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# **Maintaining Business Growth and Profitability through *effective* Business Measurement.**

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## 1 Introduction

A successful business results from strong leadership, a coherent business team, favourable market conditions and stable local circumstances. This creates a positive environment in which business activity results in a profitable outcome. Changing one or more of these conditions can turn a profitable business into a basket case, within a very short time, unless appropriate actions are taken.

It is therefore vital for businesses of all sizes to have a set of business objectives aimed at ensuring that profitability and growth are maintained, and that negative changes are predicted and mitigated.

Many businesses do have objectives, but often they are not SMART (Specific, Measurable, Achievable, Realistic, Timely) and are not owned by the key company directors and managers.

Start up, and very small business, are usually managed by one person who is able to instinctively know what is right to enable the business to be profitable and sustain growth in a given market place. These type of business leaders are usually classed as entrepreneurial and do well so long as the business does not get too large, and does not stray out of the leader's knowledge domain.

However as businesses grow and move into new markets one person becomes unable to manage everything on their own, and it is at this stage that they need to focus on setting and achieving SMART objectives at all levels of the business. The larger the business the more remote the 'workers' become from the top directors and the more difficult objective setting and achievement becomes.

As a business grows, a further problem begins to emerge. For a number of reasons, sometimes valid, but often not fully thought through, the directors and senior managers decide to make changes. What is usually forgotten is that change destroys, and that it takes time to repair the damage to customer and staff relations before the benefits of the change can be realised. This means it is even more important to have SMART objectives that everyone understands.

To compensate for the above issues companies have traditionally imposed tight financial controls. There is no doubt these work in the short term but tend to restrict growth into new markets and products in the longer term.

So what is needed is a balanced set of business SMART objectives supported by a robust and effective business measurement programme at all levels of the business.

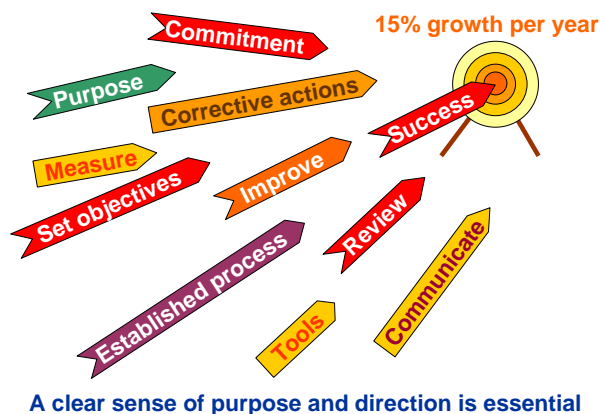
This e-book is aimed at those businesses and business managers seeking help and guidance in achieving this elusive goal.



## 2 Planning a measurement program

Planning is a key for a successful measurement program. All too often an ad hoc approach is taken and after the initial euphoria has evaporated the initiative soon dies.

### 2.1 Getting started



#### 2.1.1 Why do we need a measurement programme?

The first step is to establish a clear purpose or reason for a set of measures. Without a purpose (For example to measure achievement of strategic business objectives) a measurement program is unlikely to succeed or provide tangible business benefits.

Here are some reasons for setting up a measurement program.

##### 2.1.1.1 To change behaviour

- Open management: A successful measurement program encourages sharing of information (as normal behavior) leading to more open management, and improved trust. Sharing does not come naturally, people tend to cover up bad news but forget to share good news. For example a project may be running late, staff need to know this coupled with the actions being taken as well as what is expected of them to recover the situation. The sooner staff know the true situation the sooner recovery can start.

- Improved understanding: Improved understanding by staff of business performance, leads to greater understanding of the decisions, which have been driven from the measurement activities. For example it may be necessary to move staff around. If they understand why then it may be more acceptable particularly if the new location is less attractive.

##### 2.1.1.2 To provide early warning indicators

- Avoiding surprises: Clarity of business performance leads to timely corrective action, rather than "fire fighting". This increases the chances of projects delivering on time and to budget. For example managers tend to put off reporting bad news in the faint hope that the problem will go away, it rarely does. Effective measures will allow the problem to be clearly seen by all concerned thus enabling corrective action to start much earlier.

##### 2.1.1.3 To increase visibility of tasks and activities

- Common data: Working with common data will reduce misunderstandings and provide a sense of common purpose across diverse business departments. For example working with two sets of the

similar data, staff from different perspectives will come to different conclusions and thus significant time will be wasted working out the correct conclusion.

- Measure waste: Waste is like a cancer, eating away at profits, but hidden from view as staff are reluctant to admit mistakes, or change their working practices. For example staff using different tools to do the same function will cost the business more in tool support.

#### **2.1.1.4 To give quantifiable understanding of business processes**

- Process performance: The majority of businesses have little idea just how much specific processes are costing, so measuring and improving processes can have a dramatic result. For example if the cost of carrying out a repeatable operation, eg filling in time sheets, was reduced by a few minutes this could add up to a significant saving across a large organisation.

- Product quality: Meeting the required 'fit for purpose' quality levels can only be achieved by some form of measurement. Too high a quality level will cost more to produce, and too low a quality level will also increase costs due to higher reject levels and higher warranty costs. Measuring quality is difficult, warranty claims and customer complaints are two examples of lagging measures, what is needed is a leading measure so that quality levels can be adjusted at source, for example reject rates.

#### **2.1.1.5 To better understand change, what works and what does not**

- Basis for process improvement: Without some form of measurement it is impossible to know whether a process change has worked or not. It is the old adage 'You can not improve what you can not measure'

- Supports [CMM](#), [CMMI](#), [SPI](#), [ISO](#), [BEM](#), [EFQM](#) etc.

#### **2.1.1.6 To make life easier**

- Enables prediction of future costs and performance. For example basing a bid on poor past performance data will lead to losing the job or making a loss. A good example is productivity where it is essential to compare like for like. A project using lower grade staff may have a lower productivity but due to lower pay rates may actually cost less.

- Provides baselines and benchmarks for current projects and future bids.

### **2.1.2 What business activities will be addressed by the measurement programme?**

The temptation to measure a whole range of business activities, regardless of relative importance, should be avoided. A few targeted measures are likely to be more effective. The trick is ensuring that measures are directly related to business objectives.

#### **2.1.2.1 Who needs the measures?**

Effective measures support business objectives, so it is important to have a direct link between objective owners and measurement owners, more often than not they are the same person eg a company director or senior manager. For example if the Managing Director wishes to increase market penetration then he needs to own and review the measurement results.

#### **2.1.2.2 When are the measures needed?**

There is no hard and fast rule as to the timing of measurement activities but too long or too short, for example yearly or daily, is not recommended. Weekly, fortnightly or monthly are the more usual periods. There are, however, some measures (for example data for estimating future work) that can only be finally confirmed at the end of an activity or project. For example software productivity can not be measured until the end of a project as problems tend to come during testing.

#### **2.1.2.3 Where will we store the results?**

In order to encourage open management, results should be available to all staff. Common repositories and web based display systems should be the norm. For example many companies have an internal intranet, this can be used to share measurement results and corrective action plans.

#### **2.1.3 How will the programme be communicated to ensure success?**

##### **2.1.3.1 Who will communicate the programme?**

A senior Director must be appointed to oversee the communication of a measurement program to ensure that it is led from the top and that the right messages are conveyed to staff at all levels. For example it is no good just reporting that profits are down without explaining why and detailing the action plan to rectify the situation.

##### **2.1.3.2 How will it be communicated?**

Organisations tend to have very set ideas on how they want to communicate with staff. Proactive workshops are recommended as an effective way to communicate and involve staff in measurement initiatives. For example pro-active workshops allow individuals involved in the work to participate which in turn teases out the real issues rather than management perceptions which are often unreliable.

