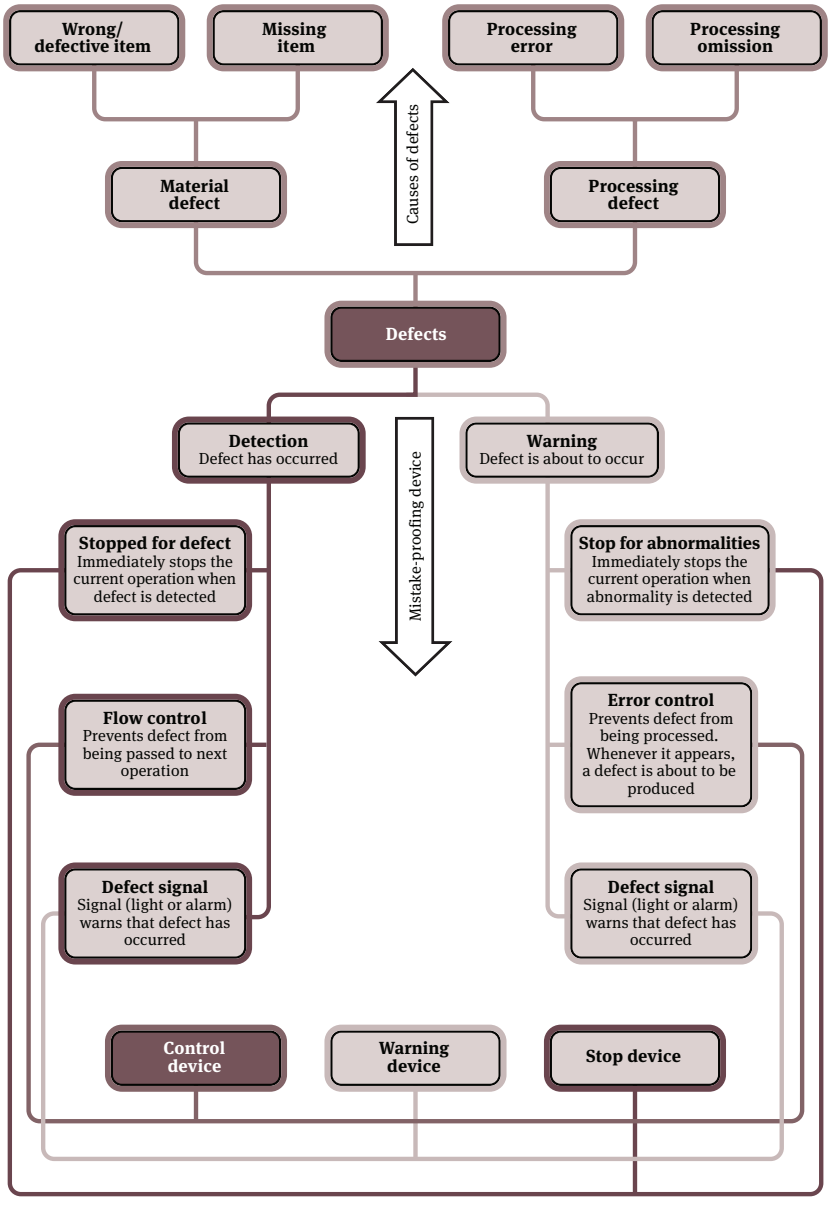
| Level of quality assurance | Approach to quality assurance | Action to improve quality assurance | Inspection type |
|---|---|---|---|
| 1 | Lots of defects and lots of customers' complaints | Shut down the organisation | No inspectors |
| 2 | Lots of defects but no customers' complaints | Use more inspectors | Sorting inspectors |
| 3 | Defects produced, but are not repeated in subseqent work | Increase industrial engineering type of improvements | Inspectors who use feedback data |
| 4 | When defects are produced at an operation but they are next passed to the next | Train all employees to spot and remove defects | Independent inspection by all employees |
| 5 | When an error occurs, the operation does not produce defects | Thoroughly implement a 'zero defects' policy | Inspection at source |

* Source: Hiroyuki Hirano

Operations can achieve 'level five' quality assurance aimed at 'zero defects' by applying 'mistake-proofing' devices that warn either that a defect may be about to occur *or* that one has occurred. Lean organisations tend to favour the former: 'An ounce of prevention is worth a pound of cure'.

*A mistake-proofing system*

Complex processes may be more prone to errors and hence defects, but not necessarily. Human error does not discriminate. Managers should always aim to reduce complexity: it adds costs. But if it cannot be avoided, a well-planned, 'mistake-proofing' system might be appropriate.


Wrong/ defective item
Missing item
Processing error
Processing omission
Causes of defects
Material defect
Processing defect
Defects
Detection
Defect has occurred
Mistake-proofing device
Warning
Defect is about to occur
Stopped for defect
Immediately stops the current operation when defect is detected
Stop for abnormalities
Immediately stops the current operation when abnormality is detected
Flow control
Prevents defect from being passed to next operation
Error control
Prevents defect from being processed. Whenever it appears, a defect is about to be produced
Defect signal
Signal (light or alarm) warns that defect has occurred
Defect signal
Signal (light or alarm) warns that defect has occurred
Control device
Warning device
Stop device

*Maintenance*

In a highly productive facility, a crucial aspect that is often overlooked is maintenance. Continuous flow depends on machines and equipment that never break down. The aim is not to repair broken equipment but to apply preventative maintenance: to treat the causes of a breakdown before it occurs.

Machines break down owing to physical deterioration. From the day a machine is installed or a new vehicle delivered, its condition deteriorates. Sooner or later one or many parts will cause the breakdown.

Almost any machine will display some symptom of ill health before it actually breaks down. A machine may fall short on quality, or a vehicle use more fuel than it did. The important thing is to recognise at what point it is on the path of deterioration. Lean thinking puts this at the door of the (properly trained) operator, not of the maintenance man. The table indicates the common stages:

| Stages on the path to equipment breakdown | Symptom |
|---|---|
| Stage 1 | Latest minor defects – difficult to see or hear |
| Stage 2 | Apparent minor defect – noticeable to the eye or ear |
| Stage 3 | Performance below expectations – difficult to achieve atandard performance |
| Stage 4 | Stops intermittently – frequently needs to be shut down to make adjustments to bring the standard of quality back in line |
| Stage 5 | Stops – breaks down, functions so poorly that it stops itself |

To prevent breakdowns, operators and managers can recognise and adopt four basic approaches to maintenance.

- 'Preventative maintenance' centres on daily checking and routine actions to raise reliability, reduce the risk of faulty operation, and slow any deterioration.
- 'Corrective maintenance' comprises the actions taken in response to a breakdown, with a view to preventing any recurrence and to improving the condition of the equipment and making it easier to maintain.
- The adoption of 'independent maintenance' requires managers to give up the conventional notion that equipment is used by operators but maintained by technicians. It is the operators who know it best. They can recognise that an engine may sound louder than usual, or that formerly clean parts are streaked with oil. So they should do the daily cleaning, checking and oiling, replace parts as necessary and perform minor repairs. It is up to the technicians to teach operators how best to maintain the machines and do major repairs.
- 'Maintenance prevention' involves using data to design equipment that is less likely to break down or malfunction and that can be maintained easily, quickly, correctly and safely.

## Improving operations

### *Multi-skilled flow cells*

It is important to eliminate defects and raise the operating rate of workers and machines. Increasing productivity is a means to economic survival. But even 'survival' is no reason to treat people like machines. Productivity is important, but attempts to increase it at the workers' expense will damage performance in the long run.

Productivity and respect for employees must coexist. What satisfaction and sense of achievement could an employee possibly derive from doing the same specific and specialised tasks for 10 years? Conversely, if employees' 'needs' were so respected that productivity was no longer important, would that sap the organisation's vitality and cause it to fail?

Multi-skilled flow cells can achieve productivity and respect for the employee.

| Productivity | Respect for the employee | Behaviour |
|---|---|---|
| High | Low | Lack of respect for workers<br>Minutely specialised jobs<br>'Human robots' |
| Low | High | Lack of concern for economic matters<br>'Selfish' culture<br>Corporate deterioration |
| High | High | Constructive activities<br>Multi-skilled work, handling several types of task<br>Corporate development and growth |

One-piece flow is the best way to eliminate defects, waste and delays and to boost productivity. The basic concept is to send work – a physical item or a piece of information – along the sequence of tasks one at a time, adding value at each operation.

So multi-skilled flow cells are essential. The workers must gain new skills to do the several and various operations in sequence and to inspect their own work.

There are some essential points to consider when setting up such a system.

- Equipment – There is a temptation to invest in expensive, multipurpose machines to maximise output, forgetting that they need only meet demand. The whole process is more important than the efficiency of any individual machine. Productive organisations recognise that it is the machines that should be specialised, not the people. Machines need to be redesigned and simplified to include only the essential functions. They should be inexpensive, small and light, so they can be moved easily. This allows the flow cell to be flexible and to reconfigure quickly to process different products.

- Layout – To do the processes in sequence, the equipment should be set out as a 'U'-shaped flow cell – a better configuration than straight lines, as it minimises waste and allows the pace of operations to flex with the customers' demands.
- Eliminate operational 'islands' – Some operations run independently, to their own rhythm, producing their own waste and disrupting the whole process. Processes should have a steady rhythm, set by the customer and extending all the way upstream. Operations should be assimilated into cells and their work should be evenly balanced.
- Operational procedures – Managers should forego conventional batch-and-queue processing for single-piece flow that pulls items from upstream operations.
- People – Employees should be involved in setting up flow cells and trained in the many skills required to handle several different operations and tasks.

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> *"There are those that are so scrupulously afraid of doing wrong that they seldom venture to do anything."*
>
> **Vauvenargues**

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*Speeding up change-overs*

Contrary to conventional belief, the costs of inventory and change-overs are not constant, and large batches do not minimise them, but cause surplus production, idle time, transport, inventory, setting-up time and defects. Now that customers demand diverse products in limited quantities, suppliers need to do fast, efficient change-overs to make small batches economically.

A change-over comprises the activities between the processing of the last old item and of the first repeatable new item. These may be to change the materials and parts or settings of the machines and to reorganise and clean up.

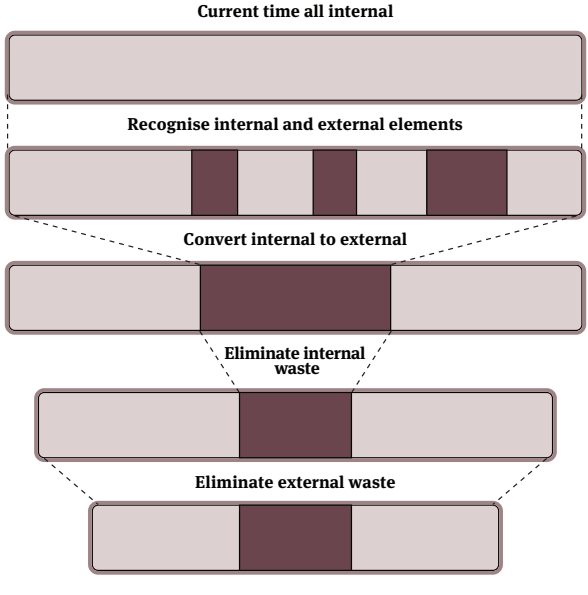
There are two elements of a change-over:

- Internal time – on tasks when the asset (person, machine or equipment) is stopped
- External time – on tasks when the machine or equipment is running.

Both elements must be improved to cut costs and batch sizes. This needs four steps in sequence:

- recognise internal and external activities
- convert internal activities to external activities
- eliminate waste in the remaining internal activities
- eliminate waste in the external activities.

*Reducing time in change overs*




A few principles should guide efforts to improve change-overs:

- Change-overs begin and end with good organisation in the workplace. A lot of time can be wasted finding the right items to use.
- If you have to use your hands, make sure your feet stay put. A sure sign of a poorly planned change-over operation is that workers must walk here and there to perform it.

- Do not pay for special, fine-tuning skills. Instead, standardise adjustments so that anyone can make them.
- Standards are standard: they are not to be flexed, interpreted or fudged. If standardisation is impossible, improvement is unlikely.

*Jidoka - Separating people from machines*

Many organisations introduce expensive machines to automate work, only to find that they generate unforeseen demands for the labour they were supposed to replace. The machine may be unable to complete an entire task as originally hoped for, or it may produce defective goods if left unsupervised. So automation can, if not introduced correctly, actually increase costs.

'Jidoka' – 'human intelligence applied to work' – means automating manual work to have it done by a machine with intelligence.

Unfortunately, it is still common to see a machine with a permanent minder. The operator has become a supervisor. Whereas to boost productivity and cut costs, the machine should run autonomously, without supervision.

There are four stages in separating man from machine.

- Stage 1 – Manual labour – all the work done by hand – makes sense only when labour is cheap and the work can be done very quickly
- Stage 2 – Mechanisation – some work is done by machine, the rest manually
- Stage 3 – Automation – all the work is done by the machine. But the worker sets it up, switches it on and stays with it, as it lacks the intelligence to know whether it is producing defective goods
- Stage 4 – Autonomation – the machine can be switched on then left alone to do all the work, as it has the intelligence to detect defects and if so to shut itself down or make adjustments.

'Automation' frees workers' hands to do other tasks; 'Autonomation' frees their feet, so that they can leave one machine to run several simultaneously. Do not try to separate workers from machines all at once. The steps that a worker takes in an operation must be analysed and automated one at a time. Bold schemes to automate complete processes in one swoop usually end up costing more than anyone would like to admit.

