

**ENTERPRISE TRANSFORMATION & LEAN  
IMPLEMENTATION IN A GLOBALLY DISPERSED  
ORGANIZATION**

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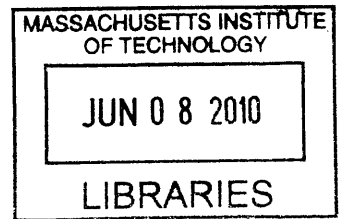
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Submitted to the MIT Sloan School of Management and the Department of Engineering  
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**Master of Business Administration  
AND  
Master of Science in Engineering Systems Division**

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## Abstract

In July 2007, the Supply Planning Organization (SPO) decided to begin its Lean journey. Through some analysis the decision was made to take a culture first approach and then follow with the use of Lean tools. The time had come to use Lean tools to help facilitate in the process of both driving business results and Lean culture acceptance. This thesis and research study set to prove the hypothesis that *“Lean tools can be as effective in a non-traditional globally dispersed information environment as they are in the traditional plant floor environment”*. In addition, this research study set out to show that Lean training and implementation can be successfully completed virtually through simple tools such as a PowerPoint presentation, Microsoft Live Meeting, and a telephone. The research study also shows how two mutually exclusive enterprise tools, X-matrix analysis and Value Stream Mapping, point to the same conclusion around effectiveness of metrics within an organization.

The core project within this research study is focused on designing the 2010 organizational improvement strategy and structure of Initech’s supply planning division through rigorous analysis of existing configurations and opportunities for process improvement and waste elimination. Initech’s Supply Planning division is an 800-person group that is globally dispersed across 23 sites. The supply planning organization is responsible for planning the quantity, timing, and location for product build. The current state analysis was completed through the use of direct observation, 1:1 interviews, and value stream mapping tools. This analysis is focused on identifying non-value added activity and identifying opportunities for improvement through simplified connections and streamlined processes. In addition, this process will also drive improvement and help eliminate the current silo’s that exist within the divisions.

The enterprise focus around process improvement, waste elimination, Lean cultural adoption, and metric effectiveness will help create a more robust and high performing organization.

**Thesis Supervisor:** Deborah Nightingale, Professor of the Practice, Aeronautics & Astronautics and Engineering Systems Division

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I want to thank the entire SPO organization for your openness in letting me explore your organization and for your receptiveness to my recommendations. It was a great experience learning about one of the top companies in the world and I appreciate the trust you had in my process, my recommendations, and in me. I would like to personally thank Viju for being a great LGO ambassador and for providing me with an internship that was challenging on many levels. Lastly, I want to thank Carolyn my project supervisor for the amazing support throughout my internship. I truly enjoyed working with you and I hope to keep in touch in the future. Your commitment to Lean and the planning organization is amazing and I can't see anything but success down the road.