##### **2.1.3.3 What is in it for the individuals?**

Unless individual staff feel that there is some benefit to them, they will take little interest in measurement activities and are unlikely to take a positive attitude to providing data. Proactive workshops are one way to overcome such problems allowing individuals to participate in formulating solutions.

##### **2.1.3.4 What does success feel like? Shared vision**

You will know if you have a successful measurement program, if you are not sure then you don't. For example if you are getting lots of surprises then your measurement programme is not effective.

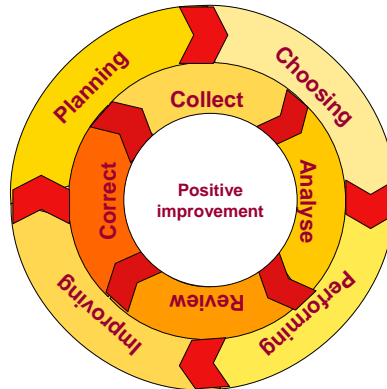
#### **2.1.4 Who is responsible for the measurements?**

Ultimately it is the Chief executive but in reality it is anyone who has an objective to meet.

#### **2.1.5 What measurements do we currently collect?**

Long established organisations will tend to have lots of measures already being collected, but often they are not used. It is worth collecting a list of these measures and ensuring they are reviewed. Where possible they should be linked into new objectives, if not they should be discontinued.

## 2.2 Using established processes



Established processes provide rigor

Following an established process helps provide rigor in setting up your measurement program and ensuring that you do not miss out important steps. Changing a process will normally result in a change in the measurement associated with that process.

Time should be allowed for the changed process to stabilise before drawing a conclusion or changing the process again. A well documented experiment, the Hawthorne effect, showed that any change produced a short term improvement, which is not necessarily maintained.

Care should be taken when changing a process. If too many changes are made at one time then this could invalidate the original measures as it would not be possible to compare like for like.

The following are established methods for supporting the setting up of a measurement program.

### 2.2.1 Balanced scorecard. For more details see [Appendix A](#)

The balanced scorecard is a method whereby a set of measures can be balanced across four key business perspectives; Customer, Financial, Learning & Growth and Internal Business. It is widely used, but does not cover all aspects of a measurement program.

### 2.2.2 Goal Question metric. For more details see [Appendix B](#)

The GQM (Goal, Question, Metric) method is a process designed to ensure that measures are driven by goals. Goals are defined based upon business objectives. In order to understand how these objectives relate to specific measures the underlying business processes are questioned. Measures are then defined based upon the answers to these questions.

### 2.2.3 Practical software measures (PSM). For more details see [Appendix C](#)

Practical Software Measurement provides experienced based guidance on how to define and implement viable, information driven, measurement processes, for a software intensive project. PSM addresses the development of a project measurement information structure, using the Measurement Information Model, and it describes measurement activities and tasks using the Measurement Process Model.

## 2.2.4 Application of metrics in Industry (AMI). For more details see [Appendix D](#).

Following the AMI method ensures that, during the planning of a measurement program, the reasons for collecting the data are properly thought through and the measures are properly focused on the needs of the business.

## 2.2.5 Benchmarking. For more details see [Appendix E](#)

Benchmarking is a process for comparing two or more organisations where examination of common processes will lead to the identification of improvements. Measurements often form part of the processes.

## 2.3 Roles



Established roles and responsibilities are a key to success

Establishing roles and responsibilities is a pre-requisite for a successful measurement program. The minimum for every measure is two roles.

The person who owns the measure and the person who is responsible for the maintenance of the measure and its data.

### 2.3.1 Measurement owner

The **Owner** who's task is to ensure that:

- The measure achieves its purpose
- It is clearly defined
- The data is reviewed on regular basis
- Actions are placed and implemented to achieve improvements in processes, products, services etc
- Results of actions are reviewed and the change is adjusted according to the results.

### 2.3.2 Person responsible for a group of measures

The **Responsible person** who's task is to ensure that:

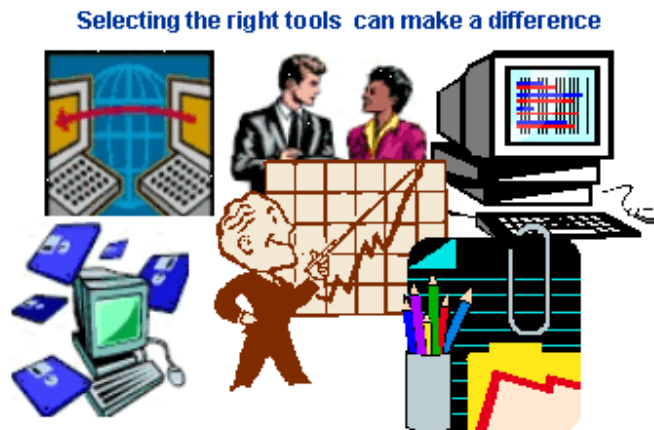
- Data collection and reporting on a routine basis are in place
- The data is valid
  - Is there any data missing?
  - Is the data within meaningful ranges?
  - Are there any anomalies?
  - Does the data look sensible

### 2.3.3 Other roles

Other roles might include:

- Project Manager, who should ensure that measurement forms a key role within his project management activities
- Process Manager, who should ensure that every process contains an element of measurement
- Quality manager, whose role is to ensure that measurement forms part of the culture and every day activities of a business. He has to ensure that it is built into core business processes.

## 2.4 What IT tools should I use



### 2.4.1 Selection process

There is a large selection of IT tools available on the market for collecting, analysing and reporting metrics some are general purpose whilst others are dedicated to a specific purpose e.g. failure reporting. Many IT tools have measurement built in as part of their functionality. It is unlikely that one tool will service all the measurement requirements of a significant business.

Before searching the market it is important to decide:

- At what level in the business is it going to operate?
- Which business functions will be covered?
- Who will be using it?
- How will it be made available to users?
- Is specific functionality required?

#### 2.4.1.1 Define criteria for IT tool

The following criteria should be considered when searching for a suitable tool:=

- Supports the Balanced Scorecard approach
- Web based and can be installed on your Intranet servers or personal PC
- Includes easy to access reports e.g. traffic light status, commentary, targets and forecasts
- Has the ability to show charts in graphical form
- Allows sets of measures, scorecards, at more than one level i.e. organisation and team or project
- Multi user with access rights for users, data collectors, and administrators
- New measurement sets e.g. scorecards and measures can be built and edited on line via the Web interface
- Measurement and scorecard attributes are parameterised e.g. units, perspectives etc
- Suitable for all levels of management, intuitive to use
- Capability to drill down each measure for more details, reports or charts

#### 2.4.1.2 **Search for available tools**

The world wide web provides links to many possible tools ranging from tools costing as little as £50 to many £10Ks.

For example see Appendix H , a web based tool which has been designed to enable you to get a new measurement scorecard up and running quickly at low cost. You can see an on-line version from this link: [View details of the P2+ tool and access the online system as a guest](#)

#### 2.4.1.3 **Short list, select best match with criteria**

A simple chart scoring each candidate tool against required criteria will usually suffice to show which tool is best suited to your needs.

### 2.4.2 **Perform tool evaluation**

It is recommended that a pilot is carried out using the chosen tool and some sample measures. It is often at this stage that it becomes apparent whether a tool really meets the business criteria.

