The Ultimate Guide to Lean Manufacturing
Introduction

Lean Manufacturing has been hugely successful in revolutionising manufacturing industries for many years – consider car manufacturers and their well publicised success in embracing Lean Principles, not only within all manufacturing processes but also as a company-wide Business Ethos.

So why not take this success and repeat it within the Printing Industry? Countless articles, seminars and business to business conversations generally include the woes of the Printing Industry with margins squeezed, over capacity and general dismissal by buyers of how important and skilled the work carried out by Print Companies is. So the introduction of a Lean philosophy in 2003 by Vision in Print – a UK Government sponsored initiative, was a welcome and pro-active move to improve productivity and profits of the Printing Industry, with a sensible, common sense approach to streamlining businesses and maximising opportunity.

Optimus were delighted to be included at the outset of Vision in Print. Optimus sat on the Vision in Print Supplier Advisory Committee and had an active part in the studies performed by Vision in Print together with an insight into how Vision in Print have continued to make a difference in showing Companies how to embrace Lean.

The Lean Philosophy continues to grow and is certainly an integral part of Optimus moving forward – once you understand the benefits it is very easy to become an Evangelist! Optimus continues to work closely with Vision in Print to ensure that the Optimus MIS is assisting Companies embracing Lean; providing instant information needed in real time.

But, don’t be fooled! Lean is not something that can be adopted by Senior Managers as a ‘quick fix’. Companies who have embraced Lean successfully have done so as a whole company – from ’board room to basement’. Employees and Managers alike are empowered and measures are agreed as a Company. The benefits are enormous, with faster, accurate and more productive processes and employees.

Following our extremely successful ‘Ultimate Guides to MIS and JDF’ and our promotion of Lean Principles within the Printing Industry, we felt it would be useful to produce our third guide – ‘The Ultimate Guide to Lean in the Printing Industry’. We hope you find this informative and, more importantly, that it gives you enough information to be able to consider the adoption of Lean within your organisation.

Nicola Bisset
Optimus Group Managing Director
The principles behind “Lean Manufacturing” were introduced into the post war reconstruction of Japanese manufacturing with a strong quality focus by American engineers including W.E. Deming, Juran and others. They are largely considered to be the modern day fathers of Lean Principles.

This led to development of new lower cost manufacturing processes and, in particular, a disciplined, process focused production system was developed called the ‘Toyota Production System’. Originally “Lean Manufacturing” was a term coined by Womack and Jones to describe the Toyota Production System in their book, ‘The Machine That Changed the World’.

“Lean” means the systematic removal of waste.

Typically, in the Print industry, as with many manufacturing businesses, employees are trained to work in teams and apply a series of tools and techniques. However in Lean the focus is on identifying value-adding and non value-adding process steps (including office and administrative processes). A value-adding step is defined as anything which the customer is willing to pay for in the transformation of material into the end product required by the customer. The team then streamlines the processes selected for improvement, takes out waste and this activity usually reduces cycle time. The result is faster, slicker processes which enhance customer satisfaction and reduce cost.

“Lean” has developed with a greater starting emphasis on ‘customer value’ and a set of key principles designed to make it happen. In its simplest form the key message behind Lean is:

“**The transformation of the VALUE DELIVERY PROCESS...**

..through the elimination of WASTE”

**A Different Approach**

Lean applies a different approach to how you as a business, as a manager and as an employee view, monitor and conduct business. Moving from a traditional focus on Added Value, to the elimination of waste and implementation of best practice into every department, process and person within the business, incidentally has a positive effect on value added.
Trends within the Printing Industry
The Print Industry will always be keen to point out that it is unique due to the very specific nature of the processes that it has had to consider in order to produce a printed product. In the traditional mindset of customers this often means the introduction of bespoke complexity and more processes into the manufacturing cycle. These complications are often reflected in the number of independent software systems and processes required to produce products.

In the last 5 years, the traditional Print Industry has started to change dramatically. The key trends appear to be more print companies than ever are going out of business due to over capacity, the internet and price pressures. In the UK during 2009, approximately four companies a week went into liquidation. Globally this trend is expected to continue.