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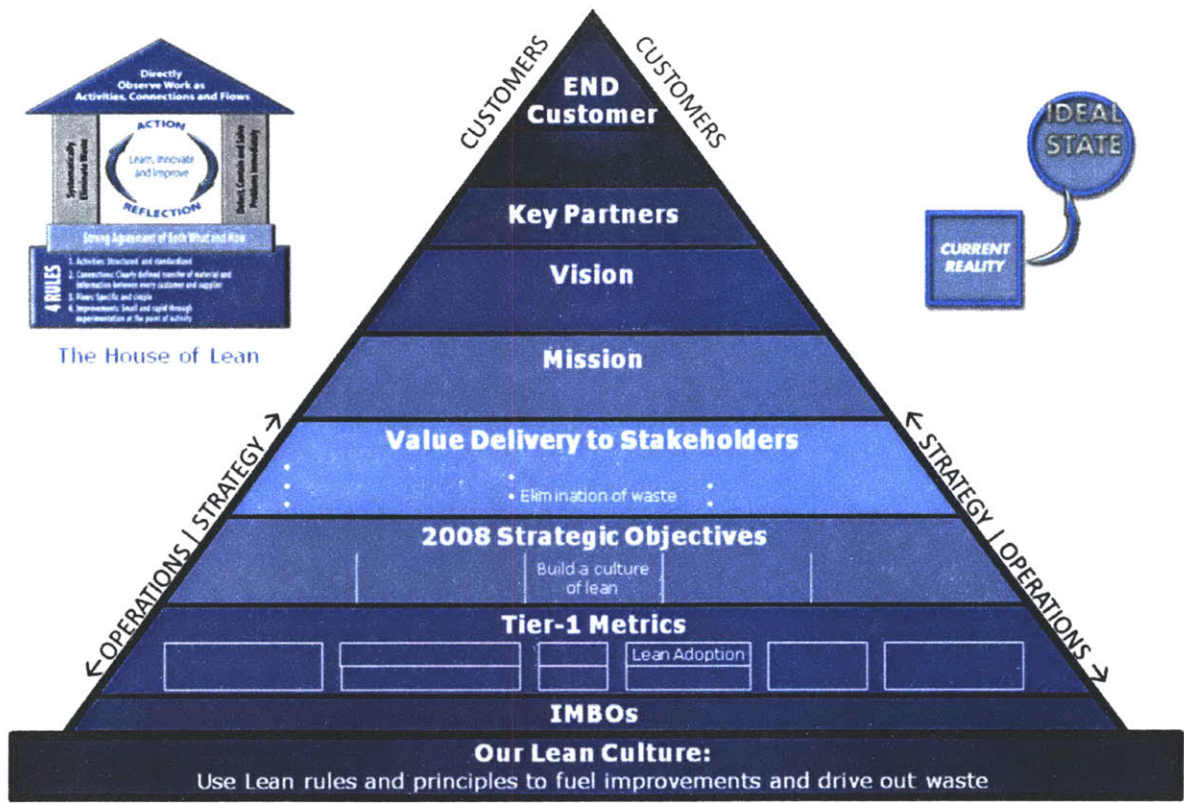
# **1. Introduction**

## **1.1. Background/Thesis Motivation**

Lean is a word that has taken many connotations and meanings over the last fifty years. Toyota created a production practice that focused on empowering workers, eliminating non-value add activity, managing inventory just-in-time (JIT), and addressing problems as they arose. This production practice came to be known as the Toyota Production System, which then transformed into what we in the industry refer to as “Lean”. Lean has traditionally been a plant floor production improvement tool. Many of the success stories that are referenced in the industry detail a physical product that was produced cost effectively through process improvement, Kanban implementation, and just in time inventory systems.

Initech’s (the company name and associated information is masked throughout the thesis) Supply Planning Organization (SPO) is a division that is responsible for planning the quantity, timing, and location for product build. The process begins when the planning team receives a virtual trigger from the marketing team detailing the upcoming demand and forecast. This information is then relayed upstream throughout the different stages of the manufacturing process. The process is extremely complex and there are many exchanges of information throughout. Information is exchanged through emails, IM’s, phone calls, teleconferences, and through IT system updates. The team is global and information has to be passed between many countries including the United States, Costa Rica, Taiwan, and Israel to name a few.

Viju, the director of Supply Planning Organization led the initiative to begin the Lean Journey within SPO in July 2007. The intention of Lean implementation was to create a benchmark organization through process improvement and waste elimination in a Supply Planning organization, where information is the core product. The SPO strategic pyramid shown below in Figure 1 was created as a way to show how the different strategic tools used within SPO are built off Lean culture.

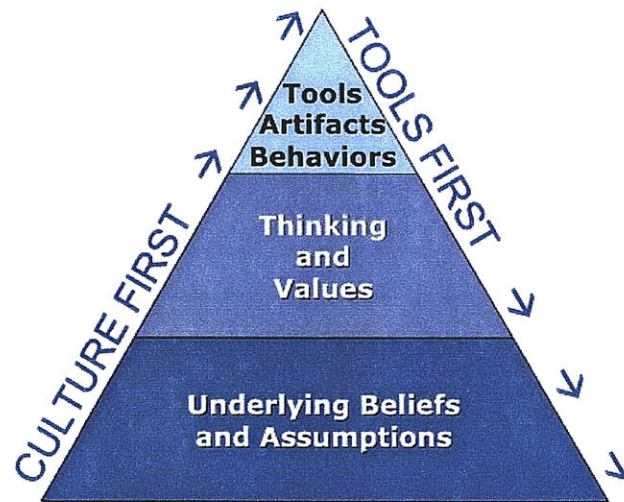


**Figure 1: SPO Strategic Pyramid (Scott, 2009)**

The strategic pyramid shows that without a strong Lean foundation SPO will struggle to meet the demands of the end customer. The pyramid also shows that the end customer is at the top of the pyramid and that all business processes and strategies are in place to deliver maximum value to the end customer.