There are three simple steps to an evaluation:

- Set up pilot
- Test against criteria
- Report

### 2.4.3 **Implementation**

Implementation and setting to work should be a straightforward process involving:=

- Installation and set up
- Testing
- Roll out to users
- Communication to all staff

### 2.4.4 **Training**

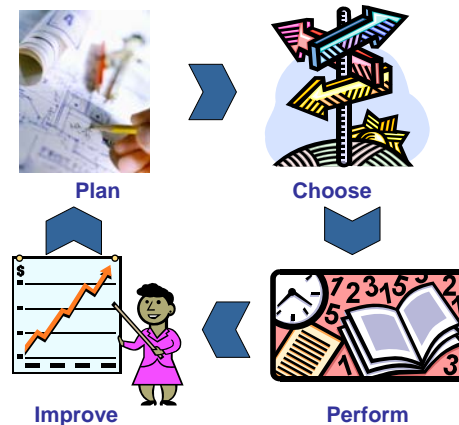
Adequate and timely training is essential to the introduction of a new tool. The various types of user will need specific training according to their role. Training should include how to use the tool and how measurements will be collected, analysed, reported and reviewed. Delegates should come away from the training with a positive attitude to the rationale behind the introduction of the tool and the measurement program. A different level of training will be required for various types of users eg:

- Tool administrators
- Managers
- Users
- Data collectors



### 3 Implementing a measurement programme

#### 3.1 Core measurement programme



##### 3.1.1 Planning a specific measurement programme

In addition to overall business measures, organisations often establish a standard set of measures for a particular discipline e.g. software engineering. Within a standard set individual projects may have a requirement to tailor the standard set to meet special requirements e.g. customer demands. In all cases the planning should consider the following.

###### 3.1.1.1 Why will the measurements be taken?

As discussed in section [2.1.1](#) It is essential to have a clear objective for a measurement activity and how each measure links to the overall objective. For example the business might have an objective to improve customer satisfaction with measures such as warranty costs as a ratio of sales, customer complaints per month etc.

###### 3.1.1.2 What will be measured?

Having established the overall objective then the individual measures can be established ensuring that already available measures are used wherever possible and that the overall number is limited to about 20. if, for example, a business has 40 top level measures then the review process will run out of time, exceed the attendees span of attention, furthermore the measures will start to interact with each other.

###### 3.1.1.3 When will the measurements take place?

Timing of measurement collection will depend upon the business processes supported by the chosen measurements; a monthly cycle is the norm.

#### 3.1.1.4 **Who will carry out the measurements?**

It is unlikely that someone will be employed full time to collect and analyse a group of measures so it is important that the person nominated has sufficient authority to give adequate priority to ensuring that data is routinely collected and reported. Great care is needed to ensure that initial enthusiasm is not lost. For example using a new young recruit may seem like a good idea but they will not carry sufficient respect, on the other hand using someone who has been in the business a long time but is not fully employed is also likely to be ineffective as they will not have the drive to sustain the initiative. The adage, if you want a job done give it to a busy person, could well be the right answer so long as the person does not become overloaded.

#### 3.1.1.5 **Where will the measurement data be stored?**

The measurement data should be stored in an IT system that enables everyone involved to view and use the results. See section [2.4](#).

#### 3.1.1.6 **When will the measurements results be reviewed?**

A clear timetable of regular reviews should be drawn up and published. It is essential that the review program is maintained and that the right staff are invited to participate. For example measurement reviews should be part of normal business reviews at all levels in the business.

#### 3.1.1.7 **Has a measurement plan been defined and approved?**

This is best approached by drawing up a specific metrics plan using a standard template which should include:-

- Project / Department / Function details e.g. Name, contacts, related projects etc
- Document approvals e.g. Author, reviewers, approvers etc
- Amendment record
- Introduction e.g. Brief project / Department / Function description
- References e.g. related documents, methods used etc
- Reporting cycle e.g. key events, who is responsible for these events etc
- Objectives. The project / Department / Function objectives, goals, that will be measured
- Measures including definition, related objectives, units, thresholds, rationale for measure etc
- Facilitates automated data collection

Individual measurement plans should refer to standard plans rather than repeat details.

### 3.1.2 **Choosing the right measures**

#### 3.1.2.1 **The importance of goals / objectives**

It cannot be overstressed that every measure must be related to the achievement of a business goal. A measure that is collected because it seems like a good idea, or because we have always collected it, will usually turn out to be a waste of time and effort.

The GCM selection process, see [Appendix B](#), supports this principle in the following steps:-

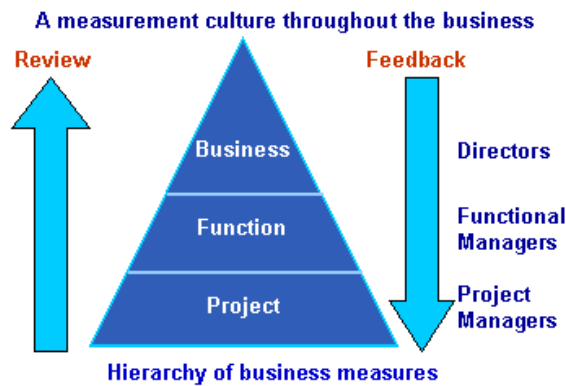
- Split objectives into relevant sub objectives
- Link sub objectives to chosen measures
- Categorise objectives
- Prioritise objectives and hence measures
- Focus on the key objectives and measures

#### 3.1.2.2 **Are the underlying processes being measured established?**

Established processes ensure that results are repeatable so it **important** to ensure that the processes that support the chosen objectives are in place and robust.

### 3.1.2.3 Hierarchy of measures

Measurement is applicable throughout the whole of a business from top to bottom. Lower level, more detailed specific measures, feed up to the top level business measures thus forming a hierarchy of measures in which data feeds up, and decisions feed down.



### 3.1.2.4 Types of measures

Measures may be leading, drives behaviours or lagging, drives results.

- A leading measure is a predictor of a likely outcome e.g. risks with no mitigation.
- A lagging measure reports on a result of past activity e.g. Orders, Sales, milestones achieved etc

A ratio is generally preferable to a specific value, e.g. sales per employee is much more useful than just sales.

Consideration has also to be given to the accumulation type. Measures can be a moving average, a yearly accumulation or just a point value.

### 3.1.2.5 Measurement attributes

It is always better to have a few measures that are *actively* used, and are an integral part of your business review processes, rather than lots of measures, many of which may not useful or relevant

<b>Measurement attribute check list</b>	
1	Each measure must form an intrinsic part of, or relate to, the achievement of an overall business goal or business process improvement. A clear purpose is essential.
2	An owner who is responsible for the definition, collection and regular review of the data, is <b>essential</b> for each measure.
3	It is important that the data review forms part of a routine and regular organisational process e.g contract review, design review etc
4	The measurement data, and the measure itself, must be regularly reviewed, e.g the data monthly and the measure yearly.
5	Targets for each measure must be set that are achievable, ambitious long-term targets should have attainable intermediate goals.
6	It is usually better for a measure to be a ratio e.g. failures/thousand hours rather than just a value.
7	Many good measures fail to be useable because they are impractical to collect, either the data does not exist in a reliable form, or it is far to difficult to extract.
8	The underlying data must be reliable, otherwise the measure will be of little value and easily challenged.
9	A measure that is good at team level may not be easily integrated to an organisation level e.g. productivity, due to different team circumstances or technological differences.
10	It is good practice to ensure that measurement data is collected and reported automatically from established business IT systems.

