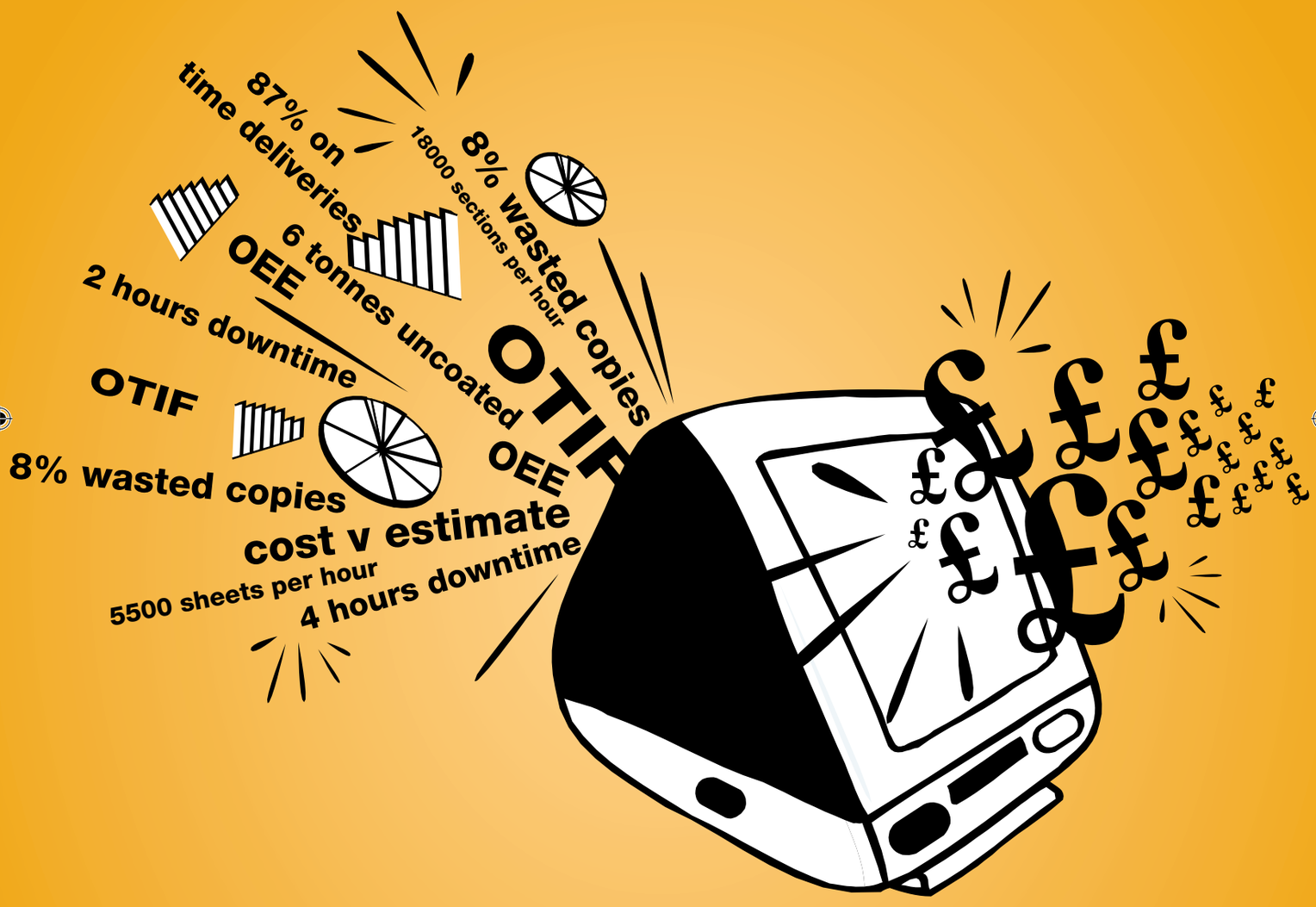
Management Information Systems
BEST PRACTICE STUDY

Guide to effective MIS use for printers



Final Report
Contains full analysis and data
November 2006

dti
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VISION IN PRINT

Management Information Systems

A best practice study from Vision in Print

Prepared for Vision in Print by Pira Consulting

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Acknowledgements

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Case study companies

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Britespot	Colourhouse
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Jade Press	John McCormick & Son
Jones & Palmer Ltd	Martins
MHDC	Newnorth Print
Norman Printing	Park Communications
Pensord	Prime Litho
Print Solutions Romec Ltd	Printwize
SPM Litho	SR Communications
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Preface: Vision in Print

Vision in Print - The Print Industry Forum

ViP was established in April 2003 and is still part-funded by the DTI as a part of the Government's manufacturing strategy**.** The Board is made up entirely of executives from companies in all sectors of the UK printing industry, large and small, Amicus GPMS. The mission is to implement a programme of practical activities to benchmark and improve competitiveness of individual companies and over time raise the performance of the whole industry. There are nearly 20,000 print companies in the UK, across sectors as diverse as newspapers to food packaging.

Vision in Print make no sectoral distinctions and introduce companies to lean manufacturing techniques by applying the Industry Forum 'hands-on' approach. The in-company performance improvement programmes are delivered by ViP's highly skilled engineers. These activities usually focus on manufacturing, however customer service, customer added value services, business processes, creating the right team and continuous improvement cultures are all areas tackled with clients. Vision in Print also conduct a series of Best Practice studies using experience from both Print and other industries; it publishes reports on key topics, the aim being to raise productivity and highlight key issues for the whole industry.

Current Products

Premier Snapshot

Masterclass

Masterclass Lite

Kickstart

Booster

Office & Pre-Press Change Cycle

Lean Focused Maintenance

Value Stream Mapping

Lean Champion Mentoring

Partners

Constructing partnerships was a key task in the first year of operation, with active links forged with all the main trade bodies and research associations serving the printing industry:

British Printing Industries Federation, Proskills Print, Amicus GPMS, EFTA, SPEF, SPA, BAPC, PICON, IOP (now called IP3), Pira

More information about ViP can be found on the website www.visioninprint.co.uk

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Glossary

AV

Added Value – a useful measure of wealth retained in the company for a specific job a fuller definition is available in Appendix 1.

CRM

Customer Relationship Management – normally used to describe a form of computer database system that collects a wide variety of information about customers, in particular, interactions between individuals, with the aim of fostering good business relationships.

EBIT

Earnings before interest and tax.

JDF

Job Definition Format – an industry standard XML based file format that contains complete job specifications, and compiles production data and machine settings as work progresses. JDF is a common language for machinery used in print production and MISs to intercommunicate. (See www.cip4.com for full details).

KPI

Key performance indicator – used to provide a simple measure of some activity that can be monitored to show performance in relation to targets and indicate trends over time.

MRP

Materials Requirements Planning – a term borrowed from general manufacturing industry to describe the process of working out the materials and components required to build a product, and sometimes the logistics involved in their delivery.

OEE

Overall Equipment Efficiency – a measure of production efficiency that combines several concepts – see the full definition in Appendix 1.

OTIF

On Time In Full – used to describe the performance of print companies in delivering work to their customers.

RFQ

Request for quotation.

Executive Summary

Overview

The print marketplace is widely believed to be more competitive now than ever before – certainly profit margins are under pressure, with the average profitability of a UK print company currently being 3.9% (Source: BPIF). In such conditions, fine tuning a business is vital, which is where an MIS can be invaluable. However the widespread opinion is that printing companies in general do not use their MIS systems nearly as well as they could and hence are missing out on much of the benefit potentially available from their MIS investment.

The purpose of this study therefore, is to encourage companies with MIS systems to invest a little time so as to use them more effectively and thereby gain benefits which will help to improve their business. The focus is deliberately on smaller companies, and the methods described in this report and largely derived from best practice examples currently in use in companies. They have been selected on the basis that they are easy to implement and deliver useful results without huge time investments or expenditure.

This study has been carried out in three main phases:
Phase 1: industry survey which was in two parts:
Survey of MIS suppliers
Survey of Printing Companies
Phase 2: 11 Case studies demonstrating good use of MIS
Phase 3: Compilation of results, using a "Balanced Scorecard" which for the purposes of this study has focussed on four main aspects that can be assisted by MISs, which are:

- Financial
- Production
- Sales
- Customer service

As a final part of the project, a practical guide to effective use of an MIS has been compiled, again structured in this way.

Also, an "MIS Health Check" has been created to encourage readers of this report (and others) to make a quick assessment of their use of MIS and so see where there is opportunity to improve without great effort. This will also be available on the VIP website.

Summary of survey findings

Key findings from the survey of printing companies were:

- MIS systems are primarily looked upon as a means of improving speed and efficiency of administrative processes, not as means of measuring, controlling and developing the business.
- Estimating emerged as a critical issue, and is a primary reason for many companies to have embarked on using an MIS in the first place. Speed of estimating and turnaround times are key issues. On average 28% of estimates become real jobs. Estimators produce on average 15 estimates per day. Estimates are primarily seen as a means of generating a quotation, not as the foundation of the entire MIS process.
- Utilisation (or lack of it?) emerged as the "critical issue" that many companies monitored closely using their MIS
- Only 35% of companies operate a costing system, with only 7% regularly comparing job cost against estimate.

- Only 25% of companies analyse profitability of job types/customers/market sector to establish the profit and loss generators for their company
- e-commerce is not widely used by smaller companies at present
- Many KPIs are in use related to production management but OEE is only used by 2% of them
- 35% of companies use MIS for at least some aspects of Production planning and scheduling, but full scale production scheduling is used by very few.
- Analysis of production, where done, tends to be done on an individual job basis rather than taking a consolidated view from which more general lessons might be learnt
- Printing companies are generally satisfied with the training they receive from the MIS suppliers but would like to see more provision for on-going training on an as-needed basis.

Summary of case studies

11 case studies were undertaken to illustrate excellence in use of MIS. Key benefits that emerged were:

- The ability to maintain control of the business – keep a finger on the pulse. This is achieved by the availability of real-time data and information from the MIS. A key purpose to this is that corrective action can be taken at the earliest possible time if a problem is detected.
- In similar vein and for the same reason is the ability to make end-of-month projections on a daily basis.
- Measurement of the business as the basis of continuous improvement
- The ability to identify profitable and unprofitable work and/or customers so that the companies selling activity can be appropriately directed.
- Improved pricing decision making, especially taking into account the AV% component of a job, and the predicted AV/hour.
- Use of the MIS to assist in the production planning process which improves the overall efficiency of production management. Only two companies surveyed use full production scheduling, the rest generate work-to lists, but even this is a positive benefit.
- Automation as a means of providing superior customer service (especially through e-commerce functions and rapid response to requests for quotations) and to gain administrative efficiencies.

KPIs are widely used. KPIs are viewed as part of a total process which involves:

- Establishing KPIs for all key operations
- Establishing targets for all KPIs (for individuals/teams/departments etc as appropriate)
- Collecting and analysing the data necessary (largely done by the costing system, which can be supported by shop floor data collection)
- Monitoring trends (usually best done by presenting KPIs graphically)
- Displaying the results (for example, on departmental noticeboards where appropriate). Some KPIs are only appropriate to individuals.
- Follow up – use as the basis for continuous improvement, either with team meetings, with individuals or departmental managers

Full scale production scheduling was used by two of the companies surveyed. Having now got used to the system neither of them would wish to be without it. This is particularly interesting since it is a commonly held view that computerised scheduling systems require much data input and are too slow and inflexible to keep up with the quick turnrounds and rapidly changing nature of work in printing companies today. But in both of these case studies, it is precisely because of these

characteristics of the modern print business that they have found it necessary to use computerised scheduling, and that the benefits are so significant. In summary the benefits are:

- Increased press-room capacity (as a result of job batching and planning by minutes rather than quarter/half hours)
- Improved quality and speed of internal communications – reduced need for "production meetings"
- Generally improved administrative efficiency
- As part of a total system it records actual performance and compares with plan – it is not necessary to have the scheduling system to do this – it just makes it an easier and more obvious thing to do.

As in the telephone survey, estimating issues featured significantly as a result of falling order value and falling conversion rate, hence the need for more estimates to ensure enough are converted to actual jobs. Speed of turnround on estimates is critical – if you are the first to respond, this significantly increases the probability of receiving the order.

Estimating systems are well developed, yet it would appear that there is an argument for a re-think of the process. One company is doing this with some benefit, which not only speeds estimating, but eventually will have the customer doing most of the work. Pricing is an important aspect of producing a quotation and several of the companies in the case studies placed importance on the use of AV% and AV/hour as predicted by the estimating/pricing system; then pricing jobs carefully so that the required targets for these were met.

Recommendations for printers

It is recommended that directors and/or managers in printing companies should:

- Undertake the health check – possibly using it as the agenda for a Board meeting
- Implement several of the suggestions in the practical guide
- Review training needs – management training and MIS training – and action as necessary

The key aspects of the Practical Guide are:

Financial and business management

1. Manage cash flow
2. Produce a 1 page A4 summary
3. Keep your finger on the pulse
4. Use accurate cost rates

Sales

5. Produce month end forecasts
6. Know where profits/losses are made
7. Produce detailed estimates

Customer service

8. Measure customer service levels
9. Analyse administration costs

Production

10. Operate a costing system
11. Use OEE and other KPIs
12. Implement production scheduling
13. Training
14. MIS ownership

Recommendations for MIS suppliers

It is recommended that MIS suppliers should:

- Implement reporting of KPIs and summary data (e.g. the single A4 page) as standard features of their systems as outlined in the Practical Guide, if not already available
- Run MIS workshops at User Group meetings
- Enhance on-going training options via webinars, remote interactive individual training etc.
- Examine estimating system methods to speed up the process while making the estimate more detailed, recognising the multi-functional role of the estimate

Are you using your MIS effectively?

The initial survey carried out for this study showed that few companies use their MIS to best effect and in fact, the overwhelming majority could derive very much more benefit from their systems. This "Reality Check" is designed to prompt you to reflect on your own use of MIS. It will also be accessible on the ViP website.

If you can give a definite or positive answer to 75% of these questions then you are deriving good benefit from your MIS. However, if some of your answers are negative or you don't know, this suggests there are several areas that you should consider working on in your company. All of these questions are addressed within this report.

1	Assuming it is working day no. 8 in the month, do you know your expected turnover, AV and profit for the month end?	
2	When did you last do a cash flow forecast?	
3	Is your average utilisation better or worse than that required for you to meet budget?	
4	Do you know the cost of producing an estimate and a works instruction ticket?	
5	What is the minimum AV/hour target for a job in your company?	
6	How much MIS/management training per person has taken place in the last year?	
7	Do you know what your current cost rates are?	
8	Is your management culture characterised as pro-active control or fire-fighting?	
9	Do you routinely compare actual cost of production with estimates?	
10	Do you know which categories of work and customers generate profits and losses?	
11	What is your OEE?	
12	What % of jobs are delivered OTIF?	
13	What are the top 10 KPIs/targets that you have in regular use?	
14	What is your estimate conversion rate?	
15	Are KPIs regularly discussed with production operators/departmental managers?	
16	Is performance data graphically displayed on your notice boards right now?	
17	Do you use a computerised scheduling system?	
18	How many estimates per day does each of your estimators produce?	
19	Do you know your average time to respond to a customer job status enquiry?	
20	Do you have a 1 page summary of current company performance that is routinely discussed at Board meetings?	

1 Background

The print marketplace is widely believed to be more competitive now than ever before – certainly profit margins are under pressure, with the average profitability of a UK print company currently being 3.9% (Source: BPIF). In such conditions, fine tuning a business is vital, which is where an MIS can be invaluable. However the widespread opinion is that printing companies in general do not use their MIS systems nearly as well as they could and hence are missing out on much of the benefit potentially available from their MIS investment. This is believed to be particularly the case with smaller companies (which in this study is taken to be companies with turnover less than £10m, while recognising that the majority have turnovers in the £1m- £5m range). Such companies often cannot afford a dedicated person to develop the use of their MIS and hence get the best from it, they may not think it is worth the effort or maybe they simply cannot afford the time given the day to day pressures they are facing.

And yet the MIS proposition is that, properly used, these systems will help with the administrative workload and most importantly enable measurement and analysis of the business leading to continuous improvement and improved quality of management decision making, eventually leading to improved bottom line performance.

The purpose of this study therefore, is to encourage companies with MIS systems to invest a little time so as to use them more effectively and thereby gain benefits which will help to improve their business. The focus is deliberately on smaller companies, and the methods described in this report, largely derived from best practice examples currently in use in companies, have been selected on the basis that they are easy to implement, and deliver useful results without huge time investments or expenditure.

2 Objectives

- To illustrate how printing companies can improve their performance through effective use of their MIS
- To identify and describe best practice scenarios to encourage better MIS use
- To assess the current usage and benefit derived from MIS systems in UK printing companies

3 Outline methodology

This study has been carried out in three main phases:

Phase 1: industry survey
This survey was in two parts:
Survey of MIS suppliers – a questionnaire was sent to MIS suppliers which was then answered by email or discussed over the phone. (See Appendix 3) The purpose was to establish the experience of MIS suppliers on how their systems are used, their views on training issues and the system choice and implementation process.

Survey of Printing Companies – a rather long questionnaire was used which was answered sometimes by email but mostly by telephone interview. (See Appendix 4) The length of the questionnaire was a result of the many aspects of an MIS that needed to be covered and the complexity of some of the answers required. The better a company was using its MIS, the longer the questionnaire took to complete, and the authors are most grateful to those companies who persevered with this process.

Phase 2: Case studies
A group of 11 companies was selected all of whom are using their MIS in an effective way. Each company was visited for interview. In most cases we have focussed on one aspect of a company's use of its MIS to examine that in detail and illustrate the benefits that have been derived. Companies ranged in size from £1.5m to £26m. One company had a turnover of £26m, the rest were below £10.6m and of these half were below £5m.

Phase 3: Compilation of results
From the outset, the project has adopted the concept of a "Balanced Scorecard" to structure the questionnaires and at this stage to assimilate the results. The Balanced Scorecard approach is widely used by various industries to provide, as the name suggests, a balanced view of a company's performance which is not unduly weighted in a single area. The Balanced Scorecard approach normally covers a wide range of issues but for the purposes of this study we have focussed on four main aspects which can be assisted by MISs, which are:

- Financial
- Production
- Sales
- Customer service

Hence the outcome of this study is presented under these headings.

The main outcome of the project is the compilation of a practical guide to effective use of an MIS, again structured in this way.

Finally, an "MIS Reality Check" has been created to encourage readers of this report (and others) to make a quick assessment of their use of MIS, and see where there is opportunity to improve without great effort. This will also be available on the VIP website.

4 MIS: Overview

The survey reported in section 5 reveals the not surprising fact that a predominant reason for companies to invest in MIS is to improve administrative efficiency, and especially to improve the output of estimates. These are good reasons for making the investment, but a good MIS is capable of contributing much more to the development of a company. As mentioned earlier there is the widespread view that MIS systems are not used effectively by the great majority of printing companies, although the results of the survey suggest that usage might be more effective than is supposed. However, the purpose of the survey was to shed some light on these issues and illustrate the scope for improvement, and at least in part, to indicate to MIS suppliers how they can improve their performance.

An MIS is a multi-functional system, with those functions all interacting to some degree. But a key function is that of estimating. Estimating is commonly seen as a means of generating a quotation for the customer, but in the context of an MIS is actually much more. Appreciation of this helps to illustrate how an MIS can make a contribution to the business overall.

4.1 Estimating

The first stage of estimating is the creation of a production plan – that is, what processes and materials will be needed to produce a given job. This is followed by a calculation of how long each process will take, and from this, using hourly rates for each process, a *predicted cost of production* is calculated. This is then one input into the commercial decision of deciding on a price to charge the customer, and hence the production of a quotation. (At this point there is the opportunity for a "sanity check" to establish that the added value and AV/hour in the job is sufficient to warrant doing it at all.) Assuming the job now goes into production, it is the production plan from estimating that is loaded into the production scheduling process (no matter whether this is done manually on a production loading board or by computer). The calculated times from the estimate become the *target times* for production. These times are effectively measured using the costing system, from which, using the same hourly rates as used for estimating, an actual cost of production is calculated. So now the *actual cost of production* can be compared with the *predicted cost of production* – discrepancies identified, and subsequently analysed. Much can be learnt from this feedback process. Done manually, this is a lot of work – the beauty of the MIS is that it becomes almost an automatic process, and hence a mechanism for continual business improvement.

What is the minimum AV/hour target for a job in your company?

As we look to the future, job specifications will be provided in JDF format, and hopefully these loaded directly into estimating programs. If this becomes possible, then e-commerce functionality will become more important and useful. Estimating will become a principal customer interface function.

4.2 Production planning and scheduling

A primary objective of the scheduling process (however it is done) is to generate a work-to list for each department or machine or individual. In a small company it may be adequate to keep a list of all jobs in a spreadsheet, sorted by delivery date, but this may not be sufficient for the number of jobs and quick turnrounds required in most printing companies today. At the very least, the work-to list for each machine should be a list of jobs which are "viable" – that is, their status is such that they can

be progressed, so for example, proofs have been passed, plates made, paper and any special inks have been delivered. This immediately adds to the complexity of the spreadsheet approach in that all these elements have to be monitored, but it is still feasible.

The next level of refinement is to work out the total hours of work required on each machine for the work currently available. This can be examined in relation to available working hours for each machine to establish the total forward load in terms of number of shifts or working days, and some assessment made of whether required delivery dates look feasible. This can also be worked out in a spreadsheet but it is often more useful to use a production loading board or T-card system which gives a more visual representation, and helps decide when things should take place.

With a few production machines this can be feasible, but any more and it quickly becomes difficult, and work loading is never optimum. The Production Planner either plays safe, and some available production capacity goes un-used, or there is a continual fire-fighting management task to juggle production and delivery dates to keep customers satisfied because production resources have been over-committed.

It is precisely these issues that computerised scheduling overcomes. Yet the perception of the survey is that this technique is inflexible and complex. As the case studies in section 6 demonstrate, this is not the case. It is precisely because of the short run nature of jobs now, hence the large number of jobs to be processed, the quick turnround required, and the continual changes to plan that are required, that computerised scheduling comes into its own, surprisingly even for small companies.