Since the origination of the SPO Lean journey in 2007 the focus has been on a culture first approach. Daniel’s thesis focused on the advantages and disadvantages between a culture first approach versus a tools first approach to creating a sustainable Lean culture and organization. His research, influence, and focus led to a culture first push within the organization. Daniel states in his thesis that, “if leaders focus on changing the underlying assumptions and beliefs first before focusing on tools and artifacts, the result will be a more sustainable Lean organizational change as measured by ongoing efficiency improvements through continual standardization and experimentation. Alternatively, if leaders focus on Lean tools and artifacts (e.g. Andon cords, Kanbans, and 5S workplace housekeeping methodology) first before focusing on the underlying beliefs and values of the culture, then the organization

will see some improvements in efficiency, but the effort will likely not be self-sustaining as measured by ongoing efficiency improvements through continual standardization and experimentation.” (Daniel, 2008) The balance between a Lean cultural push and tool push is extremely important. Many organizations focus too much on one or the other and in turn do not drive sustainable business results. Figure 2 shown below, details the approach that Daniel and Viju were taking in July 2007 when embarking SPO on the Lean journey:



**Figure 2: Culture first versus Tools first pyramid (Daniel, 2008)**

I joined the SPO organization after two 6-month internships within SPO by Daniel and Scott. SPO had taken major strides in the Lean Journey because of the work and effort of both Daniel and Scott. I equate Daniel and Scott’s internships as the two bottom blocks shown in Figure 2: Underlying beliefs and Assumptions and Thinking and Values. Scott’s thesis used “enacted systems analysis to identify artifacts, habits of thought, and habits of action.” (Scott, 2009) This resulted in the identification of many organizational barriers that were vital to eliminate for my project to be a success. Because of the strides made by SPO during these internships, the focus of my internship was on the top block: Tools, Artifacts, and Behaviors. Viju wanted me to create a process that could be used to help drive process improvement across the planning organization. I explored many different options and then presented a form of Value Stream Mapping and Solar Mapping. Viju felt that the team was ready to be exposed to Lean tools and felt that this project would be a great way to help drive

Lean culture on a macro level across the organization. This was a major turning point for SPO as this was one of the first times that Lean tools would be used to drive a cross-functional improvement across major divisions within the organization. This project and internship was also a major risk for the organization because if the initiative was not successful then much of the work that has been completed over the last 2 years around Lean culture could be jeopardized.

## **1.2. Problem Statement/Thesis Hypothesis**

The issues faced by the SPO organization are very similar to the issues faced by many large organizations. The SPO group has grown quickly over the last 4-5 years and now finds themselves structured in a way that there are silo's that exist between the core divisions. Effective communication is lacking and a change is needed to reenergize the group. Leadership within SPO is well aware that a more effective and efficient organization is both achievable and necessary for long-term success. With benchmarking completed both internally and externally it is clear to the team that they have a long way to go to being a world class Supply Planning Organization. The challenge at hand is how does this group identify the opportunities for improvement and how does it go about implementing changes across globally dispersed organization? In addition, how does SPO take an unbiased view of the organization when so many individuals within the group are focused mainly on the success of their individual business units? Creating an environment where cross-functional business units operate for the better good of the organization is a difficult task. This is ever more difficult when business units have their own profit loss centers and are being driven aggressively by the organization that they are within.