### 3.1.2.6 Measurement categories

Measures come from all aspects of the business and take many different forms. For example:-

- Results: These tend to be business or progress focused e.g. Orders received, Milestones achieved etc.
- Quality improvement: Quality is very subjective but should be measured in terms of fitness for purpose. The quality of a fabric might be measured by its smoothness. Rough may be OK for sacks but useless for ball gowns.
- Product measures: All manufactured products will have been produced against a specification which will include one or more measurable properties.
- Process measures: The old adage you cannot improve what you cannot measure is the key to improving processes within a business. Any attempt at process improvement will fail if there are not tangible measurable benefits. Great care is needed to ensure that the measures taken before the change can be compared with those taken after the change.
- Services  

Service is generally about achieving customer satisfaction; Did we provide the level of service expected?  
Great care is also needed with service measures, for example just clearing more enquiries more quickly may be masking an underlying dis-satisfaction with the actual service received.
- Benchmarking  

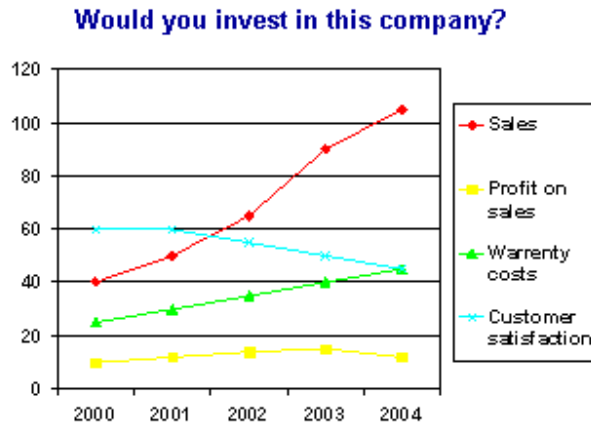
Benchmarking is the process of assessing your organisation against one or more other organisations.  
It can be carried out at organisation level or functional level e.g. procurement.

Specific measurement is not essential to the benchmarking process but can provide useful comparative insight. Great care needs to be taken to ensure comparative measures are like for like. For more details see [Appendix E](#)
- Perceptions  

Whilst not strictly a measure in absolute terms, a survey can be used to measure perceptions e.g. customer satisfaction. Questions can be scored and a value produced which can be used to compare different categories i.e. customers by country or last year v this year.

3.1.2.7 **Typical measures (need for balance)**

A set of measures needs to be balanced. It is no good having lots of financial measures but no customer measures.



Throughout this guide we have been stressing the need to clearly work top down. That is, establish the business strategy, objectives, purpose or goals, then work down to specific measures. However it is also helpful to have a few typical measures to hand to help in selecting the measures themselves. At the lower functional levels of a business experienced staff will almost certainly have plenty of ideas of their own, often far too many, so the problem will be selecting the most suitable. But at a business level it is not so easy.

Here are some example measures taking a business view starting with a list of key areas within a business which will probably need measures at level 1 or 2.

Area of activity	Key measures	Supporting measures
Business performance	Profit on sales	Profit, Sales
	Sales per employee	Sales, No of employees
	Debitors	Cash, Debts
	Cash receipts	Cash, Cash received
	Margin	Sales, Costs
	IT investment	Sales, IT Costs, IT Capital
	Order growth	Orders
Winning business	Bid win rate	Bids won, Bids lost, Bids submitted
	Enquiry response	Enquiries, Time to clear enquiries
	Bid response rate	No of bids, Time to clear bids
Customer relations	Customer satisfaction	Survey score, Complaints, Compliments, Time to clear complaints
	Customer contact	No of customers, No of contacts
	Customer survey schedule	No of customers, Surveys planned and completed
Risk management	Risk mitigation	No of risks, Risks mitigated, Risks with no mitigation plan
	Risks outstanding	No of risks, Risks with no mitigation plan
Delivering products and services	Products delivered on time	Delivery time, Customer delivery requirement
	Milestones achieved	Milestones planned and completed
	Cost performance	Budgeted costs, actual costs
	Schedule performance	Schedules planned and achieved
	Estimate performance	Estimated costs, actual costs
	Requirement stability	No of requirements, requirement changes planned and actual
	Design reuse	No of design elements created, no available for reuse, no reused
	Productivity	No of items (products, units, designs etc) produced, effort to produce items

	Concessions	Product size, No of concessions planned, raised, cleared
	Rework	Product size, Product cost, rework cost, rework effort.
Meeting customer expectations	Customer response	No of enquiries, Time to respond, Time to clear enquiry
	Product reliability	Product size, No of failures (Design, component etc), Estimated failure rate
	Repair time	No of repairs, Time to repair, No repaired on-time
	Spares availability	No of spares, No available when rewuired
	Post delivery defects	Product size, No of failures (Design, component etc),
	Warranty claims	No of claims, Cost of claims budgeted and actual
Business improvement	Training per employee	Training time, employees
	Accident rates	No of accidents, No of employees
	Improvement achievement	No of improvements completed, Costs planned and actual, Process costs before and afterwards
	Communication effectiveness	No of surveys carried out, Survey scores planned and actual
	Ideas raised	No of employees, No of ideas
	Lessons learnt	No of employees, No of lessons, No of lessons used
	Staff recruitment	Required new staff, recruited staff
	Staff retention	No of employees, length of service, No of leavers
	Operational waste cost	No of product changes, Cost of changes planned and actual
	SHE risk assessments	No of SHE assessments planned and actual
	Sickness rate	No of sick days, No of employees

### 3.1.2.8 Target setting

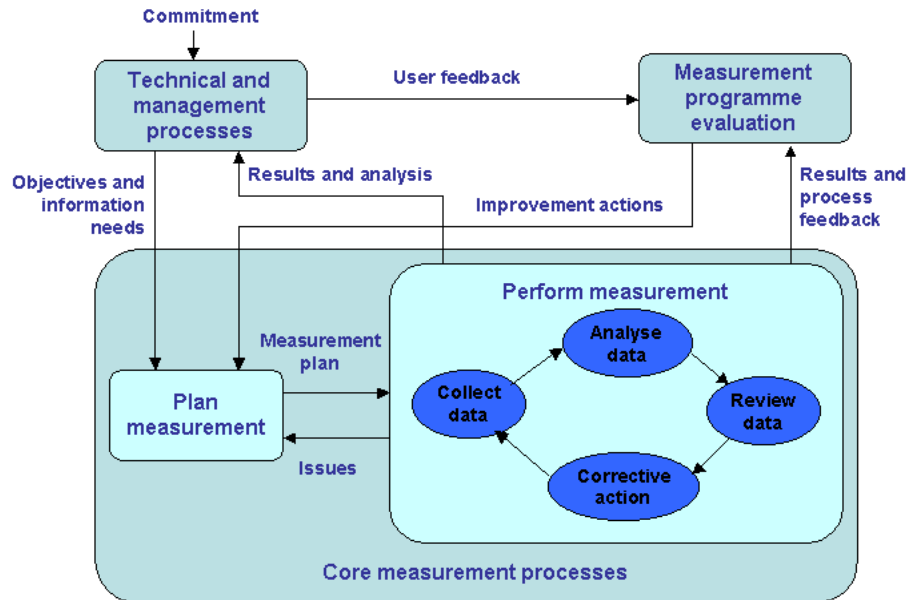
Setting targets is an essential part of measurement. However great care is needed in choosing the right target. It is important for targets to be achievable and realistic otherwise they will lack credibility.

Unrealistic targets are counter productive. A good approach is to have a long term aspiration with a number of achievable intermediate targets.

Historical data can be used as a basis for target setting, but care needs to be taken to ensure like for like comparisons.

### 3.1.3 Perform measurement

The performance of measurement **must** be underpinned by a robust process. The following diagram illustrates a typical process.



The technical and management processes, driven by strong commitment, are the business activities being measured.

