Lean Manufacturing and Six Sigma Applied to Lawyer’s Office

Prachi Tajneker
Samip Fozdar
Casey Miller
Teresa Cacco
Palaniappan Narayanan
**Lean / Six Sigma Project Title:** Lean Manufacturing and Six Sigma Applied to Lawyer’s Office

**Project Participant(s):** Prachi Tajneker, Samip Fozdar, Casey Miller, Teresa Cacco and Palaniappan Narayanan

Please provide general information regarding the purpose scope and business objective(s) of the Lean / Six Sigma Process Improvement Project:

In this current scenario, where there is so much of Lean Six sigma everywhere, very little interest has been shown to applying Lean to a Lawyer’s Office. There is so much of inefficiency in the way the office is run and the cases as well as the clients are handled. Our project attempts to apply Lean principles to improve the overall working of a law firm and show some possible direct and indirect savings.

Brief summary of each participant’s role in completing the Lean / Six Sigma Process Improvement project:

The project was divided into three parts namely, Background study & data collection, Value Stream Mapping, Lean Six Sigma tools application. The first part was done by Casey Miller, while Value Stream mapping was done by Teresa Cacco and Palaniappan Narayanan and the last part was handled by Prachi and Samip. Although we divided our work, every part had the inputs of every other person in the team.

Brief summary of expected business results from the successful completion of Lean / Six Sigma Process Improvement Project

We propose to have about 8.2% direct cost reduction in the law firm. In addition to that we expect to have Estimated time saving of 165 mins (20.37%) in the Process time and about 7.5 days (17 days 5 hrs 30 min to 9 days 17 hrs 30 min- 36.11%) to 18.5 days (51 days 5 hrs 30 min -32 days 17 hrs 30 min) (43.53%) in the lead (delay) time of the process.

**Project Sponsor:** PL.Narayanan, Barrister-at-law, Director PLN Associates Law Firm

**Organization:** PLN Associates Law Firm

Address 14, Raman Street; T.Nagar; Chennai -600017; South India

Telephone /Fax /e-mail address: 9144-28151799 / plnbarrister@rediffmail.com
Lean Manufacturing and Six Sigma Applied to Lawyer’s Office

Executive Summary

In this current scenario, where there is so much of Lean Six sigma everywhere, very little interest has been shown to applying Lean to a Lawyer’s Office. There is so much of inefficiency in the way the office is run and the cases as well as the clients are handled. Our project attempts to apply Lean principles to improve the overall working of a law firm and show some possible direct and indirect savings.

Summary of Results

We propose to have about 8.2% direct cost reduction in the law firm. In addition to that we expect to have Estimated time saving of 165 mins (20.37%) in the Process time and about 7.5 days (17days 5 hrs 30 min to 9 days 17 hrs 30 min- 36.11%) to 18.5 days (51 days 5 hrs 30 min - 32 days 17 hrs 30 min) (43.53%) in the lead (delay) time of the process.

Presentation Date, Site and Audience

Thursday April 23rd 2009 presented in front of spring 2009 ENGR 409 class at 203 Sackett Building, Pennsylvania State University, University Park, USA.

Team Member Names and Personal Signatures

Prachi Tajneker
Samip Fozdar
Casey Miller
Teresa Cacco
Palaniappan Narayanan
# Table of Contents

Section 1: Introduction.................................................................................................................... 5

Section 2: Lean Principles............................................................................................................. 6

Section 3: Six-Sigma Tools (DMAIC).......................................................................................... 7

Section 4: Value-Stream Mapping................................................................................................ 8

Section 5: Background of our Case Study and Illustration of Direct and Indirect Savings.................................................................................................................................11

Section 6: Six Sigma Tools utilized in this project.......................................................................16

Section 7: Conclusions.................................................................................................................. 17

Section 8: References.................................................................................................................... 17

Acknowledgement..........................................................................................................................18

Appendix.........................................................................................................................................19
Section 1: Introduction

Lean manufacturing deals with analyzing process flow and delay times at each activity within a process. And while Lean Manufacturing principles help speed things up, they don't really focus on quality control. It can be assumed as "improving process speed."