A barrier to the use of computerised scheduling systems has undoubtedly been the effort required to get all the required data into them, and keep it up to date (up to the minute). This has been greatly assisted by the implementation of shop floor data collection systems. However, this has not been so well applied in the pre-press area and consequently it has not been easy to know when jobs become “viable” (i.e. proofs have been approved, plates are ready etc.). However, JDF is becoming widely implemented on pre-press systems and hence can link and intercommunicate with many MIS systems now with little difficulty (it is worth checking your own systems for JDF capability since it is the experience of MIS suppliers that companies frequently are not aware that their pre-press equipment is already JDF enabled). This connectivity seems to be a key development in enabling the further implementation of computerised scheduling, which will be greatly eased by the now, quite rapid progression of JDF development and implementation.

4.3 Hourly rates

The estimating and costing processes both depend on the use of hourly rates for machines and processes. The determination of hourly rates needs some care, and there are software and consultancy services available to assist (such as the BPIF cost guidelines). However, a critical factor in determining hourly rates is the assumption made about utilisation. A common tendency is to overestimate utilisation and hence arrive at hourly rates that are too low. (Hence, this is a good reason to continually monitor utilisation, as well as the more obvious productivity focused purpose). Absorption costing, which is the most commonly used method in the printing industry, is based on all-inclusive hourly rates. Hourly rates are most meaningful when they include the full cost of operation; the major elements of which are direct wages, depreciation, interest charges, rental and building costs, energy costs, plus an allocation of overheads (e.g admin, management and sales costs). The allocation of overheads is somewhat arbitrary and different principles are used in different companies.

However it is done the key issues with hourly rates are:

- Know how they have been calculated – i.e. what they include and exclude
- Know what assumptions they are based on, in particular what utilisation rate has been assumed
- Review them regularly – at least annually or whenever there is new equipment or a significant change to a process

As printed job values have decreased (and still seems to be reducing) it is vital that the cost of administrative processes and the selling activity related to each job reduces too. In many companies these costs are not monitored at all. However, a costing method known as Activity Based Costing (often referred to as ABC) does take these into account and its advocates cite this as one of its principal advantages. Alternatively it is possible to arrange for a conventional job costing system to collect these costs too. But in both cases it must be said that it is somewhat complex to do. A better approach, especially for smaller companies, is to undertake perhaps a quarterly spot check of average selling and admin cost/job and use this to examine the overall profitability (or not) of jobs/customers etc.

4.4 JDF (Job Definition Format)

JDF is a well defined non-proprietary file format that holds all the metadata about a job to be printed. It makes provision for holding a complete record of the administrative information, technical specification and production data for a job to be printed. JDF is still relatively new, but is now widely implemented on production machinery, pre-press systems and MISs. The specification and much other related information can be found at www.cip4.org. JDF overlaps a great deal with the kind of information held in an MIS, but its primary purpose is to facilitate easy interconnectivity of different machinery, or at least the control systems. This will benefit the functionality of MISs, make it easier to interface equipment to them and so enable real-time data to be collected as well as issuing setup information to equipment to reduce setup time.

Because of its ability to describe the complete process required to produce a job, JDF can be used in many different ways in different parts of the overall process. Two main areas of application are:

- JDF provides a mechanism to control, monitor, and provide communication between all of the processes in print production, from job submission, through pre-press, press, finishing and delivery. In this role, JDF is acting as a “universal message format”, independent of any individual system or equipment/system manufacturer. In time, this should greatly reduce the time and costs involved in integrating a printer’s MIS with those of its customers.
- JDF provides a mechanism to allow production automation systems to control and track jobs. In this role, JDF supplies a messenger service to run between MIS and production systems. JDF defines a messaging architecture, which includes a dedicated messaging format, JMF (Job Message Format), to communicate with the control systems for individual items of equipment. The messaging may operate at a number of different levels:

1. Notification – a uni-directional message from a machine to the MIS to inform when a process begins and ends etc.
2. Query support – a bi-directional communication in which the MIS requests status information and receives data on job identity, queue status, current job progress etc. This obviously provides data for job tracking purposes, and for updating job status within the costing and scheduling systems of an MIS.

3. Command support – the MIS can issue commands to interrupt a current job, change priorities in the queue etc.

So, for example, JDF could support the following processes:

- The whole e-commerce transaction between a print buyer and a print company, both the administrative data and the job specification data.
- The automation of estimating
- Near real-time job tracking. This uses a JDF extension known as JMF (Job Message Format), which is intended for use in sending messages between the various systems in use in a printing company. These messages can be instructions to printing equipment (e.g. for queue control) but can also contain information about job status and progress. JMF is therefore a standard that can be used by MIS to collect data from production equipment.
- Transmission of setup data into machine control systems to reduce make-ready times.

5 Current use of MIS by print companies

To examine the way in which MIS systems are currently used, a survey was undertaken. The questionnaire is in the Appendix. This survey was supplemented by a much smaller enquiry to six MIS suppliers (questionnaire also in the Appendix 4). In this section the outcome of these surveys is presented, along with some resulting general observations.

The survey was completed by over 40 companies, the broad details of which are given in the following table.

Companies interviewed	40
Average number of employees	43
Staff in Admin	7
Staff in Sales	4
Staff in Production	26
Average turnover	£3.75m
Categories of work Brochures/catalogues Stationery Books Magazines Other (mainly labels and packaging)	 80% 60% 12% 25% 20%
Average number of presses	4

All the companies used an MIS. If it is assumed that for these companies, AV is approximately 60% of sales (i.e. paper costs etc amount to approximately 40%) then AV/employee is approximately £52,000, which bearing in mind the high capital cost of printing equipment (and the consequent depreciation and/or interest charges) is not particularly good.

Critical issues addressed by use of MIS	Utilisation of critical resources Estimating Forward work load Production planning and scheduling Customer service
How long has the MIS been installed?	Average 8 years Minimum 4 months Longest 36 years
Installed at one time or incrementally?	25% all at once 75% incrementally
Most common modules installed (in order, estimating being the most common)	Estimating Costing Order processing Scheduling
Average number of workstations in use	Admin: 10 Production: 5
% of companies planning installation of new modules	30% of companies were planning new modules
% of companies with MIS interfaced to other systems	25% of MIS systems were interfaced with other systems in some way

A primary reason given for using an MIS was to improve the efficiency and speed of administrative processes. This probably accounts for the widespread focus in the responses, on admin and activity rather than on business improvement. Related to this was the emphasis on estimating – most obviously to enable more estimates to be produced with reduced turnaround time.

It is perhaps significant that utilisation emerged as a top "critical issue", not, for example, profitability. The survey results overall suggest a focus on activity (production and admin) and tend to overlook whether this is profitable activity – i.e. are the jobs and product categories/markets within which the company is operating, profit generators for the company?

Although the results show that 25% of MIS systems are interfaced to other systems in some way, this is often only for simple e-commerce transactions, with the customer, for example, using the printer's MIS web-site to call off-stock, or send an RFQ. According to MIS suppliers the actual proportion of systems connected more closely with a customer's MIS so that, for example, orders can be raised within the customer's MIS and transmitted directly into the printer's MIS, is very low, probably between 2-5%, although for larger print companies it was thought to be 5-10%. However, in all cases it was believed that there is great benefit for both parties in doing this.

5.1 Financial

Accounts packages are not always sold as part of a printer's MIS, but in 60% of companies interviewed they are integrated with MIS. The efficiency advantages of so doing are obvious.

Is accounts integrated with MIS?	60% are integrated
What key measures are looked at on a regular basis?	Net profit Gross profit Wages Added value Sales Debtor days
Do you use "what if?" functions for forecasting?	25% yes, but its usually done externally to the MIS
Are you proactive at credit control?	80% yes.
Calculation of hourly rates Self calculated Employ specialist Last reviewed Cost rates or charge out rates	 75% 25% 25% every 3 months 35%, 6 – 12 months 40%, over a year 95% are cost rates 5% are charge out rates

It is perhaps noteworthy that there is not more emphasis on cash flow control – few companies mentioned this, despite a specific question on this topic. This contrasts markedly with some of the case studies (see Section 6) where cash flow forecasts are done at least monthly.

Do you know what your current cost rates are?

The majority of companies are now using cost rates in their MIS (as opposed to charge out rates). The significance of this was discussed in section 4.3. However, it was evident in the responses that cost rates can mean different things. One respondent went to the trouble of pointing out that their cost rates included depreciation and interest charges associated with the equipment concerned (as they should), but this is not always done.

Key KPIs mentioned were:

- Added value generated in the month
- Purchases in the month
- Capital expenditure in the year to date
- Return on capital employed
- Stock value
- Value of work in progress
- Number of days to invoice after delivery

5.2 Production

The primary function of order processing is to launch a job into production once the order is received and to set up appropriate records to ensure that invoicing and delivery can take place. It is the key stage at which a job specification should be finalised; if this is not rigorously done, errors and wasted time occur later in the process. The survey results suggest that this is an area for improvement.

Is your MIS used to book in jobs?	100% yes.
Do you have checking procedures in place?	70% yes
Does production rely entirely on the job specification in the MIS?	55% yes.
How often do you process a job without a specification?	55% never 30% occasionally 15% regularly
Do you print out job bags or works instruction tickets?	100% yes
Is outworked managed through the MIS?	40% yes.

35% of companies used their MIS systems for at least some aspects of production planning and scheduling. Full scale computerised scheduling is used by very few companies this being regarded as “inflexible and complex” (but see the two case studies which strongly challenge this view – in their view the traditional loading board would be regarded as inflexible). The more common approach is a work-to list ordered by delivery date. Two companies use a product called Scheduler Pal.

Is MIS used for production planning or scheduling?	35% yes
Is a manual production loading board used?	80% yes
Do you re-work estimates before scheduling?	20% yes 10% in some circumstances
What processes are scheduled?	Presses, outwork, 2 companies scheduled some finishing processes. 1 company scheduled platemaking

Are jobs sorted by: Delivery date Viable jobs Capacity loading Other	 45% 20% 30% 5%
How is production status monitored?	Production meetings Shop floor data collection 50% yes
Is there a process for communicating job status to customers?	No formal processes appear to be used. Appears to be reactive to customer demand.
Are author's corrections captured on the MIS?	45% yes 55% captured via job bags
Are these extras notified to the customer at the time or at invoice?	70% are notified at the time
Is a job costing system in use?	35% yes
If so is job cost routinely compared against estimate?	Of the 35%, 20% yes regularly, 60% occasionally
Do you use production KPIs?	60% yes
Is paper stock managed on the MIS?	50% yes

It is noteworthy that only a third of companies operate a costing system, and yet this is the principle means within an MIS of measuring production. Costing seems to be seen as a financial process, not a measurement and feedback mechanism. Comparing actual cost with estimated cost would seem to be a basic analysis needing to be done, yet clearly only a very small proportion of companies do this (only 7% of the total sample on a regular basis).

There was some evidence that where analysis of production is undertaken it was done on a job by job basis rather than taking a consolidated view, or a view over time.

A large number of KPIs are in use related to production:

- % utilisation
- Forward load
- Overtime as % of production hours
- AV/direct production employee
- AV/total employees
- AV/production wages
- AV/total wages
- Make-ready time (average time and % of total hours)
- Running speed
- Output/machine/operator
- % waste

What is your company's average OEE?

Only one company in the sample uses OEE. (See Appendix 1) This is unfortunate in that OEE combines equipment availability, quality and production performance into a single figure that provides an excellent measure of actual output relative to the theoretical (but practical) maximum output. It demonstrates clearly the scope that usually exists with a machine or in a company for increasing output without any additional machinery or people and hence is usually very challenging of current performance levels.

One company admitted to a worrying attitude to waste that is no doubt replicated elsewhere: “we used to measure our waste, but it frightened us so much we stopped!”

The purpose of KPIs in production is to encourage an improvement in production efficiency. It is therefore essential that they are regularly presented to and ideally discussed with, production staff. The survey examined how this was done.

What information is routinely communicated to staff?	Quality issues Productivity measures
How is this done?	Mainly verbally (the majority) Notice boards
Is the information taken directly from the MIS Or by using additional software Or manually	 20% 15% 65%
What is the shop floor involvement in data collection	Data is collected from time sheets, notes on job bags, and occasional shop floor data collection system

Is performance data graphically displayed on your notice boards right now?

The impression is gained that more could be done to communicate performance to production staff. However, it is also evident that companies do not find their MIS systems very capable at presenting data in an easily digestible form. The experience of ViP’s engineers regarding data collection in print, which was supported by printers on this project’s Steering Group, is that people take more interest in the KPIs and reports generated if they feel they have been involved in the data collection process. They seem to trust it more. With shop floor data collection systems, the ability to attach notes to the electronic job bag or time sheet is very significant in gaining acceptance for the system.

5.3 Sales

Is the MIS used to help develop a sales strategy?	70% use MIS for sales development
% of companies operating a CRM system	25%
% of companies relying on work from print management companies	25%
Are won/lost quotations regularly analysed to give a guide to pricing?	25% yes

While 70% of companies use an MIS in relation to sales development, it is not clear how this is done. Clearly there is value in a “sales analysis” report which shows customer, value of work year-to-date, added value and so on, but with so few companies operating a costing system this cannot be extended to examine profitability by customer or product category.

CRM is not widely adopted and clearly means different things to different people. Full CRM is thought to be overkill for small companies.

Having a sensitive feel for the market value of print products is a critical attribute for a Sales Director responsible for pricing. The analysis of won and lost quotations by

product category/market sector/by customer is one of the most valuable sources of market information available.

KPIs used in connection with Sales activity are:

- Estimate conversion rate
- Number of jobs/week/month
- Number of estimates/week/month
- Average job value
- Average quote value
- Quotation turnaround time
- % turnover from top 3 or top 10 customers
- % profit or AV from top 3 or top 10 customers
- Sales person performance: sales/month
- AV/customer
- Profit/customer
- AV/job type
- Profit/job type
- Average daily order intake
- Value of new business in current year

Average number of estimates produced per day	30
Estimates per estimator per day	15
Conversion rate to sales	28%
Pricing principles	Cost +% 85% Added value target 50% Market pricing 25%

Estimating is where many companies started with their use of MIS. One company described estimating as a “critical issue”. It clearly is regarded as an important process and yet is seen primarily as a means of generating a quotation, not in the broader sense described in section 4.1. (or as described in some of the case studies).

What is your estimate conversion rate? How many estimates per day does each of your estimators produce?

The speed of generating estimates has become a key issue mentioned by several respondents, but clearly also is the low overall conversion rate – that is to say that about 70% of estimates prove to be fruitless (although providing useful market pricing data). As one company pointed out, the situation can be worse when print management companies are involved, with the conversion rate falling, in their experience to 7%. So productivity in generating estimates is a critical issue.

E-commerce, or transacting business over the web is becoming an increasingly important means of doing business and interfacing with customers. It should be administratively efficient for both parties. The survey showed that it is widely used now in the printing industry but not much by small companies.

Do you operate a web site?	80% yes
Do you monitor hits as well as sales?	30% yes
Does it accept orders?	20% yes
Does it allow change in text and graphics on standard templates?	10% yes
Does it enable submission of PDF files?	25% yes
Does it enable call-offs from stock?	15% yes
What other information is communicated?	Delivery Contract details Historical data

Very few companies (according to MIS suppliers perhaps around 5%) have their MIS fully integrated with that of their customers, although the benefits of doing this are recognised as substantial by those who have done it. (We can expect JDF to have an impact on this situation in the future.)

5.4 Customer service

Excellent customer service should be the norm for any print company but it is still necessary to ensure that:

- Customers are really satisfied
- Customers are retained (for the future)

Customer service can mean many things – it at least involves producing and delivering work on time, but superior customer service might also include:

- Providing management reporting to customers
- Proactively supplying job status information to customers
- Undertaking regular reviews with customers of their current and future needs
- The ability to respond to requests very quickly
- Making it as easy as possible to buy print from the company

For further excellent guidance on this topic see:
"What makes a good printer" – a report published by Vision in Print
(see www.visioninprint.co.uk)
PAS 75: Specification for print production and services – a document describing the BSI Kitemark accreditation scheme
(see www.bsi-global.com/Kitemark/PrintServices/index.xalter)

The differing aspects of customer service have led to a debate concerning the optimum arrangement within a company to interface with customers. The key arrangements currently used are:

- A dedicated and separate customer service team. These are usually account handlers, representing the customer interests within the print company. In some companies they may simply be progress chasers and customer liaison personnel, in others they may undertake estimating, order processing, and other functions on behalf of one or more clients.
- To merge the above functions in with the sales team. It is argued that the best selling tool for the next job is to do well with the current job, and therefore customer service is an integral part of sales. This approach provides a more integrated contact with a customer (i.e. no handover from one department to another).
- To merge customer service with the pre-press department. The rationale for this is that this provides a single point of contact with a customer. It improves

communication both internally and externally at the start of a job which is crucial.

No single arrangement will suit all, but in all cases, the MIS has a key role to play in providing communication so that whoever within the print company communicates with the customer, they know all there is to know about that customer and the status of their jobs. This is part of the function of a CRM module within an MIS. The survey found little evidence of use of CRM by print companies.

Is Customer Service:	A dedicated department 25% Integrated with sales 55% Not an identifiable function 20%
Do you provide management reporting to customers?	30% yes
Do you undertake performance reviews with customers?	70% yes
Do you have KPIs in place to assess customer service?	25% yes

Despite 25% of companies claiming to have KPIs in place to measure their customer service, in fact many of these were related to the sales process, or to measure the scale of business with a customer. The KPIs directly related to customer service were:

- Measures related to customer complaints (number of complaints, value etc.)
- Cost of reworking

(These are somewhat negative in nature, and do not really reflect customer *satisfaction*.)

- Delivery performance measures (e.g. % of jobs delivered on time), OTIF (on time in full)

Customer satisfaction measurement is not a MIS function, but nevertheless, should be regularly carried out in some formal way. One company surveys a different five customers every month and reports the results to all staff.

6 Effective use of MIS

To demonstrate the effectiveness of MIS, 11 companies were selected for min-case studies. All these companies are performing above average in their sector, all are making good used of their MIS and all think there is still more they could do. They agree that their businesses could not operate without their MIS.

In undertaking the case studies, an attempt has been made to focus on one aspect that the company in question has found particularly beneficial. This has not worked in all cases since an MIS works best as a set of integrated functions and therefore one aspect cannot be examined in isolation, nor are the benefits confined to just one area. It is striking the extent to which some case studies challenge "conventional wisdom".

The Balanced Scorecard approach suggests examination of the use of MIS under four headings:

- Financial
- Production
- Sales
- Customer service

Some MIS systems use this as the basis of a summary report with a typical structure being as follows but with rather more KPIs down the left hand side. Typically colour would be used to indicate good and bad figures.

Indicator	Current value	Target	Variation	Trend
Financial				
Turnover to date	3,600,000	3,500,000	100,000	^
AV	2,000,000	2,000,000	0	-
EBIT	250,000	230,000	20,000	^
Production				
Utilisation%	84	83	1	^
OEE%	62	60	2	^
AV/Direct Wages	1.9	2.0	-0.1	v
Sales				
Estimate conversion %	24	25	-1	v
Average job value	740	760	-20	v
Customer service				
On time delivery%	92	95	-3	v
Value of complaints	22,000	10,000	12,000	^

Do you have a single page summary of current company performance that is routinely discussed at Board meetings?

Summarising much data into a single page of easily assimilated information is a good approach. At Sherwood Press, a single A4 summary page of information is regularly produced.

Case Study

Company	Sherwood Press
Turnover:	£10m
Number of employees:	78
Type of work:	Greetings cards and other general print sectors
MIS:	Shuttleworth

Background

Sherwood Press is 30 years established and part of a larger group. It has pre-press facilities, a range of B1 and B2 presses and others, together with digital equipment and an extensive range of finishing equipment. Sherwood is perhaps best known for producing greetings cards, but in fact provides a much wider range of products.

Key benefits of MIS use

- The ability to maintain control of the business, identify matters of concern in advance and reduce risk.
- To measure the business as a basis for continuous improvement
- The ability to identify profitable and unprofitable work/customers

Measurement, KPIs and analysis

Very careful consideration has been given to the need for, and use of, information within the company. This has resulted in key information being reduced to a single A4 page format of graphs and data which can be readily assimilated, and which gives a snapshot in time of the company performance and major trends.

Firstly there are three key data elements that may be looked upon as providing a measure of the current level of risk:

- "**Breakeven**" – the ratio of sales to breakeven sales. Breakeven sales is the sales value required to cover the fixed costs of the business. Clearly the ratio should be greater than 1. However, the absolute value is not so important as the trend. So this data is presented graphically, hopefully resulting in a line sloping upwards which would indicate steady improvement.
- **Working Capital Funding Requirement** – this is defined in the Appendix 1, and for control purposes, this is examined both as an absolute value and expressed as a percentage of sales. It is one measure of cash flow. It is regarded as a key measure since "Cash is King" as they say. As a general rule, the ratio should be fairly low, but in practice will always be positive. At Sherwood a target of below 10% is used, but in practice it depends on the time of year (since their business is seasonal) and may vary between say 7% and 17%.
- **Gearing** – is defined in the Appendix 1. This may be looked upon as a measure of who is controlling the business – i.e. shareholders or the bank. If debt to the bank is greater than shareholder funds then effectively the bank controls the business – which is generally considered undesirable.

Other key analyses and KPIs are:

- Wages/Added Value, Overheads/Added Value (both measures of efficiency)
- Added Value by Department
- Return on Capital Employed
- Value of spoilt work
- Cashflow *forecast*
- Comparison with budget and variance analysis
- Sales
- P&L
- Gross profit
- Net profit

Other benefits

An issue that Sherwood is addressing is that of understanding the costs of administrative processes. So, for example, they have examined what it costs to raise an invoice, create a job

bag, produce an estimate and so on. This enables them to look at the profitability of an account not just in terms of the cost of product manufacture but also including the costs of servicing that account. In some instances this provides a different view of which customers are profitable, and more importantly, which are not. This is one factor behind the company trying to acquire more work on a contract basis, since, although there is more work involved in selling and setting up the contract in the first place, each individual job in a contract does not require so much selling and administrative work.

The future

The next stage of MIS development is the integration with pre-press, using JDF. This is perceived as a workflow issue, where the pressure is for easier operation with quicker response and processing time, hence improved cost effectiveness of the total system. As part of this, the company is implementing on-line proofing and is reviewing its whole proof appraisal process. They also see this integration process as another step of automating the administrative systems within the company.