This has created demand for greater productivity and efficiencies from those companies wishing to survive and prosper. In its simplest form, more and more printed products are required to be produced by fewer companies in considerably less time and critically; for considerably less money! This means that companies have to reduce and eliminate any activity that does not add value to their production process.

What the UK Government did
The UK Government introduced a not for profit government funded but UK Print-Industry led initiative called “Vision in Print” (VIP) in 2003 which identified the following Printing Industry facts in 2004.

- Sales £15bn. (1.5% GDP)
- 200,000 direct employees
- Part of 5th largest manufacturing sector

But...
- Profit margins were declining, the median had been as low as 3.5%

Their task was to improve the profitability and performance of the UK printing industry by employing the proven techniques founded by W.E Deming. Vision in Print is now part of the British Printing Industry Federation. Since 2003 Vision in Print have helped over 500 British Printers to achieve these goals.

The survival of the printing industry
Optimus started to notice an investment trend amongst printers which was very specific. There was a growth in smaller and more diverse, multi skilled, highly efficient, printing organisations who consistently invested in the streamlining of their processes and the training of their staff. This was also identified as a consistent process, not treated as a one off project.

These organisations saw what they produced as a manufacturing process not a traditional craft industry! In addition they directed their focus to excellent customer service and the elimination of waste and unnecessary repetition throughout their entire business.

Why Lean Manufacturing for the printing industry?
At Optimus we believe that the Lean philosophy is one which will help rejuvenate the Print Industry as we know it and we, as an MIS vendor, have a hugely important part to play in the process to provide the technology and the management tools to make it happen.

This may appear a little simplistic and potentially negative, but I’m sure many of you reading this will recognise something from the following flowchart; which incidentally is about as far removed from the principles of Lean as you can get!

There is a whole range of questions to ask about the people, the processes, the systems, profitability, waste and competitors to name but a few about your business before you can determine whether Lean is something that your business is ready for; but it is clear that at least one process, one person or one department will benefit from applying Lean principles.
As stated previously, Lean is about eliminating the wasteful processes that gain no revenue in offices and production Companies. Waste is not just around materials but rather encompasses the whole business. The following are examples of measures that can transform your business and eliminate waste – all available within Optimus.

**Customer Service**

It is a well known fact that retaining customers is far more cost effective than finding new customers. In the Print Industry as discussed previously, more choice and price pressure means that your customers can easily go elsewhere – it is therefore essential that Companies keep their existing customers happy!

The first question to ask is ‘What is most important to my customer’? It is remarkable how many Companies find that number one is the customer receiving their order on time. It is equally remarkable that many companies have no idea how many jobs they delivered on time thereby meeting customer expectations. Therefore Optimus believes this is a vital measurement which should be used to ‘pull’ production to fulfill all deliveries on time.

Quality of jobs produced is another key area – after all, if you get it wrong, a reprint may be necessary, ensuring 100% waste on the original job! Therefore measurement of jobs delivered right first time is essential. There are multiple measures involved in this key area – including ‘right first time’ job bags, proofs submitted and returned on time, materials used – were the materials right and available exactly when required? Therefore monitoring and measuring becomes vital to ensure quality and all the elements this encompasses are available.

We should of course mention cost – both to the Customer and to the Printer – Customers make decisions on a balance of three elements: Quality, Delivery on time and cost. Therefore it is essential to be able to give the right price – but the price given should not generate a loss for the Printer and so measurement of cost versus price should be closely monitored.

Customer retention overall needs to be measured – when was the last time you received a job from your customer list? Statistics on this can be extremely revealing!

**Internal Processes**

There are numerous measures that can help identify why there are issues or ‘bottlenecks’ in your business.