### How improvements in process and operation interact

An organisation cannot truly realise its full productive potential unless it successfully improves its processes and operations, adopting and combining techniques in a specific sequence to curb waste and spur performance.

| Approach to improvement | Primary impact on waste | Secondary impact on waste | Operational improvement | Process improvement |
|---|---|---|---|---|
| Single-piece flow | Over-production and inventory | Conveyance and processing | Flow cells | Kanban |
| Levelling and synchronisation | Idle time and defects | Inventory and over-production | Faster changeover | Quality assurance |
| Standardised operations | Processing and operational movement | Defects and idle time | Jidoka | Maintenance |

*Step 1 The awareness revolution – combining the 7 wastes and 5Ss*

All innovation and improvement start in the mind. Once made aware of their organisation's situation, people will want to improve it. But the best place to start this is not on the shop floor, in the engineering department or at the suppliers: it is at the top. As long as the leaders persist in thinking 'It won't work here' or 'We are different', the necessary changes won't be made. But once those leaders become alive to the waste in the status quo, that awareness will quicken the middle managers and then the whole staff, prompting change. At the start of any programme of improvement, use the 7 wastes to recognise waste and the 5S to eliminate it.

*Step 2 Creating flow – combining multi-skilled flow cells and Kanban*

Once the organisation is aware of its waste and has started to make improvements, it can start to create flow – to bring to the surface the buried waste that the processing of large batches tends to conceal. Small-scale improvement will not weed it out. So set up multi-skilled flow cells to raise productivity and shed costs. Then create flow between the cells by linking them with Kanban throughout the process.

*Step 3 Levelling organisational pace – combining reduction in change-over time and quality assurance*

Once flow has been created throughout the processes, reducing time and costs, the organisation should start to level its operational tempo.

Start at the point closest to the customer – the stocks of finished goods that give firms a false sense of security by hiding from them the changing needs of the customer and market trends. Only by reducing that inventory can organisations meet the demand for shorter lead times. Levelling is not trimming peaks in demand to match capacity. It is matching types of product or service precisely to customers' needs, breaking monthly schedules down into daily outputs, which are then used to set processing times. To aid this, the operational cycle times are evenly balanced and synchronised, so all employees have an equal amount of work and are 'doing the same dance'.

Start by reducing the change-over times of all operations to allow the organisation to respond quickly to changing demand without incurring extra cost. Then set up quality assurance throughout the process to make deliveries just in time.

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> *"Nothing will be attempted, if all possible objections must first be overcome."*
>
> **Samuel Johnson**

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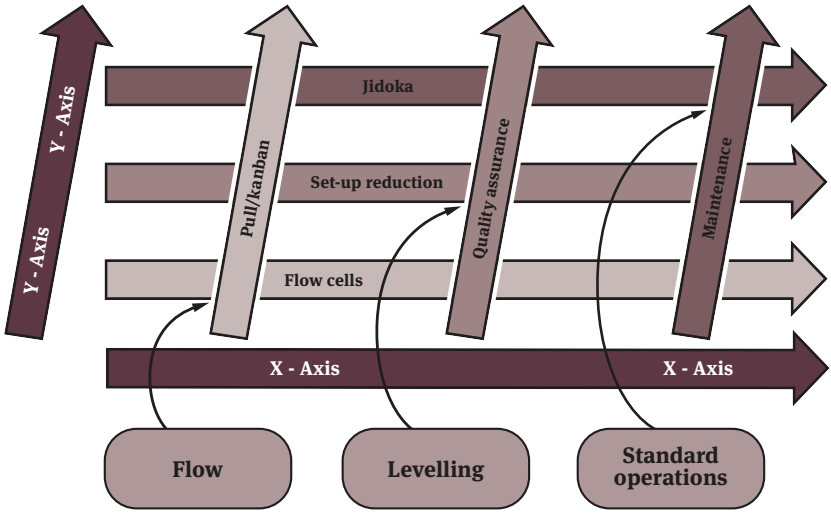
*Step 4 Standardising operations – combining Jidoka and maintenance*

Once flow and levelling have been set up and the organisation has less cost and working capital, it should move on to standardising its operations.

Standard operations are those that best combine people, goods and machine to produce good items economically, quickly and safely. They are not the same as standard operating procedures (SOPs). To achieve full standardisation, SOPs must be combined with the physical standardisation of the work place: separating the people at each operation from the machine that processes items consistently and continuously, that must never break down and that should be carefully maintained.

## Improving operations and processes



# A short history of the long march

Adam Smith wasn't the first to consider how work should be organised, but he left an indelible mark on economics and management theory. Famous for advocating the division of labour, he also introduced ideas on how work is done (using skill, dexterity and judgement) and how many people were engaged in it actively (employment/unemployment). In the 1770s industrial technology was in its infancy, so Smith did not comment directly on the impact of investment and innovation. At the time the transfer of labour from agriculture to manufacturing was much more important.

Since the industrial revolution, managers and statisticians have increasingly tried to measure every aspect of production, work, investment, costs, waste, outputs and (more recently) comparative value. War has always been a spur. How fast could 15th century galleons be built? How quickly could American engineers make and ship tanks to Britain in 1941? How quickly could factories construct Spitfires and Hurricanes during the Battle of Britain?

## The progress of productivity

- 380BC: Plato writes about the division of labour in 'The Republic'
- 300BC: Xenophon amplifies the division of labour in 'The Education of Cyrus'
- 100AD: Publilius Syrus notes the efficiencies gained by single piece flow *'To do two things at once – is to do neither'*.
- 1000: The formation of 'guilds' in Europe sets standards for training and quality and increases productivity
- 1450: The Arsenal in Venice uses standard parts and modular construction
- 1620: Francis Bacon applies deduction – the 'scientific method'
- 1750: Henri-Louis Duhamel du Monceau writes about the division of this work in 'The Art of the Pin-Maker'
- 1760: Benjamin Franklin warns about unnecessary inventory in 'The Way to Wealth' 'You call them goods; but, if you do not take care, they will prove evils'
- 1770: Adam Smith, inspired by du Monceau, recognises that the division of labour represents a qualitative increase in productivity in 'An Inquiry into the Nature and Causes of the Wealth of Nations'

- 1808: Portsmouth dockyard introduces single purpose machines to manufacture pulley blocks for ships of the line and increases productivity by a factor of 10
- 1817: Economist David Ricardo uses the concept of comparative productivity in an examination of international trading patterns
- 1820: Karl Marx accepts the division of labour as a 'necessary evil'
- 1880s: Electricity is first commercialized, but the real pay-off in industrial productivity is only realised in the 1920s
- 1890: Frederick Winslow Taylor describes scientific management
- 1900: Vilfredo Pareto states 'the law of the vital few' – that for many events, roughly 80% of the effects come from 20% of the causes
- 1901: Professor FB Crocker comments on studies of the *productivity* gains from electricity. 'It is often found that this gain (in output) actually amounts to 20 or 30 per cent or even more, with the same floor space, machinery and workers'
- 1910: Henry Ford invents the moving production line
- 1910: Sakichi Toyoda invents Jidoka: a way to detect a defect automatically, and correct it at once
- 1911: FB Gilbreth studies masons setting up piles of bricks and how far they reach to retrieve each brick, making recommendations on how to lessen fatigue, increase morale, and raise productivity through conservation of motion
- 1920: Fokker-Wolf invents 'takt' time: the time allowed to produce a product
- 1926: Charles E Bedaux, an entrepreneur and industrial engineer, brings his system of work measurement to Britain
- 1920s: Frank and Lillian Gilbreth popularise time and motion study and the need to study the total working environment in raising efficiency of effort
- 1930: The Hawthorn effect: studies show that workers are motivated by interest shown in them
- 1940: Taiichi Ohno fully defines the Toyota production system
- 1950: William Edwards Deming teaches top Japanese managers how to improve quality through various methods based on Bacon's rationale
- 1955: Japanese and American governments form a joint 'Productivity Improvement Program'
- 1960: Japanese manufacturers adopt Total Quality Management
- 1970: Toyota produces manuals for its suppliers; other Japanese companies become aware of the Toyota production system
- 1980: The NBC documentary, 'If Japan can, why can't we?' makes the world aware of Toyota's production system

- 1990: Womack et al publish 'The machine that changed the world'; the term 'lean' is popularised
- 1998: Chancellor Gordon Brown notes that the productivity of labour in Britain is between 15 and 40 per cent below rates in the United States, Germany and France!
- 2000: Lean is adopted by western manufacturing firms
- 2010: Lean is adopted by all sectors and expands past the shop floor to the front line and back office
- 2020: The future – 'Productivity' becomes the new mantra as competition increases between western and eastern firms, and different government organisations compete for limited central funds.

## An evolving story

Although rigorous thinking about processes can be traced all the way back to Plato's discussion of 'the division of labour', the Arsenal in Venice made the first real attempt to improve them in the 1450s. It standardised components to allow modular construction of ships and specialised workers' jobs to accelerate learning and increase productivity.

In the early 1890s President Theodore Roosevelt prophetically remarked that 'The conservation of our national resources is only preliminary to the larger question of national efficiency.' Frederick Taylor pointed out that the remedy for chronic inefficiency lay in systematic management rather than in extraordinary effort. He also showed that improvement was applicable to activities great and small, from businesses, farms, philanthropic institutions and universities to government. The main aim of management should be the maximum prosperity for employer and employee – the result of maximum productivity. And that demanded the training and development of everyone in the establishment to 'do the highest class of work'.

In the 1910s Henry Ford married consistently interchangeable parts with standard work and moving conveyors to create what he called flow production. Fabrication steps were set in sequence, wherever possible, and special-purpose machines and go/no-go gauges were used to fabricate, in a few minutes, components that would fit perfectly into the vehicle and to deliver them directly to line-side. This was a revolutionary break from the normal practice of grouping general-purpose machines by process to make parts that would eventually find their way into finished products after a good bit of tinkering (fitting) in subassembly and final assembly.

The problem with Ford's system initially was not 'flow': he was able to turn the inventory of the entire company every few days. It was his inability to provide variety. The Model T was not just limited to one colour. It was also limited to one specification. All Model T chassis were essentially identical up to the end of production in 1926. When the world wanted variety, Ford was unable to respond and seemed to lose his way. The fabrication shops acquired increasingly larger and faster machines, apparently lowering costs per process step, but continually increasing throughput times and inventories. Even worse, the time lags between process steps and the complex part routings required ever more sophisticated systems for managing information, culminating in complex systems for materials requirements planning (MRP).

In the 1940s Toyota looked at this capital-intensive mass production, with its large batches, dedicated assets and high waste, and worked out that a series of simple innovations would make it possible to provide an alternative: a continuous process, efficient operations, and a wide variety of high-quality products. The secret was to eliminate waste. In the 1950s and 1960s Toyota did so. In the 1970s it produced manuals to help its suppliers do the same, sharing the lean approach with outsiders for the first time.

But it took almost another decade for these manuals to appear, in English, on shop floors in the West, and yet another for the concept of the value stream to be applied to the entire process from raw material to customer. For the first time, production 'pull' was extended beyond the factory to the partners up and down stream.

Today 'Lean' has been applied in all sectors: maintenance, repair and overhaul (MRO); consumer services; financial services; central government; the police; military organisations; healthcare; and charities. They all want to minimise waste and maximise productivity and value to the customer.

# 7. Understanding change

*Improvements in productivity flow from better processes, systems and operations. But fundamentally they depend for their success on changing the behaviour of managers and workers. Investing some time in understanding how this can be achieved usually pays dividends.*

# 7 Understanding change

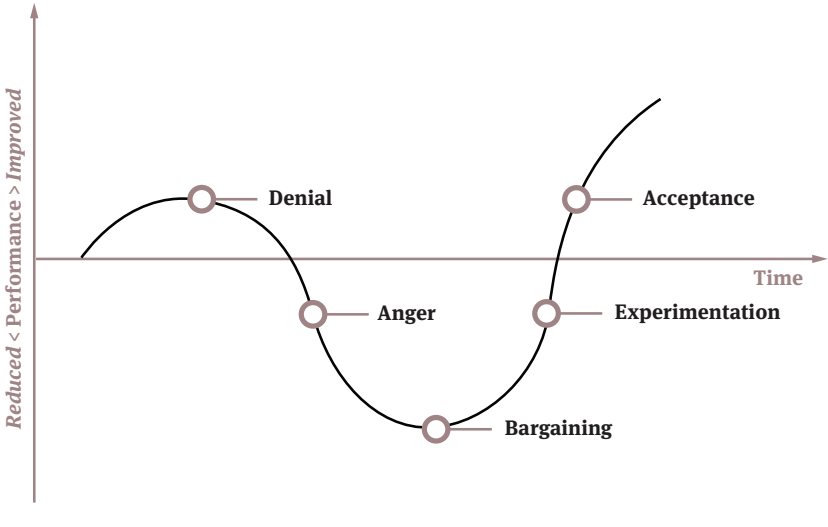
## Personal change – the emotional rollercoaster

As innovation and change accelerate, firms constantly have to adapt. But why is change such a fuss? Why, after so much experience, does it so often go wrong, or fall short of what is wanted? One reason may be that organisations initiating change often set up techniques to manage and control it. They might do better to help it rather than manage it.

Organisational inertia sets in when leaders fail to consider the needs, feelings and responses of the people they need to carry with them. It may pay to raise managers' awareness of how people may react, and why. They can then plan to handle this process positively.

Elizabeth Kübler-Ross has revealed key stages in grieving. And people do seem to associate change with loss. The less they are involved in the change, the more negatively employees see it, and the stronger and longer that emotion can be. So leaders of change should be prepared to involve the staff from the off, and to support their managers in helping employees through the process.