SPO is an organization that suffers from many manual workarounds and IT system issues. Individuals within the organization get so busy from fighting fires that there simply isn't enough hours in the day to step back and drive process improvement or get to the root-cause of issues. In addition, the IT resources are limited and any system fixes have to be prioritized by necessity, which means that process improvement issues generally take a backseat to more burning issues. In addition, any type of improvement initiative must be sensitive to the

political issues that can arise when the structure of an organization is changed or power is shifted between divisions of the organization. Also, the needs of the customer are a key focus and any changes that occur within the organization must not negatively impact the customer in any way. Many sites within SPO are operating at close to manufacturing capacity and if any improvement initiatives minimize capacity in the short-term it could severely impact supply to the customer and bottom line revenue goals.

The hypothesis of this thesis is that, *Lean tools can be as effective in non-traditional environments where information is the product as they are in traditional plant floor environments.* This research study will also touch upon the effectiveness of using Lean tools in a globally dispersed organization and help solidify the culture first verse tools first debate. The hypothesis ties directly into the organization's need for process improvement and Lean cultural adoption. If the hypothesis can be proven true, the results can be groundbreaking for an organization that is looking for the small and short-term improvements across a global landscape. In addition, a successful project will provide positive visibility on the application of Lean tools, which in turn will help broaden the Lean cultural adoption across the organization.

This research study also looks to prove whether Lean training can be delivered successfully across an organization, with the recipient of the training then leading a Kaizen event at his/her site. This can be a very important revelation as many global organizations are faced with the challenge of driving process improvements with much tighter budgets and travel restrictions than in the past. Lean practitioners across these companies have argued that without a travel budget Lean cultural adoption can stall. Their argument is that Lean experts and practitioners looking to develop their skill set have to be able to travel from site to site. Companies that are early in their Lean journey have to address this issue as generally they have an uneven balance of individuals looking to develop their Lean skill set and Lean experts. Initech has a limited number of individuals who can be considered Lean experts and not every site has a Lean expert in all the basic tools such as Standard Work, 5S, and Value Stream Mapping. The test case

used to help to prove that Lean training can be delivered virtually is with an Office 5S initiative that is focused on driving productivity improvement in an associate's physical and virtual workspace.

### **1.3. Context**

The context of this hypothesis is set within the Supply Planning Organization of Initech. This group functions as the behind the scenes wizards that manage capacity of the manufacturing facilities and demand of the customer. They also determine the most optimal location for product manufacture and product delivery. The Supply Planning Organization is a globally dispersed group, with 3 main divisions that handle the bulk of the supply planning. This research study focuses on these 3 core divisions: FAB X, ATM Y, and DIV Z.

The company within which SPO operates in is Initech, the world's largest semiconductor chip manufacturer. Initech has faced many successes and challenges, even having to layoff over 10,000 employees in 2006. Initech has since decided to focus its efforts back on technological advancements. The core focus of this initiative is to alternate annually with process innovation and technological innovation. The belief is that if Initech operates with-in this clock speed that it will continually stay ahead of the competition. With the continued focus on technological innovation and also with Initech entering new markets such as Netbooks and mobile platforms the necessity for cost reduction across the entire value chain became quite evident. This strategic push for cost reduction, efficiency, and process improvement led to the creation of my project.

### **1.4. Thesis Chapter Outline**

The thesis is organized as follows:

**Chapter 1:** Provides a background and context behind the internship and also details the macro level issues faced by the SPO organization. This chapter also provides the thesis hypothesis and other areas of research interest that were explored during this internship.

**Chapter 2:** provides a brief history of Lean and then transitions into a short background of the Lean journey in regards to both Initech and the Supply Planning Organization. Enterprise transformation in regards to its application to this internship

**Chapter 3:** provides a literature review of some of the core topics that are touched in this research study such as Service Excellence, Office 5S, Policy Deployment, and Metrics. The purpose of this chapter is to provide some theoretical background to help support the practical usage of these tools in later chapters.

**Chapter 4:** shows a detailed background on the purpose, approach, and results of the Office 5S initiative. Included are examples of the productivity improvements and the direct results associated with this virtual Kaizen event.

**Chapter 5:** provides a detailed summary of the internship project objective, approach, process, and challenges. Included are many examples of solar mapping and current state mapping. Lastly, final results of the enterprise transformation are discussed.