- The objectives and information needs feed from these processes to the measurement plan.
- The plan drives the actual measurement activity which consists of four activities performed on a routine basis.
- The results and analysis feed back into the business and any issues are fed back into revisions of the plan.
- Measurement programme evaluation is carried out based upon user feedback and feed back into measurement plans and activity.

#### 3.1.3.1 Collect data

In-complete, invalid or poor data is one of the greatest reasons for measurement program failure. Wherever possible data should be automatically extracted and processed from available sources including other IT systems.

When this is not practical individuals should be nominated to be responsible for accurate and timely collection of data. Good IT tools can be of significant value. An example of a web based tool that has been designed to enable you to get a new measurement scorecard up and running quickly at low cost is:-

[View details of the P2+ tool and access the online system as a guest](#)

#### 3.1.3.2 Analyse and report

Managers have little time and short attention spans, so it is very important for the data to be presented in a simple and understandable form. Graphical formats showing trends are recommended. Beware of charts that suggest that failures are increasing: So what? It may be perfectly reasonable if production is also increasing. In this case the chart should show changes per items produced by month. Another method that can be used is box plots see Appendix F for details.

### 3.1.3.3 Review

Reviews are best carried out as part of business as usual. If, for example, a department holds a regular monthly review of departmental activities, then measurement review should be an agenda item, preferably near the start of the meeting. A separate review will tend to be a low priority for attendees and the meeting will be poorly attended. Material for review should be prepared beforehand in a clear and easily understood form that ensures the audience can relate to the results, and make decisions based upon the results.

### 3.1.3.4 Set corrective actions

There are two types of actions (investigative or change) that can be set at a measurement review.

- If for any reason it is considered that the results do not match the perceived reality then some sort of investigative action should be placed.
- If trend is moving outside the agreed thresholds then some sort of investigative action should be placed.
- If any of the investigative actions indicate an underlying systemic problem then some form of process change should be considered. This may need some additional measures to measure the effect of the change. It is important not to change too many parameters at once, and to allow a settling time before attempting further corrections.

## 3.1.4 Drive improvements

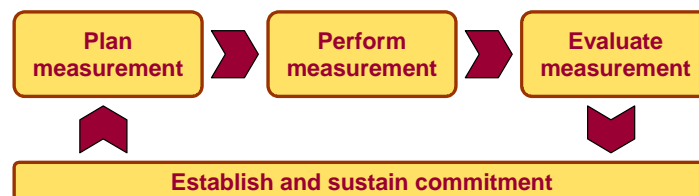
### 3.1.4.1 What decisions are we going to make based on each measure?

All businesses need to strive to improve because there is no such thing as a steady state. Collecting measures may be an interesting occupation, but will not be very productive unless the results are used to drive decision making. So it is important to ask 'what decisions are we likely to make' when reviewing the value of a particular measure. Some things may be obvious e.g. measuring cash flow could lead to a specific drive to collect more cash or conversely pay off a few more suppliers. Others such as productivity are more difficult; exhorting employees to perform better is unlikely to change anything, and might even be counter productive.

### 3.1.4.2 How are improvement programmes supported by measurement

It is here that the old adage 'You can not improve what you can not measure' applies. It is clearly essential to ensure that all improvement programs are supported by a robust measurement activity. Measurements should be taken before, during and after the program. The biggest difficulty is to ensure like for like measurements as improvements tend to change behaviour. Quite often a justification is made for purchasing an expensive bit of capital, but no one ever tests to see if the savings actually materialised.

## 3.2 Measurement management processes



### 3.2.1 How will the business measurement programme be defined?

To be effective the business measurement program should be driven from the top. It is no good having one director keen on a program but others paying lip service. The establishment of a measurement program should form part of the normal business planning process so that it becomes 'The way we do things' rather than a special 'Seemed like a good idea at the time'. This is not to say that lower level managers cannot establish their own programs, but they should be aware that they will only be effective within their own area, and their process may die when they inevitably move on.

### 3.2.2 How will areas of the business to be targeted be defined?

Assuming that establishment of a measurement program does form part of the normal business planning process then it will be clear which areas are to be targeted as these will be the higher priorities in the business improvement plans

### 3.2.3 How will responsibilities for business measurement be defined?

Whilst it has been stressed that measurement must form part of 'Business as usual' i.e. the way we do things, not much will actually happen unless some one is given responsibility for the overall program. Lower level programs could be allocated to lower level staff but they should have a reporting line into the person, usually a director, who has been given overall responsibility. The responsibilities for staff handling measurement activities should be defined within the Business Management Processes.

### 3.2.4 How will objectives be defined?

Defining the objectives, annual and strategic, for a business is a difficult process. It is recommended that a small group of senior staff draft up a business plan. This group would be given general guidelines by the board of directors. Once the plan had been reviewed, agreed and approved by the directors then it is possible to define a set of annual and strategic (longer term) objectives. This is probably best done using brainstorming techniques at a special session headed by the Managing Director. Buy-in i.e. commitment is required by all participants. Without such commitment the measurement program will surely fail.

### 3.2.5 How will the results required by the business be reviewed?

Building the measurement review processes into 'Business as usual' is essential. At the top level e.g. board of directors, it is likely there will be regular financial reviews. Adding the measurement review to this agenda will ensure that it is addressed. At lower levels e.g. projects it is likely that progress reviews will be taking place so again adding measurement review to this agenda will ensure that it is addressed.

## 3.3 Communicating the results



**Choosing the right form of communication is key to getting your message across to the target audience**

### 3.3.1 Communicating the right messages

Communication is difficult; too much and people get bored, not enough and they complain. Even with the right amount care is needed to use the right media, get the right message and address the right audience. It is important to recognise that measurement is boring, so unless there is something in it for me or I have a particular interest then I will ignore it.

By far and away the best way to communicate measurement results is by face to face interactive sessions with key players. The results should have been analysed and a presentation prepared before hand so that the session concentrates on the exceptions rather than going through every item each time. For example; if a trend is deteriorating then the reasons behind the change can be considered and actions placed to improve understanding and / or rectify the systemic problem.

Another method for more general communication is to pick a specific topic each month and using either the Intranet, or posters, present the results and proposed actions. It is vital to keep this sort of communication up to date otherwise it will soon be ignored. If the Intranet is used then drill down facilities can lead to more details.

### **3.3.2 Within the business**

Within the business, the best method is to have a regular face to face session involving all the key directors and, as has already been said, this should be part of a 'Business as Usual, meeting.

### **3.3.3 Within the team**

Within in a team, the best method is to have a regular face to face session involving all the key players and, as has already been said, this should be part of a 'Business as Usual, team meeting.

### **3.3.4 Obtain feedback**

At all times it is vital to keep all parties informed on the measures themselves, the consequent actions and the results. Far more important is getting active feedback. One of the main benefits of an effective measurement program is the ability of the senior managers to know what is actually happening at the coal face. All too often one hears the cry 'we did it despite management'. Once the managers loose touch with the workforce then the business becomes second rate. It becomes difficult to control the direction of the business and management get lots of surprises, not often good surprises!



## 4 Measuring success

From time to time, say annually, an independent person should be appointed to review the measurement program(s) and report on their success. Here are a few questions that should be asked for every measurement program in the business.

### 4.1 Are the measures being used for decision making?

For every set of measurements the review process should be examined and evidence collected on whether any of the measures contributed to the decision making process. If not the measure must be suspect and should be reviewed.

### 4.2 Are the measures giving value?

Every measure, in every set of measures, should be questioned to determine if it gave any useful information and did anyone actually use it. If not the measure must be suspect and should be reviewed.

### 4.3 Have success criteria been met?

Naturally this assumes that the success criteria have been considered. Success is often a matter of opinion but here are some suggestions:

- The order book is growing but not at the expense of sales.
- There are a significant number of repeat customers.
- Deliveries are on time.
- There is a buzz about the place.
- Sickness is below the national average.
- Staff turnover is low.