## How people can react to change imposed on them



The progression of emotions can be characterised as follows:

***Denial*** *–'I feel fine. This will not really happen, not to us.'*

Denial is usually the initial, temporary defence. It soon gives way to a heightened awareness of the reality of the situation. Paradoxically, resistance to change often shows in better performance – an attempt to prove that there is no reason to change.

***Anger*** *– 'Why me? It's not fair! How can this be happening? No, I can't accept this. Who is to blame? This is all because of the other department. They are the ones who should change!'*

Denial cannot continue, so it leads to frustration or anger, resentment, and animosity towards the people associated with the change.

***Bargaining*** *– 'Just let me continue as we are for six more months, then we'll change. I'll do anything for a few more years, just don't close the department. We can accept a 10% reduction in funding, but we'll need to reduce output.'*

The change is coming to seem inevitable, but the impulse is to delay or minimise it.

***Experimentation*** *– 'I miss the old way, but everyone else seems to be getting on with it. Perhaps not everything in the new way is bad. Let's try this element first to see how it goes.'*

As change becomes certain, cooperation may be grudgingly and selectively offered, as the shift from the old to the new dispensation is internalised.

***Acceptance*** *– 'You know what, it's going to be okay; some of the small things still are not so good, but overall I actually prefer it the new way.'*

The new environment is accepted. Morale and performance reach new heights.

Not everyone will go through every stage, but most will experience at least two, and many will repeat one or more. Others will get stuck. The bigger the change and the less people can control it, the more extreme their emotional response.

Getting stuck in denial is common in 'cool' cultures (Northern European countries such as Britain, Germany, Denmark, and Asian countries such as Japan and Taiwan) where expressing anger is less acceptable. Sympathy will not free the logjam. Only a respectful but candid statement that this is how it is going to be will suffice.

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> *"Faced with the choice between changing one's mind and proving that there is no need to do so, almost everyone gets busy on the proof."*
>
> **John Kenneth Galbraith**

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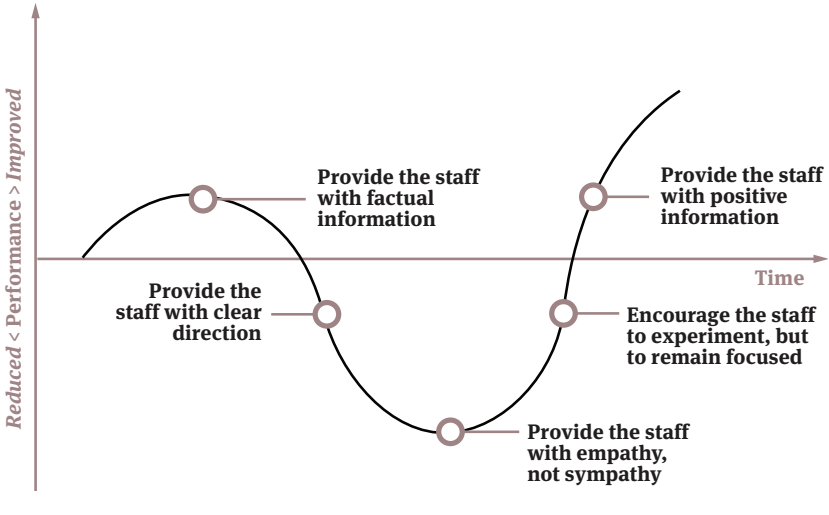
Another common response is anger. Let it run its course. As it ebbs, start to communicate, and to bargain. Bargaining introduces at least the possibility of a shift in attitude.

Yet another reaction is a hesitant interest, a willingness to experiment. Nurture it, value it, and make sure that tentative efforts are rewarded. Nothing succeeds like success.

Once a change takes root, it soon becomes the norm. But you may want to stop the new from becoming as rigid as the old – especially if yet more change is planned.

**How managers can help the staff with change**



Be aware the one time this approach does not work is in dire straits during corporate turn round. That's the one time you have to leave people's feelings until later – or else it will be too late.

### Social networks – the company behind the chart

It is not enough for leaders to have power. In order to seek support for their proposed changes, they need to know who else has power, and how much; how they are organised; and whom they influence.

But simply identifying the most powerful people may not give sufficient information to anticipate the overall dynamics of resistance and support for change. Power accrues not only to those who occupy powerful positions, but also to those who understand the structure of the organisation – 'who loses and who wins; who's in, who's out' (King Lear), where the coalitions are, and where these have weaknesses.

Social networks ease the flow of information, decisions, advice and friendship. They constitute the tacit knowledge of the organisation: how work gets done and exceptions are handled; who is seen as expert; who goes to whom for advice; and who can be counted on for trust, cooperation and defence.

Research has consistently shown the existence of 'tied dyads' (strong relationships between two people embedded in three-person cliques. For example, party A may have a relationship with C, but also may have an indirect relationship to C through B, who may then serve to alter the relationship between A and C). These function as efficient, effective, and trusted decision-making mechanisms. Organisational 'triads' resemble magnetic fields – 'personal forces' by which individuals and groups attract and repel each other. The structure of these networks is tacit in the workforce: there is no diagram for it.

Some social networks may be for advice, others for friendship. Those for advice are instrumental, because knowledge is vital to how work gets done, how routine exceptions are handled, and who the perceived experts are. Knowledge of who goes to whom for advice can be advantageous in short-circuiting long, indirect chains for gathering information in the firm. Knowledge about friendship, on the other hand, is useful in determining who can trust whom, who is more likely to cooperate with whom, and who is likely to go to whose defence in a political scrap.

Thus armed, leaders charged with running a programme of improvement can anticipate resistance, mobilise support for action or change, and exercise unofficial power.

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> *“If you want to make enemies,*
> *try to change something.”*
>
> **Woodrow Wilson**

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# 8. A Lean approach to measuring change

*Lean uses numerous techniques for measuring progress and assessing what more needs to be done. Knowing precisely where you started from is an obvious, but sometimes overlooked, advantage.*

# 8 A Lean approach to measuring change

## Evaluating progress

Benchmarking has become a popular method for managers who want to mimic the high performers in their field. But do remember that the best a copycat can do is a perfect imitation. And by the time you have mastered that, the model has moved on. Firms deciding to improve their productivity had far better gather evidence on their own organisation, understand their own 'status quo', and recognise the various forms of waste impairing performance and inhibiting improvement.

Managers do tough jobs. Demands for decisions are relentless. Information is incomplete. Even the best executives make mistakes and face constant criticism from people inside and outside their companies. Managers facing one decision after another can't possibly make the right choice every time. As Hippocrates recognised, 'Life is short, art long, opportunity fleeting, experiment treacherous and judgement difficult'.

So it is important to get enough evidence to inform decisions without being drowned in a sea of data. Measures affect behaviour. And traditional measures such as return on investment and earnings per share can discourage the continuous improvement and innovation that today's competitive environment demands.

When making change to improve performance, it is important to use a balanced set of the 'vital few' relevant measures that accurately reflect the overall intentions of the programme and provide enough evidence to allow the right decisions to be made. Organisations that have made successful and sustainable improvements in productivity tend to focus on four aspects of performance, using simple measures coupled with absolute targets that move the organisation forward each and every year.

- Employees' development and organisational learning – 100% of employees involved in improvement
- Quality – 100% yield
- Timeliness – 100% of flow time is working time
- Cost – 100% of working time is adding value.

Lean organisations fear that success can lead to arrogance, to complacency, and ultimately to corporate failure. A simple and balanced set of measures helps them to stay focused on the remaining gap between current and ultimate performance. They minimise the focus on 'how good we are' and the attendant complacency. To reflect this approach, measures of performance should always be negative. Do not measure quality, measure failure – then track down the reasons for it. If you want to check deliveries, you will learn more from those made early or late than from the ones sent on time.

---

> *"Evidence-based management is conducted best not by know-it-alls but by managers who profoundly appreciate how much they do not know."*
>
> **Jeffery Pfeffer**

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### Measuring improvements in processes and operations

In Chapter 6 we argued that an organisation cannot truly realise its full productive potential unless it improves its processes and operations, adopting and combining techniques in a specific sequence to curb waste and spur performance.

There are accompanying sets of measurements to monitor and support these improvements at each stage of deployment.

*Step 1 The awareness revolution – combining the 7 wastes and 5Ss*

When starting to transform the performance of an organisation, concentrate on measuring the 'human' aspects. Some organisations track 5S performance, but this tends to beautify the workplace rather than make it highly productive.

In transforming productivity, express all measures as percentages, and go at the right speed. Too fast, and 'initiative fatigue' may set in before any substantial improvement has been made. Too slowly, and the employees may lose interest and the programme stall.

Every firm is different and should set its own targets. The following guidelines are useful.

**Engagement** – aim to involve 35% of the staff in improvement each year. In three years, everyone will have chipped in his two penn'orth. If only 5 to 10% take part, it may take a decade to involve everyone!

$$\textbf{Engagement} = \frac{\textbf{Number of people who have participated in an improving activity}}{\textbf{Number of people in the area being improved}}$$

**Pace of improvement** – aim for 5% to 10%. If, say, four to twelve people take part in each improving activity, this will support their engagement. Treat improving events as 'inventory'. Do not have too many open at any one time. Launch them in 'single piece flow' and try to get each one done before launching the next. For example, if an area with a staff of 150 is being improved, a good pace of improvement might be 8% – one improving event fully completed each month.

$$\textbf{Pace of improvement} = \frac{\textbf{Number of improving events in the last 12 months}}{\textbf{Number of people in the area being improved}}$$

**Support for improvement** – aim to start a programme of improvement by placing 1% of the staff in the improvement team dedicated to the effort. As success builds and the organisation becomes more productive, strengthen the team. Of every 20 employees freed by the improved operations, add one to the team.

$$\textbf{Support for improvement} = \frac{\textbf{Number of people dedicated to the programme}}{\textbf{Number of people in the area being improved}}$$

*Step 2 Creating flow – combining multi-skilled flow cells and Kanban*

We have already stated that, when output is being raised, productivity should always correlate directly with customers' demand. Making more products or providing more services than are required is 'overproduction' of waste inventory. It follows that the operation's tempo or cadence (also known as takt time) should be set by customers' demand.

$$\textbf{Takt time} = \frac{\textbf{Available time}}{\textbf{Customers' demand}}$$

Once the takt time has been established, the minimum number of people required in that process can be determined by dividing the sum of manual cycle times by the takt time.

$$\textbf{Minimum staffing} = \frac{\textbf{Sum of manual cycle times}}{\textbf{Takt time}}$$

As the multi-skilled flow cells (or work stations) are being set up and linked through a series of Kanban, the efficiency of the operation and the effectiveness of the process need to be measured and managed.

Operational efficiency should be measured through 'line balance efficiency', and can be calculated to quantify how much of the capacity of the process is being used.

$$\textbf{Line balance efficiency} = \frac{\textbf{Sum of manual cycle times}}{\textbf{Takt time} \times \textbf{number of staffed work stations}}$$

Effectiveness should be measured through 'line balance ratio', and can be calculated to quantify how work is shared between work stations.

$$\textbf{Line balance ratio} = \frac{\textbf{Sum of manual cycle times}}{\textbf{Longest cycle time} \times \textbf{number of staffed work stations}}$$

*Step 3 Levelling organisational pace – combining reduction in change-over with quality assurance*

The efficiency of a changeover should be measured as a proportion of the cycle time. It is always difficult to set a target for this measure, but if mixed model processes and 'levelling' of schedules are to be achieved, the changeover time should be approximately one tenth of the standard cycle time to process an item.

$$\textbf{Changeover efficiency} = \frac{\textbf{Elapsed time between the processing of the last old item and of the first repeatable new item}}{\textbf{Cycle time to process one item}}$$

Too many firms measure quality at the end of their processes. The effectiveness of quality assurance should be measured by the 'rolling yield' through the complete process. This is calculated by multiplying the yield of each operation in the process. For example, if a process consisted of four operations, and if each operation had a yield (right first time) of 80%, the rolling yield effectiveness would be 41%.

$$\textbf{Rolling yield effectiveness} = \textbf{Operation 1 \% yield} \times \textbf{Operation 2 \% yield} \times \textbf{Operation 3 \% yield} \times \textbf{Operation 4 \% yield}$$

*Step 4 Standardising operations – combining Jidoka and maintenance*

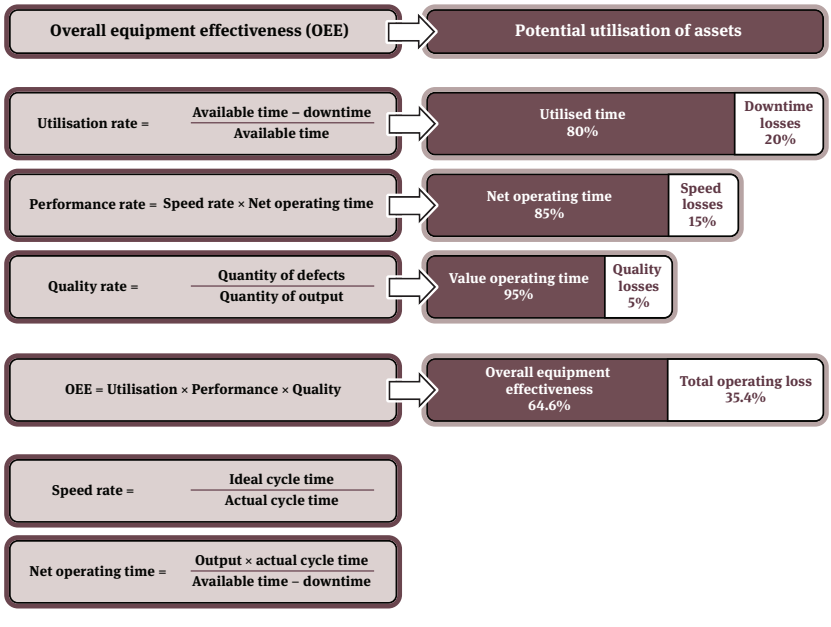
'Jidoka' aims to automate operations, using fewer people to process more items with increased consistency. The efficiency of automation should be measured as the proportion of human operation in the automated cycle. For example, if an operator oversaw one machine for a week, the operator might work 40 hours and the machine cycle might amount to 30 hours – an automation efficiency of 75%. If the operation were to be improved so that one operator could oversee two machines, the automation efficiency would increase to 150%.

$$\textbf{Automation efficiency} = \frac{\textbf{Sum of automated 'machine' cycle times}}{\textbf{Operator's time spent}}$$

## Overall equipment effectiveness

Automated productivity depends on equipment that never breaks down. Total productive maintenance aims not to repair broken equipment but to treat the causes of a breakdown before it occurs. The maintenance regime should be measured through 'overall equipment effectiveness'. This is calculated by multiplying the three performance elements – machine 'utilisation', 'performance', and 'quality' (similar to 'Effectiveness of People').