6.1 Financial

The purpose of the financial activity is to

- Measure financial performance
- To control cash

There are many aspects to financial performance, but two key ones are:
Current operational performance, for which key reports are:

- Management Accounts: i.e. P&L, Balance sheet, usually produced monthly but in some companies more frequently. These include comparison with budget.
- Value of Work in Progress
- Added value generated in the current month – sometimes done weekly
- Breakeven

Use of (financial) resources, for which key measures are:

- Capital expenditure in the current year
- Return on capital employed (and comparison with forecast, e.g. in cost justification for the purchase)
- Stock valuation
- Gearing (see Appendix 1)

When did you last do a cash flow forecast?

It is worth noting that a common cause of company failure is not necessarily lack of profitability, but running out of cash. Companies performing well tend to place some emphasis on this issue, producing monthly cash flow *forecasts*. However, from the survey it is evident that a large proportion of companies do not do this.

Good KPIs in this context are:

- Working capital funding requirement, or one of the other measures of cash availability. This is described in the Appendix.
- Debtor days

Case Study

Company	Optichrome Printers
Turnover:	£5.5m
Number of employees:	55 approximately
Type of work:	General print
MIS:	Optimus. Over 25 years experience with MIS use.

Background

Optichrome Printers is a high quality general printer employing excellent pre-press facilities, a mix of litho and digital machines and a range of finishing equipment. 20% of their business is now related to digital print, but much of their other business is also of a short run nature. As a consequence of this and the increasing trend to more complex jobs with more complex finishing requirements, they find it necessary to undertake considerable hand finishing.

Their search for an MIS began in the late 70s, and finding no suitable system available at that time, decided to create their own. Within a few years the concepts in this were built into the first Optimus MIS which now has an established place in the industry.

Key benefits of MIS use

It is difficult for Optichrome to identify a single area of benefit – as with some other case study companies, their emphasis is on managing the totality of the business, and it is the integrated nature of the MIS that pays dividends. However, from a Managing Director's perspective, the key benefit of the MIS is the ability to keep a close eye, in real-time, on the pulse of the business so that an active management approach can be adopted to keep the business on track – which has become a vital necessity in an increasingly competitive environment with reducing margins.

Measurement, KPIs and analysis

To keep an eye on day to day business (or even hour by hour) the following information is examined:

- First thing in the morning, review staff attendance today – and whether any have "appointments" (e.g. doctor/dentist) that will reduce production capability to some extent. (In the longer term this can also be used to review absenteeism in general, although this has never been a problem.)
- Examine value of Work in Progress – available directly from the MIS
- Examine value of orders today
- Examine value of jobs delivered
  In the long term these two latter figures should be approximately equal, but in the short to medium term may vary considerably, perhaps highlighting potential difficulties. All these figures are compared against known daily targets or norms to give a feel for current business activity.
- Examine productivity per day. This is done in terms of
  - Added Value/day
  - Sales/day
  Again, there are expected norms.

These figures are continually used to generate an end of month forecast (i.e. Average AV/day for the month so far x working days in the month = a projection for the month) which can be compared with budget for the month. This might be done twice a day. From about day 5 in a month, this technique generally gives a reasonably accurate projection of the end-of-month results. (Full accurate management accounts are available by day 7 in the month at which point a cross check between projection and actual can be made.)

None of the above measures is used in isolation but collectively they will illustrate an upcoming problem situation, which results in a revision of sales and pricing policies with a view to gaining more work, or aiming at higher added value work (etc.) as necessary.

- Examine cash flow – actually done in a grid which takes information from the ledgers – that is, all expected payments required in the month, and a projection of what income is expected, the result is obviously a measure of cash flow.

Many KPIs are also in use related to productivity, such as:

- AV% of sales value (compared against target, long term and by individual job). For individual jobs the company has AV% targets which are considered when pricing jobs, and below which work is regarded as unacceptable.
- AV/hour – different targets exist for all major processes. This is usually examined by job, based on data from the costing system. As with all KPIs, it is necessary to know their significance and how to interpret the data.
- The efficiency of each individual person is constantly monitored, for example,
  In repro: pages/hour
  On press: sheets/hour, total elapsed time for jobs, total change over time for jobs. This leads to an analysis of non-chargeable time by individual.
  In finishing: laminates/hour, sheets folded /hour
  In transport: deliveries/day

Everyone has targets that they are working to. However, these are not so much a driver as a measure used as the basis of discussion.

The company has become increasingly aware of the growing amount of administrative work necessary to secure an order. This is a combination of sales effort, the number of estimates that have to be produced, the number of variations of each estimate (or now the increasing demand for the generation of price matrices as the basis of a contract), the falling estimate conversion rate, and the amount of "customer service" now required once an order is received. The result of this is an increase in the ratio of admin staff:production staff. Much focus has been placed on raising productivity in production, but clearly it is now necessary to also focus on increasing productivity in administrative processes. The company is therefore looking to the use of KPIs such as

- Estimate conversion rate
- Estimates/hour
- And others related to sales

A finite capacity approach is used for scheduling and all to-do lists are generated from the system. In order that a very rapid response to customers can be provided, the plant always has a degree of spare capacity, and so smallish jobs (which is the overwhelming majority) can always be fitted in. Only if a very large job is involved will a more detailed production plan be generated with consideration of the impact on the ability to deliver other jobs.

Other benefits

Although perhaps not directly related to MIS use, the company adopts an interesting approach to budgeting. Amongst all the usual things it also takes into account three factors which are:

- Provision for bad debt
- The seasonality of business (including the precise number of days in the month)
- The observation that if you make a loss in a single month it is always bigger than the profit on any other single month. This of course is not a "rule" but it commonly is the case. In practical terms it means that a loss in a month takes several months to recover.

There is nothing that unusual about these factors, but they are used together to smooth the wild swings in results that can occur – results which, if negative, can be very demotivational to sales and customer support teams.

So, prior to a year start, the budget is prepared – effectively a model of the year. But as the year progresses, for the 3 months prior to August and again before December (both notoriously bad months), profit is retained and then released into the accounts for those bad months. This has a smoothing effect which removes the demotivational effect. But they have also found that it results in everyone working harder during the good months. In addition hopefully the bad debt provision is not fully needed, and this will be released into the accounts at the year end. These systems need careful use, but can be helpful in the right circumstances.

Case Study

Company	Hobbs the Printers
Turnover:	£10.5m
Number of employees:	180
Type of work:	Specialist book printer
MIS:	Over 24 years experience of using a computerised MIS, changed to Radius Vision system two years ago.

Background

Hobbs the Printers is a high quality family owned book printing business, with a focus on short run specialist titles particularly for the legal profession but for many other subject areas as well. The company has developed many added value services around the core manufacturing processes related to typesetting, data processing, fulfilment; and stock management. It has an outstanding track record of continuous capital investment all of which is funded out of profits – the company always has a positive bank balance (which is most unusual for a printing company!). Some of the more recent additions to the business have been a new warehouse, a Nipson digital web, an HP Indigo 5000 and a gathering/stitching line. These complement the existing sheet-fed litho presses, digital print department and extensive finishing facilities.

Even before the introduction of a computerised MIS, the company operated a system manually which enabled the state of the business to be monitored on a weekly basis. The philosophy of this system has been carried forward into the system currently in use so that on a Monday, the managing director has a picture of the company's performance up to the previous Friday.

The company has used an MIS for many years but their system began to have limitations. So an evaluation of MISs was made by the directors which resulted in adoption of the Radius Vision system. Hobbs has been in a transition period between these systems for a couple of years, but are now completing the move to Radius.

Implementation of the new system started with estimating since "everything stems from there". It now does estimating, costing, order processing, a certain amount of stock management and production scheduling (yet to be fully implemented). Accounts is integrated and an on-line link has been established to the SAP system of one of the company's key customers.

Key benefits of MIS use

- Analysis and reporting, almost in real time, and the consequent control and understanding of the business
- Administrative efficiency as a result of the key-once only principle
- Speed of generating dockets/job tickets/works instructions
- Complete invoicing within 4 days of month end
- Analysis of work by customer (often contract based) to ensure that the totality of work from a customer within the contract is achieving the added value targets required.

Measurement, KPIs and analysis

As might be evident from the introductory background, Hobbs is a very well managed company from a financial point of view. Hence a primary purpose of the MIS is to maintain control of the business, particularly in terms of its finances. The two essential inputs to enable this on a weekly and monthly basis are:

- A weekly report derived from the costing system which records the total time against each operation/cost centre for the week. This is multiplied by the relevant hourly cost rate to show total recorded labour and machine costs in a week for each cost centre. These cost centre totals are then summed for each department, and then all the departments summed to give a total for the whole factory. The total costs by department and for the whole factory are then compared against the weekly budgeted costs. This then shows how well all the departments are being utilised.
- A monthly Sales analysis report which shows: individual job cost, jobs grouped by main customers, totals for each customer, P&L for each job and totals, contribution. By taking

the profit (or loss) from this sales analysis report and adding this to the total costs from the weekly reports one can see how efficient the company has been as a whole (e.g. if production efficiency has been poor, the weekly report will indicate high utilisation, but the sales analysis will show 'losses' on jobs etc.).

Once the financial accounts for the previous month are available, the data from the above reports can be reconciled and any anomalies examined.

Other key reports produced regularly are:

- Outwork and paper costs – if these are too high (that is, the added value is too low) this will result in a review of the work for a given customer, with subsequent rejection of the work if nothing can be done to remedy the situation. Much of Hobb's work is carried out under contracts, hence it is not necessarily possible to examine the added value content of an individual job prior to committing to produce it. For other jobs for which individual estimates are prepared, added value is examined at the estimating stage with the guideline that it should be at least 60%. (Note that Hobbs only buy about 10% of the paper they print, which accounts for this added value minimum target being at this level.)
- Overtime report – the purpose behind this is to highlight the situation (which can so easily happen) of working for little/no financial gain – that is, to ensure that the marginal extra revenue exceeds the marginal extra cost.
- Cash flow is closely monitored on a monthly basis. The normal expectation is that the Quick asset ratio should typically lie between 3 and 4 and the Current ratio is also monitored. A monthly cash flow forecast is also carried out which includes all expected income and expenditure including capex and corporation tax payments.

The future

The company recognises that its use of targets in production is not good at present. However, a new management structure is being implemented which will bring with it the opportunity to introduce production KPIs. This is regarded as central to the production strategy now in place.

Plans also include the introduction of the computerised production scheduling system. Now the estimates are detailed in their production plans (and are directly used for generating works instructions), it is a relatively small step to implement production scheduling.

6.2 Production

The primary function of the MIS based production management activity is to increase productivity.

Is your management culture characterised as pro-active control or fire-fighting?

Production management has a number of components to it which at least include:

- Production planning and scheduling
- Production monitoring and control
- Productivity measurement (which includes cost minimisation, waste reduction etc.)

6.2.1 Production planning and scheduling

It is evident from the survey that computerised scheduling is one of the less frequently implemented functions in an MIS, particularly by smaller companies. It is true that for small companies, a spreadsheet generated work-to list can be adequate. However, as described in the two case studies in this section, computerised scheduling systems now provide companies with real benefit for surprisingly little effort; they are well suited to the quick turnaround of many small jobs that is the common requirement, as well as planning production of larger jobs over longer timescales.

Case Study

Company	Halstan & Co Ltd
Turnover:	£8m
Number of employees:	99
Type of work:	Music books, journals, other books, booklets, high quality promotional print (brochures, leaflets, catalogues, directories)
MIS:	Imprint user for 3 years, and another system before that.

Background

Halstan is an 87 year old business and until relatively recently was a £3m turnover business. But two acquisitions later, it now has a turnover of £8m, producing about 450 jobs a month. Their original speciality was printing music, including its typesetting, which resulted in a delayed introduction into digital pre-press. However, in the mid 90s, the typesetting of music became a digital process and a core USP of Halstan was undermined. Consequently the company had to diversify into other types of work.

At first the company diversified into journals, these then required an element of four-colour work and this encouraged the installation of the first 5 colour press. However, the capacity of this press exceeded the demand, so the sales force was expanded and the work mix extended to include promotional print. The company now has two 5 colour machines as well as 2-colour perfectors.

Music publishing (and printing) had traditionally worked to “long” turnround times, but the new product sectors were more demanding. Increasingly the work extended from books to promotional literature, so that turnaround times now might only be a day in some cases. The work mix that had now developed was far greater in volume (i.e. more jobs), of greater complexity (more processes) and also wanted more quickly than ever, with a few exceptions, it was short run work (less than 2000). The previous manual methods of production scheduling were strained, resulting in the Operations Director driving a move into computerised scheduling.

The company now has an Imprint MIS that is used for estimating, costing, order processing (job bags etc.), production scheduling and accounts. It has shop floor data collection for personnel to input data. This has not been extended to direct connection to presses (etc.) since the short run nature of the work means that the majority of work is on and off the press in under an hour so it is not really necessary to know the progress through the run.

Implementation

Because the company had an MIS, it was natural that the Imprint scheduling system should be considered. This was not however adopted by default, but rigorously investigated first. There was no formal upfront cost justification process, but assuming it was going to work the payback was obvious.

The Operations Director spent a month running the system in parallel with existing systems, then moved to a semi-live position for a further two months. The system worked so well, it then moved to a totally live system. It has taken some while to implement it in all departments but is now used to schedule platemaking, paper delivery, presses, adhesive binder, stitcher/gatherer, and laminator.

Key benefits of MIS use

The Imprint computerised scheduling system has proved outstandingly successful. The key benefits that have resulted are:

- Has increased the effective capacity of the press room by 20%
- Has opened up the production schedule for everyone to see – this contributes to an open style of management in which everyone can see the part they are playing
- It measures and records and compares with the plan – leading to easy identification of problem areas which can be dealt with in a non-confrontational manner because it is facts that are being discussed, not assumptions or personalities.
- The system paid for itself in less than a year
- Shop floor data collection has been well received, especially the elimination of dockets and lead to a substantial saving in administrative processes.

Production scheduling

The Imprint production scheduling system is of the type that displays a production loading board on screen. As is commonly the case, colour is used to good effect to show job status, individual jobs can be interrogated at the click of the mouse to reveal full job details and jobs can be moved by “drag & drop”.

Loading jobs into the system is done on a continuous basis. If a job has been estimated, then it is usually possible to just transfer all the production times from the estimate into the schedule. When the system was first installed this worked about 75% of the time, in other cases estimates had to be partially reworked. But this is much rarer now, apart from those cases where no estimate has previously been generated. Thus, the data input required by the system is minimal.

There are some interesting features of the Halstan’s use of the system:

- Besides having lines across the production schedule representing actual presses, for each group of presses, there is a dummy line into which potential jobs are placed. These are typically jobs currently out on proof, which are known to be coming, but not precisely when. By putting them into the dummy line on the schedule it is easy to see the potential workload immediately alongside the actual booked work on the presses, and hence to see the likelihood of filling any spare capacity. This can then be used in a pro-active fashion by contacting customers to prompt for proof approval and hence fill upcoming slack periods.
- A major benefit (possibly THE major benefit) of using the system is the way it enables batching of work. This is a manual interactive process, but the system facilitates it because it makes all the necessary information so readily accessible and visible. Batching is done on various criteria such as:
  run length (with a view to minimising make-ready time)
  minimising wash-ups
  minimising paper changes
  minimising paper size changes

Run length is a key criterion since not all the presses have automatic plate change. Therefore, the short run work (consequently lots of make-readies) is directed to the autoplate machines, while longer run work is directed to the non-automated machines.

The above also illustrates an important general principle related to scheduling, that of “minimisation”.

The outcome of the scheduling process is a work-to list for every machine. (Plate-making uses the work-to lists for the presses.) At present these and job bags are printed out, but the company is preparing for this information to be presented purely on screen, thus saving the administrative time in printing and distributing the information, also keeping it up to date with any changes.

Other benefits

The production scheduling system is a core component of the total system. Every aspect of every job can be immediately investigated directly from the loading board screen. It is therefore very easy to look into matters when things do not go according to plan. The MIS system in total measures and records by default, and hence enables many KPIs and analyses to be undertaken with minimal effort. Some critical KPIs used by the Operations Director are:

- Make-ready time
- Average running speed
- Paper runnability (number of washups, stoppages etc) that is then related to paper cost. In this way, for example, it has been demonstrated that buying cheap paper can be a false economy.

In addition, cost of production is routinely compared with estimated costs, exceptions noted and investigated.

The future

Production scheduling is still being fully implemented into all departments – it takes time, and it may require changes in the attitude of staff who need to build confidence in the system before fully accepting it.

Halstan's use of their Production Scheduling system is exceptionally good and the company would not wish to be without it. It is particularly interesting since it is a commonly held view that computerised scheduling systems require much data input and are too slow and inflexible to keep up with the quick turnarounds and rapidly changing nature of work in printing companies today. But in Halstan's case, it is precisely because of these characteristics of the modern print business that they have found it necessary to use computerised scheduling and that the benefits are so

Case Study

Company	Northend Creative Print Solutions
Turnover:	£4m
Number of employees:	54
Type of work:	General print including brochures, catalogues, stationery and books
MIS:	Shuttleworth user for just over 2 years. The system is 'off-the-shelf' but tailored by Northend to their precise requirements.

Background

Northend receives some 50 enquiries per day which on average lead to about 20-25 jobs per day, that is, their conversion rate is 48%. Their MIS has all the usual modules, most of which are fully used, although there is still more to do with some; there is an integrated accounts package. The company has a design & pre-press department, 2 sheet-fed colour litho presses, 1 digital colour machine, and a range of finishing equipment. They are implementing JDF, with connections to pre-press and press systems. This is viewed as an essential next step towards integrating the whole production process.

Implementation

The company has a very open style of management which involves everyone in the process. It also has adopted a holistic approach to its use of its MIS – this means viewing the MIS as a component of a total production and business system which includes people (staff and customers) as much as it does machines. They therefore viewed the MIS implementation as an end to end process, looking at the overall workflow starting with initial customer contacts and encompassing every aspect of the business.

Their general approach is to measure everything. A shop floor data collection system is used, so data gathering is not arduous, but good use is made of the data collected.

Like so many other print companies, Northend has, and is, experiencing price deflation and falling order value. This leads to the need to process more jobs to maintain or increase turnover without any increase in manpower or overheads, hence the need to increase efficiency in both admin and production. In moving to its MIS, a conscious effort was made to eliminate all double keying of information. The company has been employing 'Lean Manufacturing' concepts in production and felt that the same approach should be applied to administrative processes. It would not now be possible to cope with the number of jobs if the associated admin had to be done manually.

Before the introduction of the new MIS, the speed of estimating was a key issue. At that point only 50-60% of jobs were estimated (as the basis of generating a quotation), but now all jobs are estimated (which is feasible because they can be produced faster), not necessarily as the basis of a quotation but for the overall benefit of the company, by generating targets and feeding information into the scheduling process.

The computerised scheduling system has been in use for a year. Almost everything is scheduled apart from finishing. The initial steps into using the scheduling system were cautious, being viewed by the production planner as a "step into the unknown". There were concerns that vital information might be lost and there did not seem to be a way of being confident that all jobs and

all pertinent information would be visible. However, with only one early casualty, confidence in the system was soon gained. Some minor modifications to the system have now made job status much more obvious and the system is working well, with live updates from the shop floor data collection system and client service personnel.

Key benefits of MIS use

The Shuttleworth scheduling system has resulted in the following benefits:

- Schedules are now visible to all system users
- They have one production meeting per week, the rest of the time communication takes place through the system
- Administrative efficiency has been considerably improved – every department used to produce its own manually typed work-to lists, now the system generates these
- The amount of "running around" to establish job status or other information has been greatly reduced
- Production planner's working life has been revolutionised. He used to work 10.5 (stressed) hours per day and was blamed if he forgot to do something; but now works 9 hours, has time to do other things such as data analysis and enjoys his work much more.
- The system works in minutes and seconds rather than half or quarter hours of the previous manual system. As a result, the time allowed for jobs is more accurate and more jobs can be planned into the available working hours. As a consequence productivity has increased.

In addition, the company used to employ 2.5 estimators (despite lower turnover), but now employs one fulltime with most other client service staff able to estimate when demand requires it.

Production scheduling

The production scheduling system is a core component of the MIS as used at Northend, but it achieves far more than just scheduling. As stated earlier, it takes its primary input from estimates, with every job now being estimated. So the estimate provides the work plan. Initially, the production controller lacked confidence in the accuracy of estimates and checked them all, but this is no longer done except in the case of a few known exceptions. The Production Controller is the only person who can load jobs into the schedule and update schedules but everyone can view them and can update job status.

Jobs are entered at time of receipt of order, working to customer's delivery date and working backwards. A latest start date is also entered and any other critical dates such as those for outwork.

The output from the scheduling system is work-to lists. These not only show the job information but the expected start and finish times. In this way everyone knows what is expected of them which has resulted in greater productivity.

Almost everything is scheduled apart from finishing. This is more complex because it involves combinations of people and machines which work in a flexible fashion. In this department the company is working towards generating work-to lists for each individual rather than by machine to allow for more varied working days. Outwork is also scheduled.

The Production Controller is also responsible for generating a number of reports and KPIs related to production from the system. Key KPIs are:

- Machine running speeds
- Make ready time
- Use of indirect time
- Machine utilisaton
- Paper waste

Measurement KPIs and analysis

The company measures many things, on the principle that if you don't measure it you can't control it. So the costing system is a primary tool for data collection and analysis. Some of the KPIs generated are listed over the page.

KPIs:

- Gross margin
- Contribution/press hour
- % added value
- Market share
- Conversion rate
- Number of jobs
- Number of estimates
- Average job value
- Average quote value
- Missed deliveries
- Quotation turnaround time
- Number of days to invoice post delivery
- Actual v estimated cost per job
- Wages as % of AV
- Overheads
- Actual v recovered wages
- % uptime on presses
- OEE
- ROI

Reports:

- Key account analysis
- Capex evaluation
- Training
- Efficiency by product and by cost centre
- Standard Bookings duration and overtime

Other benefits

The system imposes a discipline on everyone in the company to work in a certain way which is then helpful in ensuring that all are working to a common goal. The work-to lists with start and finish times make it quite clear what is expected from everyone and the costing system effectively monitors to see that they are doing what they are supposed to do – that is, it is a feedback mechanism. It is then possible to deal with the issue as appropriate.

