

## General Topics – Investing in the future

**TANGRAM  
TECHNOLOGY**

**Consulting  
Engineers**

Tangram Technology Ltd.

33 Gaping Lane, Hitchin, Herts., SG5 2DF

Phone: 01462 437 686

E-mail: [sales@tangram.co.uk](mailto:sales@tangram.co.uk)

Web Pages: [www.tangram.co.uk](http://www.tangram.co.uk)

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## Part 1: Introduction

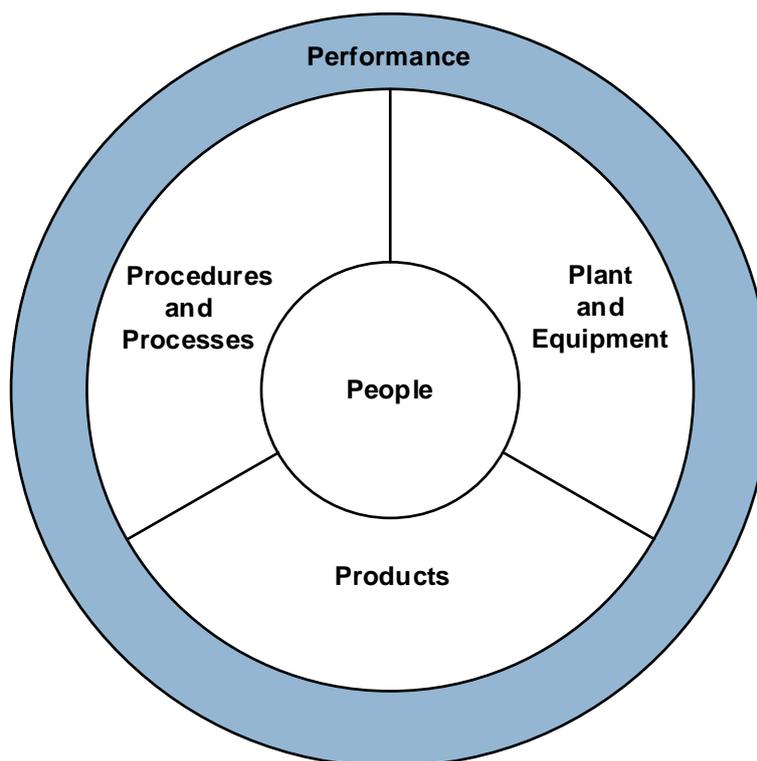
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### 1. What is investment?

When we think about investment, we invariably think about purchasing a capital asset: as in ‘The company plans an investment of £400,000 in new machinery next year’. This is the traditional but limited view of investment where the concentration is on the acquisition of fixed assets.

The reality is that an investment is ‘something on which a business spends money in order to earn more money’ and this definition includes all the time and money we have tied up in the business. These total investments are not always easily realised into cash and can easily be lost to us. These investments are what we have put into the business or have at risk should the business fail. This is a broader definition of investment but it does reflect the reality of being in business today.

In general terms we invest every day in our business, although many of the investments are classed as expenditure because of the traditional focus of investment thinking on fixed assets. This series looks at investment from the broader definition and includes aspects which are not traditionally regarded as investment but are certainly things we spend money on in order to earn more money. The series is not only about spending money but also looks at areas where we can reduce the investment (via working capital) that we have made in our companies. The areas covered are shown in the diagram, the people are at the centre because without them you can do nothing and the performance measurements are outside because you need to assess how good your investment has been.



**Figure 1**

### 2. The traditional criteria

The conventional accounting treatment of investment is largely based on criteria such as Net Present Value (NPV), Return on Investment (ROI) and Discounted Cash Flow (DCF). These assessment methods look at the pay back and financial implications of an investment and provide a method for judging the financial impact of the investment. These methods are well documented in any accounting textbook. The numbers tend to focus on the short-term financial aspects of investment rather than the longer-term strategic needs of the business. They cannot look at the strategic cost of ‘not investing’,

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which can be far greater in the longer term. To paraphrase Oscar Wilde 'The numbers give you the cost of everything but the value of nothing' – the value of an investment must always be assessed by the management of the company.

There often a need for two classes of investment criteria to be applied in a business:

- Traditional investment criteria – based on the traditional numbers and firmly supported by these.
- Strategic investment criteria – based on the need for the company to remain in business in the coming years.

One of these criteria needs to be applied to all of the investment made in our companies.

### 3. The need for investment

Henry Ford once said 'If you need a machine and don't buy it then in the end you will find out that you have paid for it anyway and still don't have the machine'. Whilst this statement was made about machines it is equally true for almost any investment that your company needs to make. Investment is necessary to continue to compete in the marketplace and the company that does not invest will surely find itself becoming uncompetitive and will eventually cease to exist. If your aim is a short term one of cash generation and removal then this is acceptable but if you want to be in business in 5 years' time then you need to consider your investment programme very carefully on a continuous basis.