An example of this is the Estimate conversion rate which is a good measure of how many ‘wasteful’ estimates are produced – for example: how many times are you used as a benchmark for price without ever gaining a job? Look at your data! If companies are using you as a benchmark this becomes quickly apparent and means your staff can be redeployed in other more profitable areas of the business.
Job profitability by customer or sector is also an area that needs to be monitored and acted upon. Without this essential data a print company may be ‘wasting resources’ satisfying less profitable customers or sectors at the expense of other customers.

Overall Equipment Efficiency is key to ensure not only that full value is received from expensive assets but also that investment decisions can be made with accurate data ensuring that all assets are fully used before further investment takes place.

Equally it should be possible to measure and monitor equipment operated. Therefore identify bottlenecks or issues as they happen rather than after the event.

For example:
• Why is one machine more productive than another?
• Are Make Ready’s quicker on different machines?
• Is this because of maintenance? If so, the manager is then able to plan repairs and maintenance.
• Are all staff trained to the same level? It could be that if one machine operator is more productive, it may not be because of work mix- it could be lack of training; organising of materials; plates not ready.
• How is the equipment performing – is the speed what is expected?

The follow on from this is to measure the productivity of staff – how many goods are made in the number of hours available by individuals/departments etc.

Although an obvious statement it is surprising how many Companies do not follow the rule of ‘only make what my customer wants’ (and is therefore prepared to pay for).

It is a false economy to increase a run length ‘just in case’ for the next job – the cost of materials and storage is not paid by the customer and indeed what is the result if the ‘just in case’ never happens, through brand changing or other multiple reasons? So Lean promotes only produce what your customer will pay for!

It therefore follows that lean promotes ‘just in time’ stock principles. Why order, pay for and store materials not required? The hidden costs are pure waste!

As stated these are examples of the measures and indicators that can be introduced into your business to ensure you benefit from embracing Lean into your Business.

The Benefits
The benefits of Lean will vary from company to company but essentially if the principles are applied consistently and systematically Lean increase:

• Profitability
• Sustainability
• Customer Satisfaction

And reduce:
• Human Effort
• Capital Investment
• Materials
• Time in all aspects of the business
• Floor Space
Because everything encompassed in Lean Manufacturing is about every process in the production of a product or service being mapped and understood holistically in relation to the whole business; its success has been its simplicity in identifying and mapping out the efficient from the wasteful!

**Average profitability for UK Printers using traditional lithographic processes**

The UK average profit margin was 3.9% for litho printed products. (Source – British Printing Industry Federation Printing for Profit 2007 survey) This is deemed by many, including Optimus customers and the Print Industry at large, to be completely unsustainable!

Lean manufacturing has been the significant common denominator for businesses operating successfully in a market where most are struggling. Lean has contributed largely to the effectiveness, competitiveness and ultimately the profitability of successful print businesses and has meant margins and performance has increased from 3.9% to over 10% for a significant no. of UK companies (Source BPIF Printing Trends Survey Dec. 2009).
Optimus has been supplying its customers with critical, real-time management information since its inception in the early 80’s. The Optimus MIS generates a continuous flow of information from the initial customer contact, through production, to invoicing so it has a window on every aspect of the business and is therefore an immensely powerful management tool if used correctly.

The data captured within the modern day MIS must provide users with simple, relevant analysis and detailed measurement to keep the management team informed. This in turn facilitates performance measurement; enables more effective decision making and strategic business planning. So essentially by the nature of the product, the MIS has always been a process driven product to monitor performance. However, traditionally, the brief given to Optimus and other MIS vendors when asked to look at a new or replacement MIS system implementation in a printing company; is often to replicate and computerise the existing processes of that company in an identical form. In many ways we are asked to reproduce the chaos of existing processes into an Optimus system, and then make it work!