The company purpose is about delighting customers (and judging from the letters and emails they have received, they clearly manage this). Their view is that to achieve this, a holistic approach is required – the whole company and all it does has to be focused on this, not just, say the Customer Service Team. “The better the service you give customers the less they argue about the price.” The MIS is central to the communication and efficiency of the printing processes which enables the company to work in an integrated fashion to achieve these goals.

The future

Scheduling with individual work-to lists is imminent in finishing. Northend are testing JDF integration with both Shuttleworth and Heidelberg through to the Press Room this year and will take that to finishing as soon as the protocols are available. Job bags are currently still printed out but with an upgrade in the shop floor data collection due shortly, enabling JMF to flow back from the press via the MIS, they may well become electronic in the next year.

If a spreadsheet system is used (most likely for scheduling work to presses) it should at least contain the following data: job number, customer, brief job description, required delivery date, latest start date to press, proof status, paper availability status, plate status (i.e. when all three are OK then job is viable for printing), which press (or press group), time required on press. The list can then be sorted and filtered easily in several useful ways for different purposes, but most likely by delivery date to create a work-to list for each press. Time on press can be summed to show

forward load etc., and with some care and a little more complexity in the spreadsheet setup, could be made to show just the sum of the viable jobs by printing press.

A typical setup would be as follows, in this case sorted by delivery date.

23/06/2006 14:33										
Job No.	**Customer**	**Job Detail**	**Del. Date**	**Start Date**	**Proof OK?**	**Paper OK?**	**Plates OK?**	**Press No.**	**Mins. on press**	**Viability?**
3027	JC	16pp brochure	29/06/2006	23/06/2006	1	0	1	1	30	FALSE
3029	LH	Flyer	30/06/2006	26/06/2006	1	1	1	2	25	TRUE
3036	LH	A4 4pp	30/06/2006	28/06/2006	1	1	1	2	25	TRUE
3041	MO	Pension booklet	01/07/2006	25/06/2006	0	1	0	1	45	FALSE

6.2.2 Productivity measurement

The measurement of production is the primary role of the costing system. A fundamental analysis is that of comparing actual cost of production with the predicted cost of production from the estimate. Then applying the principle of exception reporting, the task is to look at large differences, and investigate further. This fuels the continuous improvement that should be a priority for every manager.

Do you routinely compare actual cost of production with estimates?

But as the case studies show, there is much other useful information that can be gleaned from the data compiled by the costing system. This may be useful in developing the business, in highlighting weaknesses in the current production setup and hence identifying areas for improvement. Or it may be motivational in the sense of encouraging people to achieve their targets. Better companies use targets not as an enforcement mechanism but as a basis for discussion and helping people to achieve the target or more.

Key performance indicators have an important role in monitoring productivity. The case studies illustrate the extensive list that is possible. KPIs are just a single figure at a point in time, which has value, but it is much better to look at them over a period. This is usually best done graphically, so that (again) continuous improvement can be encouraged. Sharing this information with the production teams is therefore important and is commonly done by displaying results on notice boards, and discussing it at team meetings – a forum in which ideas can be gleaned for improvement.

An important KPI related to production is Overall Equipment Effectiveness (OEE) which is defined in the Appendix 1 but is not widely used in print (it is in other industries) at present.

Case Study

Company	Bishops Printers
Turnover:	£9.6m
Number of employees:	122
Type of work:	General commercial print, brochures, promotional print
MIS:	Optimus user since 1995

Background

Bishops is a private family owned general printer, using 7 B2 Heidelberg sheet fed presses, finishing equipment from Stahl, Muller Martini and Heidelberg and an in-house pre-press facility. They have six delivery vans.

The company has grown consistently, rising from £6.5m turnover 3-4 years ago to £8.7m last year and £9.6m this year with no increase in personnel. Clearly productivity has increased greatly.

The company produces 230 quotations a day, with 5 estimators and an average turnaround time of 3 hours. On average this leads to 55 jobs/day with an average order value of £710. So the challenge for Bishops is to quickly and efficiently process this number of enquiries and jobs, but from a management perspective it is to keep a business comprised of so many small elements on track to achieve a profit each month. The MIS is critical to the achievement of both of these objectives.

Key benefits of MIS use

The MIS enables Bishops to pro-actively direct and manage a complex, high volume and largely unpredictable business so as to ensure good utilisation of resources, high productivity and hence provide superior customer service.

Measurement, KPIs and analysis

Because of the very volatile nature of the business (it lacks predictability of workload, it has a large number of customers and jobs etc.) it is essential to keep a finger on the pulse the whole time (almost minute by minute) to ensure that overall work levels are such as to achieve the necessary performance targets derived from the budget. To this end, there is much monitoring and measuring within the company which is done by the MIS, from which a wide variety of measures and reports are generated.

The Managing Director has on his home-page screen, 13 KPIs which are continuously updated during the day. The most important of these are:

- Total value of orders received today
- The number of orders received today
- The number of sheets passed through the printing department since midnight
- The number of jobs completed today
- The number of jobs on proof (there are typically 80-140 jobs on proof at any one time)

The purpose behind these is obvious. The MD knows the typical numbers for these KPIs to ensure that the business is on track. These KPIs show at a glance how current production is going, and what the near future production workload is.

In addition the MD has a few less time critical measures in place, an interesting one being:

- The number of customers this year who have had a quote but not yet placed an order

On a daily basis (10 o'clock each day), a report is issued to everyone in the company who has any responsibility for customer accounts, which shows for the month to date:

- Number of jobs invoiced in the month
- Value of jobs invoiced in the month
- Number of jobs booked in in the month
- Value of jobs booked in in the month
- Value of quotations in the month
- Number of quotations in the month

On the basis of information such as this, a projected cashflow for the month is prepared. This is effectively done on a continuous basis so that corrective action can be taken if necessary. Actual results at the end of the month are never a surprise.

Also, the sales team receive daily information on their performance relative to target.
Several exception reports are run overnight, for example, a list of all quotations issued during the previous day with a value in excess of £1500 (so that these can be followed up during the day).

A range of reports is produced monthly (in addition to management accounts). Some key ones are:

- Customer spending this year to date, ranked in order of spend compared with their expenditure previous year
- Direct end-user expenditure compared with third party expenditure (the latter being work received from agencies, graphic designers etc which generally has a lower profit margin).

The result of all these measurements and reports is that any sign of departure from budget targets is known at the earliest possible time so enabling some suitable action to achieve an overall and continuous high level of utilisation throughout the company.

Other benefits

The company moved factory three and a half years ago, and introduced a number of changes at that time which have resulted in cultural change (a more focussed work ethic) and substantial increase in productivity (turnover increase from £6.5m to £9.6m with same number of staff). Amongst these changes was the introduction of benchmarks or targets for almost everyone in the company. Typical targets are:

- Platemaking: plates per hour
- Printing: sheets/hour, jobs/hour
- Finishing: sheets/hour, jobs processed through guillotine
- Delivery vans: drops/day
- Sales: calls/month, value of invoices, quotes issued
- Credit control: collections/day

To ensure that the MIS works as efficiently and accurately as possible, and that data related to these and other KPIs is collected, it is clearly essential that everyone logs on and off jobs as necessary. They are encouraged to do this since it is the system that is measuring their performance against their target and their bonus is based on this performance.

Over this time, the company has also gradually paid more attention to the added value component in a job and this is given much more significance in job pricing than was previously the case.

The future

Despite being a long-term user of an MIS, the company is convinced that there is room for continuous improvement in the system and the way it is used. Even the Managing Director is going for two more days training on the system in the near future!

Case Study

Company	Quadrant Offset (owned by the Linney Group)
Turnover:	£26m
Number of employees:	46
Type of work:	Promotional and marketing literature
MIS:	user for 8 years. Imprint.

Background

Quadrant is an experienced user of MIS, using it for a wide range of tasks currently excluding production scheduling and e-commerce. Their accounts system is integrated.

Quadrant is a member of a larger group of companies and therefore has to supply a number of reports and KPIs to the parent company on a monthly basis. Having to operate in this way has encouraged a better use of the company's MIS than might otherwise have been the case, although such are the pressure of business today that they would probably have arrived at the same level of usage anyway eventually.

The company has established an excellent rapport with its MIS supplier, which it ascribes to having good technically qualified and experienced staff who have pushed the system capability in a constructive fashion. This has developed into a good 2-way relationship, strongly promoted within the company by the Operations Director who is effectively a system "Champion".

Key benefits of MIS use

The principal benefit of using the MIS is that it has contributed to improved production and administrative efficiencies. The company would probably require two more people to do administration and accounts than they currently have, and the cost of producing estimates and work tickets would increase enormously.

Measurement KPI's and analysis

The company makes excellent use of the system in measuring its performance through use of KPIs and other reports. These have contributed to increasing productivity. KPIs are applied in four main areas:

1 Estimating

- Success rate
- Average turnaround time on generating estimates
- Number of estimates per estimator (and from this is derived the average cost of generating an estimate)

2 Machine and Individual productivity

- Average sheets/hour (by machine and operator)
- Average make ready time
- Dead time
- Maintenance

3 Rework

- Identify the nature of the rework and its cause; hence analyse trends and locate area of difficulty. (See Pareto analysis Appendix 2)

4 Accounting

- Average ship to bill time (i.e. how quickly an invoice is sent out)
- Profit margin by client and sales rep.
- Added value by client and sales rep.

For all of these KPIs targets exist. The KPIs are reviewed by the Operations Director and then at regular departmental team meetings. Productivity issues will be discussed with account managers and others directly involved bearing in mind the overall workload and type of work, to formulate actions for improvement. In the longer term the KPIs are examined quarterly and annually comparing with previous quarters/years and also examined market sector by sector.

Reports

A number of reports are produced on a regular basis:

Margin report (weekly)

This provides a breakdown of costs for an individual job.

Collectively from these is derived an exception report showing all jobs with a margin or deficit of more than 10%. These exceptions are categorised and trends identified. Clearly, issues can be investigated further by interrogating the MIS in depth. The issues raised by these reports become agenda items at the regular departmental meetings.

Delivery date

Presented as an exception report, highlighting failures (which are very few). This is a historic and forward looking report (say 5 days), the latter aspect showing the expectation of job delivery over the next few days. (This is also being used to assimilate a case for implementing production scheduling).

Downtime report

An example would be, waiting for plates. This is compiled for each significant production area within the company. Again, categorisation and identification of trends is the principle of analysis.

Labour hours for each job

This is linked with added value for each job and hence Added Value/person hour. This is an excellent measure of productivity. There are other similar ratios such as Added Value/£wages. Much use is made of this within Quadrant which has been critical to the development of the business. In particular it has been used to develop a profile of the type of business they want as opposed to just chasing new business. It has identified jobs with a high outwork component and ensured that a suitable mark-up is applied to these so that the added value as a percentage of sales does not fall below the target value.

Other Benefits

At one point the company learnt that it was to lose its largest customer. Using the MIS, the company was able to look at the impact this would have on the business, and consequently to identify the

type of work that would be best to replace it, bearing in mind their added value criterion. Indirect costs of the business were examined as well as production issues, all of which was fairly easy to accomplish given the MIS. As a result of this, the company did lose the business, but were able to replace the work and the following year exceeded budget by some £50k.

The use of the MIS imposes a common structure and routine which enables people to be channelled and directed more effectively. People can more easily see the big picture, their own set of objectives in relation to this and so all work to a common goal.

The future

For the future, the company expects to be:

- Implementing a tender estimating module for the generation of price lists. There is a growing demand from customers to be provided with these, but the work involved to generate the very large tables covering different types of work, the variations, and the range of quantities is considerable. The use of an automatic system for this will provide a real productivity gain.
- A further extension of this will be a web based system to enable customers more generally to obtain their own quotes.

6.3 Sales

The purposes of the sales focussed functions in an MIS are:

- To contribute to winning profitable work
- To identify the most beneficial types of work/customer/market sector for the company
- To facilitate the most effective deployment of sales resources
- To measure the success of the sales activity, ensure there is the appropriate level of work for the company and to highlight the need for corrective action when necessary

A key component of the sales activity is estimating. The need to turn round estimates in hours (or less) is now regarded as paramount, and hence estimating (and particularly speed of estimating) is a primary issue when companies are selecting their MIS. Additionally, increasing numbers of companies are now being asked to prepare multi-dimensional price lists for some of their customers. Producing these can be exceedingly time consuming, but there is now software available from some of the MIS vendors to produce these as automatically as possible.

Case Study

Company	Avalon Print
Turnover:	£1.5m
Number of employees:	17
Type of work:	Commercial colour printing
MIS:	User for 2 years since company inception. Accura and BrightBlue

Background

Avalon is a fairly typical small printing company with a 5-colour press and a 6-colour B2 press, a pre-press system with CTP output, and a selection of finishing equipment. Die-cutting and laminating and certain other processes are outsourced. The company has an Accura MIS system that provides basic estimating and order processing, including the creation of works instructions/job bags. A separate accounts system is used, which is interfaced to Accura. Since March a new estimating system has been installed which is proving a great success and hence the main focus of this case study.

The Operations Director is an experienced MIS user of many years standing, experience gained in other companies. He is the “Champion” of MIS within the company, and knows the development team behind the new estimating system from BrightBlue Systems. This in part accounts for his adoption of the system, but it is really because it works in the way that he believes it should.

Key benefits of MIS use

The new estimating system has resulted in

- Another half a person to produce estimates **now not** required.
- Account Executives (who already produced estimates) now having more time to interface with customers, and having more time to creatively and analytically review jobs with a view to improving production efficiency and/or providing the customer with an improved product.
- Sales reps now being trained to use the system so that they can produce fully detailed quotations instantly in front of the customer. Avalon's experience is that the sooner a quotation can be provided, the more likely the conversion to an order, hence this provides a significant advantage
- In the medium term, selected customers will be able to produce their own quotations.

Estimating

Avalon's experiences the low conversion rate typical of many general printers, meaning that some 80% of quotations produced are "fruitless". For a small company such as Avalon, this is a serious "waste" of manpower resource which could be more usefully employed. This situation is exacerbated by the average order value being less than £1000, meaning that many quotations have to be produced to ensure an adequate work load in the factory. However, quotations obviously have to be produced, so if this process can be made as automated as possible, the benefit is clear.

However, traditional estimating systems need to be used by an estimator who is knowledgeable of all production processes, knows how every different type of product is best produced and so on. The estimator chooses the production route best suited to the product in question (usually by recalling the most appropriate "template"), modifies it to suit the particular case, adds details of paper required, quantities etc, and the estimating system produces an estimated cost of production. A commercial decision follows in which someone decides on the price to charge to the customer. For a company such as Avalon it is impractical to train all Account Executives (who, because they are relatively young, therefore lack the many years of experience of the Operations Director) up to the high level required, especially bearing in mind that estimating is only part of their job.

Brightblue Systems was chosen as this is an "expert system" estimating solution. This means that it encapsulates the knowledge of a human estimator. To operate the Brightblue Systems estimating system, all that is required is that the operator inputs a description of the job required – no knowledge of production equipment capability and processes is required. The system then examines all possible methods of production (given the equipment actually in the company using the system), selects the lowest cost, produces a complete detailed production plan, applies rules relating to mark-up (by cost centre, from a calendar to favour under-utilised equipment and customer if required, although Avalon do not use this feature at present), shows potential added value, allows manual intervention and then produces a quotation. The entire process takes less than a minute.

Avalon has been using the system since March 2006 and since May has been producing all its estimates through the system.

Other benefits

Avalon has also found that:

- The system is generating accurate estimated costs of production. They believe that an accurate prediction of the cost of production is essential as the basis of the commercial decision as to what to charge the customer.
- The system shows the added value component of a job (as do most other good estimating systems). Avalon works to the rule that no job will be accepted with lower than 30% added value (although their target is much higher). Application of this rule is critical in identifying the type of work the company should best undertake, and is particularly significant with jobs with a high outwork component. In these latter cases, a mark-up is applied to the outwork to ensure the added value targets are achieved.
- Re-estimating a job just prior to production (e.g. because the job specification has changed) is a simple and quick procedure – a new work plan is generated if necessary, all with a few mouse clicks.

The future

For the future, the company expects to introduce the system into some of its key customers to give them the ability to immediately produce their own quotations (which incidentally off-loads the task from AP) but has the more strategic benefit of creating a stronger tie with the customer.

But there are other key aspects of the sales support function for an MIS. Assessing the AV component in a job, analysis of lost/won jobs by job category, customer, customer type, or market sector and knowledge of current/near future workloads are all important factors to be taken into account in determining price. In Section 7 and in the Appendices 1 and 2, simple ways of establishing what is and is not profitable work are demonstrated. And then there is the use of KPIs in relation to sales activity. This will not suit all companies, but for some (see the Bishops Printers case study) it is vital to maintain a steady flow through enquiries, quotations, conversions to jobs and an effective way of doing this is to ensure that everyone knows what their daily target is and achieves it.

CRM (often thought of as a customer service function as discussed in the next section) can also be a valuable tool in analysing the market for the purposes of sales strategy development. By extracting information from the CRM system it effectively becomes a source of market research information – trends can be identified, and even quantified in some cases.

6.4 Customer service

In terms of day to day activity, customer service is about ensuring that a customer has enough information to feel confident that they will receive what they want, when they want it, with the minimum of effort and that this really happens. It may also be argued that customer service is about selling the next job, which is quite a useful perspective.

From an MIS point of view, customer service involves:

- Being able to answer all customer enquiries (RFQs, job status reports etc.) immediately
- Knowing everything about a customer and the products they buy (historically, and into the future)
- Providing whatever management information the customer might require to assist them with their business
- Achieving administrative efficiency for them and you, which might, for example involve e-commerce functions, automated job status reporting etc.
- Being sufficiently in control of your own business so that quick changes to schedules can be made to respond to last minute customer demands

The use of KPIs in connection with customer service is less well developed than in production, but the following are used and useful:

- RFQ turnaround time
- Number of times customer enquiries could not be answered immediately or were answered incorrectly
- Proof delivery performance
- Final job delivery performance
- Number of customer complaints
- Number of rejected jobs
- Value of rejected jobs
- Value of rework

CRM systems (customer relationship management) also have a role to play in customer service provision. Classic CRM certainly involves knowing everything about a customer company, and as much as possible about the individuals in that company that one deals with. However, in the present context, CRM functionality can help to compile customer information simply from tracking day-to-day business and by systematically recording customer preferences, for example:

- Formats for presentation of estimates and other forms of documentation
- Preferred channels for communication
- Are job status reports required, and if so at what frequency and how should these be delivered

Systematically dealing with product specifications for customers is another key area, as demonstrated well in this case study. Incorrect job specification is one of the major issues that consistently affects performance in the print sector.

Case Study

Company	Tamar Labels
Turnover:	£2m
Number of employees:	26
Type of work:	Labels
MIS:	Shuttleworth user for 2 years

Background

Tamar Labels produces adhesive labels from 3 flexo press lines, and an HP Indigo ws4050 digital press. It specialises in labels for use in the food industry and hence operates a very clean factory. The company is 10 years old and growing.

The MIS includes estimating, costing and order processing (job bags/works instructions), CRM and accounts. The latter is not integrated but could be. The system also has the facility for e-commerce that is used internally for order entry into the system and this could easily be extended to key customers. They also have the scheduling module but have not implemented this yet.

The production of labels is better seen as a manufacturing process which involves converting raw materials into labels which are then held in stock for JIT delivery to the customer. In view of this, Tamar is very rigorous about job specifications (e.g. substrate, adhesive) as this is critical to end use performance. They will not even produce a quotation until a full product specification has been received since even quite small changes in specification might have a great impact on cost of materials or process. Hence to ensure product suitability for purpose, a “proof” is actually the real thing and will probably be tested to destruction. The company is equally rigorous about traceability of all materials they use, and the processes used in manufacture/printing of labels. This is good discipline, but also protects the company’s interests in the event that a label fails in some respect when not used as expected, but also demonstrates to the customer that they are receiving the quality product they ordered. The MIS plays a key role in managing specifications and ensuring traceability.

Key benefits of MIS use

- Business focus and improvement
- Less price sensitive relationship with customers through data provision and data management services
- An ability to handle the increasing number of jobs, in particular produce more estimates per day
- Reduced wastage
- Order processing efficiency
- Pick list generation
- Fewer rejects, improved QC
- Tamar warehouses products for its customers which are produced elsewhere and supplies these on a JIT basis as needed. This was originally managed on a spreadsheet but is now done within the MIS. This warehousing and stock management task would now take 4 people, but using the MIS, it is done by 1 part time person.

Implementation

Before choosing an MIS the company developed a specification of what it required, which was especially important since they required the “manufacturing” approach mentioned above. The specification was developed jointly by the management team as part of their weekly and monthly meetings. A large number of potential MIS systems were examined in detail, at the end of which the Shuttleworth MIS was selected because it had the building blocks to enable working as a manufacturer as opposed to being “job focused”. (This is one aspect of an MIS which tends to be different for packaging printing companies compared with media printing companies). For example, a key issue with label production is the cutter. Cutters come in many shapes sizes and types, so that a company such as Tamar will have well over a thousand. An important feature then is the ability to search for a cutter on any single or combination of criteria to find the closest match to what is required.

It was not thought possible to produce a cost justification for the system, but there was a process in which expected time savings were identified and quantified. For example, how long to produce an estimate, time to produce a job, time spent ordering stock. In this way the expected admin efficiencies were quantified. There was also an expected saving from error reduction, but this was difficult to quantify. The company is confident that now, with hindsight, a cost justification could be done with a positive outcome. However, their feeling is that they “couldn’t afford not to have done it”.

The resulting system was off-the-shelf but with some Shuttleworth additions that have now become core product features. Implementation took place overnight initially, with the system operating live within a week. However this was only possible because of prior preparation. In another sense though implementation is never ending and the company is constantly pushing the boundaries.

People were trained to do what they were immediately going to be expected to do, hence avoiding overload and forgetting that which is not used often. Over time however, this has been supplemented by telephone support whenever a person needs to learn something new. Shuttleworth’s technical support can take over control of a user’s machine, show someone exactly how to do something, and ensure that it is working properly. In the long run this has proved a more effective approach to training.