Re-investment approaches will vary from company to company and from country to country and will tell you a lot about where the company or country is going in the long term. Perhaps the most graphic examples are Germany and Japan – as a result of the 1939-45 war they were forced to re-invest in all new machinery but because of this they effectively won the peace. This enforced investment was building for the future and has been remarkably successful – in contrast to the UK where antique machinery can often still be seen operating ineffectively.

### 4. The major resources

Before making any investment, it is essential that the proper resources are available to the company. If these resources are not available then the investment is probably set to fail before it has even been made. The major resources needed are:

- Financial resources – Without the right degree of internal and external resources most investments will not be successful. Even for strategic investments the costings need to be made and to be accurate. The effect on the cash flow of the company is particularly important.
- Human resources – Investment programmes need the right human resources. This might mean training staff, hiring staff or even redundancies. Some of these will only be required during the implementation phase but others will be permanent. High technology machines may require less operators but often require more highly skilled maintenance staff to keep them going, this is rarely recognised and included in the investment costings.
- Management resources – Investment programmes require management and it is important to invest only in what you can manage. It makes no sense starting on an investment programme of any size unless you know that the management capacity (or capability) of the present management team is available to successfully run the project.
- Technology resources – Most investments will need to fit within the existing operations and equipment. If a project does not fit within the technology currently used, the space available or the equipment available then the costs for these need to be included in the overall cost of the project.

The correct resourcing of any project needs to be part of the initial assessment and approval. Inadequately resourced projects will either never be completed or will fail outright. In business you don't get points for starting things, you only get points for finishing things!

### 5. Integration with the business plan

Every business needs a business plan and the associated aims or goals and every investment needs to contribute to achieving these goals. The investment programme is an integral part of the business plan and projects outside the limits of the business plan should not be considered.

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## Part 2: Machinery – plant & equipment

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In Section 1 we looked at the general framework for investment and included all of the things we invest in to run our companies. This month we take the specific area of machinery – the traditional investment area that we are all familiar with.

### 1. Machinery investment

Investment in machinery should only be made in bottleneck areas – these are the areas that slow up production and restrict the total output of the factory. Bottleneck areas are relatively easy to find – look for the machines with work in progress (WIP) in front of them and you have probably found the bottleneck machine for that product. One problem is that the bottleneck machine or area moves as the product mix changes. The bottleneck area may be the gearing area when tilt and turns are being made but may be the welding area when complex casement windows are being made. Investment should be made in the most important bottleneck for your existing or proposed product mix.

Do not invest in non-bottleneck areas as these do not increase the output of the factory and do not increase your ability to make money.

### 2. New machinery

Whenever new machines are installed, there is initial decrease in productivity because of the learning and debugging curve, the length of this decrease depends on the complexity of the machine installed. Do not budget for an immediate increase in production output and deduct about 20% from the rated output of any machine to give a realistic expected output from the machine over a long period.

### 3. Small investment steps and small machines

Machinery investment should give a close linearity between available capacity and demand. If you have a demand for 500 windows per week then investing in machines to produce 2000 windows a week does not make sense.

The traditional approach has been to invest in complex automatic ‘supermachines’ to improve efficiency and reduce labour costs. This view is that the technology can solve the problems by attacking the labour cost via increased investment. When the supermachines fail (as they must do at times) the whole line grinds rapidly to a halt and window production fails for the whole factory.

‘We can turn out windows in half the time with this new machine, but we have to because it’s down the other half.’

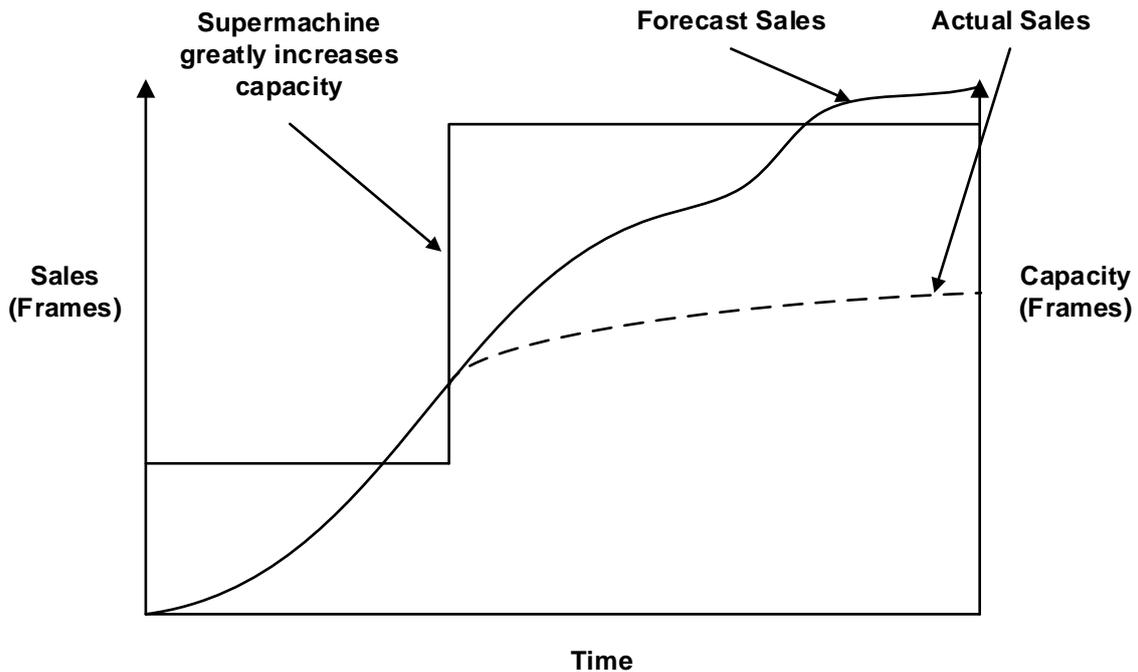
An alternative view is that of investment in small machines and the use of work cells. When a small machine in a cell fails, flow can be switched to another simple machine or cell and the line or other cells keep on running. Production continues for the majority of the factory.