On the other hand, Six Sigma uses data-driven decisions to achieve a specific quality through statistically tight controls. Its main focus is quality. Six Sigma won't necessarily improve process speed or reduce capital investments. It can be assumed as "improving quality of the end product."

By combining these two concepts, we form the idea of Lean Six Sigma, an effort to improve both process speed and end-product quality at the same time. Both concepts are built around measurements.

When companies start incorporating these concepts into their manufacturing or business practices, they realize a potential for huge improvement in productivity and profitability. Moreover, recent research indicates that efforts like Lean Six Sigma are certainly needed. For example, in the service industry, slow production and doing work over again accounts for somewhere between 30 percent and 50 percent of the actual cost of producing and delivering a service.

Synopsis:

The first principle of Lean Six Sigma is to delight your customers with speed and quality. The second principle says to prove process flow and speed. Lean Six Sigma emphasizes that speed is directly tied to excellence.

This project deals with mapping out the processes involved in any office, specifically, a lawyer’s office. The team was able to uncover many uncoordinated processes that create waste of both time and physical resources. Next, the team was able to put into place a more automated and streamlined system that was able to cut days of wasted time and significantly improved productivity.

The irony is that the fast-moving company had to slow down to speed up; more discipline led to higher speed. This is not an isolated case; there is a direct relationship between speed and discipline. Adding discipline should streamline a process, and streamlined processes don’t work without discipline.

Lean principles and Six Sigma tools commonly used are summarized in the following sections.
Section 2: Lean Principles

1. Workplace Organization / 5-S (Sort; Straighten; Scrub; Standardize; Sustain)
   - The key element of 5S is the getting rid of non-useful material that has accumulated in the work place. A 5S red tag blitz quickly identifies what has to be removed from the work place in what is called SORT, the first of the 5S's.
   - SET IN ORDER, the second of the 5S's, which is having “a place for everything and everything in its place”, brings effective organization to the work place.
   - The third S, SHINE, comes into play when the work place is given an initial cleaning and then maintained in a "spic and span" condition through regularly keeping it clean and orderly as part of the daily work routine.
   - The first 3 S's are the easy physical elements. The next two, STANDARDIZE and SUSTAIN require a change in culture to bring them into being. Regular checking to ensure the first 3 S's are maintained is critical to prevent backsliding and loss of the gains made.

2. Just In Time (JIT)
   - Producing or conveying only the items that are needed by the next process when they are needed and in the quantity needed.

3 Quick Changeover / Set-Up Reduction
   - Quick Changeover is a process that allows a person to reduce the time to changeover a production process from making one part or product to another part or product. The process to reduce the time elapsed from the last good part A to the first good part B at the same station or process. Quick Changeover is also referred to as SMED or Single Minute Exchange of Die. This quick changeover process must take less than ten minutes (hence single minute).

4 Cellular – Modular Flow: Pull / Kanban (Visible Record)
   - A signaling device that gives instruction for production or conveyance of items in a pull system.

5 Poka Yoke (Mistake Proofing)
   - A mistake proofing device or procedure to prevent a defect throughout the system or process (office or manufacturing).

6 Visual Management
   - An environment where it is easy for everyone to 'see' the current status of the process or 'system' and the visual gives immediate information to the individuals to understand 'how the operation is doing
7 Total Productive Maintenance (TPM)

- A series of methods, originally pioneered by Nippondenso (a member of the Toyota group), to ensure that every machine in a production process is always able to perform its required tasks so that production is never interrupted.