For example, a machine with a utilisation of 80%, performance of 85%, and quality rate of 95% would have an overall effectiveness of 64.6%.



## Measuring the continued rate of improvement

The maxim, 'What you can't measure you can't manage', remains as true of learning as of any other corporate objective. The costs of processing tend to fall as productivity rises.

But the focus on output ignores what organisations learn. As they improve their operations, processes and productivity, they get better at improving them.

The 'half-life' curve offers a way of comparing internal rates of improvement. It measures the time it takes to boost a specified performance by 50% (a nominal figure derived from studies of successful improvements in diverse companies and from the 'lean thinking' that offers to 'double the good and halve the bad'). Half-life curves work on any measure of output (not just on costs or prices), can easily be put into operation, provide a simple yardstick, and offer ready comparison between groups. So rather than believing the traditional 'law of diminishing returns', organisations should seek to accelerate their rate of improvement and actively monitor and manage their 'half-life' curves.

This is a pivotal phase in the transformation process. Too often firms start to disseminate incomplete methodologies to be applied by employees lacking sufficient skills or experience. Middle managers quickly rebel and the momentum for change is lost. Discipline and patience are required to avoid this common pitfall.

## A disciplined approach to managing improvement

### *Using an A3 paper template*

Toyota introduced a simple method for employees to think about the problems they encounter and to learn from solving them. The data, analysis, causes, actions and results are all shown on a single sheet of A3 paper. This is a powerful way of solving problems. It contrasts markedly with fruitless meetings in which the participants struggle to deal with a problem that has scarcely been defined.

The objective is to use sound data and/or direct observation to prompt a systematic analysis, focused discussion and rapid consensus on the best

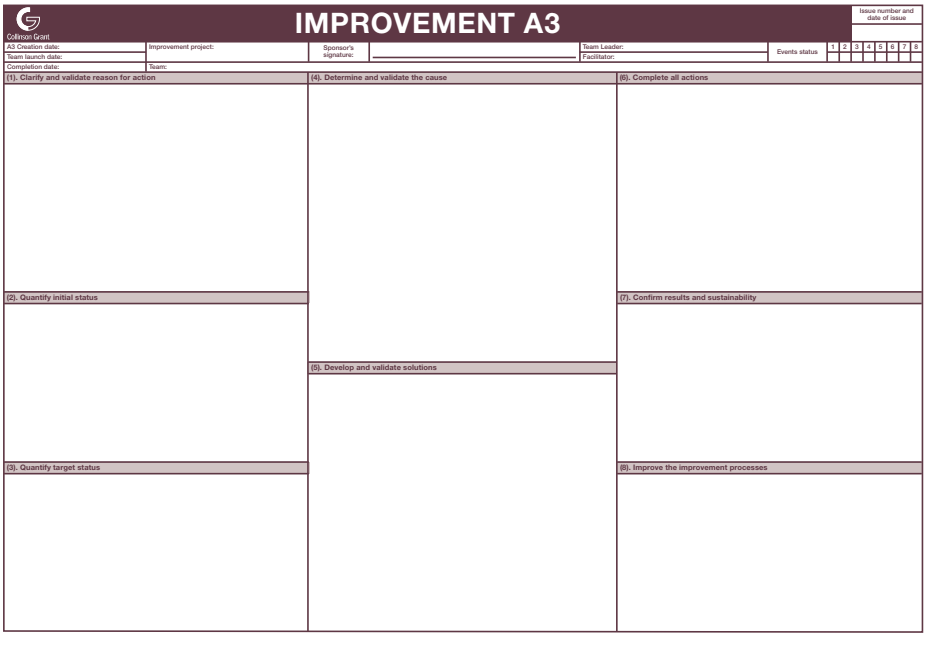
way forward. Properly applied, the methodology speeds up decision-making and boosts productivity.

The A3 template follows a logical and standardised structure – who, what, where, why, how, and when? It presents data simply, so that they can be quickly assimilated. And it promotes the sharing of information and provides a forum for learning about past failures and future opportunities.

A3 templates have been improved and refined many times over a number of decades, and there are now different designs for specific uses.

- Managing and reviewing programmes of improvement
- Developing strategy through value stream analysis
- Designing processes
- Running improvement exercises
- Managing complex and 'messy' problem-solving.

The Improvement A3 is the base document and should be used on most occasions. Other formats are slight variations that ask some other specific and relevant questions.



*Using the A3 template*

Each improving activity has a sponsor and leader. They define the problem, specify the starting point and set the target for improvement. Hence:

- Box 1 – a clear description of what needs to be improved, based on evidence validated with data and/or observation.
- Box 2 – the starting point. A yardstick against which future change can be measured, taking into account the multiple aspects of any situation, cost versus quality etc.
- Box 3 – the realistic goal for improvement, using the same measures as above.

Once this framework is established, the sponsor and leader approve the template and send it to the chosen team of employees to consider possible action. The separate members of the group spend up to two weeks considering the challenge that has been set before meeting to consider what might be done:

- Box 4 – the team's task is to understand and find what is causing the gap between the present and desired states. The conclusions are summarized, prioritized, and recorded.
- Box 5 – further work to draw up solutions and to assess costs, benefits and the impact on future performance is then recorded.

The sponsor and leader at this point confirm that proposed solutions match the causes; the causes correlate with the gap in performance; and the gap with the initial assessment in Box 2.

- Box 6 – All improvements are recorded and their status is updated regularly – commenced, in progress, completed etc.
- Box 7 – the resultant effects on performance are recorded and monitored. The A3 sheet remains 'live' until the targets set out in Box 3 have been achieved.
- Box 8 – provides the opportunity to review success / failure and learn from the exercise. Once completed, the A3 is then distributed throughout the company to transfer knowledge and experience.

Used effectively, the A3 process facilitates a shift from authority (who owns what) to responsibility (what is the right thing to do). People earn the right to

take an action by focusing the question on facts rather than on opinion. A3 management is neither 'top down' nor 'bottom up'. It clarifies responsibility by placing ownership squarely on the shoulders of the author-leader of the A3. Authority to make changes is pulled by the leader in a lean manner: on-demand, just-in-time, single solution flow.

**The seven ages of a highly productive organisation**

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*"All the world's a stage,*
*And all the men and women merely players;*
*They have their exits and their entrances;*
*And one man in his time plays many parts,*
*His acts being seven ages."*

**William Shakespeare**

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Some initiatives, be they to boost quality or culture, or even stave off disaster, generate only lukewarm results. Others may fail miserably.

Leaders should realise that change is not an event but a process. Progress is in phases that take time to work through and complete. But skipping stages creates only the illusion of speed, rarely a satisfying result. And if victory is declared too soon, momentum and hard-won gains can be lost and the desired change thwarted.

As Shakespeare's Jaques said of Man, leaders and employees pass through seven stages in an organisation's change into a highly productive entity. Understand these stages and you will you boost your chances of success.

*'Get ready' – Infancy*

Aware that performance is not sustainable, but as yet unable to change it, managers seek possible ways to improve and to give the employees at least an inkling that the status quo is not acceptable. If this is not done, the employees might well resist change.

*'Steady' – Childhood*

They start to analyse data to find the causes of its poor performance, to design a new model and decide how to create it, and to tell the employees what is going on. The leaders set a programme and a method of improvement and encourage employees to contribute to any analysis and to question and test the proposed solutions. Otherwise the improvements may not be focused on the right problems, and employees may deny responsibility.

*'Go' – Teenager*

Progress is in fits and starts as employees learn how best to do it. Emphasis is on raising the performance of one product or service rather than them all. Leaders, accepting that mistakes can be made, demand worthwhile results – 'half the bad, double the good' – and that benefits are reflected in the bottom line. Employees become fully involved and work to the new standards. This 'consolidation' reduces the risk that the programme might be seen as just another toothless initiative and the leaders as less than serious.

*'Go quicker' – Young adult*

After the first improvements, the same products or services are given a tougher challenge – to improve as much again, but faster. Only once the staff has become proficient and learned the lessons can it move on to other products or services.

*'Go broader' – Adulthood*

Now there is sufficient competence and confidence, it is time to spread new skills throughout the firm – to improve all products and services in all departments and functions. Leaders should clearly enunciate a new ETHOS: there is no going back! The 'company' should still try to learn from mistakes and make more refinements to working methodologies. Increased productivity and service are noticed by customers and can speed up growth.

As the organisation becomes aware of its new-found competence, arrogance easily sets in. If it is to continue to improve, managers need to remain humble and open to new ideas.

*'Go deeper' – Wisdom*

Production, service and support will have passed through four or five cycles of improvement. The demarcated roles and responsibilities of departments and their employees will start to blur. Leaders need to redefine the departments and jobs. As waste continues to be stripped away, each employee's responsibilities will grow in a loose structure of semi-autonomous teams. All employees should be focused on the 'three zeros' challenge; 'zero waiting, zero defects, and zero waste'.

As new skills are honed and experience in their application increases, employees' dependence on internal improvement teams should diminish. This is a telling moment; leaders should plan for this and consider the improvement managers for senior positions.

*'Go farther' – Altruism*

Organisations sometimes try to improve their suppliers when their own internal processes and performance are well below par. This should be attempted only during the later phases of a programme. The objective is to extend the approach beyond the business's boundaries; to improve the processes for upstream supply and downstream consumption. The work should be collaborative throughout the value chain. Leaders should stimulate innovation and welcome new ideas. They should also be willing to make more changes in the organisation to benefit suppliers and customers. Once organisations work together harmoniously, the end product, service, and value offered to the customer can be completely redefined.

The risk of not doing this is that the firm may be left behind as competitors improve, overtake, and compete for customers.

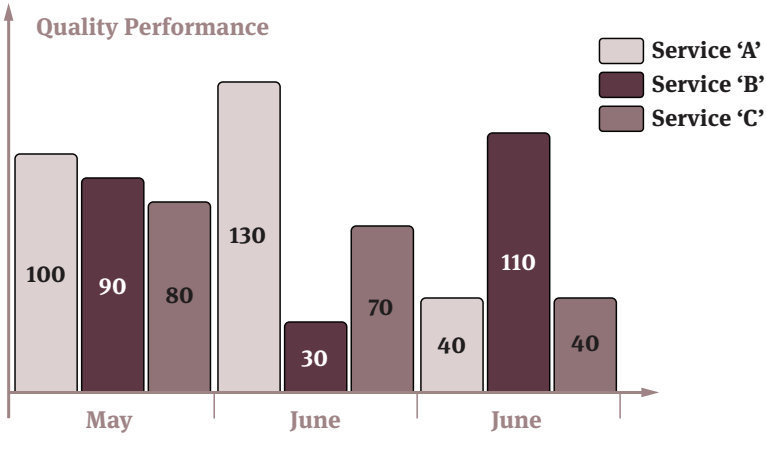
A programme to improve an organisation should demonstrate the effectiveness and efficiency it seeks to promote. The activities should flow without pause. If they fail to generate the expected benefits, stop them and resolve the problem. Ensure that each stage provides a solid enough foundation for the next.

*To reiterate: declaring victory too soon can lose momentum and hard-won gains and jeopardise the entire effort.*

> *"Singleness of purpose is one of the chief essentials for success in life, no matter what may be one's aim."*
>
> **John D Rockefeller, JR.**

To achieve the desired performance, an organisation needs first to work out what is causing the shortfall, and then how to get the most benefit from any effort to improve.

Computer-based spreadsheets can make data easy to analyse, although their automated graphing can, as below, be baffling.




What are the services? Are higher numbers better or worse? Are the figures percentages, complaints, minutes lost or what?

Often managers cannot see the information for the teeming data.

One effective way to recognise underperformance and its causes is to combine the 'Pareto principle' with 'plan-do-check-act' (PDCA).

*The Pareto principle*

In 1906, the Italian economist, Vilfredo Pareto, observed that 80% of the land in Italy was owned by 20% of the population. 20% of the pods in his

garden contained 80% of the peas! And so on. As a rule, 80% of the effects come from 20% of the causes.

This holds good in business. 80% of sales come from 20% of clients. 80% of value lies in 20% of stock. Fixing 20% of bugs in IT would eliminate 80% of crashes. 20% of patients use 80% of health care. 20% of criminals commit 80% of crimes. 20% of customers in financial services generate income: 80% cost money.

So, nurture the 20% of processes that add value and eliminate the 80% that add none.