Small machines allow a closer linearity between capacity and sales and the capacity of the factory is increased in line with actual sales increases rather than with predicted sales increases.

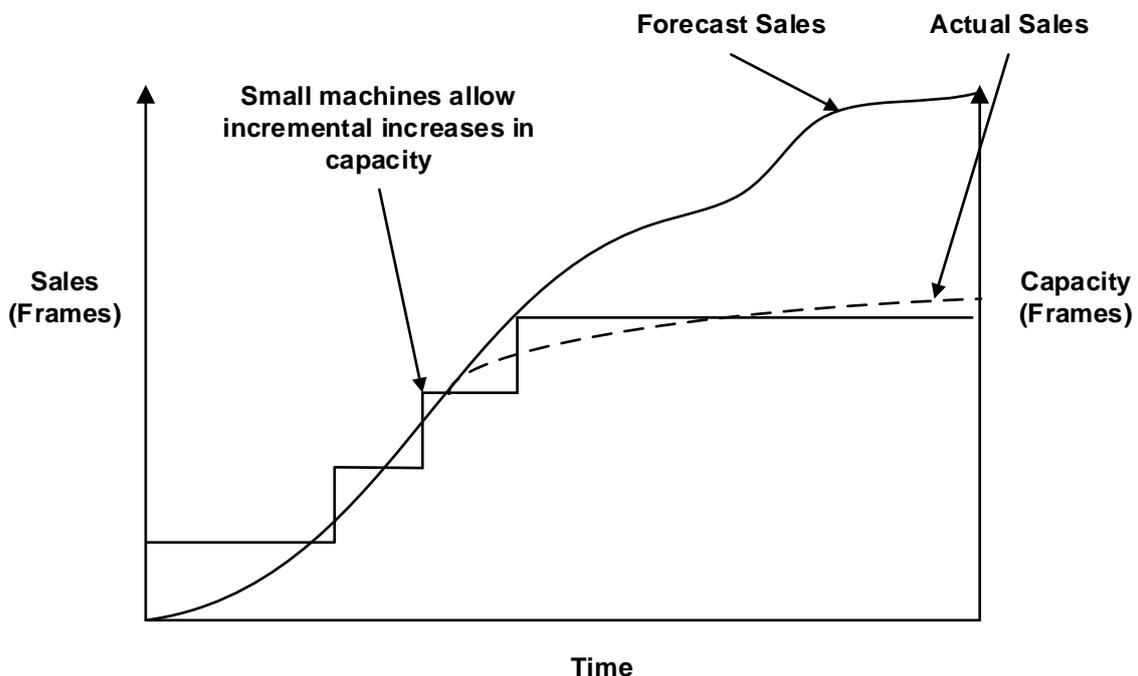
Supermachines invariably mean that capacity outstrips sales for some time. The major concern here is that in business the ‘costs are certain, but the sales never are’. If sales have been increasing over a period, then the sales forecast will normally say that this will continue. The forecast then says that there will be sufficient volume requirements to keep a supermachine fully utilised. But sales are never certain, they sometimes tail off and the factory is left with overcapacity and a machine that never gets into its stride.

Small machines spread the investment and can be timed as sales increase and finances allow. Close linearity between capacity and sales gives a well-balanced factory capacity and is shown in the diagrams below.

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**Figure 2: Large 'supermachines' result in over-capacity immediately after purchase. If sales do not increase because of rising costs (which can sometimes be associated with the supermachine) then the over-capacity will become detrimental to the business. There is no linearity between capacity and sales.**



**Figure 3: Small machines are easier to fund, allow closer linearity between capacity and sales and investment and match the actual not the forecast needs of the business.**

Small cheap machines also give other benefits:

- Easier operator maintenance – simple to repair and keep productive, basic maintenance carried out internally.

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- Easily copied – reduced dependency on a machine, quick changeovers, built-in capacity redundancy.
- Parallel flow – cells allow parallel flow to take place.
- Developed and adapted internally – standard parts to meet specific needs.
- Lower emphasis on utilisation – total factory capacity is more important.
- Simpler control systems – can be developed to cope with the expansion rather the great leap forward.