Section 3: Six-Sigma Tools (DMAIC)

**Define:**
- Flowcharting
- Brainstorming
- Pareto Diagram and Analysis (Greatest Issues from Customer’s Perspective)
- Cause and Effect Diagram and/or Matrix
- SIPOC Diagram (Suppliers; Inputs; Process; Outputs; Customers)
- QFD Diagram (Quality; Function; Deployment)
- Project Charter

**Measure:**

Data Collection Plan / Sampling
- Measurement Techniques, and Integrity
- Description of Variables
- Run Charts and/or Control Charts
- Capabilities Studies

**Analyze:**
- Gap Analysis
- Hypothesis Testing / Confidence Intervals
- Analysis of Variance (ANOVA) / Parametric Tests
- Correlation and Regression Analysis
- Reliability Estimates and Tolerancing Techniques

**Improve:**
- Implementation Plan
- Design of Experiments (DOE)
- Pilot Testing
• Failure Mode Effect Analysis (FMEA)

Control:
• Monitoring Plan
• Statistical Process Control (SPC)
• Dashboard Metrics
• Lessons Learned

Section 4: Value Stream Mapping (VSM)

Current State VSM:

Value Stream Metrics
Process Time = 810 min
Lead Time=17 days 5 hrs 30 min-51 days 5 hrs 30 min
Percent Complete and Accurate = 27.88%
VSM showing the lean icons applied on the Current State:

Value Stream Metrics

- **Process Time**: 645 min
- **Lead Time**: 9 days 17 hrs 30 min - 32 days 17 hrs 30 min
- **Percent Complete and Accurate**: 51.78%
Future State VSM:

Client

Register a case in the firm & Allocate lawyer and schedule an appt.

Allocate lawyer and schedule an appt.

Meeting with client & Documentation & Case filing

Case in court

Post Processing, Getting back with client, Rescheduling etc

Value Stream Metrics

Process Time = 645 min

Lead Time = 9 days 17 hrs 30 min - 32 days 17 hrs 30 min

Percent Complete and Accurate = 51.78%

Regular Checkpoints - 1 unit = 3 days
Section 5: Background of our Case Study and Illustration of Direct and Indirect Savings

If direct savings measure the savings in actual cost, then indirect savings would mean the savings which arise as a result of improving the overall efficiency of the process. Also, a very important aspect of this is the savings in terms of time. Generally it is regarded that reduction in the overall process time is as good as or sometimes even more important than measurable cost reductions.

As we can see from the Value Stream Map (VSM), current state and future state, we have brought about an estimated time saving of 165 mins (810-645 min) in the process time and about 7.5 days (17 days 5 hrs 30 min- 9 days 17 hrs 30 min) to 18.5 days (51 days 5 hrs 30 min -32 days 17 hrs 30 min) in the lead time of the process. This essentially means a time savings of 20.37% in terms of the process time and about 36.11% to 43.53% in terms of lead (delay) time.

Apart from this considerable reduction in time, there is also an improvement in the efficiency of the process, i.e. improvement in the overall running of the lawyers firm and also the process in which the cases and the clients are handled in an attorney’s firm.

Let us illustrate some of the Lean principles we have used to bring about this process improvement.

**Chunking**

Chunking is one of the very important lean tools. It is always very important to take a big picture view. One should be on the lookout for Major outputs, within the value stream, look for changes in skill requirements to do the work and then chunk based on major differences.

Our Process consists of the following 6 steps:-

(i) Register a case in the firm
(ii) Allocate lawyer and schedule an appointment
(iii) Meeting with client
(iv) Documentation & Case filing
(v) Case in court
(vi) Post processing which includes Getting back with client, Rescheduling etc.

We propose to chunk together Steps (i) & (ii), (iii) & (iv), (v) & (vi). Then these steps would be called as Receive, client processing and event respectively.
Include case checklist

Generally, when a client has a legal issue, he selects an attorney or a law firm and comes to the firm with his/her legal issue. If he/she arrives at the firm for the first time, he communicates with the front desk, gives some background information about his case and then the front office schedules a meeting with a lawyer to discuss further issues.