**Chapter 6:** details the analysis and results associated with the Metric selection and Policy Deployment initiative.

**Chapter 7:** provides an overview of next steps, including implementation plan and future research and internships.

**Chapter 8:** provides final thoughts on this internship study in reference to the current state mapping project and the Office 5S and Metric selection and Policy Deployment initiatives.



## 2. Lean Overview

### 2.1. Lean History

The history of Lean goes back over a hundred years from the timeframe of Eli Whitney to Henry Ford to Edwards Deming to the Toyota production system. There are many historical moments that have defined Lean and many individuals that have revolutionized manufacturing, as we know it today. It is important to understand the history to better understand how Lean is changing in the future.

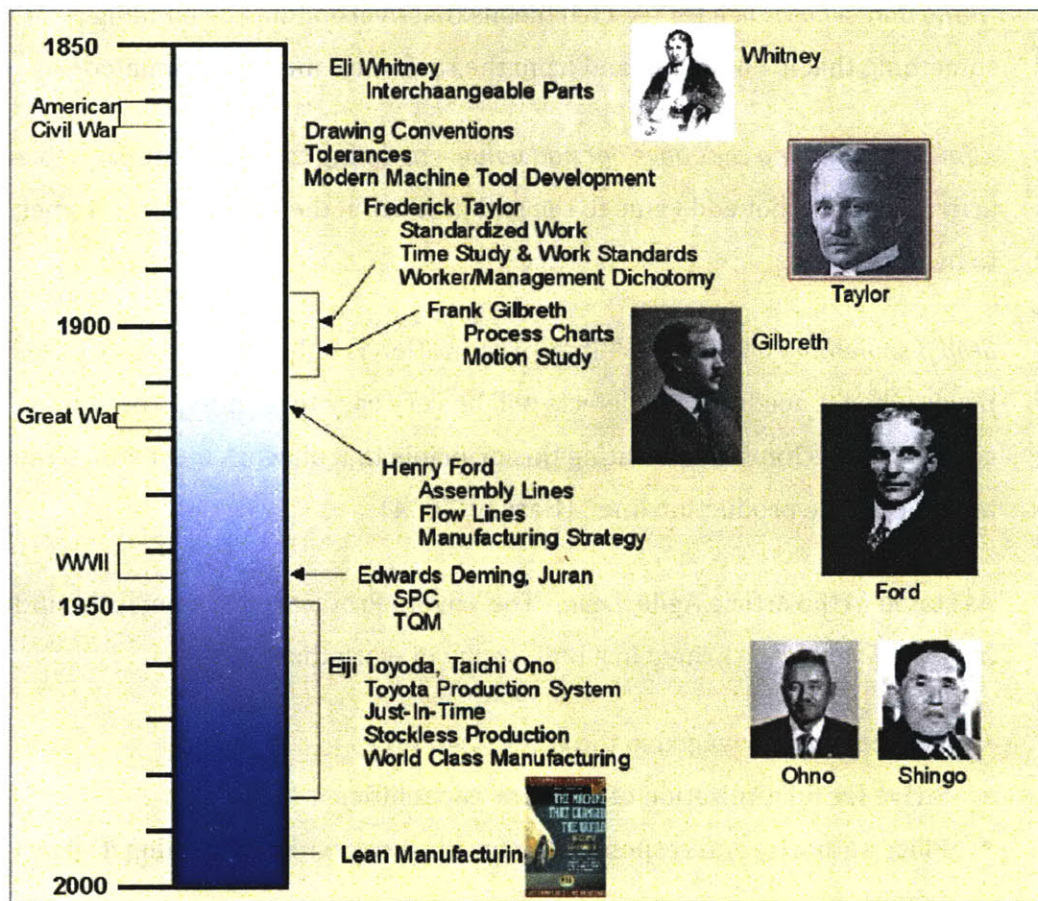


Figure 3: History of Lean (Strategos, 2008)

“Eli Whitney revolutionized the cotton gin through using interchangeable parts.” (Strategos, 2008) Henry Ford became one of the richest men of his era through the use of “assembly lines, flow lines, and manufacturing strategy.” (Strategos, 2008) The famous quote, “you can have any color car you like as long as it is black” revolutionized delivering exactly to the customers needs at that time.