The benefits of small machines show why some companies with relatively crude equipment outperform companies who have invested heavily in sophisticated equipment.

### 4. Flexible investment

Investment in machinery should allow flexible production. Production demands will change with time and with the product mix. Investment in machinery should consider this at the planning stage. It is almost impossible to 'future proof' any investment but flexible production capability is essential in any factory, dedicated machines should only be considered if they are low cost and disposable.

### 5. Planned preventive maintenance

Planned preventive maintenance is an investment to protect future production capability.

Look at your factory. Which pieces of equipment would stop the factory if they failed? How long would it take to get them fixed and how much would it cost? Don't just look at the production equipment but also at the support equipment. If you lost your compressor right now then what happens to your output, and when was the last time that you had the compressor serviced?

*'What's the noise I can hear in the background? Sounds like a sick compressor to me.'*

When a component is required, it must be produced – especially if there is little work in progress or inventory. This demands high reliability and fast repair possibilities for all machines. Operators must carry out routine preventive maintenance of machines in their care, this reduces machine breakdowns and increases operator involvement.

Investment in maintenance removes unscheduled stoppages and machines are available when required. Unscheduled stoppages cause problems by overloading bottleneck machines, increasing lead times, making production planning difficult and increasing scrap and re-work. Preventive maintenance should

be planned into the schedule and planned machine utilisation should not exceed 80%.

Predictions can be made for breakdowns by history and performance measurements. Most machines suffer the same breakdowns repeatedly, a history helps diagnose the problem quickly and predict what is going to go wrong. Go for those repeated faults on bottleneck machines and provide tool kits and stocks of trouble prone items.

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## Part 3: Materials – products

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Investment in products is made both in terms of time and money by the window fabricator. The product often defines how well your company performs and is not a trivial investment. Product problems are immediately reflected in reduced output or increased complaints.

### 1. Product performance

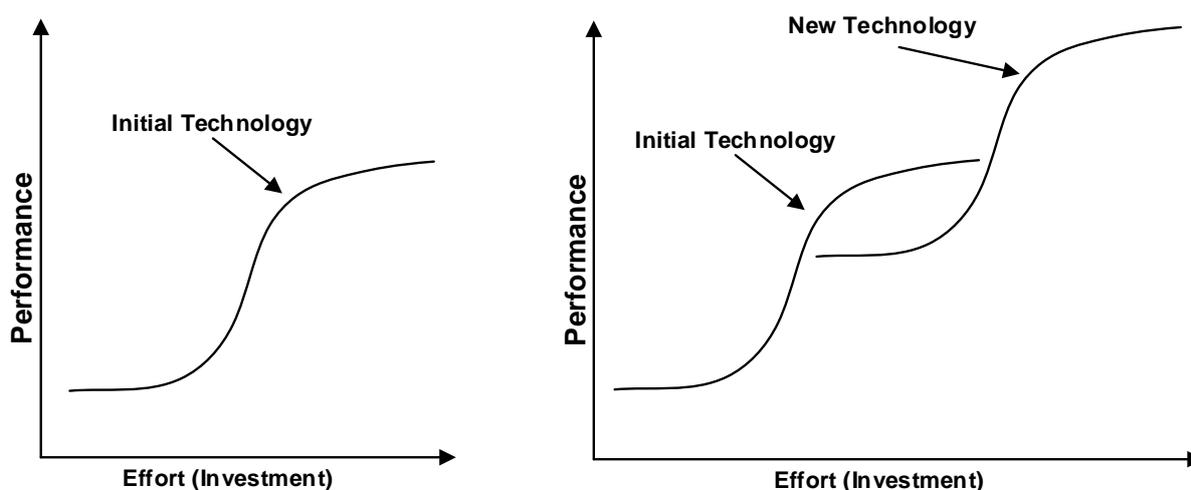
Investment in any of the major systems is now a safe but major investment in product performance terms. For the fabricator there is often little difference in the performance of the major systems. The major systems have largely reached a stage where basic product performance can be assumed. No reputable systems supplier would now release a system unless it conformed to the BS 7413 and could be manufactured to BS 7412. This could not be assumed in the early years of the industry and we have come a long way in terms of performance and quality. Competition between systems suppliers is now largely based on price, services, style and 'fabricator friendliness'.

### 2. More products – systems suppliers

For systems suppliers the 1990's are considerably different to the 1980's. In the 1980's it was 'all the products you can make from only 7 profiles', but all the products were compromised by being designed for multiple uses. The 1990's have seen more dedicated products and it has become unacceptable to make doors out of tilt and turn profile. The driving forces have been the increased need for security, the reluctance of fabricators to cut down and make do with profiles that are not dedicated to the product and dedicated systems for unique products (e.g., reversible windows). Systems suppliers have also added various depths of profiles and the standard range now includes at least two depths of profile (a 60mm and a 70mm system).