What we propose is that a client could download an online form known as a “case checklist” which would be like a questionnaire, fill it up at his/her own pace, and then bring it to the office. This would avoid any sort of communication gap which may result between the client and the front office. Also, this would save a lot of time as far as data entry, sorting and allocations processes are concerned.

Cross training

The third process element “Meeting with client” essentially defines the process of the client meeting up with the allocated lawyer in the scheduled time to discuss his/her legal issue. The Fourth process element “Documentation & Case filing” follows the previous process, where the lawyer forms a consolidated report about the case and the overall background of the client. He then meets up with his boss (if necessary) and then with the typist (and/or clerk) and documents the case.

What we propose here is the lean tool called Cross training.

“Cross training means training employees to do one another's work. This is good for the managers and the company. It is also good for the employee because it will improve new skills. It will also prevent the employee to get bored by the same work he does everyday”

If we could train the lawyer in areas like computer handling, typing, Xeroxing, filing and documentation, he could do the work partially, or in cases where none of the clerks or typists turns up. Also, he could do a partial documentation in the computer as soon as his meeting with the client is over and then send it through LAN to the documentation section. This would be immensely useful as a little of the documentation gets done and also the information provided by the client gets recorded correctly as it is done without a large time gap.

Proceed unless halted

Sometimes in an Attorney’s firm, the junior lawyers, wait to get approval from the firm Partners (usually the senior lawyers), and only then file the case in the court. This could lead to a lot of waste in time, if the Boss is out of town or is busy.
What we propose here is the “Proceed unless halted” lean concept. What this means is that the process is in motion and if the boss sees it and desires it has to be definitely halted, then the action is aborted, else it is in motion, in which case we save a lot of time. This is very pertinent in our case, as almost always a junior lawyer would be correct and the Boss always nods his head.

3 days Max – Set Service Level

Sometimes it takes about a week to schedule an appointment with the lawyer. Such lackadaisical activities lead to client dissatisfaction and a lot of waste of time. So we need to set a Service Level across the firm. This is called the “3 days Max” Service level which means irrespective of the situation the client would meet the lawyer by 3 days.

Kanban & Poka yoke, as we will see latter part of the report are common lean tools which we would apply to any office, to improve the overall process. In our case it would improve the documentation and filing section, and in the bigger picture reduce the direct cost associated with the firm.

Include Checkpoints

It is also very important to have checkpoints. We have fixed it as 3 days, to see if there any backlogs, updating the status of the case and so on.

Direct Savings:

Almost every Lean principle can be applied in this project to directly optimize the operation cost. The principles applied are tabulated in the following excel sheet along with overall percent savings in office operation.
### Expenditure account for the year ended 31.03.2008