CRM

Within Tamar, CRM is about bringing together as much information as possible concerning customers and the products they order. There are a number of aspects to this:

- All products are allocated into categories, sub-categories and sub-sub categories. A customer may be a category. But categories will also be associated with say, type of substrate, type of adhesive. The point behind this is to enable a detailed analysis of the overall business identifying for example global trends. This information is used by Tamar in specifying new machinery. It is also used in identifying the market sectors to target. They analyse to establish which product categories are successful for Tamar and which are not.
- The information collected helps with developing relationships with customers and hence with the selling process. Tamar constantly feeds data back to customers concerning for example, their stock levels, usage, which saves the customer having to do this task. The provision of this data is valued by customers who are then less price sensitive.
- Data derived from the MIS is used to support sales presentations to potential or existing customers – economies can be quantified. This can only be done because the MIS collects the information more or less automatically.
- In labels, data handling is as important as the printing. Sometimes bar codes and/or numbering of each label may be required which complements the traceability requirement mentioned earlier. This imposes a discipline on Tamar and on the customer, to ensure that the data supplied is correct. Accurate management of this data is vital.

All these aspects are used to enable the company to distance itself from selling labels purely on a lowest unit cost basis.

To facilitate these requirements the MIS has had to constantly develop. Tamar regularly reviews what its customers need by way of information and data handling and have either fitted that to what the MIS can do, or adjusted the MIS (possibly with Shuttleworth) to suit.

An aspect of growing importance in providing good customer service is e-commerce. All good MIS systems can now support this to at least some extent. It benefits the customer by giving them a degree of control and helps them and the print company to achieve administrative efficiencies. Most e-commerce systems at present provide for order placement and stock management/call-off. But a lot more is possible as the last two case studies illustrate. In these cases the e-commerce functionality is integrated with core aspects of MIS operation so that much higher levels of automation are achieved throughout the entire process.

Case Study

Company	Prism
Turnover	£1.6 million
No of employees	14
Type of work	Commercial print, stationery and office supplies
MIS System	Tidy & Optimus

Background

Prism started life as a commercial printer but as a way of providing added value and responding to customer demands created a stationery and office supplies area of the business. Currently the print side of the business accounts for approximately one third of the company turnover.

Key Benefits of MIS use

The main benefit of the MIS is to control stock management in the stationery and office supplies business. The system used for this purpose is Tidy and this is linked into an Optimus system for integration into the print side of the business. The print MIS is mostly used for producing job tickets and financial monitoring and control. For e-commerce print sales Prism employs a web based front-end which feeds into an automated ordering system. The web based office supplies front-end has been developed from their printed catalogue and made bespoke to individual products and customer requirements. The system functionality allows customers to manage their own stock and place orders for printed forms on the web to replenish stock. Web orders placed for outwork items automatically generate their own purchase order which is seamlessly forwarded onto the appropriate supplier. Prism believes that this added value approach has given them a significant competitive advantage for a company of their size.

Measurement, KPI's, analysis, reports

Prism use KPIs mainly for stock management purposes and to benchmark their prices against market competition. They view their MIS and web based system as valuable CRM tools and information derived from both systems allows them to build comprehensive customer profiles. This information is compiled into monthly sales and productivity reports which are shared with internal staff in regular review meetings. As part of their customer service and sales strategy they conduct regular customer review meetings, initially on a monthly basis which is then extended to three months and six months as the relationship develops.

Other Benefits

The systems that Prism employs allow them to generate information which can be used to forecast buying behaviour and trends, which is extremely important when managing stock items. This provides them with the ability to identify hidden costs and advise customers on more cost effective purchasing and stock management solutions.

The Future

Prism is currently looking to update their MIS to Optimus 20/20 version 18 in order to provide increased functionality for their impending entry into the digital print market. They believe this will open up the whole area of stock management for print which has become an area of considerable strength from the office supply side of the business. They are currently focusing their sales attention on markets where ongoing change is inevitable and where they can provide real time control for customers and a synergy for on demand print and office supplies.

Case study

Company	Lightning Source
No of employees	38
Type of work	Digital book and journal production
MIS	Bespoke system commissioned for their needs

Background

Lightning Source is a relatively new company specialising in the production of low volume digitally printed books and journals. The average print run length is 1.78 so it is essential to have a system which can accommodate a wide range and variety of products which are accessed via the web. The two main areas of business activity are:

- An "on-demand" printing process which allows a book to be printed to order in a range of formats within 2 business days, whether the order is for one book or one hundred. Short-Run and web direct distribution orders are printed and fulfilled within 5-10 business days.

- A comprehensive e-book digital fulfilment system providing a full range of services from digital rights management to content delivery in multiple formats.

Lightning Source is a resource for both retailers and publishers. While the fast, easy solutions they provide ultimately benefit the consumer. Lightning Source's customers are publishers, booksellers and libraries. The services Lightning Source offers are designed to give publishers the tools they need to maintain high standards for customer service in a changing marketplace.

Key Benefits of MIS use

The main benefit of the MIS is to integrate with the front-end web based function. Publishers and retailers set up an account and submit orders on line. Orders can be fulfilled from titles within the Lightning Source online digital library or by submitting new titles that are digitised and then subsequently archived. The MIS tracks this process, generating estimates, assigning costs, producing job tickets through the entire production process. The system also tracks e-books that are ordered online, the system ensures secure file delivery and accounting procedures. The web based front end also provides technical and customer support.

Measurement, KPIs and analysis

KPIs are mainly used to monitor the performance of production methods, on time deliveries and customer sales and satisfaction. Waste figures are closely monitored due to the nature of the short print runs. Individual orders are identified by a unique bar code reference which is duplicated on all printed covers and text blocks. These are scanned into the system at each production process and at the packing and despatch stages. This method ensures delivery of real time information to both Lightning Source staff and customers. Information can be gathered and reports prepared for publishers on trends in various titles or buying behaviour in market sectors. This information is considered extremely useful as a CRM tool but also as a sales tool to predict market trends and new areas of business.

The Future

Lightning Source are currently exploring new web based integration directly with publishers own ordering and accounting systems, to make all transactions seamless on a global basis. From available production data they are investigating new methods to reduce lead times and speed up the delivery and fulfilment side of the business.

7 Practical Guide to using an MIS

14 steps to getting the most from your MIS

The purpose of this guide is to suggest a basic set of measures and processes that can be easily implemented with minimal effort and in most cases, with no additional cost, that will assist in supporting key management functions. If used appropriately, they will improve bottom line results.

The 14 steps are derived from the experience of the companies described in this report. Consequently they are somewhat ad hoc and certainly not a complete guide to managing a printing business. However, earlier in this report the concept of the Balanced Scorecard was briefly described which does encourage a more complete and rounded approach to MIS use. Therefore at the end of this section, a more formalised description of this is used to demonstrate a balanced and integrated use of MIS within a company.

From an MIS perspective, management is concerned with:

- Optimum day to day management of the business
- Continuous improvement of the business

The suggestions in this guide have been selected from the case studies with these objectives in mind, but of course, depending on the nature of the business, an MIS has much else to contribute in other areas.

Summary

Financial and business management

1. Manage cash flow
2. Produce a single page A4 summary
3. Keep your finger on the pulse
4. Use accurate cost rates

Sales

5. Produce month end forecasts
6. Know where profits/losses are made
7. Produce detailed estimates

Customer service

8. Measure customer service levels
9. Analyse administration costs

Production

10. Operate a costing system
11. Use OEE and other KPIs
12. Implement production scheduling
13. Training

In many cases, especially where KPIs are concerned, it is not so much the current value of a measure that is of interest as how it is changing over time. Therefore there is much value in presenting numbers as graphs so that trends can clearly be seen. This also aids understanding and discussion with the managers and production operators who can really make the difference. This principle can be applied throughout this guide.

Financial and business management

1. Manage cash flow

The management of cash is an essential business requirement. Key measures are:

Working capital funding requirement

This can be expressed in various ways but is based on:

1. Current assets, i.e. cash or "near" cash, including monies owed to the company (accounts receivable) and finished goods stock (where this can be readily sold for cash).
2. Financial obligations to be paid in the current operating year, or period (accounts payable).

For cash flow control purposes, the measure required is (1) – (2) which should always be positive.

Another way of expressing this is as a percentage of sales, with a target value of around 10% but recognising that it will vary considerably. This is sometimes referred to as the Working Capital Ratio.

Understanding the working capital funding requirement of a company is a much larger subject. However, if a company is under funded it may well run out of cash, and be forced to cease trading since it can no longer pay its suppliers.

A ratio frequently used to monitor cash flow is (Current Ratio). It should be greater than 1.

$$\frac{\text{Current assets}}{\text{Current liabilities}}$$

Cash flow forecast

Forecasting cash flow is a critical task, especially where large amounts of materials may be purchased and/or where customers take their full 90 days to pay. A wide range of circumstances can cause available cash to suddenly fall in an alarming fashion, hence the need to forecast.

Based on information extracted from the ledgers – that is, all expected work related payments required in the month - and a projection of what income and other payments such as corporation tax, capital expenditure etc. are expected, a forecast can be prepared. It is best done as a spreadsheet by month – there are standard layouts that can be used. The bottom line may be plotted as a graph to show cash flow trend.

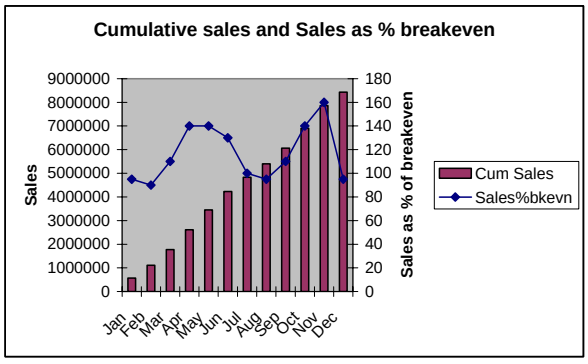
2. Produce a single page A4 summary

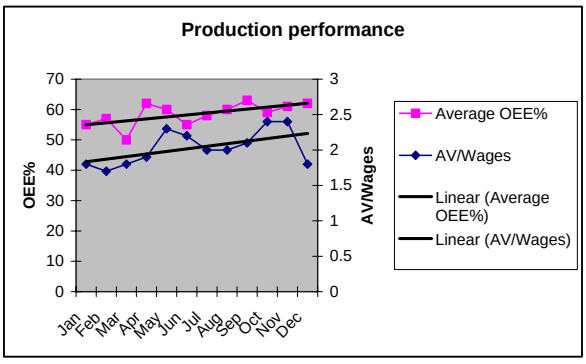
This summarises data and measures from a wide range of sources, and other aspects of this practical guide. It should be designed with the balanced scorecard concept in mind so as to give a broad overview. The precise data to include will depend on personal preferences and company characteristics, but the following is an example. Its purpose is to enable a quick assimilation of all the key factors of the business. Used on a regular basis, departures from the norm are readily apparent, so prompting appropriate action.

Date: 26/06/2006

Healthy Printing Company Ltd

	Current month				Year to date			
Indicator	**Current value**	**Target/ budget**	**Variance**	**Trend**	**Current value**	**Target/ budget**	**Variance**	**Trend**
Financial								
Turnover to date	600,000	600,000	0	-	3,600,000	3,500,000	100,000	^
Sales/brkevn sales%	1.2	1.3	-0.1	v				
AV	340,000	340,000	0	-	2,000,000	2,000,000	0	-
EBIT	42,000	45,000	-3,000	v	250,000	230,000	20,000	^
AV/sales%	57%	60%	-3%	v				
WIP	123,000	125,000	-2000	v				
Current ratio	1.4	1.3	0.1	^				
Gearing								
Days to inv. pst del.	4	5	-1	v				
Debtor days	57	50	7	^				
Production								
Utilisation%	86	85	1	^	84	83	1	^
Average OEE%	57	70	-13	v	62	60	2	^
AV/Direct Wages	2.2	2.5	-0.3	v	1.9	2.0	-0.1	v
Value of outwork	43,000	20,000	23,000	^				
Sheets printed	1,450,000	1,500,000	-50,000	v				
Jobs completed	106	100	6	^				
Overtime hours	95	100	-5	v				
Sales								
Enquiries per day	112	120	-8	v	24	25	-1	v
Quotes/day	80	80	-	-	740	760	-20	v
Orders/day	32	30	2	^				
Value of orders/day	27,000	30,000	-3,000	v				
No of jobs delvd/day	28	30	-2	v				
Value of jobs delivered/day	31,500	30,000	1,500	^				
Estimate cnevrn %	40	40	-					
Estimates/hour	14	12	2	^				
Average job value	844	1000	-156	v				
Month end forecast	650,000	600,000	50,000	^				
%sales from agencies (inc Print managers)	13	10	3	^				
Customer service								
On time delivery%	92	95	-3	v	92	95	-3	v
Value complaints	0	2,000	-2,000	^	22,000	10,000	12,000	^





3. Keep your finger on the pulse

Depending on the nature of the business, it may be necessary to review some of the KPIs at frequent intervals during the day in addition to the single A4 page summary that might only be produced weekly. If it is a highly volatile business then experience suggests monitoring:

- Number of enquiries today
- Number of estimates/quotes today
- Number of orders today (hence estimate conversion rate)
- Number of jobs delivered today
- Value of jobs delivered today
- Number of jobs out on proof
- Value of WIP
- Added value per day
- Sales value per day
- Number of jobs completed so far today
- Number of sheets printed so far today

For each of these, “norms” will be established (or can be derived in some cases from the budget). The absolute value of these is not important, but departures from the norm can be critical. Keeping a track of similar data only for a longer period, say a week or month, is also useful in terms of identifying trends.

The key reason to track these data at regular intervals is to detect as early as possible any lull or overload in work. In both cases, management action in the form of directions to the sales force, pricing policies, encouragement to customers to pass proofs and type of work to pursue can be taken while there is still time to make a difference.

4. Use accurate cost rates

Cost rates are a core data set used by the estimating and costing systems. If the cost rates are not as accurate as possible, then much else will be of reduced accuracy and value. Some key principles related to cost rates are:

- Use cost rates which include all costs i.e. include depreciation, interest charges, space rental charges, even if the equipment was bought using available cash and the premises are owned freehold (hence interest charges nor rent). All-inclusive costs show the true cost of the business and ensure that the value of assets is recovered in a reasonable time.
- Cost rates should be just that, and not incorporate a profit margin, thus becoming a “charge out rate”. Otherwise over time, the distinction between cost and margin becomes blurred and it is no longer clear at what point a job is profitable.
- Cost rates should be reviewed regularly (at least once per year) and when new equipment is installed. New equipment is often more costly but more productive than that which it replaced. Margins should be reviewed to ensure that the benefits of the new equipment are not squandered entirely in lower prices.
- Specialist services are available for calculating cost rates. However, for many small to medium sized companies, it is possible to use a computer program or contact The BPIF for costing guidelines.
- Cost rates critically depend on the assumed utilisation rate. If in practice this rate is not achieved, individual jobs might appear to be profitable (as measured by the costing system), but full recovery of overheads will not be achieved, and the company might in fact be loss making. It is therefore essential to continually monitor utilisation rate and adjust cost rates accordingly if assumed utilisation is not being achieved.

Sales

5. Produce month end forecasts

The purpose of a month end forecast is to detect as soon as possible a potential shortfall in sales for the month early enough that corrective action can be taken. This complements the data examined in point 3. Taken together these can suggest a revision of selling and pricing policies with a view to stimulating more work.

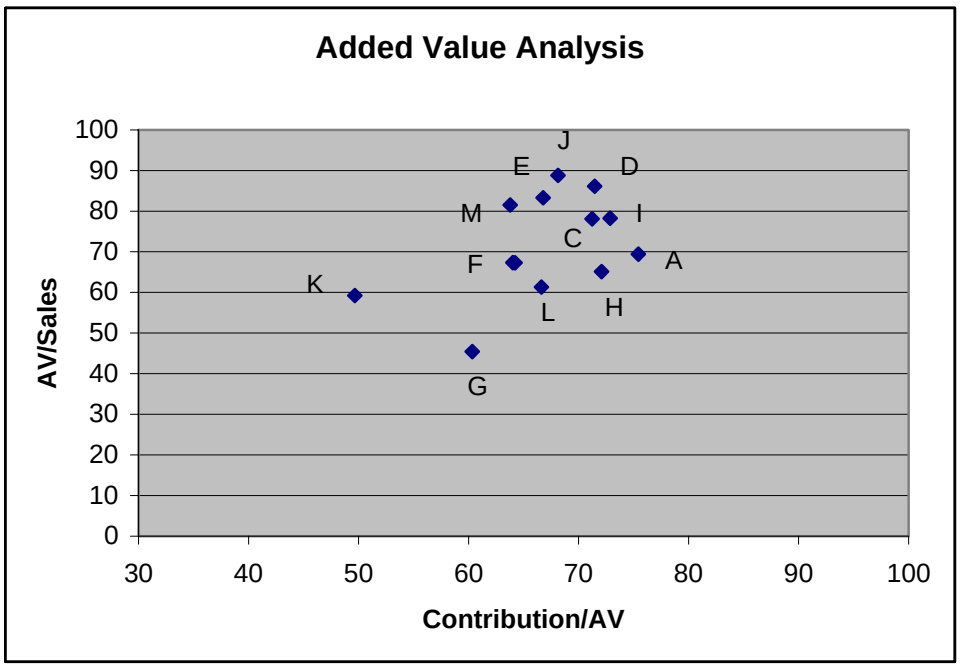
The month end forecast is easily produced by taking the average added value/day up to the current point in the month (normally available directly from the MIS), and then multiplying by the number of working days in the month. Experience shows that this usually produces a reasonable forecast from about day 5 in a month onwards. The answer is a projection of Added Value for the month that can be compared with budget targets.

Note that added value is a better measure than sales for this (and many other analyses) since it is a measure of the work done (and wealth created) within the company. Total sales figures can be very distorted by paper costs and outwork costs, and hence misleading.

6. Know where profits/losses are made

Knowing which products/markets/customers are the most beneficial for the company is crucial to determining the future development of the company, and its profitability. The MIS collects all the data required for this analysis almost by default. For some analyses it is necessary to categorise jobs and customers and possibly also allocate these to market sectors. This only takes a moment during job entry once the system is set up to do it. Most MISs accommodate this.

Then the MIS can be used to compile data as in the following table and a graph plotted as below.



Healthy Print Company Ltd

Summary of sales, costs etc by product (12 months ending dd/mm/yy)

Product category	No of jobs	Labour	Outwork & external costs	Paper	Delivery	Other charges	Job Cost	Sales Value	Profit/ loss	Added Value	% Sales	% Profit	% AV	Wages	AV-Wages Contrib	AV/ sales	Contrib/ AV	Contrib/ Sales
A	549	435,760	45,126	228,094	23,884	61,915	794,779	971,461	176,682	674357	13	36	12	165,688	508,669	69	75	52
B	70	119,644	27,522	32,897	1,378	6,265	187,706	188,970	1,264	127173	2	0	2	45,492	81,681	67	64	43
C	62	96,584	16,748	17,300	1,702	8,986	141,320	163,392	22,072	127642	2	4	2	36,724	90,918	78	71	56
D	38	248,122	41,608	6,854	4,826	39,530	340,940	383,769	42,829	330481	5	9	6	94,343	236,138	86	71	62
E	1071	1,063,844	149,783	77,090	17,236	122,795	1,430,748	1,461,783	31,035	1217674	19	6	21	404,503	813,171	83	67	56
F	234	228,322	57,670	53,210	6,268	16,993	362,463	358,467	-3,996	241319	5	-1	4	86,814	154,505	67	64	43
G	57	41,328	10,225	36,076	1,320	8,347	97,296	87,243	-10,053	39622	1	-2	1	15,714	23,908	45	60	27
H	765	523,869	90,694	275,093	16,897	71,713	978,266	1,096,521	118,255	713837	14	24	12	199,190	514,647	65	72	47
I	146	216,686	55,147	24,720	4,478	21,366	322,397	387,912	65,515	303567	5	13	5	82,390	221,177	78	73	57
J	844	957,649	102,646	16,780	24,639	122,811	1,224,525	1,286,641	62,116	1142576	17	13	20	364,125	778,451	89	68	61
K	290	152,599	47,867	29,305	2,140	5,554	237,465	194,562	-42,903	115250	3	-9	2	58,022	57,228	59	50	29
L	660	599,586	192,708	222,006	16,547	50,738	1,081,585	1,114,342	32,757	683081	14	7	12	227,979	455,102	61	67	41
M	4	11,374	859	1,684	162	266	14,345	14,645	300	11940	0	0	0	4,325	7,615	82	64	52
TOTAL	4790	4,695,367	838,603	1,021,109	121,477	537,279	7,213,835	7,709,708	495,873	5,728,519	100	100	100					

The table of data is derived from the costing system using the categorisation of products mentioned earlier. So each line is the sum of all the jobs in that category. This data is quite interesting in itself. For example, it shows that while Product category A only represents 13% of sales, it is responsible for 36% of profit.

We can also see that products F, G and K are loss making. However, examining only profit/loss figures derived from the costing system can be misleading since this calculation depends on the distribution of overheads. Another way of examining the data that does not have this problem is based on added value and involves drawing the graph. The further towards the top right hand corner the better a product category is. Conversely, the chart illustrates that Product Categories K and G are questionable. (See Appendix 2 for more details of this technique.) It would be normal to then look into these categories in more detail. It can be seen that these two product categories only account for 4% of sales but are depressing profits by about 11%. Clearly it would be good to stop doing this work.

Another useful aspect of categorising jobs and customers is that it enables a better analysis of won/lost quotations by job category, customer or market sector. There is no simple way of doing this because all jobs are different to some extent, but by looking at the frequency of success/failure in each category related to the average margin for jobs in that category, a picture can be obtained of pricing/margins that are acceptable in that category.

7. Produce detailed estimates

Estimates are multi-purpose, and producing a detailed estimate can save much work (and re-keying) at other stages in the process. Therefore it is worth estimating all jobs, even if this is not necessary for producing a quotation.
An estimate is:

- a production plan – hence can be used to directly generate job bag/works instructions
- a sound foundation as input to a pricing decision – and a good estimating system will show, for a certain job price, the predicted added value component of a job and express this as a percentage of selling price. From the budget it is possible to establish the necessary AV component of a job to ensure that the job is worth doing. For a typical general print company that buys its own paper, this figure might be as low as 30% but is ideally at least above 50%. Where companies mainly print on customer-supplied paper, a minimum figure of 60% is more likely. Good companies will never price a job such that the AV is inadequate. It is also most useful to examine the AV/Wages or perhaps more easily the AV/hour that the job is expected to achieve. From the budget, required minimums for these ratios are easily calculated, and should not be undercut except in deliberate (and limited) “loss leader” situations.
- a set of working targets for production – for example, how long each stage of processing should take. It is this data that, after the job is done, is compared with the actual performance measured by the costing system.
- the data needed by production scheduling – as a result, almost no additional data input is required for computerised production scheduling, unless a re-estimate is necessary because job specifications or production method have changed.