*Plan-do-check-act*

'Plan-do-check-act' (PDCA) was made popular by Dr Edwards Deming, the father of modern quality control. The concept is based on the scientific method, a fundamental principle of which is iteration – once a hypothesis is confirmed (or contradicted), repeating the cycle will extend the knowledge, just as souls in Purgatory rise as they circle.

*Combining Pareto and PDCA*

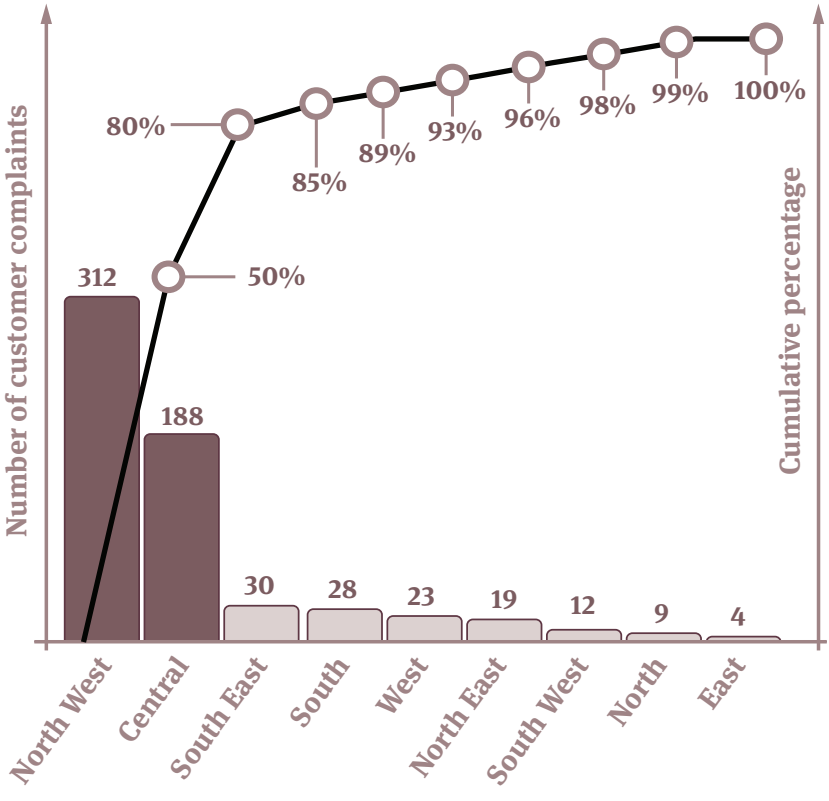
A graph sets out knowledge to be understood. This works best if it follows PDCA.

Here the heading is the **plan**, the main body **do**es the analysis, the conclusion **check**s the findings and the **act**ion box shows what will happen next. The graph is clear, meaningful, and easy to understand. But, well presented as it is, showing the largest and least causes of complaints, it may still not be all that useful.

The data should be reanalysed until the 80/20 distribution is found.

The graph below incorporates PDCA and Pareto.

**An investigation of customers' complaints in January**



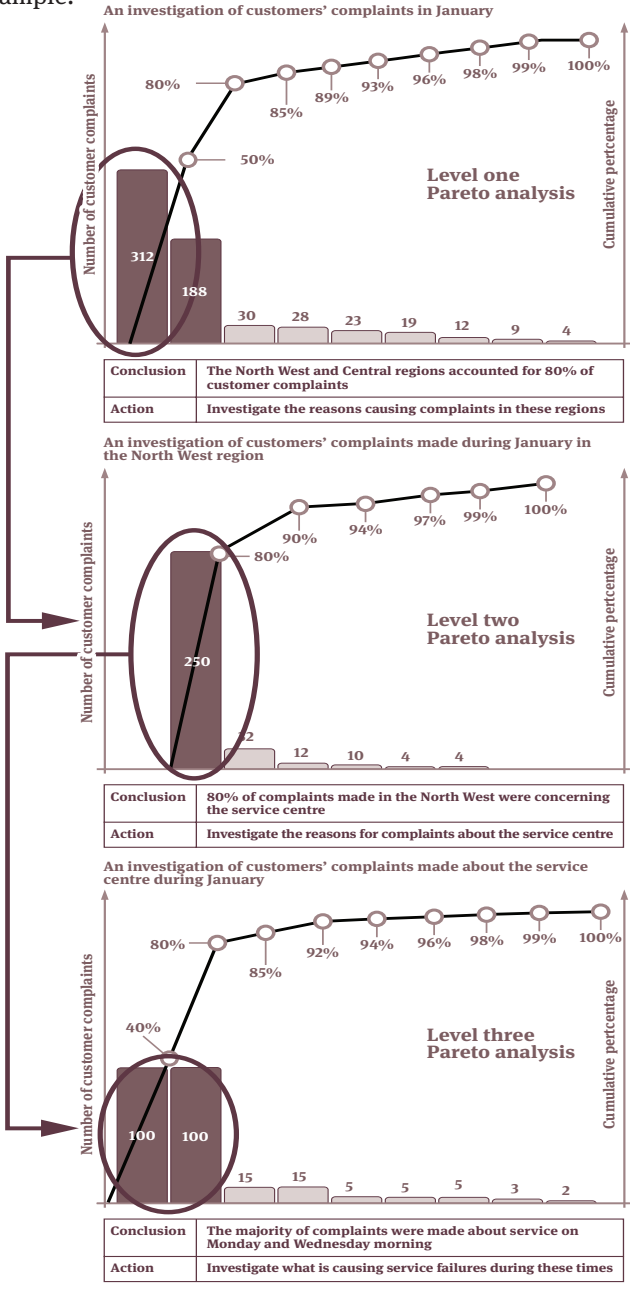

| | |
|---|---|
| Conclusion | The North West and Central regions accounted for 80% of customers' complaints |
| Action | Investigate the reasons for complaints in these regions |

Standardising the graphs used in the organisation teaches all employees how to read, understand, and present analytical work done by colleagues. So it may be worth setting some corporate standards. For example, all Pareto graphs should:

- strive to find the 80/20 relationship
- be structured in a PDCA format
- have no more than nine categories
- colour the 80% – the important bit – red
- match the left hand vertical axis to the size of the sample

Further iterations of analysis should seek the 80/20 distribution, and should be repeated until the causes are found and means of improvement specified.

For example:



There are many ways to analyse losses in performance: 'value stream mapping'; 'process activity analysis'; 'capacity analysis' et cetera. We reckon that the starting point should always be to create a 'data story' through multiple layers of Pareto analysis structured through PDCA. This will focus attention and suggest the most relevant tool or technique.

## Money, money, money

Good service, high standards and committed employees are all very well. But 'Money makes the world go around'. Change gets mandated only if it will produce a financial benefit. So it is important to show that it will.

The cost of purchases is a vital part of the profit and loss statement. But this is primarily determined by the price of commodities and by original equipment manufacturers (OEMs). There is not much scope for competitive advantage there.

The second, and usually the largest, internal cost is people: their salaries; and the facilities required. And that depends on their productivity. If that goes up, the size – and cost – of the staff should go down.

Next, sales and revenue can be boosted by improvements in quality and lead time. Reducing inventory is a start. But the real benefit comes from being a responsive supplier. Cutting lead times by 75% can double or even quadruple the rate of growth, say from 2% to 4% or even 8%.

Then there is quality. Few leaders recognise how closely quality and financial performance are linked. But they are. Firms perceived as excellent generate high returns on investment. But disappointed customers disappear, never to return. Worse still, they tell others. Remember, it is cheaper to retain a customer than to acquire one. To improve quality is one of the best – and cheapest – marketing efforts that a firm can make.

This prompts a virtuous cycle: processes speed up; productivity rises; stock is turned over more often; lead times shorten; customers pay faster; fixed and working capital are reduced and net margins increased; debt declines; and marketable assets rise in value.

# 9. Managing the cost of payroll

*People are difficult and expensive to manage. Nobody wants to do more for less. Governments don't seem to understand that excessive regulation increases costs and stymies innovation. It takes sustained effort to reduce complexity and get better value from the workforce.*

# 9 Managing the cost of payroll

## Classes of payroll

However lean processes might be, even today most depend on managers and their teams – on payroll.

Many operations, in manufacturing and administration, now carry a much diminished element of payroll: companies have relaxed formal controls over staffing and the cost of payroll in consequence. Nevertheless, the total cost of employment remains significant for most organisations. It is a visible hit on profit and loss, and there are many options available to cut it, probably more than for the cost of manufacturing materials.

Furthermore, employees still hold the key to the efficiency and effectiveness of many processes. It is the size of the staff and its rate of remuneration that have the highest propensity to increase if not given systematic attention.

Traditionally, costs, particularly payroll, have been classed as direct (varying with volume of output) and indirect (varying less than proportionately or not at all with output). The distinction between direct and indirect has usually been associated with the production payroll and the administrative payroll.

This particular classification is no longer worth using. The words continue to have meaning, but the old basis for the distinction does not. Nearly all payroll - whoever it pays and whichever the process at which they work – is a semi-variable cost. And when there is a change to a process, volume should increase or payroll cost should fall, or both.

## A strategy for controlling the costs of employment

As a matter of routine managers should:

- Reduce the staff or working time whenever volume goes down, but resist increasing both when volumes increase.
- Reduce the numbers of grades and the number at which decisions can be made.
- Have a good system for tracking the number and types of employees.
- Recover annual pay awards in increased productivity.
- Quantify outputs in units (even in administrative departments) and publish them.

- Use accurate measures for productivity, including unit cost.
- Create an atmosphere in which there is an expectation that productivity is a continuous, upward path and that improvement is natural, to be expected, and part of everyone's job.

*Productivity and jobs*

Research by the University of Cambridge's Institute for Manufacturing* has highlighted the dilemma that if small firms increase productivity, they shed jobs. In revealing that Gross Value Added per Employee is considerably higher in advanced manufacturing businesses, it celebrates the contribution of the UK's scientific and technology firms. And it notes that success in boosting productivity and applying Lean has sometimes ignored the potential for growth. Foreign direct investment has also promoted improvements throughout the supply chain. The researchers conclude that the emphasis on productivity alone is not enough. Smaller firms must have robust plans for growth as well.

** 'Stimulating Growth and Employment in the UK economy' – University of Cambridge – July 2010*

## Stop spending on more members of staff

Each employee represents a daily investment. The total annual cost of his or her job can be up to an additional 50% of salary once the time and total cost of an employer's obligations have been met.

The obvious costs of pension, national insurance and benefits may account for half of the addition, but space and furnishing (including car parking, recreation and refreshment areas) is substantial. Teams generate a need for team leaders. There is a cost to paying people, for the HR department and training, and so on. At least half of a company's total costs are to do with the size of the staff.

Techniques to boost productivity emphasise getting value by maximizing the outputs from people and processes. But the first step is economy – do we really need extra heads?

If a new job or task looms up, the last question is 'Should we recruit?' Ahead of that are ten other questions.

- Is the new job or task consistent with Lean in that it will add value to what the customer buys? Or if not, is its function essential to run the business?
- How did the need for the job or task arise? Investigate the who, where and why of the apparent need.
- Can we stop doing something we do now in order to take on the new job or task?
- Can we change or improve our process to avoid taking on an extra person?
- Can the job or task be done somewhere else in the company where there is some slack?
- Could we make an internal transfer, so avoiding an increase in the total staff of the company?
- Can the task be added to someone's current job? Why not try it and see?
- Is a bit of overtime the solution?
- Instead of recruiting a new whole person, would a temporary, contract or part-time job be a solution?
- If you are the manager – how is your work load?

A bit of simple formality – a tick list of the alternatives submitted in support of an application to recruit – might slow the rise of the payroll. Most companies in distress (or administration) have formal procedures for authorising recruitment. So why not use them all the time? And the cost of recruitment itself is highly variable. An audit of many large companies reveals myriad and conflicting mechanisms for finding new members of staff, often highly inefficient.

*Real and imaginary jobs (Conker health and safety manager)*

The public sector, particularly local government, has come in for a lot of criticism about the creation of new jobs – not without some justification. Bureaucrats are given ever-increasing responsibilities to provide new services. But there is rarely a critical review of how the duty should be executed and whether a current employee could take it on. The gut reaction is to create a new post – before considering the cost. And the government's attempts to reduce red tape rarely seem to succeed!

### Grade structure

Unit costs are controlled by paying the right rate for the job, and no more. There can be two potential problems.

The first is whether, because of change in technology or for other reasons, employees have become overpaid for what they do. The solution to this may not be available at a stroke, but a solution, long-term if necessary, should be sought. It is difficult to reduce unit costs in such an exercise, but at least it should be possible to arrest further decline.

The second is whether the jobs can be de-skilled further in order to drive down cost by designing them for members of staff who can be paid at lower rates for less demanding work.

Of course some jobs demand skills that legitimately increase. In that case the return can be sought by making the processes more efficient and effective and so reducing the staff or increasing the output.

### Structure and composition of teams

How teams are put together and managed affects the numbers employed and the cost of the process or processes on which they are engaged.

Any organisation, department or unit can optimize its cost by paying attention to the design of its structure. The technique involves analysis of the layers in the hierarchy and the spans of control under managers. It is often the case that managers do not 'manage' and excessive supervision creates lethargy and delays decision-making. 'Team building' is often given considerable attention. But getting the structure right in the first place is usually the best starting point.

This subject has been dealt with more thoroughly in Collinson Grant's book, 'Managing indirect costs'.