<table>
<thead>
<tr>
<th>Description</th>
<th>INR</th>
<th>Lean principle applied</th>
<th>Estimate of % saved</th>
<th>Total amount saved</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Salary &amp; Bonus</td>
<td>2,757,850.00</td>
<td>Poka yoke</td>
<td>5%</td>
<td>137,892.5</td>
</tr>
<tr>
<td>To Rent</td>
<td>825,000.00</td>
<td>Quick Changeover</td>
<td>2.50%</td>
<td>20,625</td>
</tr>
<tr>
<td>To Telephone charges</td>
<td>217,075.00</td>
<td>Production Maintenance</td>
<td>20%</td>
<td>43,415</td>
</tr>
<tr>
<td>To Electricity charges</td>
<td>150,785.00</td>
<td>Production Maintenance</td>
<td>20%</td>
<td>30,157</td>
</tr>
<tr>
<td>To Travelling Expenses</td>
<td>193,180.00</td>
<td>Production Maintenance</td>
<td>25%</td>
<td>48,295</td>
</tr>
<tr>
<td>To Cell phone charges</td>
<td>64,555.00</td>
<td>Production Maintenance</td>
<td>20%</td>
<td>12,911</td>
</tr>
<tr>
<td>To Xerox maintenance</td>
<td>176,615.00</td>
<td>Production Maintenance</td>
<td>20%</td>
<td>35,323</td>
</tr>
<tr>
<td>To Professional Books and stationery</td>
<td>259,596.30</td>
<td>Production Maintenance</td>
<td>25%</td>
<td>64,899.075</td>
</tr>
<tr>
<td>To Stock Handling expenses</td>
<td>2,445.70</td>
<td>Production Maintenance</td>
<td>5%</td>
<td>122.285</td>
</tr>
<tr>
<td>To Car Insurance</td>
<td>78,460.00</td>
<td>0%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>To Car Loan interest paid</td>
<td>6,340.00</td>
<td>0%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>To Bank Charges and commision</td>
<td>5,009.50</td>
<td>0%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>To Chamber rent</td>
<td>6,300.00</td>
<td>0%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>To Computer maintenance</td>
<td>15,000.00</td>
<td>Poka yoke, visual</td>
<td>10%</td>
<td>1,500</td>
</tr>
<tr>
<td>To Car maintenance</td>
<td>207,820.00</td>
<td>Poka yoke, JIT</td>
<td>10%</td>
<td>20,782</td>
</tr>
<tr>
<td>Inverter maintenance</td>
<td>200,000.00</td>
<td>Quick changeover</td>
<td>10%</td>
<td>20,000</td>
</tr>
<tr>
<td>A/C maintenance</td>
<td>40,000.00</td>
<td>0%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>To Court fees</td>
<td>622,500.00</td>
<td>0%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>To Bar Association (Court)</td>
<td>18,250.00</td>
<td>0%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>To Sundry expenses</td>
<td>90,000.00</td>
<td>5 S, Quick changeover</td>
<td>15%</td>
<td>13,500</td>
</tr>
<tr>
<td><strong>Total Expenditure</strong></td>
<td><strong>5,936,781.50</strong></td>
<td></td>
<td></td>
<td><strong>449,421.86</strong></td>
</tr>
</tbody>
</table>

### Total Reduction in Expenses

8.190129488 5,487,359.64
Some of the Inefficiencies observed, and how the above principles could be applied:

1.) Improper management of stationary
   Description: Buying and keeping too much of A4, Full Scape papers which lie in the cupboard and get damp and old. Similar inventory maintained for Pens, Staplers and Printer Cartridges.
   Solution:
   - Apply Kaizen and arrange all the types of inventory systematically.
   - Have a red card placed to indicate that the inv is going to reduce and needs to be ordered JIT
   - No money waste-no time waste

2.) Inefficient filing system leading to searching the file every time that case comes to court
   Description: Every time a case file has been taken out and it requires to be called back, 1 out of 5 times, everyone in the office goes on a frenetic search.
   Solution:
   - Arrange the files in each category in time + department based case files. Place a fluorescent cloth when you take out a file, so it’ll be useful to put the file back.

3.) Improper fees collection system from clients
   Solution:
   - Put checklist in a black board and send bills without delay.

4.) Responding to emails, mails, queries which come from the client.
   Solution:
   - Apply Poka Yoke or mistake proofing.

5.) Unnecessary personnel in the office.
   Description: Having a receptionist to just attend to calling is a waste.
   Solution:
   - Instead, she should take care of the Xeroxing, becoming a master at it and not allowed every untrained person to experiment with the machines and waste resources. Or, all other people could be cross-trained to operate the machine and answer calls and the receptionist position could be eliminated.

All the others are direct implementation of the Lean Principles as indicated in the above table.
Section 6: Six Sigma Tools Utilized in this Project

**Define:**

To define the problem with law firm office efficiency, it was important to first define the areas where savings and increased productivity could occur. A flowchart was used to map out how a law firm operates. Then, after brainstorming ideas about how to increase productivity and find savings, cause and effect relationships were studied. These steps helped refine the goals of the project and gave the team direction on how to proceed.