A crucial aspect of estimating today is the speed at which estimates are produced. Three key KPIs in relation to estimating are:

- Time from receiving enquiry to delivery of quotation
- Number of estimates per hour (by each estimator)
- Estimate conversion rate

Customer service

8. Measure customer service levels

Good companies will periodically review in a formal way (e.g. a special meeting arranged for the purpose), their performance with key customers. This is an excellent way of maintaining a good relationship with customers, and provides the opportunity to gain invaluable information about their future needs and print spending plans.

In the meantime, there are several measures that are helpful in monitoring service performance:

- % of jobs delivered on time and in full (OTIF)
- Number of customer complaints per month
- Cost of reworking or of compensation
- % of customer enquiries answered immediately (i.e. no call back)

Pareto analysis is useful in analysing some of this data so that matters requiring management attention are highlighted. This is illustrated in Appendix 1.

Also in relation to customer service, the MIS should be used for:

- Compiling knowledge about a customer and the individuals in it
- Providing information (nearly) automatically to customers (e.g. job status information)
- Providing e-commerce functionality where appropriate

9. Analyse administration costs

With falling job values, it is easy for sales and administration costs to become a large proportion of selling price, at which point a job is no longer profitable, but this would not be shown up by most costing systems. Therefore it is important to analyse the costs for core administrative functions such as processing an order, creating a job bag, raising an invoice, producing an estimate/quotation etc. This can be done using the standard costing system if set up appropriately but this may not be worthwhile. Usually, a spot check every year or so is adequate and requires examining the time taken for the processes involved and knowledge of the wages etc of the staff. Complete accuracy is not required. Having carried out the analysis, every effort should be made to extract cost from the system (for example, note the benefit of producing a good estimate in the first place as described above). Another tool for reducing administrative costs is shop floor data collection. This is a standard feature of all good MIS systems and is usually very easily cost justified. It has benefits that go far beyond reducing admin costs, and should therefore be seriously considered by all MIS users.

It is sometimes found that certain customers require much service support and this loads a job with “hidden” admin charges that might make an apparently profitable job, unprofitable. For example, a customer that routinely requires several proofs to be delivered and collected may pay for the proofs, but rarely for the man hours of sales staff or CSRs in delivery and collection, which becomes serious if say long distances are involved. So, it is worth analysing a selection of jobs, examining their profitability including all sales, administration and service support costs. It is particularly important to do this with low value jobs or those with a high outwork component (for which added value will be low).

Production

10. Operate a costing system

The fundamental purpose of a costing system is to compile a comprehensive sum of the costs associated with producing a job. It does this by measuring the times of all processes (and multiplying by the appropriate hourly rate) and collecting costs of materials, outwork and so on. As demonstrated earlier, this can then be used to undertake a profitability analysis.

Another major function of the output from the costing system is to compare actual costs with estimated (i.e. predicted) costs, as in the following table.

Job No	Estimated cost	Actual cost	Variance	Cumulative variance
1	2454	2346	108	108
2	3658	3682	-24	84
3	2317	2275	42	126
4	670	589	81	207
5	34	1869	-1835	-1628

Hopefully most of the data can be ignored because jobs happened as planned. But by including a variance column, jobs with a greater than expected variance can be highlighted and examined in more depth. Most MISs can produce this kind of exception report where only those jobs with a variance of say, greater than 10%, are listed. This is one of the key measurements involved in achieving continuous improvement.

It can also be illuminating at times to include a cumulative variance column – this helps to identify trends in the data. In particular, in this case, it will show whether estimates are tending to be consistently too high or low in relation to actual costs. Clearly a deviation either way suggests some review of hourly rates is necessary.

11. Use OEE and other KPIs

Use of KPIs (and associated targets) can be motivational and provides the measure against which improvement can be assessed. Most KPIs are best presented graphically with time as the horizontal axis. KPIs are part of process which involves:

- Establishing KPIs for all key operations
- Establishing targets for all KPIs (for individuals/teams/departments etc as appropriate)
- Collecting and analysing the data necessary (largely done by the costing system, which can be supported by shop floor data collection)
- Monitoring trends (usually best done by presenting KPIs graphically)
- Displaying the results (for example, on departmental noticeboards where appropriate). Some KPIs are only appropriate to individuals.
- Follow up – use as the basis for continuous improvement, either with team meetings, with individuals or departmental managers

There is no definitive list of KPIs which will suit all circumstances. However, OEE (see Appendix 1) is an excellent summary one, combining productivity and quality issues.

It is recognised that achieving an OEE of 50% at the first attempt is an indication of reasonable performance. However an OEE of 75% is recognised as world class performance and is attained by very few companies. OEE can be illustrated in a simple table as follows:

As the table demonstrates this is a very easy way to understand available capacity and to start highlighting problem areas.

Total Potential Output	100hrs indicates total machine manning level over a given period	100hrs
Availability	70% production time left after, taking out wash ups, make ready etc	70hrs
Performance	70% taking into account running speeds, web breaks, paper jams etc	49 hrs
Quality	90% material issues, spoilage etc	46hrs
OEE	46%	46hrs

Other KPIs that are more appropriate to individual operations are:

- Plates per hour
- Average make-ready time on press
- Average running speed on press or in finishing
- Output per machine/operator
- % utilisation of individual presses and department overall
- % dead time (and normally the cause would also be noted for later analysis)
- % waste (if this can be measured)
- Added Value/Direct Wages or AV/Direct employee or AV/Person hour – all these are good measures of productivity – it matters little which is used

It seems to be that people respond better to KPIs and targets when they are involved in the data collection process that supports them. Shop floor data collection has a part to play but there are other methods which are helpful. A simple way of collecting information, especially where teams or groups are working is to have a simple data entry board that can be used by say press crews, to input relevant information. This can be made up of a number of key productivity drivers or KPIs which can be easily recorded in real time with minimum effort. From this a table of emerging trends can be compiled which can be used in production and management meetings for feedback and review of company performance.

Run to list

Measure	Performance	Job No.
Plates on time	N	
Job spec/ proofs	Y	
Make ready	30mins	
Running speed	8000 hr	
Web breaks	1	
Wash up	20mins	
Waste	600m	
Overs run	2000	

Trends

Measure	Incidents	Job nos.
Plates late to press	8	
Information queries	4	
Proofing issue	2	
Paper issue	6	
Wrong Job Specification	2	

12. Implement production scheduling

When you've done the other 11 consider this!

It is true that computerised production scheduling does not seem to suit everyone. It is often said that computerised scheduling systems require too much data input, are inflexible, too slow, cannot cope with the rapid changes that customers impose on

printers, and simply cannot keep pace with the number of quick turnround jobs that are characteristic of many print companies today.

However, it is very significant that the two companies described in the case studies have adopted their scheduling systems for precisely these reasons – that is, they would be unable to cope with the number of jobs, the quick turnrounds, the changes etc. if they did not have these systems. These companies simply would not wish to be without their scheduling systems, pointing to gains in production capacity, much better control and predictability of production, with less administrative effort required.

The criticisms of computerised scheduling may be valid if they are looked upon and operated as a separate function. But if they are fully integrated into the production management processes, if estimates are properly prepared and if shop floor data collection systems are used, the benefits appear compelling.

13. Training

Effective use of an MIS depends on

- Being a competent manager and knowing what information is required
- Knowing what the MIS can do and how to make it deliver the information required

To achieve these training is required, but not just when a new system is installed – training is a lifetime requirement. MIS suppliers provide effective training in the use of their systems – but it is difficult to absorb it all in one go and they are of the view that on-going training is really required. Some of the suppliers and some of the print companies point out that telephone support has a valuable training role, especially where this is conducted by the technical support person at the MIS supplier remotely taking control of a workstation in the print company and demonstrating how something should be done. In this way, training related to the immediate problem is provided and the trainee is much more likely to remember what they have been told since they will immediately put it into action.

But there is still a role for formal training sessions to demonstrate the complete system capability. It is noteworthy that even a couple of Managing Directors were contemplating more formal system training for themselves so as to advance their use and benefit of their systems.

However much training you have done in your company there is likely to be room for much more.

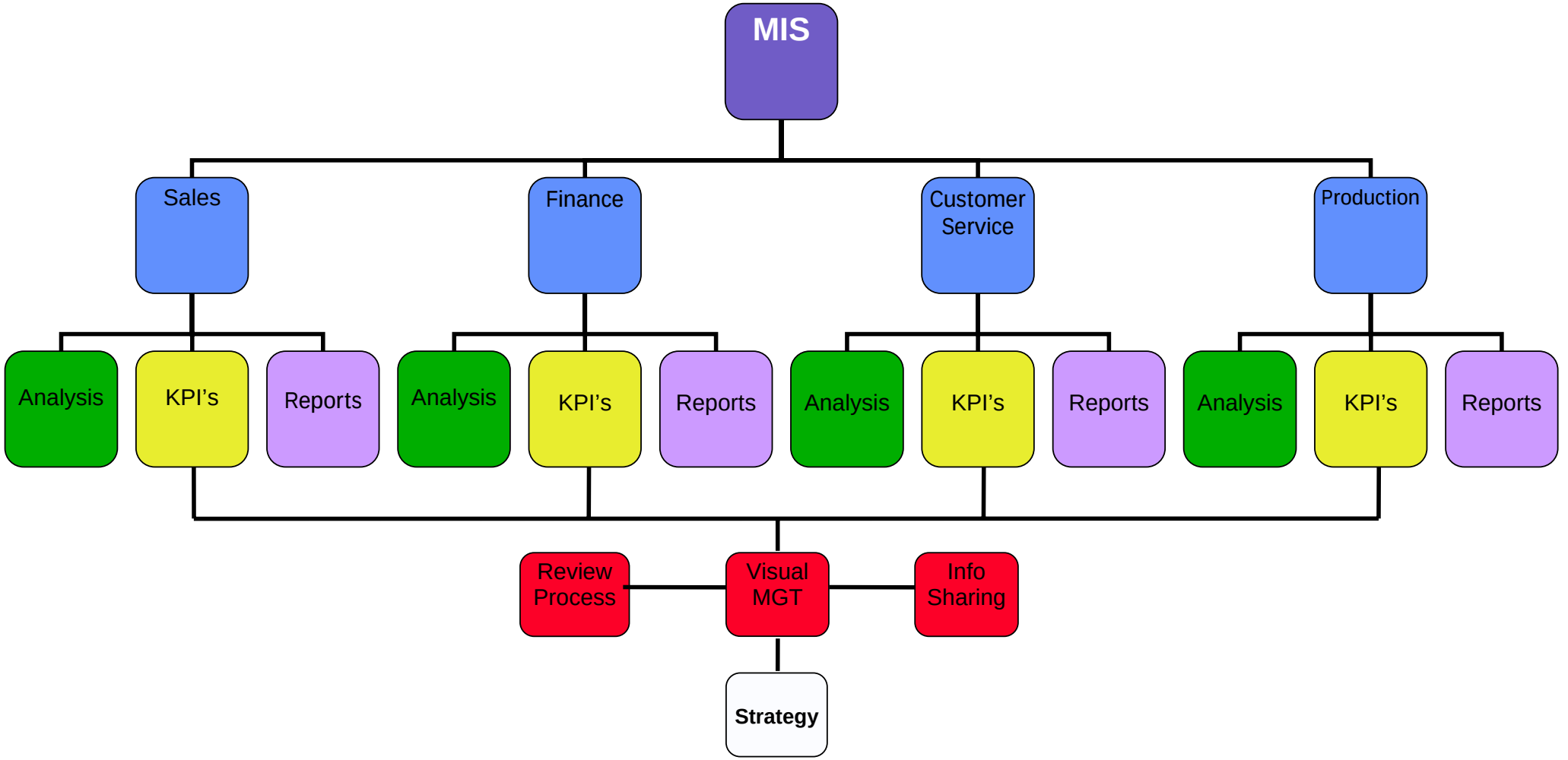
14. MIS System ownership

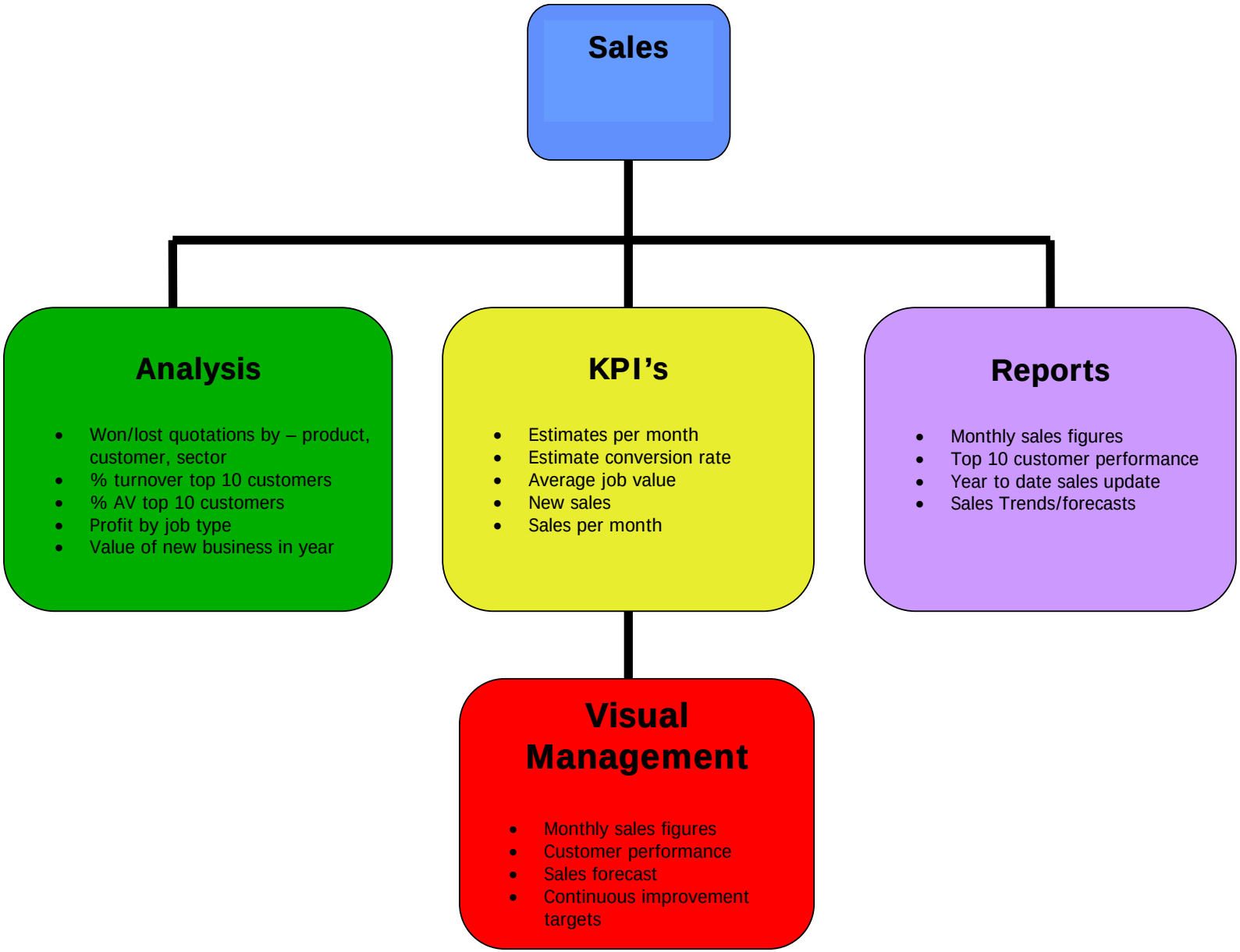
An MIS system needs someone within the user company to “own” it. There are differing views on who this should be and there is no right answer. Commonly the MIS becomes adopted by the “Finance” function in a company, but it could equally be by “Production” or “Sales”. In order to ensure a balanced perspective it could be argued that it should be the responsibility of the managing director and while this should ultimately be the case, it may be too much to cope with. Another approach that can work if the company has a team-based culture is to have an MIS Team in which all major functions are participants.

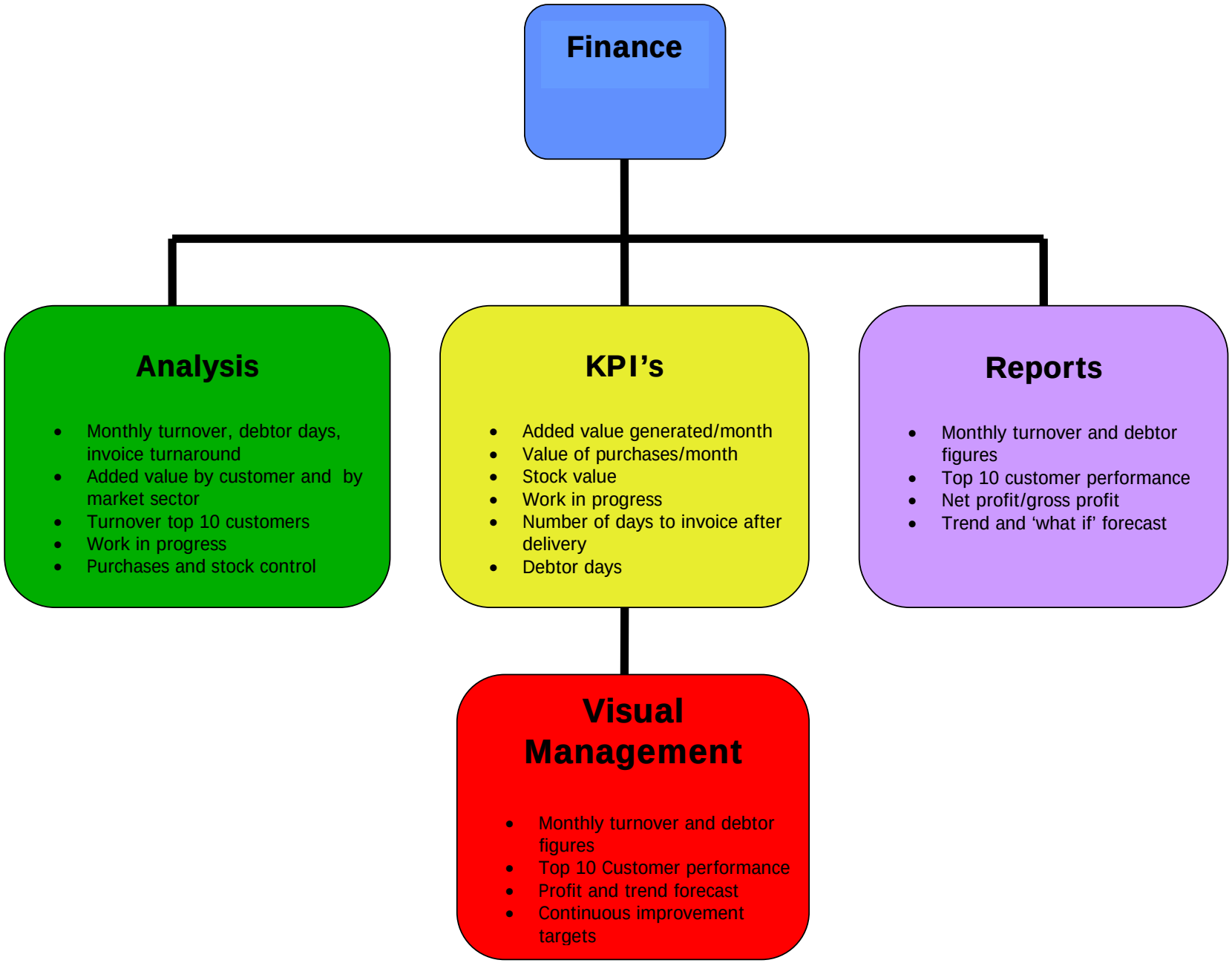
The important thing is to recognise that whoever does have ownership/responsibility for the system inevitably (but maybe unintentionally) puts their bias into it and this should be proactively guarded against. As is made clear in some of the case studies, and has been emphasised in this report by use of the “Balanced Scorecard” concept, an MIS works best when it is viewed and operated as an integrated entity with each aspect of the system having its due recognition and impact on the rest.