This increase in product numbers has meant a decreasing rate of return on investment at a time of severe price pressure in a stagnant market. New products are under increased pressure to give returns but it is getting more difficult to generate returns from new products. Many systems suppliers may never see a real return on their investment from additional sales and will only substitute sales of the newer systems for sales of their older ones.

The PVC-U window profile is essentially mature as a product. There is no doubt now that the product works and further penetration of the market will be both difficult and slow. In product performance terms the market is heading towards the top of the S-curve shown below. For the systems suppliers this predicts a further decrease in returns until the market is re-structured in a fundamental manner, a process which not all will survive.



**Figure 4: In the initial stage of any market the performance of the product increases slowly despite the investment of significant funds, in the middle stage there is a rapid improvement in performance with investment and in the final stage investment of significant funds gives little real improvement in**

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**performance. This stage continues until a new technology is developed and the S-curve begins again. The return on investment for the technology is the slope of the S-curve – low at the start, high in the middle and low in the later stage.**

### 3. More products – fabricators

For fabricators the increase in product numbers makes the control of investment in stock critical. Stock is an investment made by your own choice – you can liquidate this investment by manufacturing and not reducing the stock but you may be stuck with it if there is no market. Inventory is a hidden investment – stocks are needed for new products and these automatically tie up cash.

*Inventory is evil – reduce inventory until you have ‘The return of the JEDI (Just Enough Desirable Inventory)’.*

Additional factors are the increased investment in training, changeover times and the increased possibility of errors and complexity of operations. Some fabricators are attracted by the lower profile price of a slimmer system and introduce one to attack the ‘contract’ market. The extra investments in stock, changeover time, set-up, training and the higher possibility of confusion on the factory floor are conveniently ignored. It can easily be cheaper to buy in the special products and concentrate your manufacturing skills on what you do well.

### 4. Product investment and niche marketing

The real question is ‘How many products we should be investing in?’ and the two choices are:

- Try to be all things to all men by offering multiple products – this introduces complexity at all levels but can give stability in a changing market.
- Offer a restricted range and use niche marketing.

For large or small fabricators, the complexity of operations can be reduced by concentrating on specific product lines, the reduction in complexity may repay the margin lost for purchased items.

Small fabricators can look for niche markets that they can make their own in product terms. Several small fabricators have used niche marketing and produce only vertical sliding windows – a specialised product of high complexity. The basic rule is to segment the market until there is a good fit between your skills and a particular market segment.

If you have no unique skills then you are in trouble and need to invest to get the skills.

### 5. Supplier partnerships

One often ignored investment is that of investing in your suppliers – this can be a most effective investment. Suppliers are often treated as the enemy when they can be treated as partners in your business. Time and energy invested in getting to know suppliers and their capabilities means that you can get the best out of them and their resources. Good suppliers can provide solutions to problems, reduce costs and open up new markets. Fabricators need to read the information sent to them by the suppliers and use this to get the best out of them. Working in partnership with suppliers can reduce your investment in stocks and can give:

- Reduced inventory levels.
- Smaller lots delivered direct to shop floor.
- Material cost savings.
- Higher quality service.
- Reduced inspection & administration paperwork.

Fabricators may be concerned with single sourcing and the need for reliable and frequent deliveries but investment in building the partnership can lead to a reduced investment in many other areas.

Building supplier relationships is a long-term investment and an ongoing activity.

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Investment in products is a key to future survival for the window fabricator and thoughtful investment will give excellent returns.

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## Part 4: Methods – procedures and processes

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### 1. Smarter and not harder

We almost always think of investment only in terms of the actual money we invest. The old saying 'time is money' is still true and the procedures and processes (of all types) that we use take up time and therefore use money. This is a hidden investment that we need to monitor.

A company may well be doing many things efficiently but if it doesn't need to do these things then there is little benefit in being efficient about them. A long time ago I took up a new job and found that my secretary was keeping records of capital expenditure for the whole company, she was very efficient in doing this and could locate any record immediately. The only problem was that the company had introduced a computer system some years previously and this automatically tracked the expenditure. All the records were already being kept in the finance department and it involved considerable effort to send the copies to her for filing and recording, all of which duplicated the records already kept. After asking 'Why are we keeping these records' we decided that there was no need to keep them at all: at a stroke my secretary's workload was reduced by 30% – she was certainly being efficient but not 'effective'. We need to be effective in what we do rather than simply concentrating on the efficiency of the process.

*Workers are paid to do things right; managers are paid to do the right things – there is a world of difference!*

We need to be ruthless in what we do and concentrate on only doing those things that add value to the business or process.

Investing time and effort in deciding what are the right things will be one of the best investments you can make. We can work smarter and not harder.

### 2. The easiest investment of all

The easiest and most productive investment that you will ever make is to invest in not doing things!

### 3. Systems growth and analysis

People are pattern seeking animals and we use patterns to simplify things and to make them work. This is how any system develops – we seek patterns and then develop systems to deal with them. All information is time based and we develop systems and methods to fit the information that we have had in the past. Systems are rarely optimised for the current situation and needs – they were fixed or developed in the past and we force the current needs into the system rather than adapt the system to meet the current needs. Systems grow in this manner until they no longer function and become a liability to the company. This is the essence of business process re-engineering (BPR) – you look at what the systems are currently required to deliver and re-design them to meet these needs.