Many companies to this day think similarly to Henry Ford when considering the number of product offerings or SKU's to provide for the customer. Apple, which offers much less SKU's, has a much different business model from Dell, which offers a much bigger selection of SKU's. Toyota realized that the Ford production model was lacking on many levels and set forth to improve upon what the competition was doing. It was at this time that Taichii Ohno helped develop the Toyota Production System (TPS). TPS was focused on empowering workers, just in time inventory, and continuous improvement. TPS focused on three core fundamental principles:

*"Build only what is needed* – which means that overbuilding or building something that is not in demand from the customer must be eliminated

*Eliminate anything that does not add value* – meaning that any process step or activity that did not add value to the end product in the eyes of the customer had to be eliminated.

*Stop if something goes wrong* – if an organization is only building exactly what it needs when it needs it then defects will be very easy to identify. The "Andon" cord is famous for demonstrating this principle that all work must stop if there is an issue on the production line." (Harvey, 2004)

As stated in the article Agile, Lean, "The Toyota Production System is grounded in a set of values enshrined in a philosophy of work that:

- Respect those engaged in the work
- Strive for full utilization of workers' capabilities
- Place authority and responsibility for the work with those doing it" (Harvey, David)

In the 1980's the learning's from Toyota reached many American companies, including General Electric who became a global leader in Six Sigma implementation. While many companies have tried to emulate Toyota's business processes most have been unsuccessful at driving a sustainable Lean culture.

Lean has many connotations and meanings in the 20<sup>th</sup> century depending on the person or company. It is important that one not get lost in all the extraneous materials on the topic matter. The 20<sup>th</sup> century has opened up Lean in many non-traditional environments and the companies that will succeed in the future will use Lean tools and methods in all portions of their business, not just in the traditional plant floor environment.

## 2.2. Initech & SPO Lean History

In comparison to organizations such as Toyota, General Electric, and Danaher, Initech is still in its infant stage of its Lean journey. Initech began its Lean journey in 2003 at one of its fabrication facilities. The main focus of improvement was an effort to reduce costs and manufacturing cycle time. “This site encountered setbacks at the beginning of the Lean effort due to a tool-centric approach to Lean. As this site tried to adapt to the lack of initial success with Lean they decided to “focus on a culture first approach to Lean.” (Daniel, 2008) The results were quite positive over the next few years in terms of cost reduction, cycle-time reduction, and an increase in inventory turns. Figure 4 shown below shows the Lean house that was developed as part of the initiative towards a more Lean organization.

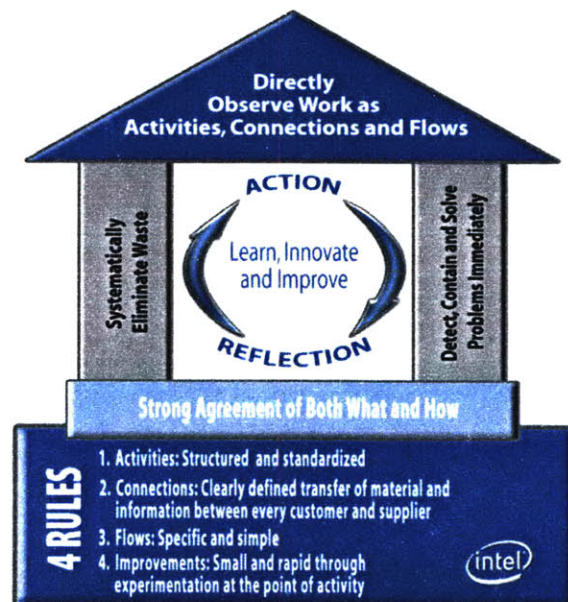
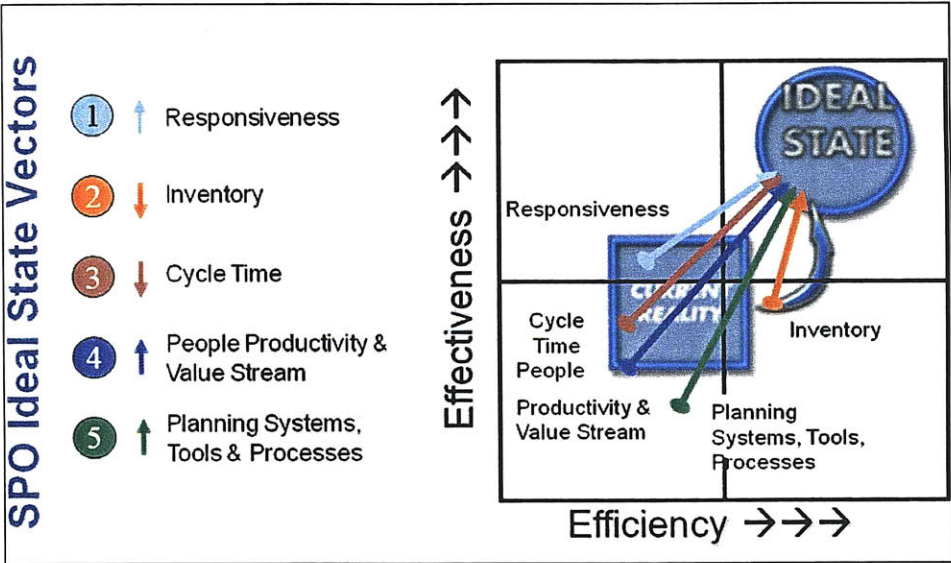