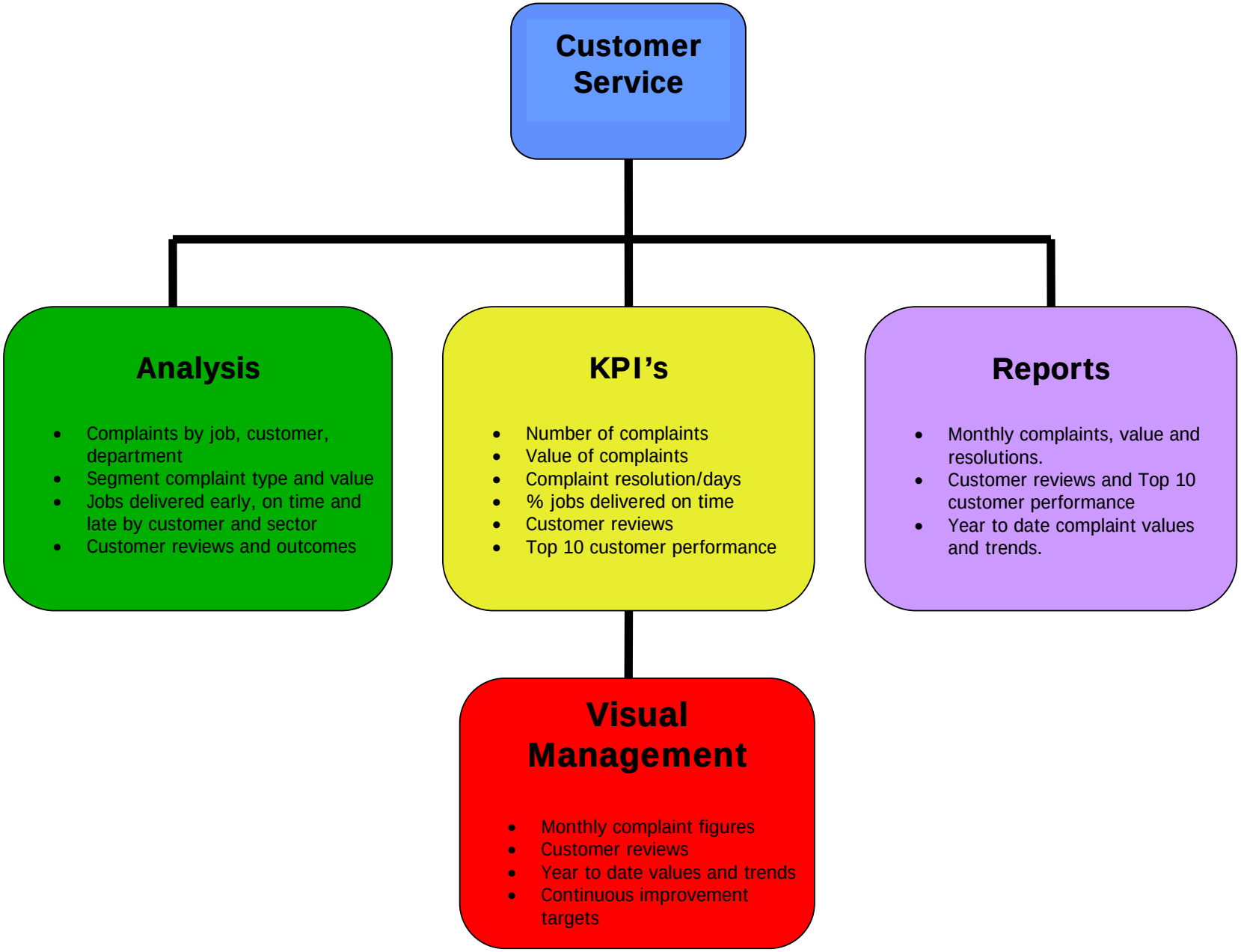
The Balanced Scorecard

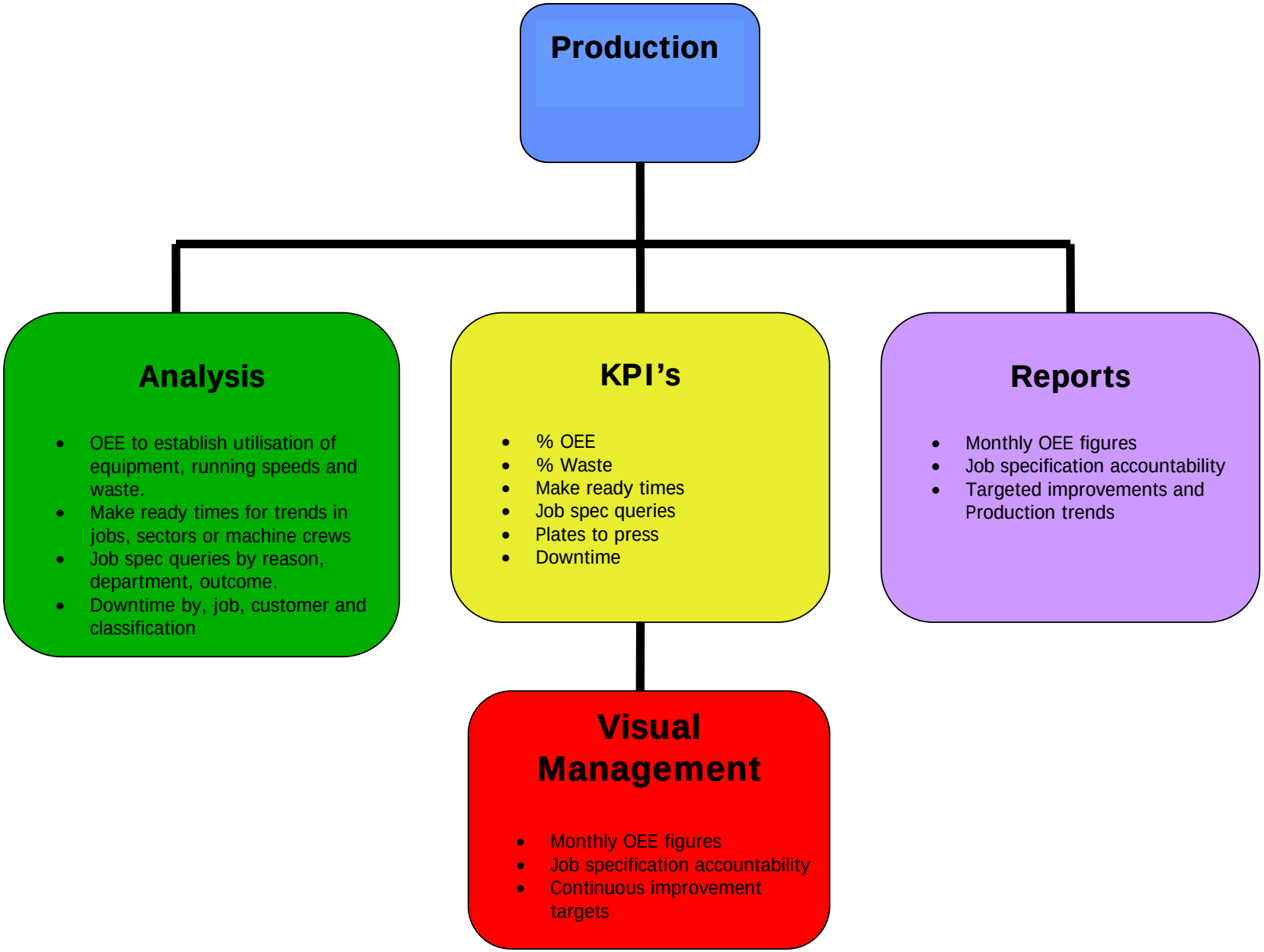
The diagram overleaf illustrates the basic framework in which each major MIS functional area is split into analysis, KPIs and reports. The following pages expand on each of these and the following commentary describes how the elements interrelate.


MIS
Sales
Finance
Customer Service
Production
Analysis
KPI's
Reports
Analysis
KPI's
Reports
Analysis
KPI's
Reports
Analysis
KPI's
Reports
Review Process
Visual MGT
Info Sharing
Strategy


Sales
Analysis
Won/lost quotations by – product, customer, sector
% turnover top 10 customers
% AV top 10 customers
Profit by job type
Value of new business in year
KPI's
Estimates per month
Estimate conversion rate
Average job value
New sales
Sales per month
Reports
Monthly sales figures
Top 10 customer performance
Year to date sales update
Sales Trends/forecasts
Visual Management
Monthly sales figures
Customer performance
Sales forecast
Continuous improvement targets


Finance
Analysis
Monthly turnover, debtor days, invoice turnaround
Added value by customer and by market sector
Turnover top 10 customers
Work in progress
Purchases and stock control
KPI's
Added value generated/month
Value of purchases/month
Stock value
Work in progress
Number of days to invoice after delivery
Debtor days
Reports
Monthly turnover and debtor figures
Top 10 customer performance
Net profit/gross profit
Trend and 'what if' forecast
Visual Management
Monthly turnover and debtor figures
Top 10 Customer performance
Profit and trend forecast
Continuous improvement targets


Customer Service
Analysis
Complaints by job, customer, department
Segment complaint type and value
Jobs delivered early, on time and late by customer and sector
Customer reviews and outcomes
KPI's
Number of complaints
Value of complaints
Complaint resolution/days
% jobs delivered on time
Customer reviews
Top 10 customer performance
Reports
Monthly complaints, value and resolutions.
Customer reviews and Top 10 customer performance
Year to date complaint values and trends.
Visual Management
Monthly complaint figures
Customer reviews
Year to date values and trends
Continuous improvement targets


Production
Analysis
OEE to establish utilisation of equipment, running speeds and waste.
Make ready times for trends in jobs, sectors or machine crews
Job spec queries by reason, department, outcome.
Downtime by, job, customer and classification
KPI's
% OEE
% Waste
Make ready times
Job spec queries
Plates to press
Downtime
Reports
Monthly OEE figures
Job specification accountability
Targeted improvements and Production trends
Visual Management
Monthly OEE figures
Job specification accountability
Continuous improvement targets

Sales

If the following key performance indicators are set for the sales function it will be possible to assess performance against the criteria that are valuable in winning new business and retaining existing customers.

- Number of complaints
- Value of complaints
- Complaint resolution/days
- % jobs delivered on time
- Customer reviews
- Top 10 customer's performance

If there is a regular customer review process in place this should provide the necessary feedback to highlight areas where service and performance can be improved. This will also act as a mechanism to provide an early warning system, alerting issues of customer dissatisfaction and allowing the appropriate steps to be taken to maximise customer retention.

Combining the analysis from the KPI's and the following list of data will provide a comprehensive view of performance from the main drivers of the sales function

- Won/lost quotations by – product, customer, sector
- % turnover top 10 customers
- % AV top 10 customers
- Profit by job type
- Value of new business in year

The analysis should be complied into four updated reporting templates

- Monthly sales figures – Turnover/ won lost quotations
- Top 10 customer performance – Turnover/AV/profit
- Year to date sales update - Turnover/ Profitability/ AV/ by product, sector
- Sales Trends/forecasts – Turnover/ Profitability/ AV by product, sector

Sales information should be shared in management meetings and via visual management techniques. The information should convey the monthly sales figures and customer performance to let employees understand the importance of individual customers to the business. Data relating to sales forecasting will provide insight into the ongoing trading position of the business and the targets for continuous improvement will reflect the necessity for constant re-evaluation and retaining a competitive edge.

- Monthly sales figures
- Customer performance
- Sales forecast
- Continuous improvement targets

Finance

If the following key performance indicators are set for the finance function it will be possible to assess performance against the criteria that are crucial for keeping the business stable financially.

- Added value generated/month
- Value of purchases/month
- Stock value
- Work in progress
- Number of days to invoice after delivery
- Debtor days

Combining the analysis from the KPI's and the following list of financial data will provide an understanding of how well the business is performing in the short term and early indications of potential cash flow and capacity problems.

- Monthly turnover, debtor days, invoice turnaround
- Added value by, customer and market sector
- Turnover top 10 customers
- Work in progress
- Purchases and stock control

The following reports should be produced to provide an overview of business performance and stability. The trend and 'what if' forecasts are extremely important to understand the longer term direction of the business and potential outcomes of poor profitability, low turnover or loss of key customers.

- Monthly turnover and debtor figures
- Top 10 customer performance
- Net profit/gross profit
- Trend and what if forecast

The following information should be shared at team meetings and displayed visually to allow an understanding of the current trading environment and create buy in to continuous improvement targets.

- Monthly turnover and debtor figures
- Top 10 Customer performance
- Profit and trend forecast
- Continuous improvement targets

Customer Service

The following key performance indicators for Customer Service will provide concise information as to the overall level of service being delivered and highlight areas for concern with individual customers, internal departments or market sectors.

- Complaints by job, customer, department
- Segment complaint type and value
- Jobs delivered early, on time and late by customer and sector
- Customer reviews and outcomes

Combining the analysis from the KPI's and in particular the customer reviews will allow pre-emptive action to be taken. Analysing complaints by type, job and department will identify problem areas and repetitive issues. Appropriate actions can then be taken to eradicate or minimize their effect.

The following reports should be produced to indicate an optimum level of customer service. They should provide detailed complaint analysis by number, value, market sector and importantly how and when they were resolved. Setting this information in the context of annual figures and trends will assist in longer term planning and strategic direction.

- Monthly complaints, value and resolutions.
- Customer reviews and Top 10 customer performance
- Year to date complaint values and trends.
- Monthly turnover and debtor figures

Information from customer reviews and customer complaints should be conveyed through visual management. This data will provide a clear understanding of the negative value and cost to the business and the importance of a shared responsibility to meet improvement targets and drive improved customer service.

- Monthly complaint figures
- Customer reviews
- Year to date values and trends
- Continuous improvement targets

Production

Key performance indicators for Production are essential to establish how equipment and resources are currently being utilised and identify measures by which this can be improved.

- OEE to establish utilisation of equipment, running speeds and waste
- Make ready times for trends in jobs, sectors or machine crews
- Job specification queries by reason, department, outcome.
- Downtime by, job, customer and classification

Combining the analysis from the KPI's and information on job specification queries, downtime and make readies should highlight recurring problems, ways to improve communication and administrative processes.

The following reports should be produced to illustrate the current level of OEE and through supporting analysis of job specification issues etc provide the information to demonstrate production trends and targeted improvement initiatives.

- Monthly OEE figures
- Job specification accountability
- Targeted improvements and Production trends

Production information in the form of KPIs should be utilised to convey the message to other areas of the business that the production process it being pushed to meet continuous improvement targets. This reinforces the message that achieving higher OEE, better customer service and financial return is a joint responsibility.

8 Are you using your MIS effectively – here is a "Reality check"

Having read through at least some sections of this report, you might like to now consider again how effectively your company is using its MIS. The questions below are the same as at the beginning but slightly restructured.

If you can give a definite or positive answer to 75% of these questions then you are deriving good benefit from your MIS. However, if some of your answers are negative or you don't know, this suggests there are several areas that you should consider working on in your company. On the next page is a brief commentary concerning each question which will point you to the appropriate section of the report.

General		
1	Is your management culture characterised as pro-active control or fire-fighting?	
2	Do you have a single page summary of current company performance that is routinely discussed at Board meetings?	
3	How much MIS/management training per person has taken place in the last year?	
Financial		
4	Assuming it is working day no. 8 in the month, do you know your expected turnover, AV and profit for the month end?	
5	When did you last do a cash flow forecast?	
6	Do you know the cost of producing an estimate and a works instruction ticket?	
7	Do you routinely compare actual cost of production with estimates?	
8	Do you know what your current cost rates are?	
Production		
9	Is your average utilisation better or worse than that required for you to meet budget?	
10	What is your OEE?	
11	What are the top 10 KPIs/targets that you have in regular use?	
12	Are KPIs regularly discussed with production operators/departmental managers?	
13	Is performance data graphically displayed on your notice boards right now?	
14	Do you use a computerised scheduling system?	
Sales		
15	What is the minimum AV/hour target for a job in your company?	
16	Do you know which categories of work and customers generate profits and losses?	
17	What is your estimate conversion rate?	
18	How many estimates per day does each of your estimators produce?	
Customer Service		
19	What % of jobs are delivered OTIF?	
20	Do you know your average time to respond to a customer job status enquiry?	

General			
1	Is your management culture characterised as pro-active control or fire-fighting?	Section 7, Step 12 Section 6.2	MISs enable work to be planned and issues to be identified and dealt with in advance. “Keeping a finger on the pulse” is greatly facilitated by the MIS.
2	Do you have a 1 page summary of current company performance that is routinely discussed at Board meetings?	Section 7, Step 2 Section 6	The single page is easily assimilated – its review at Board meetings encourages a strategic response to trends that are identified.
3	How much MIS/management training per person has taken place in the last year?	Section 7, Step 13	An MIS can do so much if people know what is needed, how to make the MIS deliver it and how to act on the information. There is always more that everyone can learn.
Financial			
4	Assuming it is working day no. 8 in the month, do you know your expected turnover, AV and profit for the month end?	Section 7, Step 5 Section 6.1	Predicting the month end as soon as possible enables corrective action to be taken if necessary.
5	When did you last do a cash flow forecast?	Section 7, Step 1 Section 6.1	Monitoring cash flow is critical – many companies fail because of poor cash flow.
6	Do you know the cost of producing an estimate and a works instruction ticket?	Section 7, Step 9	As job value falls, the cost of admin, estimating and sales rises as a proportion of sales revenue. With average profitability so low, controlling admin costs is crucial.
7	Do you routinely compare actual cost of production with estimates?	Section 7, Step 10 Sections 6.1 and 6.2.2	Operating a costing system is fundamental to MIS operation, measurement of the business and hence sound management of the business.
8	Do you know what your current cost rates are?	Section 7, Step 4 Section 5.1	It is important to know the true cost of producing a job which can only be done if cost rates are accurate and up to date.
Production			
9	Is your average utilisation better or worse than that required for you to meet budget?	Section 7, Step 4 Section 5.1	Utilisation is only one measure and should be used along with others. Cost rates are based on an assumed utilisation level – it is vital to know if this target is not being met.
10	What is your OEE?	Section 7, Step 11 Appendix 1	OEE provides a balanced view of the overall production performance of the company – it is the best single figure available.
11	What are the top 10 KPIs/targets that you have in regular use?	Section 7, Step 11 Sections 5.2 and 6.2.2	It’s not critical how many KPIs are in use, but that there are a selection used for all the critical processes in your company.

12	Are KPIs regularly discussed with production operators/departmental managers?	Section 7, Step 11 Sections 5.2 and 6.2.2	KPIs are useful as part of a measurement and control process – feedback is essential. KPIs, and how they may be improved should be regularly discussed with those people best placed to influence them.
13	Is performance data graphically displayed on your notice boards right now?	Section 7, Step 11 Section 5.2	Displaying performance data encourages team spirit and maybe a little competition, as well as keeping awareness high and stimulating improved results.
14	Do you use a computerised scheduling system?	Section 7, Step12 Section 6.2.1	Computerised scheduling may not be for all, but it has very tangible benefits. With the coming of JDF, implementation is far easier and the benefits consequently available to far more companies.
Sales			
15	What is the minimum AV/hour target for a job in your company?	Section 7, Step 7 Section 4.1	Job pricing is a critical activity – it has a direct impact on the bottom line. But pricing must be such that work is always profitable. Ensuring that the AV/hour target is not undercut is a good safety measure.
16	Do you know which categories of work and customers generate profits and losses?	Section 7, Step 6 Appendix 2	Knowing where profits and losses are made enables a focus on the former. The MIS can easily analyse jobs especially if categorised.
17	What is your estimate conversion rate?	Section 7, Step 7 Section 5.3	Producing an estimate has a cost. Every job that is won carries the cost of producing all the estimates that failed. Review estimating to see what improvements you can make.
18	How many estimates per day does each of your estimators produce?	Section 7, Step 7 Section 5.3	
Customer Service			
19	What % of jobs aredelivered OTIF?	Section 7, Step 8	Delivering jobs on time and in full should be the norm.
20	Do you know your average time to respond to a customer job status enquiry?	Sections 5.4 and 6.4	If you are in control of your business, customer enquiries will be dealt with immediately (i.e. no call back, which incidentally saves time and money). Good companies proactively supply job status information to their customers, and JDF makes it feasible to provide real time reporting.

9 Recommendations for printers

It is recommended that directors and/or managers in printing companies should:

- Undertake the health check – possibly using it as the agenda for a Board meeting
- Consider participation in one or more of the ViP MIS workshops
- Implement several of the suggestions in the practical guide
- Review training needs – management training and MIS training – and action as necessary
- Consider engaging an accountant to help review cost rates periodically

10 Recommendations for MIS suppliers

It is recommended that MIS suppliers should:

- Implement reporting of KPIs and summary data (e.g. the single A4 page) as standard features of their systems as outlined in the Practical Guide, if not already available
- Run MIS workshops at User Group meetings
- Enhance on-going training options via webinars, remote interactive individual training etc.
- Examine estimating system methods to speed up the process while making the estimate more detailed, recognising the multi-functional role of the estimate
- Encourage their customers to conduct cost rate reviews regularly

Appendix 1

Definition of OEE

Overall Equipment Effectiveness

OEE is a measure of overall efficiency. It can be used as an improvement tool to identify opportunity and provide a focus for effort. Overall Equipment Effectiveness for the purpose of a benchmarking exercise should be calculated on a machine, cell or line basis and then may be averaged to give a company OEE. A minimum of three months data (collected on a weekly basis) is considered a realistic sample.

Overall equipment effectiveness = Availability x Performance x Quality

Each of the components of OEE is defined as:

$$\text{Availability} = \frac{\text{Planned time – Downtime}}{\text{Planned time}}$$

$$\text{Performance} = \frac{\text{Total Output}}{\text{Machine design rate x Actual operating time}}$$

$$\text{Quality} = \frac{\text{Total output – Non-conforming}}{\text{Total output}}$$

Overall equipment effectiveness = Availability x Performance x Quality x 100%

Summary of ratios used by accountants

Working capital funding requirement

This can be expressed in various ways but is based on:

1. Current assets, i.e. cash or “near“ cash, including monies owed to the company (accounts receivable) and finished goods stock (where this can be readily sold for cash).
2. Financial obligations to be paid in the current operating year, or period (accounts payable).

For cash flow control purposes, the measure required is (1) – (2) which should always be positive.

This is also frequently stated as a ratio (Current Ratio)

$$= \frac{\text{Current assets}}{\text{Current liabilities}}$$

Gross profit margin

Gross profit = Turnover – Cost of sales

Hence gross profit margin = $\frac{\text{gross profit}}{\text{Turnover}} \times 100\%$

Net profit margin

Net profit = gross profit – expenses (but before Interest and Taxation)

Hence Net profit margin = $\frac{\text{net profit}}{\text{Turnover}} \times 100\%$

Return on Capital Employed

$$\text{RoCE} = \frac{\text{Profit (after interest etc.)}}{\text{Capital employed}} \times 100\%$$

This basically addresses the question – would you be better off putting your money in the bank?

Note also the related ratio, Return on Total Assets =

$$\frac{\text{Profit before interest and taxation}}{\text{Total assets}}$$

This is regarded as a measure of *operational* performance, compared with RoCE that is more a measure of *business* performance.

Gearing

$$\textbf{Gearing} = \frac{\text{Long Term Liabilities}}{\text{Equity Shareholders' Funds}}$$

Gearing is concerned with the relationship between the long terms liabilities that a business has and its capital employed. The idea is that this relationship ought to be in balance, with the shareholders' funds being significantly larger than the long term liabilities.