### 4.4 Are the measurement results being reviewed?

Each measurement activity should be examined on a regular basis e.g. every 6 months, to see that there is a review process in place, it is active and there is full participation and commitment by key staff.

### 4.5 Is the data being reviewed?

One of the main reasons for the failure of a measurement program is poor data. When deciding on a measure, inadequate attention is given to the availability of valid data. For example the process for collecting customer satisfaction data may be working fine but the method used may be fundamentally flawed. Salesman and support staff visiting customers may detect dissatisfaction but the surveys may be giving a different picture. So part of the review process must examine the validity of the data.

### 4.6 Is the need for a measure being reviewed?

Quite often a measurement is put in place in response to a crisis but once the crisis has been resolved consideration is not then given to removing the measure. So any review of measurement in a business must look at all measures being taken. Such a review should also look for duplication, particularly in a large business.

### 4.7 Do the high level goals meet business needs?

Assuming that a business has set objectives, linked through goals, to measures then, as time progresses, the top level objectives will change.

So when reviewing a measurement program it is important to check that the measures have been reviewed and updated to take account of changed and new objectives.

#### **4.8 How mature is your measurement programme?**

Business maturity has a major impact on the maturity of a measurement program. It is quite easy to test measurement maturity. A simple model is included see Appendix H but other models can be found on the Internet.

A low maturity level does not necessarily mean an un-successful program. In a business that is constantly changing it will be very difficult to achieve a high measurement maturity level.

Conversely a long established business that has changed very little may have a very low measurement maturity level.

The cost of achieving higher levels of maturity may not be justified.



## 5 Conclusion

We hope you have found something useful in this e-book that will contribute to improving your business through an effective measurement program. Like all technical and management activities there is never one right solution. Circumstances will dictate what is right for you but at the end of the day there are a few common sense things you can do that will significantly improve the effectiveness of your measurement program.

- Ensure that measures are driven from business objectives (goals)
- Obtain management commitment, this is essential
- Follow an established process

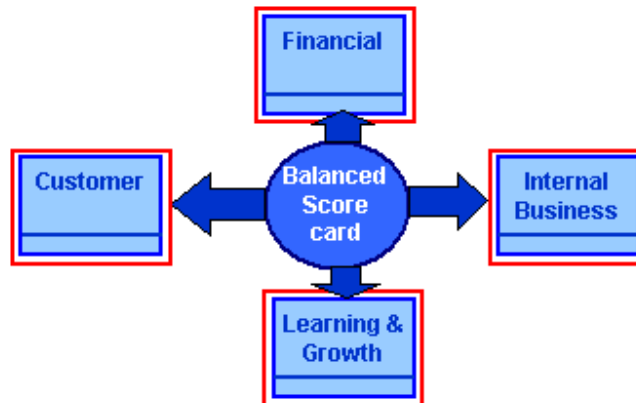
Finally above all 'Keep it simple', a few, well targeted, measures are far better than reams of data that is never actually used in decision making.

### And finally .....

If you find this e-book useful, and particularly if you did not pay for it, it is [Good Karma](#) to offer the author a financial reward ~ we all have to make a living, and you would happily give a tip at a restaurant for good service 😊

## Appendix A Balanced Scorecard

A balanced set of measures is essential to success



The Balanced Scorecard concept was developed by Kaplan and Norton is fully detailed in their book reference [2 Balanced scorecard](#). There is also a wealth of information on the web, search for Balanced Scorecard

The beauty of the concept is its simplicity, stripped of its detail it proposes that a set of business measures be balanced across four business perspectives, Customer, Financial, Learning and Growth and Internal Business.

Traditionally businesses have focused on short term financial goals and hence measures such as orders, sales, costs and profit. This is natural when a business is fighting for survival but is almost certainly detrimental to long term survival and growth.

Another key facet of the Balanced Scorecard approach is the requirement to limit the number of measures to around 20. This is to ensure that time is spent selecting the most suitable measures that have a clear link to business objectives. Furthermore too many measures leads to confusion and before long staff lose interest and the measurement program losses credibility.

Here is a simple example of a Balanced scorecard:=-

Scorecard Perspective	Measures	Units	Target	Current value
Finance	Orders	£M	10.5	11.5
	Sales	£M	6.5	5.5
Customer	Complaints	No	12	10
	Compliments	No	6	7
Learning & Growth	Improvement achievement	%	6	4
	Lessons learned	No	5	3
Internal Business	Staff retention	Years	5	6
	IT investment	£K	65	87

## Appendix B GQM (Goal Question Metric)



The Goal, Question, Metric method was originally defined by V.Basili reference [4 Goal, Question, Metric](#), it also forms part of the AMI method.

There is a wealth of information on this method on the web, use key words GQM.

At the highest level in a business goals would be based upon the business strategic objectives whereas lower down projects would have goals focused on project achievement. This leads to the concept of goals and sub goals. Whilst it is not essential for lower level goals to be matched to higher level goals it can help staff understand how their activities fit into the bigger picture.

### 1. Defining the Goals

Clearly at a business level this method relies upon there being a set of achievable strategic objectives. These would usually be drawn up by the Board of Directors who would consider the following:=-

- The organisations mission, i.e. why the organisation exists.
- The organisations vision, i.e. how is the business going to develop in the future
- Specific areas where improvement is needed, this may be due to past problems e.g. poor delivery times, production problems or improvements needed to meet business development
- Key stakeholder needs. E.g. customers may be demanding on-line services,
- New statutory or legal requirements.

Goals tend to be of a rather general statement like ' Increase customer satisfaction by 10% per year' and do not necessarily lead directly to a measure.

### 2. Defining the Questions

The next step is to ask questions of the process that underpin the goals. Due to the fuzzy nature of goals, particularly at the top business level this is actually a difficult process. Taking the example goal, ' Increase customer satisfaction by 10% per year' the first question might be 'Which processes impact customer satisfaction'. E.g. The repair process or the allocation & dispatch of a service engineer.

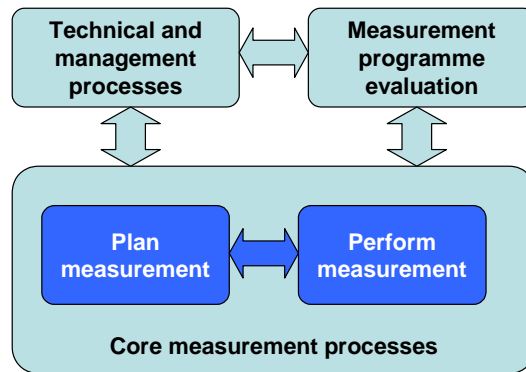
Another question might be 'what factors impact on customer satisfaction?' E.g. Delay in return of rectified faulty goods, Service engineers are not available when needed, support staff unhelpful, promises not kept etc Followed by 'Which factors have the biggest impact?' say 'Promises not kept', then 'Which stages of the process affect the critical factors?' e.g. 'Allocation of service staff'

### 3. Selecting the measures

From these questions we can identify possible measures.

Using the above example possible measures might be 'How many times does a service engineer meet the allocated time?' or 'What is the average delay in arrival at site' or 'How many times was problem on site not resolved? etc. The final measures chosen will depend on whether it is practical to collect the data.

## Appendix C Practical Software Measurement



Practical software measurement (PSM) was primarily developed for the USA military for software intensive projects but the principles apply across all type of measurement programs. There is considerable information available on the intranet as well as a book, reference [5 Practical Software Measures](#)

Measurement is of particular interest to managers of software products because the product is invisible and very complex. i.e. documents and code. It is much easier for a builder to know the approximate cost of a 4 bedroom house with certain specified features and square footage. For this reason many measurement processes have emerged from the software project community.