Figure 4: Lean House (Spear, Bowen, 1999)

Over the next few years another Fabrication facility and the Materials organization began their respective Lean journey. Similar to the first facility, the Materials organization emphasized a tools first approach. While results were initially strong sustainment and cultural buy-in were questioned.

In July 2007 SPO began its Lean journey with a culture first approach and was one of the first organizations within Initech to take this approach. A common saying across the organization was “Rules before Tools”. (Scott, 2009) Much of the culture first push was because of previous LGO intern Daniel’s work and influence on the organization. A major challenge for the SPO organization is that many associates had become accustomed to the “fly by night” improvement initiatives. Leadership had to be extremely careful to present Lean as a long-term initiative for the organization. Shown below in Figure 5 are the SPO ideal state vectors.



**Figure 5: SPO Ideal State Vectors (Viju, 2009)**

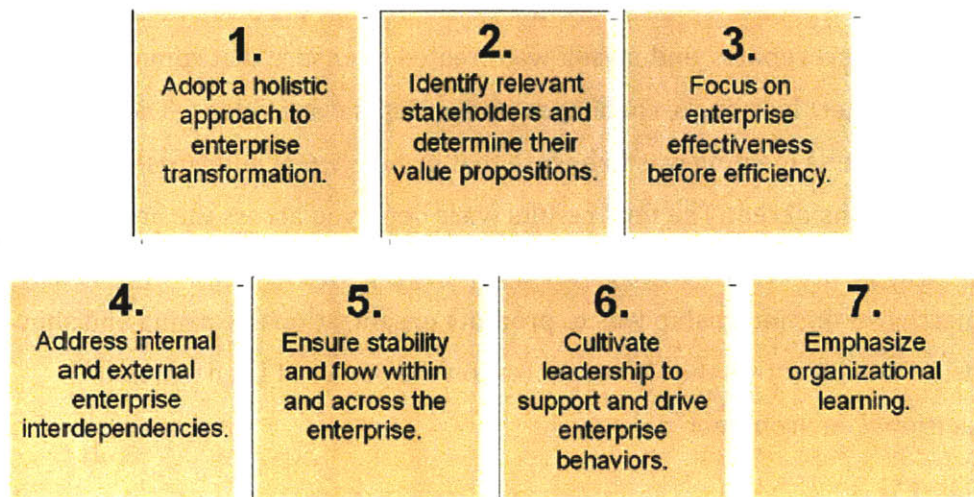
The purpose of this visual is for the SPO leadership team to emphasize 5 vectors that would lead SPO to an ideal state as an organization. These 5 vectors include responsiveness, inventory, cycle-time, people productivity and value stream, and planning systems tools and processes. The chart shows the current state of these vectors in terms of effectiveness and efficiency and then shows how far the

organization must move to reach ideal state. The vectors that are longer in length obviously have to move further to reach the ideal state.