Summary of other ratios useful for printing companies

Press utilisation
Cost per productive hour
Production wages/productive hours
Overtime as % of total productive hours
% deliveries on time
Added value/direct production employee
Added value/total employees
% turnover from top 3 customers
% profit from top 3 customers
Added value /£ of production wages
Added value/£ of total wages
Make ready time as % of total production hours
OEE
Estimates per estimator per day
Estimate conversion rate

Added Value

Note that Added Value is a very useful concept in relation to printing businesses because materials costs are often a high proportion of turnover and focussing on the latter can therefore be very misleading. Definitions of AV vary, but this does not matter as long as an agreed definition is used within a given company. A typical definition is:

Added value = Sales value – (all external expenditure directly attributable to a job)

Thus, typical external expenditure would be the sum of paper costs, ink cost, raw material plate cost, outwork cost, and delivery cost.

Added value is therefore a direct measure of the “wealth” created and retained by the company in connection with a given job. It is not influenced by arbitrary decisions about allocation/distribution of overheads.

For a typical general print company, AV is usually 40-60% of sales. From a company’s annual budget it is relatively straightforward to calculate what the minimum added value as a percentage of sales has to be. If a job is accepted with a %AV less than this, the company will effectively lose money on the job. Typically this figure is about 30%.

A related and very useful concept is AV/hour or AV/Direct Wages. These are measures of productivity. Minimum acceptable values and target values can be determined from the budget. These provide another very effective way of considering the pricing of a job.

Appendix 2
Extracting information from numbers

Many KPIs and some reports are a snapshot at an instant in time. What is more interesting and useful is to be able to identify trends and look at measures that give a broader view of the business. This is one reason why OEE is a useful KPI – the data put into it is averages of, say, a month's performance and then it combines several concepts into one ratio to give an overall indication of performance.

In this section three other simple but very useful techniques are described for extracting information from data. With the majority of MIS systems at the present time, it is necessary to dump some data into a spreadsheet program and perform the calculations, but once set up this is a very quick process and well worth the effort.

1 Variance analysis

This is based on four key principles:

- Exception reporting
- Focus on major variations from the expected
- Identify trends
- Annualise data to extrapolate to the future

It is best explained with a simple example. Consider the issue of comparing actual cost of production with estimated (or predicted) cost of production. This is a basic analysis that should be done from the data compiled by a costing system. The table below shows this data, in sequence, for 20 jobs.

Job No	Estimated cost	Actual cost
1	2454	2346
2	3658	3682
3	2317	2275
4	670	589
5	34	1869
6	2598	2379
7	2395	1957
8	6838	6735
9	3468	2349
10	2457	2164
11	1694	1573
12	2436	1754
13	764	1835
14	287	257
15	5932	5873
16	2376	1956
17	4809	4249
18	4563	3952
19	2467	1953
20	23	20

It is very difficult to just examine these figures and extract anything meaningful from them. An approach might be to examine the large numbers since these could be considered more significant, but a much better approach is to examine large differences between what was expected and what happened. So a variance column is added to the table, this being estimated cost minus actual cost.

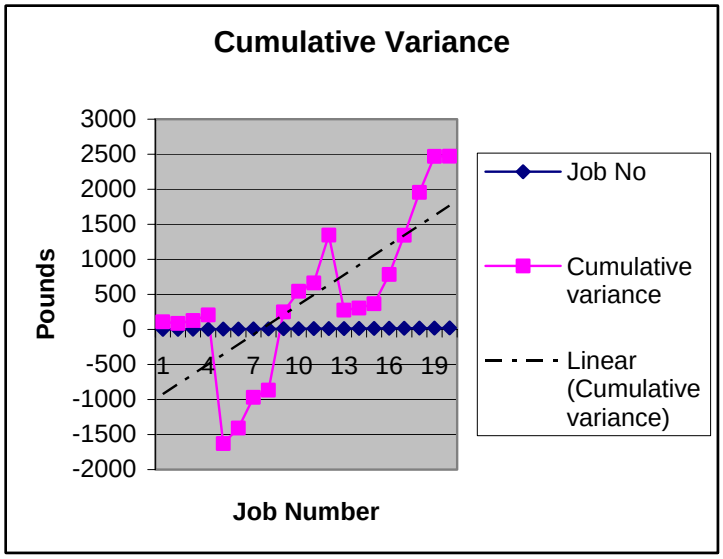
Job No	Estimated cost	Actual cost	Variance
1	2454	2346	108
2	3658	3682	-24
3	2317	2275	42
4	670	589	81
5	34	1869	**-1835**
6	2598	2379	219
7	2395	1957	438
8	6838	6735	103
9	3468	2349	**1119**
10	2457	2164	293
11	1694	1573	121
12	2436	1754	682
13	764	1835	**-1071**
14	287	257	30
15	5932	5873	59
16	2376	1956	420
17	4809	4249	560
18	4563	3952	611
19	2467	1953	514
20	23	20	3

Now, three very significant variations stand out. Attention can be focussed on these to establish the reasons for the differences.

But this data was compiled in sequence – maybe there is a trend. We can look into this by calculating the cumulative variance. That is, we run down the variance column and keep a running total.

Job No	Estimated cost	Actual cost	Variance	Cumulative variance
1	2454	2346	108	108
2	3658	3682	-24	84
3	2317	2275	42	126
4	670	589	81	207
5	34	1869	-1835	-1628
6	2598	2379	219	-1409
7	2395	1957	438	-971
8	6838	6735	103	-868
9	3468	2349	1119	251
10	2457	2164	293	544
11	1694	1573	121	665
12	2436	1754	682	1347
13	764	1835	-1071	276
14	287	257	30	306
15	5932	5873	59	365
16	2376	1956	420	785
17	4809	4249	560	1345
18	4563	3952	611	1956
19	2467	1953	514	2470
20	23	20	3	2473

The trend might now be apparent but it helps greatly to plot as a graph.



It is now clear that there is a trend, which is illustrated by the trend line that has been added to the graph. The upward slope indicates that job estimates are on average higher than job costs. This may or may not be regarded as a good thing, but at least one should know.

The technique illustrated here can be used with any set of data compiled over a period of time where we want to compare actual against planned. For example, it could be used to examine actual make-ready times compared with plan, or utilisation rates relative to budget.

2 Pareto analysis

Pareto analysis is what is more commonly known as the 80:20 “rule”. For example, it might be the case that 80% of profits derive from 20% of customers. It is not intended to be highly accurate – it is intended to filter a mass of data so as to highlight the points worthy of management attention. It is another form of exception reporting.

Pareto analysis involves two processes:

- Ranking – i.e. sorting into order
- Categorisation

Consider the following example which examines the causes of customer credits during a month.

Date	Job No.	Credit £	Reason
2	461	193	Late delivery
3	489	160	poor register
5	550	1469	late delivery
8	552	26	binding quality
10	678	67	late delivery
15	723	107	poor trimming
16	757	12	poor register
18	802	8	late delivery

22	959	667	set-off!
28	992	54	late delivery
	Total:	2763	

If this data is ranked by the credit given, and two other columns added, it can be readily seen that 77% of the credit relates to just two jobs – clearly the ones that deserve most investigative attention.

Date	Job No.	Credit £	% of total	Cum%	Reason
5	550	1469	53.2	53.2	late delivery
22	959	667	24.1	77.3	set-off!
2	461	193	7.0	84.3	Late delivery
3	489	160	5.8	90.1	poor register
15	723	107	3.9	94.0	poor trimming
10	678	67	2.4	96.4	late delivery
28	992	54	2.0	98.3	late delivery
8	552	26	0.9	99.3	binding quality
16	757	12	0.4	99.7	poor register
18	802	8	0.3	100.0	late delivery
	Total:	2763	100.0		

Alternatively, if the data is sorted by the reason the credit was given, it is evident that late delivery is the most significant problem.

Date	Job No.	Credit £	% of total	Reason
8	552	26	0.9	binding quality
5	550	1469	53.2	late delivery
2	461	193	7.0	late delivery
10	678	67	2.4	late delivery
28	992	54	2.0	late delivery
18	802	8	0.3	late delivery
3	489	160	5.8	poor register
16	757	12	0.4	poor register
15	723	107	3.9	poor trimming
22	959	667	24.1	set-off!
	Total:	2763	100.0	

With this simple and limited set of data, this answer may well have been obvious. But real life cases are more complex and could have many times the amount of data. In these circumstances, Pareto analysis is very useful for sorting out those issues worthy of attention.

3 Use of AV ratios

This is a simple but powerful technique for establishing which products are most beneficial for a company and which are loss making and should be eliminated. It also provides pointers to some other issues which, if dealt with, can radically change the performance of a company.

It is based on the concept of added value (see Appendix 1) and what here will be termed “contribution”, where this is defined as:

Contribution = Added value – Direct Wages

These then form the basis of some useful ratios, notably:

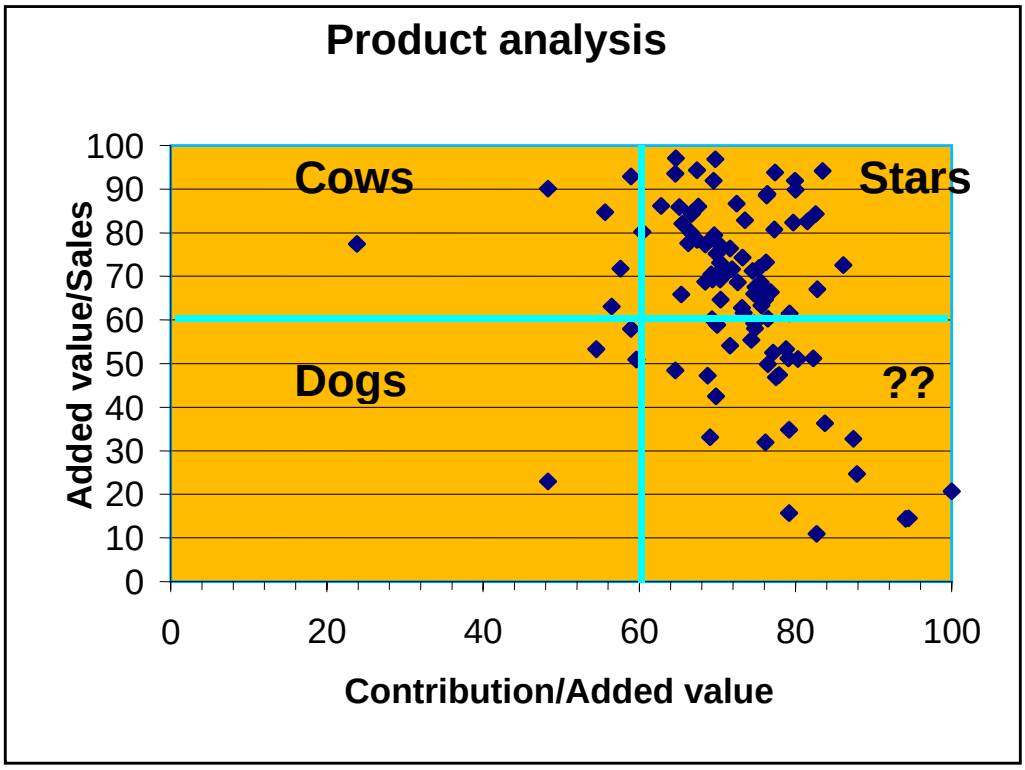
$\frac{\text{Added Value}}{\text{Sales}}$	which for the majority of small to medium sized print companies is typically in the region of 50% overall
$\frac{\text{Added Value}}{\text{Direct Wages}}$	Which typically needs to have a value of at least 2 and preferably somewhat higher. It is a measure of productivity.
$\frac{\text{Contribution}}{\text{Added Value}}$	Which is an alternative to AV/Wages. It is also a measure of productivity. It will have a value less than 1, but the higher the better.

There is no “correct” value for these ratios, but the higher the better. The aim should be to improve on them.

They can be used in a simple technique to enable focus on the best types of work for the company. The technique is based on the so-called Boston Matrix (see any book on marketing) which divides a company’s products into four categories: Stars, Cows (or cash cows), Dogs and Question Marks.

- Stars are the really good products. Sometimes referred to as Rising stars because they might be at the early stage of their life cycle during which a price premium may be charged. The key issue with Stars is to sell more and do more of this type of work.
- Cows, or cash cows are usually mature products, generating a lot of turnover, but because there is plenty of competition, the profitability is not so good. However, the shere volume of work associated with cows usually means they make a sizable contribution to paying overheads etc. The key issue with Cows is to improve the efficiency with which the work is produced.
- Dogs are usually loss making products. The added value tends to be low, and they are difficult and/or time consuming to produce – that is, production efficiency is low. They are usually mature products, possibly in a declining market. The key issue with Dogs is to identify them and eliminate them from the product mix.
- Question marks have low added value but appear to be produced very efficiently. In a printing business this arises when work has a high outwork component. This is not necessarily a bad thing, but it is important that the work is priced so that added value targets are achieved, otherwise the work is not worth the administrative effort involved. The key issue with Question marks is to identify them, and ensure that pricing is adequate for added value recovery.

The ratios defined above are easily derived from an MIS and can be used to sort work into these four categories by plotting a diagram (a modified Boston Matrix). The following diagram is a typical result.



The position of the horizontal and vertical lines is somewhat arbitrary but good for a start. The points can be for individual jobs, or usually more usefully, the averages for categories of work, or perhaps work for individual customers.

In summary, this technique

- Identifies the best products for the company
- Identifies the probably loss generators
- Helps establish focus
- Identifies where it is worth improving production efficiency
- Helps to establish sound pricing

Appendix 3

Questionnaire to MIS suppliers

Company

Contact name

Which MIS modules are most frequently sold?

	Modules sold?	**Modules most used?**
Costing		
Estimating		
Order processing		
Production planning		
Production scheduling		
White paper stock control		
Finished goods stock control		
e-commerce		
Web site		
Sales management		
Purchasing		
Shop floor data collection		
CRM		
Quality management		
Analysis		
Other		

Do you carry out a customer requirement evaluation – always or sometimes?

Are modules bought on your evaluation and recommendations?
- Or in conjunction with the customer
- Customers own decision

What percentage of printers, ask for specific personalised developments to modules?
- Generally which modules are they?

What percentage of modules are being fully utilised?

What percentage of printers have the right modules employed to most effectively run their business?

Which modules are currently being used most effectively and why?

How do upgrades/new modules relate to continual improvement?

What % of printers use e-commerce?
- To trade with customers?
- To trade with suppliers?

What % of printers do this through the MIS suppliers web site?

What % of printers have modules integrated (i.e. real-time data exchange) with customers & suppliers?

- Which modules are these?
- Do you carry out the evaluation and integration process?

What benefit do you think this has for the printer?

- Can you quantify this?

Is MIS being more effectively used by Print Buyers, Print Management companies or printers?

- Why do you think this is?
- What are the key differences?

What process do you use to gain general ongoing feedback from your customers?

- How is this utilised to develop systems and improve the effectiveness of general use?

Do you proactively review the level of usage of your system by your customers?

Do you have a user group?

- What form does it take?
- How often does it meet?

In comparison to other industry sectors are printers using MIS more or less effectively?

Do other sectors utilise the same basic modules or are there any significant differences?

What is the basic training requirement (days per person) to begin to use your MIS effectively?

What are the key factors to ensure a successful implementation of an MIS?

What are the most significant issues/problems you encounter in

- Selling an MIS
- Specifying an MIS
- Implementing an MIS
- Training print company staff to operate an MIS

How could the print company help you to do a better job?

Appendix 4

Effective use of MIS questionnaire to printers

Company details

Contact name: Position:

Company turnover

No of employees

No of presses (by category or press size)
- sheet fed litho mono
- sheet fed litho colour
- digital mono
- digital colour
- web
- other

Main categories of work
- brochures/flyers
- Catalogues
- Stationery
- Books
- Magazines
- Cartons
- Flexibles
- Labels
- Other

How many staff are employed in the following areas
- Sales
- Admin
- Estimating
- Other management staff (including Directors)
- Production staff, inc. line managers etc
  - Prepress
  - Press
  - Post press

(fractional answers are allowed where these functions are part of a person's job)

MIS

What are the critical issues in managing your company that an MIS does or could address?
- Cashflow management
- Forward load
- Utilisation of critical resources
- Customer service
- Sales management
- Production planning and scheduling
- Continuous improvement
- Other

How many MIS workstations are in use? In Admin? In production?

How long have they been installed?

Were they all installed together or have any been added incrementally?

Which Modules are installed?
Which Modules are most frequently used?

	Modules installed?	**Modules most used?**
Costing		
Estimating		
Order processing		
Production planning		
Production scheduling		
White paper stock control		
Finished goods stock control		
e-commerce		
Web site		
Sales management		
Purchasing		
Shop floor data collection		
CRM – integrated with MIS?		
CRM – independent system?		
Quality management		
Analysis		
Other		

Have you plans to install any new modules?
If so, what?

Is the MIS interfaced to any other internal systems e.g. pre-press system, presses or JDF workflow, or external systems e.g. paper suppliers, customers' MISs?

Sales

Sales management

Are you using MIS derived information to help develop a sales strategy to expand your business?

Do you operate a CRM system?

Do you work with/rely upon a print management company to provide work?

Do you sell to fill capacity?

Estimating

On average how many estimates do you produce per day?

What is your usual success rate for conversion of estimates to sales?

What pricing principles are applied?

- Do you use estimated cost +%?
- Do you consider ratios such as AV/£ when pricing?
- Do you systematically analyse won/lost quotations by category/market sector/customer to assess market pricing?

How do you think your estimation system could be improved?

Order processing

Do you use your MIS to book work in, create job bags, work tickets etc.?

What checking procedures are in place?

Analysis

How do you analyse your business to establish the most appropriate sales strategy?

What KPI's, ratios or other measures do you use in relation to sales?

e-commerce

Do you operate a web site?

- If so do you monitor hits as well as actual sales?
- If not, are you thinking of implementing one?

What e-commerce functionality does it have?

- Can it accept orders for standard jobs?
- Does it provide an opportunity to change text/graphics on standard jobs?
- Does it provide a method to submit PDF's?
- Can it accept requests for call-offs from stock?
- Anything else?

What improvements could be made to the functionality?

Do you view this as a valuable tool for CRM and sales?

Customer service

Do you have a dedicated Customer Service Department?

- Is this part of or separate from "Sales"?
- What are its main functions?

What KPI's are in place to measure performance of this function?

What management reporting do you provide to customers?

- At what frequency?

Do you use "value added statements" to illustrate savings to customers?

Do you proactively review your performance with customers?

- If so, how?

Finance

Is your accounts system fully integrated with your MIS?

What key measures of your business do you look at on a regular basis (e.g. weekly or monthly)?

What other key analyses do you undertake, say 1-4 times per year?

Do you use “what if?” functions for budgeting and forecasting?

Are you proactive at credit control – please describe method?

How do you calculate hourly rates?

- Do you do it yourself or engage a specialist?
- When did you last review your hourly rates?
- Are these cost rates or charge-out rates?

Purchasing

Do you use information in your MIS to help you negotiate a best price?

Do you negotiate on price or performance?

Do you use your MIS to record and analyse a supplier’s performance?

Production

Order processing

Does Production rely entirely on the job specification in the MIS?

- What checking procedures are in place?

How often do you process a job without a formal job specification?

Do you print out job bags/tickets?

Do you purchase and manage outwork via your MIS?

Production planning and scheduling

Do you use your MIS for production planning and scheduling?

- If not, how? (e.g. Excel, Production loading board, other?)

Do you rework estimates before production planning?

As a result of your production planning process, do you produce a “work to” list and is it:

- A list of all jobs sorted by delivery date
- A list of all “viable” jobs (those in such a state that work can proceed)
- Based on an infinite capacity loading process
- Based on a finite capacity loading process
- Based on a backward/forward loaded full scheduling process

What do you schedule? Just press capacity or other elements as well?

Production monitoring

How is current production status monitored for schedule update purposes?

- How is this communicated to the customer?
- Is there any formal process and is it generally proactive or reactive?

How are extras, author's corrections etc captured and dealt with?

- Are they recharged to the customer?

Do you notify the customer at the time of the extra charge or leave it until the invoicing stage?

Do you operate a job costing system?

Production analysis

Do you compare actual job cost/production times against estimate on a regular basis?

What KPI's are used in relation to production activities?
For example do you analyse:

- Machine running time
- Machine utilisation
- Production speeds
- Make-ready times
- Paper waste
- OEE
- Spoilt work

Stock management

How is white paper stock managed?

- Materials from stock
- Customer materials
- JIT delivery

Visual management

What business and/or production performance information is routinely communicated to all staff?

Does it show

- Current performance (e.g. KPIs etc.)
- Cumulative performance in relation to budget or annual targets
- Trends

Is this done by notice board, newsletter, website, other?

Is the information generated

- Automatically from your MIS
- Using additional software
- Manually

What is the shop floor involvement in data collection for the above information?

Purchase of MIS

Purchase

How did you decide on the most appropriate MI system to install?

Who was involved in the decision making process?

Was it an “off-the-shelf” package, an off-the-shelf package with significant custom designed components, or bespoke?

Does the system do everything you expected?

In your experience do MIS Suppliers fully understand your business?
Is such an understanding an essential requirement for a successful system design and implementation?

How can MIS suppliers improve the way in which they sell & recommend systems?

Would you consider moving to another system?
What are the barriers discouraging this?

Implementation and training

How long was the implementation period?

What level of support did you receive from the supplier during this time?

How many staff were trained to use the system?

How many man hours of training on average did each employee receive?
Was this adequate?

Do you feel that formal training is good value or prohibitively expensive?

Do you think that the standard training on offer is sufficient to meet the operational requirements?
Does it do the job?
Should it be more flexible
Would more focus on continuous training over a longer period be more useful?

When people leave the company do you send their replacements for formal training or do it “on the job”?

Do staff multi-task in key areas (i.e. job share in finance – sales staff estimating - account managers scheduling etc)

On-going support

Have you worked collaboratively with your MIS Supplier to assess the business requirements for introducing any new modules or upgrades in the last 2 years?

Would you say MIS suppliers were proactive or reactive to customer demands?

Do you receive the level of support you require?

Do you evaluate your MIS supplier the same as any other supplier?

Questionnaire to MIS suppliers
Questionnaire to MIS Suppliers

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Contact name

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How could the print company help you to do a better job?

Whatever your size, we can make you run faster

There are always ways to improve performance. Vision in Print specializes in helping print businesses, of all sizes and disciplines, to become more productive, competitive and profitable.

Our programmes harness the dedication and skills of your own teams, teaching new ways to creatively approach bottlenecks, workflow issues and limitations on your future growth.

VISION IN PRINT

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