An enormously productive investment is to 'map' the current system and to carry out a paper chase of all your documents. This will give an overview of where the system is performing, where it is failing and where any redundant work is being carried out. This is an opportunity to combine forms and information and to eliminate any overlap. A good rule to follow is 'Record information only once and do this at the point of origin'. A good quality system based on BS EN ISO 9000 should be doing this already – the quality standard should be seen as a way to reduce documentation rather than as an excuse to increase it.

Investment in systems analysis should bear the following points in mind:

- Processes should be simple – easy to understand and carry out.
- Processes should be self-checking – mistake proofing should be built in to all systems.
- Humans are not rational creatures; they are rationalising creatures - they will invent all types of reasons for doing something when it is not required.
- Systems analysis in an on-going process of improvement.

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Productivity should not be just measured in the factory. Often the worst bottlenecks are in the office where it can sometimes take longer to complete the paperwork than it does to make the actual product.

### 4. Manufacturing processes

Investment in manufacturing processes is vital and is easily made but before investing you need to monitor and measure the existing activities to know where you are starting from.

Invest in jigs and fixtures to guide the workers and make the job simple and easy for them. Investment in fixtures will improve quality and throughput almost every time.

Invest in process development (with the help of the systems supplier) to remove or reduce processing at all stages. Outer frame corners will be hidden when the product is installed, if you are finishing them in some way then ask both why and how you are doing this.

As with any system the most productive investment is in stopping doing something that is not effective. Investment in waste reduction is critical to success in the future.

Waste is an investment of resources which do not add value to the product at least equal to the cost of the resources expended. Reducing wastes gives more effective production and a better factory environment.

The table below gives some of the typical manufacturing activities and their classification in terms of adding value or wasting value.

ACTIVITY	ADDING VALUE	WASTE
Moving		✓
Storing		✓
Machining	✓	
Counting		✓
Inspecting		✓
Scrapping		✓
Re-working		✓
Assembling	✓	
Sorting		✓

In many firms the material in the manufacturing system is having real value added to it for less than 1% of the total time it spends in the system. The rest of the time it is work in progress (WIP) or inventory and it is effectively a liability rather than an asset.

### 5. Keep it clean

As a final point no procedure or process will ever function properly if you cannot find it. Clean and tidy office areas, factories and yards will enable you to see where you are and what needs to be done. Be ruthless with junk and invest in a big rubbish bin. Everything needs a place and should be in it – even if it is the rubbish bin!

Invest wisely in procedures and processes, small investments here can have excellent returns.

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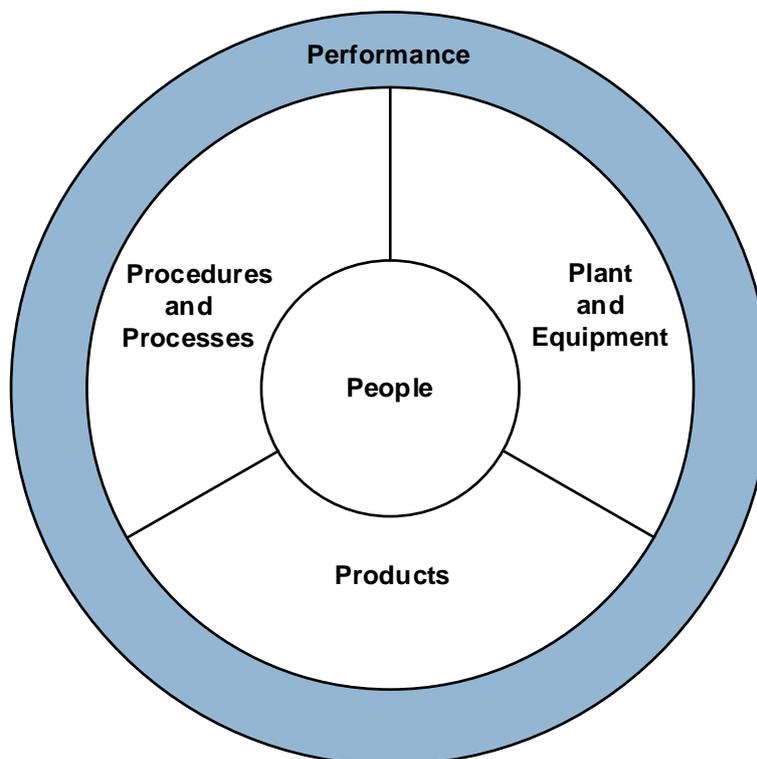
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## Part 5: Manpower – people

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### 1. The core of the business

The diagram below was in the first article of this series and the people are at the centre because the people are the heart of the business: without them you can do nothing and even the best investment plans will fail. The human and management resources are just as critical to successful investment as are the financial resources.