### 1.0 Concepts

PSM focuses on project level measurement and shows how measurement can be tailored to satisfy needs of each project. With care objective organisational level information can be derived from projects thus addressing the concerns of different levels of management.

PSM concentrate on two key characteristics:

- The collection, analysis and reporting of measurement data that relates directly to the information needs of the project decision makers.
- A structured and repeatable measurement process that defines project measurement activities and related interfaces.

### 2.0 Measurement process model

PSM includes four key activities:

- Plan measurement, using the information needs model and includes defining resources required.
- Perform measurement, implements the measurement plan and includes collection analysis and review.
- Evaluate measurement, covers the evaluation and analysis of the measurement activity itself.
- Establish and sustain commitment, ensure commitment at all levels of management.

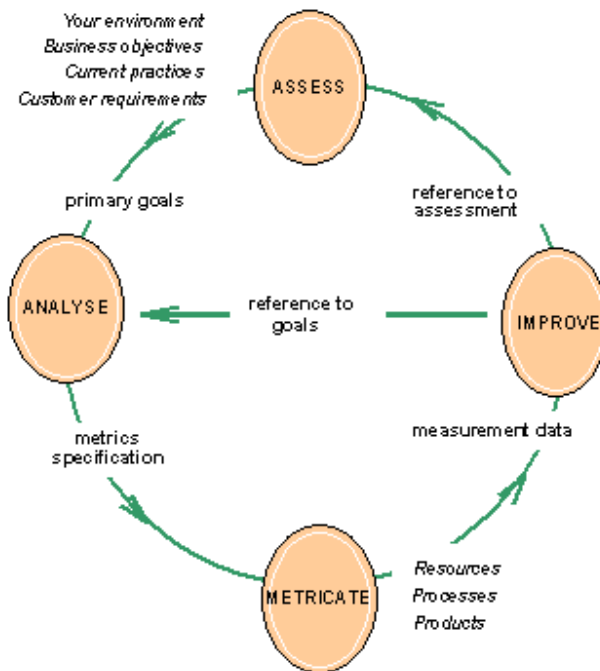
### 3.0 Measurement information model

At the heart of the PSM method is the measurement information model. It is based upon the following key areas:

- Information needs, this is the information needed by project managers to support decision making.
- Measurable concept, defines the entities that need to be measured to support the information needs.
- Measurable construct, defines what exactly will be measured to meet the measurement concept.
- Measurement procedure, defines how the data will be collected and organised to satisfy the measurement construct.

- Measurement plan, this is the document that records the Information needs, the Measurable concepts, the Measurable constructs and the Measurement procedures

## Appendix D AMI (Application of Metrics in Industry)



Many measurement programmes give insufficient consideration as to why the metrics are being collected or how they should be used. This often leads to the situation where a large collection of data is not effectively used or cannot be fully utilised because a key piece of data has not been collected.

Following the AMI method ensures that, during the planning of a measurement programme, the reasons for collecting the data are properly thought through and the metrics are properly focused on the needs of the business.

An outline of the AMI method is given below. For more details and how to implement the method the reader should refer to the AMI handbook see reference [1 Application of metrics in Industry](#).

The AMI method is organised into four activities

- **Assess:** The objective of this activity is to identify the goals and objectives of the metrics programme related to the business goals.

The steps in this activity are targeted at looking at the existing situation and using the knowledge of the strengths and weakness of the organisation's current development processes. The goals identified are used in the later activities to provide an appropriate focus to the measurement programme.

- **Analyse:** The objective of this activity is to take the goals produced by Assessment activity and to produce a set of metrics to be collected that will provide information supporting the achievement of the goals.

It also includes discussion of the sub-goals with personnel near the work face to get their insights into the details of the processes and the practicality of the metrics to be collected. The goal tree also provides a means of collating the collection, distribution and interpretation of the metrics.

- **Metricate:** The objective of this activity is to plan and then to collect and verify the data and metrics values.
- **Improve:** The objective of this activity is to compare the measures collected with the goals and use this as a means of achieving the goals.

The aim is for this activity to lead to a set of actions that will improve the processes. This activity also covers the consideration of how to extend the measurement activities, based on the information and understanding already obtained, to gain more detailed information that could lead to further improvements.

At the end of the Improvement activity the organisation will have produced plans to revise the measurements to provide more information.

It might also want to change its processes to improve them. This will be the event that triggers a new cycle of the method. This cycle will be a lot simpler since a lot of the information that was needed the first time around will be available as well as that derived from the execution of the first AMI cycle.

The cyclic nature of the AMI method recognises the continuous nature of process improvement and the need to periodically review and update the goals and the metrics that are collected.

Measurement is applicable though out the whole of a business from top to bottom. Lower level, more detailed specific measures feed up to the top level business measures thus forming a hierarchy of measures in which data feeds up, and decisions feed down.

## Appendix E Benchmarking

The main benchmarking, [see reference 3](#), process steps are:-

- Where are we now, [what](#) is our current performance?
- Where do we want to be, what is our target performance?
- Which processes do we need to improve?
- How do we compare with other organisations?
- Which organisations are better in similar or related industries?
- How do organisations achieve better performance?
- How can we improve performance?

In order to ascertain the first three it is imperative to have concise and accurate description of the process(s) to be compared together with measurements of each stage in the process. It is also important to realise that the benchmarking partner is likely to want a two way exchange of this information so it is wise to 'de-reference' or average the data over a number of projects rather than giving precise details of a particular project.

For these reasons it may be necessary to produce a special set of benchmarking metrics based on mutual definitions. These may be derived from historical data already collected under a company's metrics scheme or they may be specifically collected for the benchmark. Defining these metrics could involve looking at the definitions used by the partner. Productivity, for example can be measured in a number of different ways but a common definition must be used in order to benchmark.

A formal agreement must be reached between the partners to ensure that any information traded between benchmarking partners is treated in complete confidence and to ensure that each party is clear about what information will change hands. Such agreements must not breach international laws.

Before a bench mark can take place it is necessary to determine your own performance against industry norms. This can only be done using published surveys and reports. The Internet provides a vast source of such data but it may take some time to find what you really need. This process is also likely to indicate suitable partners.

### 2.0 Selecting a partner

The benchmarking forum, search web for a number of references, maintains a database of all Companies and the processes they consider to be well founded and available for benchmarking. The Forum provides a service to Companies whereby it will seek out prospective partners, throughout the Companies organisation, at the behest of the company seeking to improve a business process, and make the initial contact to see if they are willing to enter into a benchmarking partnership.

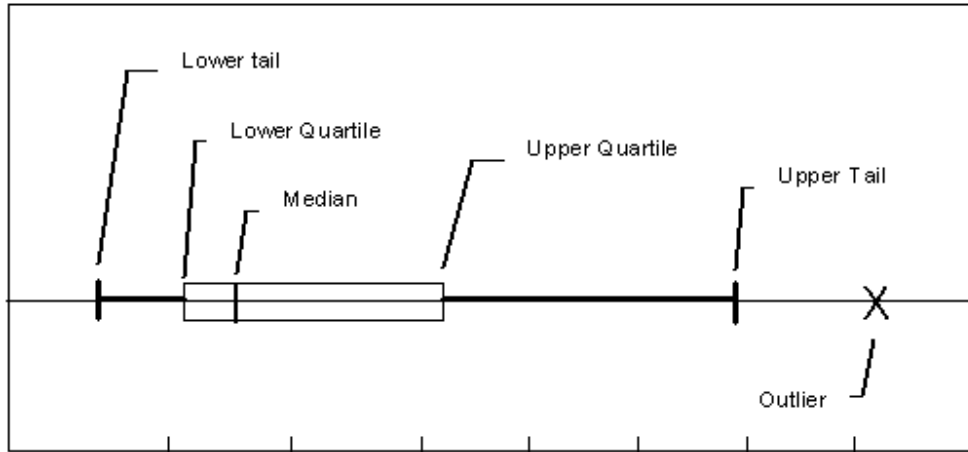
Once a clear picture of what needs to be improved has been identified a set of targeted questions are formed. These will help when approaching a partner, as it will be clear exactly what is required of them.