> *“The best executive is the one who has sense enough to pick good men to do what he wants done, and self-restraint enough to keep from meddling with them while they do it.”*
>
> **Theodore Roosevelt**

*Productivity in complex manufacturing*

Sophisticated teamwork is necessary to boost performance in manufacturing, according to research by Stanford Graduate School of Business and others.* A study of steel mills in the United States producing high-quality products found that problem-solving teams with various skills could boost output considerably, particularly used on really knotty problems. Team working seemed to stimulate workers who otherwise might not have contributed. The researchers commented that investment in this type of ‘HR’ initiative should go hand-in-hand with major capital investments.

*Stanford Graduate School of Business – Research papers – Journal of Labor Economics 25, 4 (October 2007):

## Measuring time

Traditional manufacturing plants, and some offices, have always used measures of standard cost to assess productivity. These methods can be accurate and have stood the test of time. But it is important to be clear just what is being measured *and* how the exercise might yield improvements. For, while it is possible to exercise control through time standards, it does not in itself do much to lever up productivity.

The basic methodology is straightforward. A ‘standard’ task is assessed for its work content and rated according to how much time an average worker should take to complete it. The cost per hour or minute can be calculated for each unit of labour.

‘Normal’ activity can then be observed and the outputs measured against units of input. This gives a measure of labour efficiency. Productivity and

cost variances can also be calculated as an aid to product costing but also to control labour costs. Variances arise as a result of inconsistency in rates of output, mix of employee grades used, unbudgeted overtime or uncontrolled incentive payments, and other unexpected events.

One reason for variances may be that the standard method has not been used. But sometimes the operator, far from reducing productivity by failing to follow the standard method, employs a method that improves it. While good in itself, this can have the effect of paying higher incentive bonuses in which the savings from lower unit cost all go to the employee, leading to disparity in how bonuses are calculated and stirring up problems in employee relations.

Traditional methods and measurement techniques have lost favour as technology has changed methods more and more often. Effort put into measurement in earlier times is now put into design and Lean projects.

## Terms and conditions for working

### *Annualised hours*

In many sectors, demand varies with the seasons or other factors. Earlier responses might have been to build up stock in quiet periods ready for busier times. But lean thinking demonstrates just how wasteful this is. A fixed labour force means fixed costs and lower margins when times are slack. When there is a sudden upturn in orders, it may be necessary to use overtime or additional temporary members of staff to meet the demand. This has a number of disadvantages:

- overtime is rarely stable or predictable, so managers have to rely on the goodwill of the workforce and the incentive offered by the premium rates to provide the required labour. This raises costs
- temporary labour can be expensive to recruit, to manage, to supervise and to train.

When there is a downturn, the options are equally messy. Redundancy is costly and cumbersome. Natural wastage often means that the better qualified and more productive workers leave. Temporary lay-offs damage morale and take time to administer.

So employers in this situation have negotiated annualised hours contracts to contain costs and increase flexibility. Often this is in a unionised environment, but that does not mean that officials will necessarily be obstructive. On the contrary, they may view the arrangement as a means of stabilising annual pay in industries prone to seasonal fluctuations. More entrenched resistance might come from those workers used to getting frequent and well paid overtime.

Well planned annualised hours strike a balance between economy, efficiency and a reasonable life-work balance for employees. The savings for the business are shown in reduced manpower, less overtime and better utilisation of people.

*Shift working*

Shift working is always difficult to plan. There are elaborate templates to fit every possibility. Workloads vary, skills change and before long inputs and outputs are out of kilter. If attractive shift premiums have been offered, workers will naturally resist change. But they and their representatives must be made to realise that working patterns are not set in stone and must be open to negotiation. Some of the methods of payment include:

- flat-rate allowances per hour, shift or week, in addition to basic day rates
- fixed percentage additions to the day-work rates
- basic rates of wages with shiftworkers getting a higher rate than day workers
- paying a standard annual amount to all employees working that particular shift
- extra allowances for hours worked outside the normal daily hours.

It may be important to recognise that in some circumstances prolonged shift working may affect employees' health. An employer should take note of these concerns in planning new arrangements.

*Containing costs*

Other 'add-ons' can also get out of hand. Premium rates for weekend and bank holiday working should all be subject to review. A standard working week is no longer a universal concept. Similarly, extra payments for call outs or standby can be particularly costly.

Careful analysis of processes and tasks is needed to establish accurate manning. Fundamental management science suggests that efficiency (productivity) comes from breaking tasks down and 'sub-dividing' labour. But some processes are far more complex than they used to be and need to combine workers with very different skills into an effective team. Indeed, research shows how teamwork aids productivity in complex processes. Services are also provided in many different ways – demanding flexibility and resourcefulness from employees. Clearly, optimum results are achieved when the right skills are available to resolve problems and reduce errors.

*Managing absenteeism*

Good managerial disciplines and consistent behaviour yield results. Absenteeism can be managed effectively, given the right commitment and tools. Managers in the public and private sectors often use 'The Bradford Factor'. It measures the frequency and duration of absences, providing managers with objective evidence to challenge persistent offenders. An analysis will reveal when people are away and the nature of their illness. This gives a clue as to how sickness absence can be managed and what support employees might need.

*Paying for results*

Having the people with the right skills to do the job is vital. Effective recruitment is always expensive, but is always worth the effort. But there is no point in paying more than is necessary to 'recruit, reward and retain'. Many reward structures get out of control because they are too complex. Others just need fine tuning to the changing conditions in the labour market. Many firms come a cropper when devising bonus or incentive payments. These must be linked to measurable indicators of performance, be time bound, not contractual and include caps on maximum payouts. When times are hard, increases in basic pay should be self-funding and ultimately linked to what the enterprise can afford.

## Employee relations

Good employee relations can easily be upset when new working practices are introduced. And fully integrated supply chains can dramatically increase the disruptive power of just a few workers. In the United States a strike at two of General Motors' suppliers forced the virtual shutdown of all GM's North

America operations and one of the longest ever stoppages in the auto industry. The dispute at United Parcel Services over a new collective agreement in the 1990s highlighted the latent power of the unions and the employer's apparent unawareness of its vulnerability. British Airways' problems are a manifestation of a dissatisfied (but relatively well paid) workforce. It all demonstrates the immeasurable value of keeping the workforce onside – and investing sensibly in maintaining good communications.

There are good examples also of unions embracing lean ideas and the job enrichment that they should bring. Good negotiators will obviously use enhanced co-operation as a lever to secure better terms. This is perfectly reasonable and part of the 'quid pro quo'.

# 10. Productivity of assets

*It should be possible to measure the performance of every asset on the balance sheet – otherwise what's it doing there? A wide view of productivity helps managers to focus efforts on the areas of best return.*

# 10 Productivity of assets

Most companies initiate action to improve the productivity of their assets. They create just-in-time inventory systems, improve the turnover of working capital, contract out non-strategic activities to more efficient suppliers, and, in some cases, take the first steps toward reconfiguring their entire supply chain.

These steps are necessary and important, but often do not go far enough. Confronted with increasing pressure from investors to improve value for shareholders, managers need to think of more radical improvements.

Maximising the productivity of assets is a primary contributor to value for shareholders. So increasing their efficiency is more than just another programme for operational improvement. It is a fundamental part of value management (and staying in business). When executives' compensation is linked to movements in the share price, estimating the impact of operational improvements on the creation of value helps build strong internal support for initiatives.

Many companies still approach this task in a piecemeal fashion. Either they focus on a single asset in isolation or they multiply internal projects for improvement without paying attention to the dynamic interactions between them. Managers should understand how improvements in one class will affect performance in others. And they need to do so not only inside the business but also along the entire value chain. By recognising those interactions and acting on the total system, companies can manage trade-offs and focus their efforts on the improvements that yield the biggest strategic benefit.

Too many initiatives are well-meaning efforts led by corporate members of staff, with insufficient ownership by the line managers who are really running the business. Unless local managers drive improvements, even the most elaborate programme is likely to be ineffective. Decisions on investment (or divestment) in new assets and productivity improvements need to be based on rigorous business cases – particularly when the timescale to achieve predicted benefits is long.

Nevertheless, the corporate centre still has an important role to play. Sometimes the greatest impact on the productivity of a company's assets comes not from improving the efficiency of existing assets but from making smart choices about opportunities for investment.

As competitive forces put a premium on the efficiency of assets, companies that pursue this stratagem aggressively are finding it a powerful mechanism for creating new ways to compete. The payoff is not only enhanced use of assets and substantial improvements in value for shareholders but also more competitive strategies and, in some instances, a radical restructuring of the business.

*Sustaining success*

Some businesses acquire monolithic structures without realising it, but then suffer as falling demand places pressure on previously satisfactory margins. We have worked with leading companies whose cost bases – planned when markets behaved very differently – were beginning to get out of control. Measuring the contribution of assets and assessing how they add value is the starting point. Establishing new managerial accountabilities that are linked to productivity creates a fulcrum to turn round a weakening financial position.

# 11. The need for continuous improvement

*It is not uncommon for apparently unknown companies to come from nowhere and overtake established market leaders without appearing to break sweat. Peter Drucker, in a celebrated article in Harvard Business Review, pointed out that the newcomer invariably enjoys a tremendous cost advantage, often in the region of 30 per cent. Companies that fail to change invariably fail.*

# 11 The need for continuous improvement

## A flexible and focused organisation

Highly productive companies use multifunctional teams, often organized around a specific product or service. The team then adopts responsibility for traditional managerial and supervisory tasks, sometimes with a rotating team leadership. Activities previously performed by indirect functions, such as procurement, materials handling, planning and control, maintenance, and quality control are integrated into the team's tasks. This can herald resistance by the administrative function, causing it to feel that 'we are losing control over what is happening in the organisation'.

Conventional management accounting systems were designed for environments dissimilar to those which face companies adopting lean concepts. The underlying assumption is that production exists in a stable environment. In contrast, improving productivity changes the operating conditions of the system, thus requiring frequent changes in the accounting system. As cycle times are radically reduced, it becomes less important to keep track of each separate step in a process. Management accounts should retain their important controlling function but not adhere too rigidly to pre-conceived concepts of manufacturing, supply chains and the demarcation of labour.

Individual reward systems related to volume produced are far less common now, having often been replaced by collective rewards. Total payroll is often a lot more than the result of time worked at a negotiated hourly rate.

All managers have to overcome inertia when making change. Most organisations are populated with sensible people and usually led by smart managers. Why is anything but incremental change so difficult, even for well-run companies? To remain successful over long periods, managers and organisations must become ambidextrous – able to make incremental and revolutionary improvements in productivity.

Almost all successful organisations evolve through relatively long periods of stable growth punctuated by radical step changes. To succeed in the long term, firms have to reorient themselves by adopting new strategies and structures that are necessary to accommodate a double-digit increase in efficiency.

*Change, complexity and inertia*

Managers are responsible for designing their businesses in ways that add value and meet customers' needs. There should be a coherence between strategy, structure, cultures and people to drive short-term performance. When done effectively, evolutionary continuous improvement is a crucial component of success. But as a company matures its structures and systems become overly complex. A structural inertia sets in – resistance to change is rooted in the size, complexity, and interdependence of structures, systems, procedures and processes.

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> *"With every act of creation, first comes the act of destruction."*
>
> **Pablo Picasso**

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The dilemma confronting managers is clear. Day-to-day they must drive forward many small, continuous improvements to reduce costs and increase efficiency. In the longer perspective, they may be required to destroy the very improvements and standardisation that made the organisation successful. This means operating in a world characterised by periods of relative stability and incremental change, and other times of rapid revolutionary change.

While respecting the past, managers should be willing to change to meet the future. Ambidextrous organisations learn by the same mechanism that sometimes kills successful firms: variation, selection, and retention. They promote variation through strong efforts to decentralise, to eliminate bureaucracy, to encourage individual autonomy and accountability, and to experiment and take risks. The corporate vision provides the compass by which senior managers can make their decisions about which of the many alternative opportunities for improvement to invest in. Just as success or failure in the market place is Darwinian, so too is the method by which ambidextrous organisations learn.

Managers must be willing to cannibalise their own business at times of transition. While this is easy in concept, these organisational transitions are difficult in practice. Links between strategy, structure and people make early efforts cohere. But as firms grow in size and complexity, those links become rigidities. So change becomes more difficult. That is when revolution is required.

But which parts of the old régime to keep, and which to ditch? That is the question. For, as Machiavelli pointed out, the would-be innovator gets more opposition from certain losers than support from possible winners. That is why only the most farsighted firms make truly radical change before it is forced on them. Great managers are the ones willing to take this step. W H Auden wrote:

> 'The sense of danger must not disappear:
> The way is certainly both short and steep,
> However gradual it looks from here;
> Look if you like, but you will have to leap'.

*'Sectoral' initiatives*

Many industrial and service sectors have embraced 'Lean' and have enthusiastic devotees who trumpet their success in a particular industry. As usual, the proof of the pudding... Sustained results follow from good application, commitment from senior managers and sufficient investment upfront to ensure that everybody is properly educated in the principles of continuous improvement. For example:

- the 'Construction Lean Improvement Programme' created in the UK triggered a wave of interest in this non-manufacturing sector. However, the value chain in construction can be particularly tortuous and wasteful. It creates good opportunities for understanding customers better and improving the efficiency of operations
- financial services throughout the world have made good use of Lean and Six Sigma. Banks and insurance companies with high volumes of transactions and large numbers of employees have used these techniques to secure significant gains in productivity in their highly competitive markets
- retailing and wholesaling – any business that is tempted to hold large inventories and where customers' demands can change quickly can clearly benefit from Lean thinking. Wal-Mart, first in the United States and then later when it acquired ASDA, was one of the first to use this approach. But it faced massive competition from Tesco, which has developed a comprehensive lean business model. The successful British retailer has grown dramatically by getting its customers exactly what they want, where and when they want it, and at lower costs

- the 'IT' industry has also invested in lean methodologies, its most celebrated example being Dell Computers, which rose rapidly to become the largest supplier of PCs in the world and reined in costs and improved service. Dell turned the manufacturing process on its head by deciding not to build any computer until it had received a firm order. More recently the company has taken some knocks for the quality of its customer service – proving that it's all too easy to take your eye off the ball even in a very successful enterprise.