**Figure 5: People are the heart of every business**

You may not recognise it but we invest a lot of money in the people we employ to get the results we need. This is not only in formal training but may also be in the time taken while they learn the job and the people involved in training them to get to know the job. This was recognised by the Government and the 'Investors in People' scheme was launched to try to make companies aware of the investment they have and can make in their people.

### 2. Knowledge and skill-based business

In many ways the investments we make in people are perhaps the most important and yet fragile of all the investments we make. The window business is both 'knowledge based' and 'skill based' – this means that the key resources of your company walk out the door at the end of their shift or the end of their day. If they don't come back your company would effectively cease to function and would probably fail. You may convince yourself that this is not true but what happens when your key employees are on holiday?

Ignore this at your peril, otherwise some day this investment may not come back through the factory gate.

### 3. Training, development and personnel

The most obvious investments you make are in the field of training, development and personnel and these are:

- Training: This is about learning and acquiring knowledge and skill. It involves learning about the job

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(either how to do it better or how to do it at all). It is also about gaining new skills so that the company can change for the better and is relevant at all levels of the business. As an investment there are two keys to getting the best return:

- What training is needed? – You need to know what the business needs, what your employees need to be able to achieve and what your employees need to know.
- What is the most cost-effective way of carrying out the training? – Your employees need to learn effectively and you need to get value for money.

Training is not always about external courses and a great deal can be achieved by investing the resources that you already have internally.

- Development: This is about gaining skills that you will need in the future in order to take effective action to improve the business. The key factors are:
  - What do they need to know?
  - What do they need to be able to do?
  - How can we help the employees to acquire these skills?

Personnel: This is about the management investment in making sure that your employees work and learn effectively. The employees need clearly understand their reporting relationships, duties, and performance standards. Investment in the personnel function must deliver this guidance and information to all employees.

A long-term training plan needs to be drawn up and discussed with the employees, training records need to be generated and kept to evaluate the effectiveness of the investment. Certain aspects of this training plan will also be valuable in the attainment of BS EN ISO 9002

Training, development and personnel are investments that we make to create the skills to do the job. Without them all your other investments will count for nothing.

### 4. The easy and cheap ways to invest in people

Investment in people is not always expensive and some suggestions are:

- Catch them doing it right – Don't try to find your people doing something wrong and criticise them for it. Find your people doing something right and thank them for it. Do it simply, quickly and don't elaborate. This is harder than it seems because we automatically look for the things that are being done wrong. Try this investment of your time and see the response. It is guaranteed to surprise you – tough guys can say 'thank you' too.
- Give them responsibility and let them respond – You have invested time and money in training your employees. Treat them like children and they will react like children. If you have to talk about empowerment with your employees then you have already blown it and any organisation that has to introduce this as a formal concept is probably too far gone to be saved by the concept.
- If we expect our employees to accept responsibility then we must also give them the power that goes with this. In many Japanese companies all employees have both the power and the responsibility to stop the production line if there is a problem. This contrasts with the traditional British way of working where to stop the line is the ultimate sin. Power and responsibility are totally linked, consider how you would feel if your boss gave you responsibility but none of the power to back it up, how would you regard your boss if he had the power but none of the responsibility for success or failure? The only way to retain power is to share it.
- Treat them fairly – Let your gravestone read 'He was a cruel man, but fair'.
- Treat them like people – When we hire a pair of hands for our production line then we get a brain thrown in for free, it is up to us to use it! The typical British manufacturing manager thinks that fabricators leave their brains at the factory gate. The reality is that they are thinking human beings who need convincing, persuading and responsible treatment to get the best out of them. The only way to communicate is to listen.

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Earlier on, we encouraged you to invest in the maintenance of your machines to get the best out of them. The same needs to be applied to your employees: you need to invest in a maintenance programme for your people to get the best out of them and if you don't then they will leave or not work properly when you need them most.

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## Part 6: Measures – performance

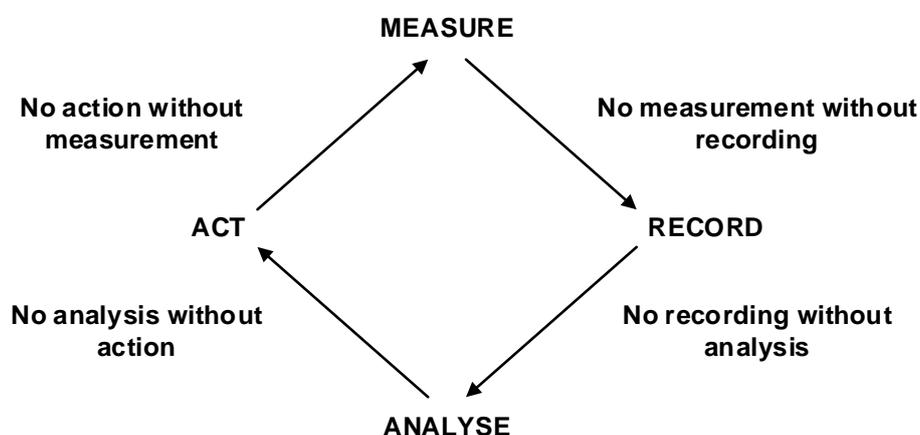
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### 1. Investment effectiveness.