Finally exchange visits are arranged to enable each organisation to see the prossees being benchmarked in action and provide feedback and advice on improvements. Measurements must be put in to place to measure the process before and after any improvements. Follow up exchange visits can be arranged to continue the partnership.

For more information see reference [3 Benchmarking](#)

## Appendix F Box plots

The diagram below shows the format of a box plot.



The statistics shown on the box plot are the median, the upper quartile and the lower quartile.

The median,  $m$ , of a set of numbers arranged in order of magnitude (i.e. in an array) is the middle value or the arithmetic mean of the two middle values. The upper quartile,  $u$ , is the median of the values that are more than  $m$ , and the lower quartile,  $l$ , is the median of the values that are less than  $m$ . The box length is the distance  $d = u - l$ . The theoretical upper tail value is the point  $u + 1.5(u - m)$ , while the lower tail value is the point  $l - 1.5(m - l)$ .

The theoretical tail values must then be truncated to the nearest actual data point to avoid meaningless concepts such as negative staff and to demonstrate the essential asymmetry of skewed data sets.

Values outside the upper and lower tails are called outliers and are shown explicitly.

The box plot shows the skewness of the data set by the position of the median in the box and the length of the tails. If the data set is symmetrical the median will be positioned in the centre of the box and the tail lengths will be equal. If the data set is skewed the median will be off-set from the centre of the box and the tail-lengths will be unequal. In the example box plot the data set is heavily skewed to the left.

## Appendix G Measurement Maturity Model

Use this schema to check out the maturity of your measurement programs at all levels within your organization

Measurement Maturity Model					
Attribute	Maturity Level				
	Ad Hoc	Defined	Repeatable	Improving	Embedded
<b>Definition</b> (Goals, processes, measures, targets)	A few measures defined and used at local team level	A significant number of measures defined and used at local team level, processes defined. Some targets set	Team measures and processes in place and usually followed, some organisational measures defined	Team and organisational measures and processes in place, some goals defined.	Organisational improvement goals fully defined. Processes in place and followed. Measures and targets fully defined. team measures feed into organisational scorecards
<b>Data integrity</b> (Validity)	Data integrity levels not known	The some data checked for integrity	About half of data checked for integrity	The majority of data checked for integrity	Data integrity fully checked
<b>Ownership</b> (Goals, processes, measures, targets)	Few owners or responsibilities agreed or defined	Most Owners or responsibilities agreed and defined at team level	Some owners or responsibilities agreed and defined at organisational level, all at team level	Most owners or responsibilities agreed and defined at organisational level, all at team level	Ownership defined and responsibilities fully accepted for goals, processes, measures and targets at all levels
<b>Review Process</b> (Frequency, feedback)	Some reviews take place at a local team level on an ad hoc basis	Regular reviews take place at a local team level some actions placed	Some reviews take place at organisational level some actions placed	Regular reviews take place at a local team and organisational level actions placed and resolved in a timely manner	Review and feedback processes for measures and data defined, approved and in place at team and organisational levels on a routine basis
<b>Data collection</b> (Process, reliability, automation, responsibilities)	Some data collection takes place at team level on an as an when basis, little automation and responsibilities not defined	Data collection takes place in many teams on a regular basis, little automation. Responsibilities may be agreed	Data collection takes place in all teams on a regular basis, some automation. Responsibilities agreed	Data collection takes place at organisational level on a routine basis with feed from team data, significant automation. Responsibilities defined	Data collection takes place at organisational level on a routine basis with feed to and from team data, wide spread automation. Responsibilities fully defined and approved
<b>Culture</b> (Relevance, Usefulness, Communication)	Measurement not seen as relevant or useful. No communication between teams or within organisation	Measurement seen by some teams as relevant and useful. Little communication between teams	Measurement seen by most teams as relevant and useful. Some communication between teams	Measurement viewed by most staff as relevant and useful, some communication of results within the organisation	Measurement viewed by all staff as relevant and useful, it is part of the culture. Significant communication of results within the organisation

## Appendix H Example of a tool

The following two images show the features of a tool to enable you to get your measurement program up and running quickly at minimal cost. To try the tool out go to <http://www.measurementmatters.com/measurement/web/index/htm> and log in as a guest.

**A range of charts are provided to enable you to monitor trends and detect underlying issues**

**Orders (Yearly cumulative)**

**Data entry for current values, targets, forecasts, rationale and commentary**

Perspective	Metric (click to show current year)	Units	Value		Jan 2005 Total entry	Responsible	?
			Month	Total			
Financial	Profit on sales	%	na		Year	supervisor	✓
	Margin	RM	12	3.0	Year	supervisor	✓
	Cash	RM			Value	supervisor	✓
Customer	Customer complaints	No.			Year	supervisor	✓
	Orders	RM	3	20	Year	user@itn	✓
	Customer satisfaction	Score			Value	supervisor	✓
	Customer complaint log	Months	na		Value	supervisor	✓
	Customer compliments	No.			Year	supervisor	✓

**Measurement parameters fully programmable**

Measurement parameters

Unit	Target direction	Distaloid (Active to %)	Distaloid (Active to %)	Source database	Source table	Benchmark value	Hypertext	Controlled text
EM	↑	%	10	P2P_Data.mdb	Business.tbl	1	1	0

Definition: Cumulative Orders received

Fields in selected table holding the measurement data (Do not select the same entry for more than one field. Actual and Target cumulative must have a valid entry)

Actual cumulative	Target cumulative	Actual monthly	Target monthly	Forecast cumulative	Forecast monthly
BU_04_actual	BU_04_target	BU_04_month	BU_04_month_target	BU_04_forecast	BU_04_month_forecast

Comment: No comment entered

More measurement parameters

Responsible	Owner	Risk	Process	Updated by	Date
user@itn	Supervisor	Enter associated risk	0	supervisor	Apr 2005

Rationale: Enter rationale for target

Update measurement parameters | Edit measurement name: Orders | Add / Edit Hyperlink Address | View available fields

**For more information**  
e-mail us at [support@measurementmatters.com](mailto:support@measurementmatters.com)

## References

1 Application of metrics in Industry.

'A Quantitative Approach to Software Management - The AMI Handbook' published by Addison-Wesley  
Wokingham 1996  
[Esprit project 5495](#)

2 Balanced scorecard.

The Balanced Scorecard: Measures that drive performance by Kaplan and Norton  
The Balanced Scorecard: Translating Strategy into Action by Kaplan and Norton

3 Benchmarking.

[Look in wikipedia](#)

4 Goal, Question, Metric.

[Look in wikipedia](#)

[Encyclopedia of software engineering, published by John Wiley & Sons inc](#)

5 Practical Software Measures

[Practical software & Systems Measurement home page](#)

Practical Software Measurement; Objective Information for Decision Makers. Published by  
Addison-Wesley

6 Measurement Matters

[Measurement Matters Home Page](#)

Practical, jargon free advice on business measurements. Includes access to a web  
database which allows a) trial runs of new metrics and b) a standard by which to compare  
other tools you may be considering.