## Festering and fostering

> *"To talk is our chief business in this world. It costs nothing in money; it is all profit."*
>
> **Robert Louis Stevenson**

Improvements in productivity can be fostered by encouraging employees to 'speak with data'. Discussions peppered with comments such as 'I think output has increased', or 'we feel that the best option is...' are too vague, slow decision-making, allow new ideas to fester and lose momentum. A good way to nurture a disciplined and professional approach to improving productivity is to insist on argument based on reliable evidence.

If robust data are requested every time a change is proposed, people sit up and take notice. Examine the logic behind that evidence and people will become more disciplined in their own thinking. Treat the organisation like an unfinished prototype, encourage experimentation and capture learning from these activities, even when something new fails. Decisions based on firm facts allow the organisation to benefit from 'enlightened trial and error' and the learning that occurs as a consequence.

Six standards boost productivity:

Stop treating old ideas as if they were new.
- Acknowledge and build on what came before. That leads to better ideas.

Be suspicious of 'breakthrough' ideas and studies.
- Most scientific progress accrues by inches. There is no magic wand.

Celebrate and develop collective brilliance.
- Effective change requires coordinated action by people who feel they own it.

Emphasise drawbacks as well as virtues.
- Recognise the risks. That way, managers won't balk at the first hiccup.

Use stories to embody sound practices, but back them up with data
- Don't spoil a good tale for the sake of the facts – or vice-versa.

Adopt a neutral stance toward ideologies and theories.
- Don't have a plank in your eye. What needs doing? What constitutes evidence?

## Liberation – the emperor's new clothes?

Change often inspires precisely the behaviour it was meant to alter.

The western approach to change usually proceeds from vision to strategy. It is logical. But it is not compelling. Imposed change is not liberating.

Change programmes can begin with great enthusiasm but end up in deep trouble. After the initial excitement, reality inevitably sets in. The CEO is tempted to anoint a new change champion, who will pursue the objectives with tenacity. The single voice of a fervent champion can lead employees to feel that managers are in control, driving out any sense of personal responsibility or freedom to act.

The rhetoric of emancipation notwithstanding, employees will have problems. They will ask their managers for help, and their managers will tell them what to do. That is how most work gets done and how organisations meet their numbers. And in many cases there is nothing wrong with this - except that it encourages dependence and reduces initiative.

Real responsibility should make it easier for complex tasks to be achieved. But when programmes of change are imposed on managers and employees who are expected to deal effectively and openly with them but not given the means, the organisation can end up worse off than it was to begin with.

*So how do firms in the East generate commitment? – Some more thoughts on lean*

Toyota modelled its seven tools of quality control on the seven weapons described in a seventeenth-century guide for Benkei samurai warriors called 'A Book of Five Rings'. One approach born from the same book that goes way beyond the western ordering is 'hoshin kanri'. 'Ho' means method or form. 'Shin' means shiny needle or compass, direction. 'Kanri' means movement or action. The phrase aims to integrate daily actions with long-term goals.

With hoshin kanri, insight and vision are not lost. Policies generated at planning meetings are not forgotten until next year, but are used to inform daily activities. The people who plan the work go on to work the plan, discussing it as they do. This is based on the concept that any plan will become stronger that incorporates group dialogue. The Japanese describe this approach as 'catchball'. People in a conversation 'toss an idea around' until consensus is achieved. People usually want to do what they believe is right. The objective is to get all the participating factions committed to the main aims of the business. It is a managerial system in which all employees participate, from the top down and from the bottom up, and people are fully respected.

**Whoops! – the failure-tolerant leader**

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> *"If at first you don't succeed, try, try, try again. Then quit. No use being a damn fool about it."*
>
> **W.C. Fields**

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'The fastest way to succeed', IBM's Thomas Watson Sr. once said, 'is double your failure rate'. This view is becoming more widely accepted. Experienced managers have recognised that failure is a prerequisite to discovery. It is difficult for a business to develop a breakthrough in productivity if it's not willing to encourage risk-taking and learn from subsequent mistakes. This is shaping the way that companies plan new improvements.

Indeed, some senior executives don't just accept failure: they encourage it. The objective is to banish the destructive competiveness that bedevils many organisations and to change the culture of blame; to see beyond the simplistic definition of failure as the opposite of success. Managers seek to engage more closely with the employees they lead – avoiding either praise or criticism, preferring to take a non-judgmental, analytical approach as they interact with the staff. They openly admit their own mistakes rather than cover them up or shift the blame. They recognise the need to take risks. As long as someone views failure as the opposite of success rather than its complement, that person will never be able to take the risks necessary to achieve new rates of productivity.

Although this approach accepts risk, that does not mean throwing caution to the wind or abandoning supervision, quality control, or good practice. Skilled managers can tell a failure caused by sloppiness from a setback in an exploratory initiative from which lessons can be learnt. And they do not rush to praise or blame. They analyse. When a manager takes a genuine interest in an employee's work, the need for compliments declines: employees prefer a disinterested pursuit of improvement to a facile accolade or criticism.

*Do as I say, not as I do...*

While companies are beginning to accept the value of failure in the abstract, it is an entirely different matter at the personal level. Everyone hates to fail. We assume, rationally or not, that we'll suffer embarrassment and loss of esteem and stature. And nowhere is the fear of failure more intense and debilitating than in the competitive world of business, where mistakes can mean losing a bonus, a promotion, or even a job. Some companies thrive on an ultra-competitive ethos – but at what cost?

While the notion of encouraging mistakes may seem counter-intuitive, it has some celebrated champions. When Jack Welsh was head of GE, he said 'We reward failure', explaining that to do otherwise would only quash daring.

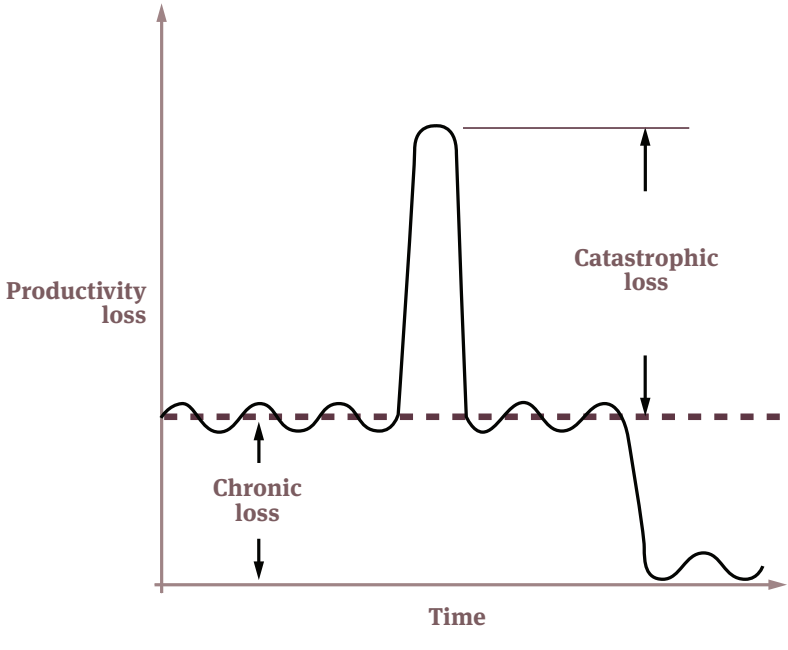
Creating a culture in which people feel comfortable with failure also requires abandoning traditional ideas about personal rivalries. The idea that achievement is maximised when we go at one another tooth and nail is embedded in the western psyche – and difficult to dislodge. Competition

infects co-workers with a desire to win rather than solve problems and move a project forward. So all that one-upmanship has to go. The aim should be to solve the collective problem, not to be costive with information and to vie for personal credit.

### Why has improvement slowed down?

The productivity of firms and countries may still be rising, but more slowly. Why is this?

*Plotting causes of lost productivity*

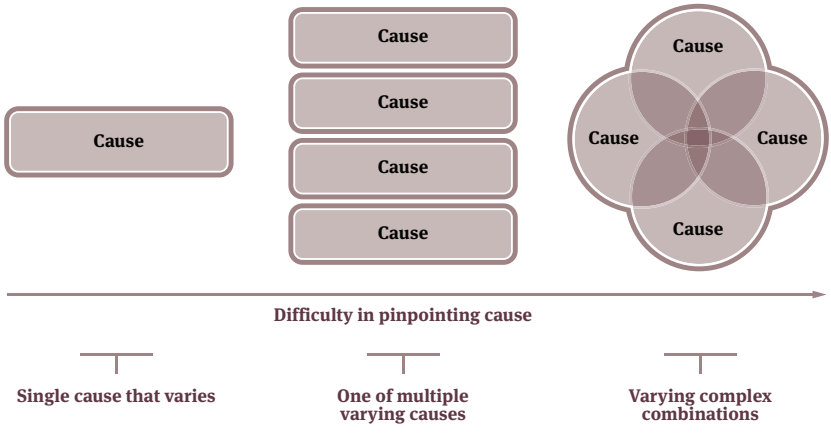



If firms are to continue achieving higher rates of productivity, they need to consider how productivity may be lost:

- **Catastrophic losses** in productivity, as the name implies, are sudden and rare, and have one clear cause that is quite easy to put right, often by simple techniques such as 'brainstorming,' 'process mapping' and 'factor analysis'.
- **Chronic losses** in productivity, unfortunately, resist correction. And, over a period of time, organisations become 'blind' to them, even building them into their plans.

It is the latter that need innovative solutions. Unlike catastrophic losses, chronic losses have labyrinthine causes. These are difficult to penetrate. What seemed like a way out hits a wall. And there may be one cause or many.

*Understanding causal factors*




'Phenomenon mechanism' (PM) analysis was developed to overcome the weaknesses of conventional methods that can sometimes fail to tackle chronic problems. The term 'phenomenon' refers to the event that needs to be controlled and improved and 'mechanism' refers to its inputs (people, equipment, materials, processing methodology) or any combination of inputs. PM analysis considers all causal factors instead of trying to decide which are most influential.

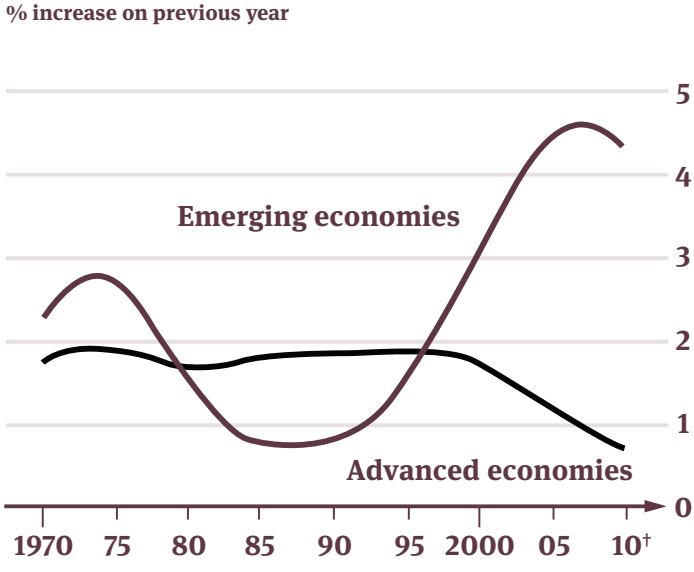
| Step | Conventional approach to improvement | Phenomenom mechanism |
|---|---|---|
| 1 | Evaluate current loss of productivity and select theme for improvement | Clarify the phenomenon by carefully defining and categorising abnormal conditions |
| 2 | Understand current condition | Describe the phenomenon in physical terms |
| 3 | Set targets for improvement | Define all conditions that will produce the phenomenon |
| 4 | Reform (cause and effect analysis) | Study inputs for casual factors |
| 5 | Define and implement counter-measures | Define the optimal conditions and standards |
| 6 | Evaluate the results and make any necessary adjustments | Plan and conduct the survey – confirm actual constituent conditions |
| 7 | Implement new standards and procedures to prevent recurrence | Recognise the abormalities to be tackled |
| 8 | Re-evaluate loss of productivity for next projects(s) | Implement correct measures or improvements for each abnormality |

PM analyses all possible causes, regardless of their suspected contribution to the loss. Every factor exhibiting abnormal conditions is investigated and corrected.

*How productivity is changing*

The emerging economies now command over 50% of international production and productivity is increasing faster there than in the developed world.

**All right for some**
*GDP per person employed (structural trend)*




Source: The Conference Board †Forecast

European CEOs have been accused of thinking that the way to high productivity is via investment in new technology. It is not the only answer. Higher performance can be achieved via better business processes and smarter management. In the past 15 years, America's productivity has outstripped Europe's. There has been and continues to be a disparity in productivity between Europe and the United States.

Companies often ask such questions such as:

- 'An internal assessment shows that 90% of our employees have taken part in an improving event. Does that mean that we are lean?'
- 'Benchmarking against local companies in our sector finds that we are the cheapest. So why should we need to improve further?'
- 'Improving productivity by 20% has cut costs by 15%. Will attempts to improve productivity again encounter the 'law of diminishing returns?' Is it worth trying to improve the same process many times?'