Any investment was made to improve something and if it wasn't then why was it made? This is self-evident yet few companies carry out the final step in the investment process of analysing the effectiveness of the investment.

Before making any investment, you need to define what it is you want to improve. It may be production effectiveness, inventory reduction, throughput, staff effectiveness or any one of the other key factors for your success. Having decided what you want to improve you can then establish the base line or current situation. This is the first step in investment assessment appraisal. These measurements are recorded and analysed to decide on the best way forward. The next step is to act on your investment plan and to implement the investment. The final step is to measure the results of the investment to make sure that it has really been effective.

This investment cycle should be part of the normal business of the company and is based on the standard Quality Action Cycle for quality improvement. The cycle is shown below and provides a standard method for most business processes.



The cycle provides a logical method for any improvement programme in a company and if you are not investing to improve something then why are you doing it?

Measure what you want to improve before and after the investment to assess the effectiveness of the investment.

### 2. Implementation effectiveness

Assessing the implementation effectiveness is necessary to check that it was effective and to see how it could have gone better. Understanding problems or failures in implementation will help you to do it better next time. The assessment needs to be carried out without searching for the guilty party to punish him – in any case only the innocent will fail to have an alibi prepared!

### 3. The measurement of investment effectiveness

Investment effectiveness raises the question of what we measure in order to assess the effectiveness. A major problem with investment appraisal is that sometimes the measurements used are inappropriate for the investment. The standard investment appraisal methods provide the financial basis for assessment but are not designed to deal with the more intangible measures. In the first section of this document, I considered the two classes of investment i.e., the traditional investments and the strategic investments.

With traditional investments any accountant can assess an investment from the 'hard' accounting numbers based on efficiency improvement, labour reduction and generally doing tasks faster or with less material/labour. All of these measurements were designed for a manufacturing environment where direct labour and machine utilisation were important and don't consider if you should be doing

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the task or not. You can be the most efficient slide rule manufacturer in the world but that won't help you if the market has moved on to pocket calculators and efficiency in making aluminium windows will not help you if the market is for PVC-U products.

If our company and market needs high quality and reliability, short lead times and low inventory and yet none of these is being measured in our investment appraisal then there is might be something wrong. Perhaps we should be concentrating on measures of real effectiveness which directly affect our success in the market place? Investment appraisal can be improved by including some more relevant numbers so that operators and managers can concentrate on creating improvement and not on creative accounting.

### 4. The new effectiveness measures (doing the right things)

There are new performance and effectiveness measurements are more relevant to manufacturing and can drive the production process. These new measurements relate directly to survival in the market place.

These measures share some common characteristics shown in the box:

#### Characteristics of the new effectiveness measures.

1. Should be clearly communicated to the employees:  
**'I will succeed if you tell me what you want me to do and where you want me**
2. Should be non-financial and widely used by all employees:  
**'Tell me in terms I can understand'.**
3. Should reflect the performance required at each location:  
**'Give me something that is relevant'.**
4. Should vary with time to reflect changing goals in the organisation:  
**'I've got that right so lets move on to the next priority'.**
5. Should be simple and easy to use:  
**'I understand that'.**
6. Should be fast to give quick response and feedback :  
**'Is today soon enough'.**
7. Should aim to teach rather than monitor. Designed for improvement:  
**'OK, now I see where I can get better'.**

Investment to improve this type of measurement will drive a factory much more effectively than pure financial numbers. When these numbers are right then the financials will fall into place for both the short and long term.

*'People react to what you inspect and not to what you expect'.*

### 5. Typical performance measures used

The choice of measurement to be used depends on what is it that you need to be good at to improve or maintain your business. If quality is vital to your business then you should include a measure of quality in your performance. If customer satisfaction or service is important then you need to develop a measure for this in your system.

Some examples of measures that fit the requirements are:

#### Quality measures

- Supplier delivery performance: supplier lead times, quality of incoming goods, supplier certification, inspection only for new suppliers.
- Cost of quality.
- Inventory accuracy: 95-99% target on a reduced inventory.

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- Customer satisfaction: Surveys, complaint recording, repeat sales, service calls.

### Customer time measures

- Number of products delivered on schedule.
- Value of products delivered on schedule.
- Lead time reduction improvement.

### Process measures

- Total processing time.
- Distance travelled.
- Set up times.
- Machine down times.
- Number of handling operations.
- Material availability.

### Cost measures

- Waste rate: amount of product scrapped or reworked.
- Direct labour productivity: value of finished products divided by number of hours to make.
- Work in Progress (WIP) turns.
- Inventory turns.
- Non-value-added production steps.

These are just a few of the possible measurements that you can use. Investment should be made selectively in the areas where you need to improve and then always measure the improvement that you have achieved. If you are in doubt about where you could improve then ask your customer, they will always have some ideas!