The Best Practice Study
Optimus along with several other MIS vendors and printing companies participated in the Best Practice Study conducted as a joint venture between the DTI (UK Department of Trade & Industry) and Vision in Print published in November 2006. The Study resulting from the coalition called “The Guide to effective MIS use for Printers” is available for free download as a pdf using the following link.

http://www.visioninprint.co.uk/BestPractice.ink

Some of the less Positive Key Findings

- MIS systems are primarily looked upon as a means of improving speed & efficiency of administrative processes, not as a means of measuring, controlling and developing the business
- 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 type/customers/market sector to establish the profit and loss generators for their company
- 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.
- Many Key Performance Indicators (KPI’s) in use related to production management but, Overall Equipment Effectiveness (OEE), is only used by 2% of management.
- Analysis of production, where monitored, tends to be completed on an individual job basis rather than taking a consolidated view from which more general lessons might be learnt.
And the Good news...

There were 11 case studies which illustrated excellence in the use of an MIS from which the following Key Benefits emerged:

- 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.
- The ability to identify profitable and unprofitable work and/or customers so that the companies selling activity can be appropriately directed.
- Measurement of the business as the basis of continuous improvement.
- Improved pricing decision making, especially taking into account the AV% component of a job and the predicted AV/hour.
- 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.

Underpinning all of the above was a focus on Key Performance Indicators (KPI’s) and the systems in place to measure that activity! KPI’s were widely used and clearly seen as part of a Total Process which involved:

- 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

The report provided several recommendations for Print Businesses and MIS Vendors alike, to keep pushing to improve the tools that are available to the Print Industry and also the importance of Print Businesses maximising the use of those tools to effect a positive impact on the bottom line!
Optimus made the strategic decision and commitment to be the very first Global MIS Vendor to truly reflect Lean Manufacturing Processes in the software, philosophy and culture of the company.

Optimus has a long term ongoing commitment to encompass Lean principles at the very heart of the product suite and has already introduced functionality to the market to assist with the adoption of Lean Principles.

Our continuing commitment means a close working relationship with Vision in Print – Optimus continues to be a Platinum Sponsor of this essential organisation. Our relationship means that we consult regularly with the Vision in Print engineers to ensure the Optimus software suite is producing the data required, in the most relevant way, to assist companies embarking on their lean journey.

At Drupa 2008, Optimus launched Optimus 2020 Vision, designed to translate the wealth of data captured by the MIS to identify key performance indicators on an operational level into a series of easy to read bar charts. This ensured all staff had access to the measures by department and by company.

Optimus extended the functionality with the launch of Optimus Analysis. Optimus Analysis is designed to provide Senior Managers with the essential supporting information behind the Optimus 2020 Vision Key Performance Indicators in an easy to manipulate graphical tool essential for the monitoring of any healthy Print Business. Both the graphs and the data are easily exported to existing Office Products for inclusion in month end reporting.

Since Drupa 2008, Optimus has continued to work closely with Vision in Print and at Ipex 2010 will show updated functionality based on feedback from the Vision in Print engineers.
Optimus 2020 Vision v.2 will encompass the complete key performance indicators as used by Vision in Print engineers in their Howard Smith Paper Group Snapshot programmes.

These include

- Overall Equipment Efficiency — Combination of Availability x Performance x Quality.
- People Productivity — Number of good products made in the number of hours available.
- Not right first time? — encompassing job bags, returns, credits and reprints.
- Stock Turn — how effective is your stock management?
- Value added produced per person.
- Floor space utilisation
- Jobs produced on time and in full (OTIF)
- Estimate Conversion Rate
- Customer Retention

Optimus Analysis will be available to give Managers the opportunity to analyse the data in depth.

However, Optimus has, for many years, included functionality that also assists in identifying issues in real time. This includes Optimus Desktop Alerts which does exactly what the name implies, ‘alerts’ the user to current key activities at a glance that may need immediate action, thereby ensuring that any potential issues can be addressed before they become a business risk. Information is provided in real time thereby ensuring any issues are highlighted immediately.

In line with the principles of Lean the Optimus Desktop Alerts provides the facility to drill down into that specific proof, job, delivery and other areas of Optimus in a single click!

Want to know more about what Optimus has to offer?

There are more areas of the system which have been tailored, adapted or indeed have always been in the software and comply with Lean principles but as this is not a product brochure I hope the above examples give a flavour of what’s on offer.

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