In essence, they are all asking: 'We have worked hard to improve productivity. Are we there yet? Can we stop now?'

No, you haven't. A growing number of managers are looking to the Buddhist philosophy of 'wabi sabi' that acknowledges that nothing lasts, nothing is finished, and nothing is perfect. *Quality, reliability, and productivity* can always be improved.

Wikipedia was developed on that principle. Other firms will follow.

Remember, Germany and France are more productive than Britain; the United States is more productive than Europe; and productivity in the emerging economies is rocketing. 'Are we there yet?' No. Nor likely to be, unless there is a constant focus on raising productivity, today and tomorrow.

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> *"You may never know what results come of your action, but if you do nothing there will be no result."*
>
> **Mahatma Gandhi**

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# 12. Summary – ‘Why not?’

# 12 Summary – 'Why not?'

Nobody can accurately predict the future, and too much thinking prevents action. Instead, there is a tendency to look back and cling to old processes that are embedded in the organisation's 'tradition'. The only tradition we should bother about in the workplace is the one of valuable productive work.

That is why some successful organisations deliberately employ a leader who has had no previous knowledge of the firm's sector, and hasn't become indoctrinated with all the reasons why something cannot be done. In scrapping old ideas, one of the first that needs to go is the attitude of excess - of holding on to or producing more than is required 'just in case.' A business ought not to drift; it ought continuously to search for new, innovative ways to raise productivity.

So, set out to discover the best way of doing everything, and regard every operation and process as purely experimental. If productivity rates beat all previous expectations, then consider this as just a stage in continuous improvement and nothing more. Greater changes are to come.

Change should not be made for its own sake. But it should be embraced if the new way is better than the old. All leaders should hold it as their duty to permit nothing to stand in the way of progress – in the objectives of increasing productivity and giving a better service. No firm is ever performing as well as it could be. Unlock the full potential of people (and plant) and be amazed at what can be achieved.

Our invariable reply to 'It can't be done' is 'Why not? Let's do it'.

# Some supplementary notes

# Productivity in the UK now

Our national productivity matters – every commentator says so. So how well are we doing? International comparisons abound, sometimes challenging the perceived orthodoxy. So:

*...at the time of printing, Japan is currently lagging behind the United Kingdom in both the standard indicators of national productivity! (– and of course not taking account of the recent tragic earthquake and tsunami.)*

In the UK, productivity has been measured and reported on regularly since the 1920s. There have even been Ministers of Productivity. Exhortations such as 'Must do better!' appear more frequently than a Number 9 bus. We are used to unfavourable comment on the national achievement.

Productivity matters today to national economies because it affects competitiveness in international markets and therefore living standards. Large companies that are lagging behind attract overseas predators who think that they will achieve better returns. The British car industry is a stark example: although there is still a reasonably sized (and efficient) manufacturing base, nearly all of it is foreign owned – Ford, Honda, Nissan, Toyota etc. It provides employment but not national profit, and investment is made by foreigners with their own agenda. And the demise of Cadburys prompted a nostalgic response and showed how exposed UK brands still are.

Managers, in the private or public sector, have only limited influence, but it is useful to view the 'national' and 'international' environment that they work in: business now is so obviously global; while decisions on locating manufacturing or service facilities must naturally consider local productivity.

The international data on productivity for G7 countries come from the Organisation for Economic Co-operation and Development (OECD). In the UK they are published by the Office for National Statistics.

## National/international productivity

The main comparative indices used for national productivity are:

- 'GDP per worker' = Gross domestic product divided by total employed workforce

- ‘GDP per hour worked’ = Gross domestic product divided by total hours worked.

Purchasing power is adjusted to allow proper comparison. The OECD publishes quarterly and annual data. It provides an important mechanism for assessing Britain’s progress against its principal competitors (although who the main ones are is becoming less clear year by year).

The latest figures for the G7 countries are for 2009. They do indeed show that GDP per worker is higher in the UK than in Japan. But here the good news ends. Britain is less productive than all the other G7 economies, albeit Germany and Canada are very close. The USA leads this index, about 33 points ahead of the UK.

In the other measure – output per hours worked – the UK does a bit better and the gap between the USA and the rest is a bit less.

But… Ministers have been keen to emphasise that our performance is getting better. In fact, the data show that since 1991 the UK has experienced faster growth in productivity than all the other G7 countries:

- UK GDP per worker – up by 34% since 1991!
- UK GDP per hour worked – up by 44% since 1991!

These figures obviously mask myriad complexities and don’t indicate whether a nation, its firms or its citizens are necessarily any better off. Patterns of consumption, currency values, and age profiles are only a selection of the many factors influencing overall living standards.

*Why isn’t Europe performing better?*

In the 1950s and 1960s, productivity in Europe blossomed as demand and investment grew. America’s lead shrank. But then improvement slowed, initiative stagnated, new competitors were overlooked and managers failed to take full advantage of international markets.

Economists have tried to work out why. Perhaps welfare, comparatively generous in Europe, puts the brake on output. But this is only one difference. American workers put in more hours each year than Europeans do – 1,768 to 1,655 in 2009 - although the gap is narrowing. Less developed economies (in

Europe and elsewhere) tend to work much longer. So what else:

- Market conditions – the single market has never realised its potential. Barriers and regulations still restrict trade. The European Commission has conceded that a lot still needs to be done
- Regulation – there is still too much of it. The United States has its own red tape too, but it seems to be less of a hobble there than it is in the UK
- Focus on winning sectors – the UK excels in some sectors – pharmaceuticals, financial services, media and some parts of IT – but it does tend to keep traditional industries going long after they have stopped providing a worthwhile return on investment
- The size of the state – the proportion of GDP spent by the public sector has grown remorselessly. However, the government that emerged from the election in May 2010 seems bent on reducing the role of the State, come what may. We shall see.

### The productivity of 'enterprises'

There is a lot of information available, from academic institutions and other commentators. The McKinsey Quarterly has always published regularly and reliably on the subject.[4] A study – reported by the New York Times in September 2008 – of 4,500 companies in 12 countries found that setting targets, monitoring performance, managing people well and introducing Lean boosted output per head.

Once again the American factories scored best. The UK was 'average'. China and India still lagged behind because huge parts of their populations remain untouched by industrial production. But:

- there was a lot of variation in each country – some Chinese and Indian plants were better than the average US factory
- unsurprisingly, multinational companies scored better – they acquired and spread knowledge and experience more readily
- it was found that managers usually think they are doing better than they actually are (several studies show this): which demonstrates the usefulness of exposure to independent assessment, advice and help
- competition forces managers to improve, or their companies die: the most productive companies are those found to be facing the most competition.

[4] McKinsey Quarterly February 2006 – The link between management and productivity .

*Manufacturing vs services*

A lot of research on productivity contrasts manufacturing with services, now by far the bigger sector. Computers have made administrative and financial processing more efficient, but not as much as is generally assumed. IT has caused some processes to slow down when they were supposed to speed up. Managers bogged down in e-mail or drafting their own cumbersome correspondence are cases in point.

On the plus side, some changes have been useful. Shared or contracted-out services – neither now a strange or radical proposition – help businesses concentrate on their main activities and reinforce the need to measure effort accurately. A large part of the service sector is actually public services, which, economists and statisticians maintain, are different and must be measured differently. Some of this is true – but a simple attempt to work out how efficiently inputs are converted into useful outputs is something that all managers should be up to.

The European Money and Finance Forum in Vienna produced a report in 2009 called 'Productivity in the Financial Services Sector'. It goes on for 329 (somewhat unproductive) pages, introducing some useful ideas on measurement, lean, integration, technology and economies of scale. But it also notes that an emphasis on matching the good practice of others often misses opportunities and results in regression to the mean rather than progression to the maximum efficiency.

*Pooches promote productivity*

Research into how productivity might be improved knows no bounds. An article in The Economist* reviewed two experiments at Central Michigan University that proved the beneficial effect of having a dog in the office. The first showed it enhanced teamwork and boosted cohesion, trust and intimacy with colleagues. The second revealed that a pooch promoted loyalty to the group and to each other.

It is not reported what breed was used. Perhaps a mongrel?

* Economist Online – August 12th 2010

# Notes on quotations

# Notes on quotations

Our readers continue to enjoy the selective quotations that pepper our publications. But sometimes their origin is not quite clear, so here are some brief introductions.

| Page reference | 'Famous person' |
|---|---|
| 2 | **Marcus Tullius Cicero** (106 BC– 43 BC) was a Roman philosopher, lawyer and politician. He is widely considered one of Rome's greatest orators. Read Robert Harris's novel 'Imperium' to find out more. |
| 8 | **Albert Einstein** (1879–1955) most people know what he looked like, but few understand what he did. Einstein's work on relativity, gravitation and radiation led to a Nobel prize and inspired many of the technological advances of the 20th century. |
| 18 | **Peter Drucker** (1909-2005) deserved the title 'the father of modern management' better than some other recipients. Among insights admired but insufficiently adopted is: 'The productivity of work is not the responsibility of the worker but of the manager'. |
| 41 | **Blaine Lee** (1946–2009) a founder of the Covey Leadership Center and co-author of *The Power Principle: INFLUENCE WITH HONOR*. |
| 46 | **Shigeo Shingo** (1909-1990) has been described as an 'engineering genius' who helped create and write about many aspects of the revolutionary manufacturing practices which comprise the renowned Toyota Production System. Parts of his work were not properly translated into English until the 1980s. Some say they still haven't been. |
| 55 | **Marquis De Vauvenargues** (1715–1747) a French essayist and moralist, he was born in Provence into an ennobled but poor family. He served in the army for ten years, then as a diplomat before retiring later to Paris. He was a friend of Voltaire. |

59 **Samuel Johnson** (1709 – 1784) oft-quoted biographer, poet and lexicographer. His *Dictionary of the English Language (1755)*, the standard reference for over a century, has since been described by Blackadder as 'the most pointless book since How to Learn French was translated into French'.

73 Author of *The Affluent Society* and other influential books, **J K Galbraith** (1908–2006), the celebrated American academic and economist, ridiculed the conventional wisdom that free market economics would bring benefits to all as 'the horse-and-sparrow theory: If you feed the horse enough oats, some will pass through to the road for the sparrows'.

75 **Woodrow Wilson** (1856–1924) was the 28th President of the United States. He introduced his 'Fourteen Points' for peace in a celebrated speech to Congress in January 1918. After the first world war he worked hard to establish the League of Nations, for which he later was awarded the Nobel Prize. But after he suffered a stroke, the Senate failed to ratify a decision to join the organisation.

80 **Jeffrey Pfeffer** is the Thomas D. Dee II Professor of Organizational Behavior at the Graduate School of Business, Stanford University, where he has taught since 1979. An advocate of 'evidence-based management,' he has published widely on this and other subjects. *Power: Why Some People Have It and Others Don't* is his most recent book.

88 **William Shakespeare** (1564-1616) What can you say? 'I could say that Shakespeare surpasses literature altogether, if I knew what I meant' – Virginia Woolf

91 **JD Rockefeller Jr** (1874-1960) had so much money when he was born that he didn't need to make much more, so he turned to philanthropy (his father had created Standard Oil). Rockefeller Jr supported many great causes in the United States. He also funded good works overseas, including the Shakespeare Memorial Endowment.

103 **Theodore Roosevelt** (1858-1919), the twenty-sixth President of the United States, was a great many other things as well. While he was campaigning in Wisconsin, a saloonkeeper named John Schrank shot him, but the bullet lodged in his chest only after passing through his

steel eyeglass case and the mercifully thick speech he was carrying in his jacket. Correctly concluding that the bullet had not completely penetrated the chest wall, he refused to go to the hospital but delivered his scheduled speech with blood seeping into his shirt. He spoke for 90 minutes, opening with, 'Ladies and gentlemen, I don't know whether you fully understand that I have just been shot; but it takes more than that to kill a Bull Moose'.

118 **Pablo Picasso** (1881-1973) the renowned Spanish painter, sculptor and nationalist recognised profoundly that 'Art is not the truth. Art is a lie that makes us realize the truth'. His ideas on feminism or on modern management may be less appealing, but one nugget is germane to our purpose: 'Art is the elimination of the unnecessary'.

120 **Robert Louis Stevenson** (1850-1894) was born in Edinburgh and died only forty-four years' later on Samoa in the south Pacific. During his short life he travelled the world, defied convention, and became one of the most celebrated writers of the 19th century. *Kidnapped* is a classic, but try *Travels with a Donkey in the Cévennes* if you haven't already read it. The donkey is called Modestine.

122 **WC Fields** (1880-1946) was the eldest of five children born to Cockney immigrant James Dukenfield and Philadelphia native Kate Felton. He went to school for four years, then quit to sell vegetables from a horse cart. At eleven, after many fights with his alcoholic father (who hit him on the head regularly with a shovel) he left home and eventually forged a career on the stage – becoming one of the most famous comedians of his era.

128 **Mahatma Gandhi** (1869-1948) known as 'Mahatma' (great soul) and to Churchill as a 'half-naked fakir', Gandhi was the leader of the Indian nationalist movement against British rule, and is widely considered the father of his country. His doctrine of non-violent protest to achieve political and social progress was hugely influential. After training as a lawyer in London, he lived in South Africa for twenty years before returning to his native land and leading the campaign for Indian independence.

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Complexity, Direct costs, Employee relations, Employment law, Implementing change, Integrating organisations, Lean, Managerial controls, Organisational design, Overheads, Performance management, Pricing, Process improvement, Procurement, Reward, Supply chain, Transitional management, Value chain analysis, Workforce planning

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