**Measure and Analysis:**

A personal case study of a law firm’s operating expenses produced the data used for analysis. There were many variables that came into play when studying the law firm. Personnel abilities, scheduling conflicts/lawyer availability, type/length of cases brought in, and document control all played a role in determining the firm’s potential. After studying a flow chart that detailed the operations and current time usage, a projected future state of the firm was determined. It was important to understand the capabilities of the firm so that the maximum operating efficiency could be achieved. Setting up a feasible program was crucial to its success. The goals for the firm had to be attainable or else there would be little support within the firm for any necessary changes in protocol. Once the goal was determined, the possible changes to the firm’s operating procedures had to be established. To do this, a comparison to the best practices had to be made. One of the most important parts of any Six Sigma project is to determine where gaps exist between the current practices and industry best practices. Once the areas where improvements could be made were determined, practical solutions were implemented.

**Improve:**

The solutions implemented in the law firm were chosen after completing an extensive cost/benefit analysis. By altering some current practices, cost and time savings can occur because the efficiency of the employees increases. This allows for an increase in the number of cases the firm can handle, therefore increasing revenue while still providing quality services.

**Control:**

The partners in the firm are responsible for making sure the firm operates at its maximum potential. Each case brought to the firm will have its progress logged every three days to make sure that the process is working as it should. New companywide procedures will be distributed so that all employees understand what is to be done. Also, in the long term, the firm will compare annual reports to determine the actual savings and increased efficiency they have achieved. After reviewing the progress of the firm, changes can be made to improve processes if the partners determine that they are not reaching their goals.
Section 7: Conclusion

All the seven Lean Tools can be applied in any office to optimize the operation cost. After collecting the annual operation cost Data of lawyers office, LEAN SIX SIGMA TOOLS are applied and annual Savings upto 8.2% can be achieved.

As shown in the report, the current state VSM and the future state VSM has been depicted and the Value stream Metrics are tabulated. The results obtained are as follows:-

Estimated time saving of 165 mins (20.37%) in the Process time.

About 7.5 days (17days 5 hrs 30 min to 9 days 17 hrs 30 min- 36.11%) to 18.5 days (51 days 5 hrs 30 min -32 days 17 hrs 30 min) (43.53%) in the lead (delay) time of the process.

Scope for improvement

As far as we have surveyed and browsed the internet, we feel that this is the first process improvement activity attempted at a lawyer’s firm. So, there is a lot of scope for improvement. For example in our last block, we do not apply any lean principles; we could improve the process by an easy 15%. Also, there is so much variation in our model as the firm we have considered and obtained our data from is an Indian Law firm. However, the model can be extended to any other office/law firm.

Section 8: References

Acknowledgement

Very special thanks to Dr. Wesley Donahue for his guidance and motivation to do this project. Actually this project idea was initially abandoned, but it was Dr. Wesley Donahue’s words which actually brought the project on track.

Also special thanks to Mr. P. L. Narayanan for the annual data provided to us from his law firm.
Appendix

A1. Snapshot of Excel table where the VSM metrics are calculated

<table>
<thead>
<tr>
<th>Metric</th>
<th>Current time</th>
<th>Estimated Future time</th>
<th>Percentage Saving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Time</td>
<td>645</td>
<td>810</td>
<td>20.37037037</td>
</tr>
<tr>
<td>Lead time – From</td>
<td>24810</td>
<td>14010</td>
<td>43.53083434</td>
</tr>
<tr>
<td>Lead time – To</td>
<td>73770</td>
<td>47130</td>
<td>36.11224075</td>
</tr>
<tr>
<td>% Complete &amp; Accurate</td>
<td>27.8843</td>
<td>51.7809</td>
<td>23.8967</td>
</tr>
</tbody>
</table>


B2. Comparison of Current State Process time with Future State Lead time
B3. Comparison of Current State Process time with Future State Lead time

![Bar chart showing comparison of current and future state lead times.]

B4. Comparison of Current State Process time with Future State % Complete & Accurate

![Bar chart showing current and future state process times.]

20
B5. Final Summary of all Estimated Savings

![Graph showing Estimated Saving Percentage]