### 2.3. Enterprise Transformation

Enterprise transformation is paramount to the success of a continually improving organization. Organizations that stay stagnant or fail to innovate or create a burning platform generally have little focus on Enterprise transformation as a key strategic initiative. The Supply Planning Organization within Initech understands that in order to become a benchmark organization it must transform at an enterprise level. The sole purpose of the current state mapping that is conducted in this research study is to provide a lens and recommendation plan that can help transform the organization.

There are seven core principles of Enterprise thinking, as identified in research by Deborah Nightingale that were quite relevant during the planning and implementation of this internship. The seven principles are shown below in Figure 6:



**Figure 6: 7 Principles of Enterprise Thinking (Nightingale, 2009)**

These 7 principles will be indirectly addressed in detail over the course of this research study. The vision of SPO Director Viju emphasized many of the principles of Enterprise thinking into the scope of this internship project. Principle 1, to “adopt a holistic approach to enterprise transformation” was core

to the objectives of this project (Nightingale, 2009). The internship had to focus on a macro holistic approach to address the issues of silos and ineffective communication across the multiple business units. Principles 2 and 3 were also critical components of the scope and objective of this internship. It was essential to “identify the relevant stakeholders” across the globally dispersed organization that could impact change across the organization (Nightingale, 2009). In addition, the primary focus was to drive enterprise effectiveness while efficiency was secondary to this primary focus. Viju understood that the overall impact to the customer would be minimal if we took an approach focused solely on driving efficiency improvements across the organization. If a focus towards large-scale enterprise effectiveness were taken the potential impact to the end customer would be significantly greater. The core reason behind why SPO is not functioning to its highest potential is because the enterprise is not effective and the smaller business units within the SPO enterprise are focused on local concerns.

Principles 6 and 7 were critical for gaining buy-in and driving a continuous learning mindset across the SPO organization. A bi-weekly meeting between Viju, his direct reports, and myself was created to ensure that communication around project learning’s, challenges, and updates was evident. The sole purpose of this meeting was to ensure that principle 6 of enterprise thinking was carefully considered. The final results were deployed across the organization and communicated extensively to ensure that principle 7 was met. A core objective of this internship was to promote organizational learning and show business units within the SPO organization the power of Lean in a non-traditional environment.

## **3. Literature Review**

### **3.1. Service Excellence**

Lean has been a major part of the manufacturing world over the last 50 years. Most view Lean in a traditional plant-floor manufacturing environment. However, many companies are asking the question of how they can apply Lean principles in a service organization. The definition of service organization in the context of this thesis is not the typical service industry that is normally thought of such as the financial and healthcare sector. Service, as defined in this thesis is work that is being done on a non-tangible product such as information. In the case of SPO, this relates to all the input and output information that is passed throughout the supply chain in order to deliver product on time to the customer. "Lean has the ability to address many problems faced by service companies, including complexity reduction, sales force productivity, employee morale, and service excellence." (Sarkar, 2008) The challenge with Lean in service organizations is that either the initiative stops at one to two attempts at change or the initiative never begins. Many managers get fixated on the belief that Lean is only applicable in a plant floor environment. This is one of the biggest hurdles to overcome in a service industry. There are just too many publications on the success of Lean implementation and Lean tools in the manufacturing world and just not enough on their success in service industries. Lean implementation in the service environment will also have much more pushback from associates and even management teams that the tools are not applicable.

As competition strengthens globally operational improvement has to extend beyond the plant floor environment. Outsourcing of service jobs such as call centers, data entry, and documentation has made it very difficult to cost-effectively compete within these functions in the United States. It is imperative that cost savings and quality come in a different form, which can be achieved through Lean tools. Figure 7 shown below depicts the importance of the service industry to various global economies.

**Table 1.1** Percentage of service sector in major economies of the world (as of 2005).

Number	Country	Percentage of Service Sector in GDP
1	United States	78.7
2	Japan	72.5
3	Germany	69.5
4	China	40
5	United Kingdom	75.8
6	France	76.4
7	Italy	68.8
8	Spain	66.5
9	Canada	68.4
10	Brazil	51
11	South Korea	52
12	India	54
13	Mexico	70
14	Russia	57
15	Australia	75

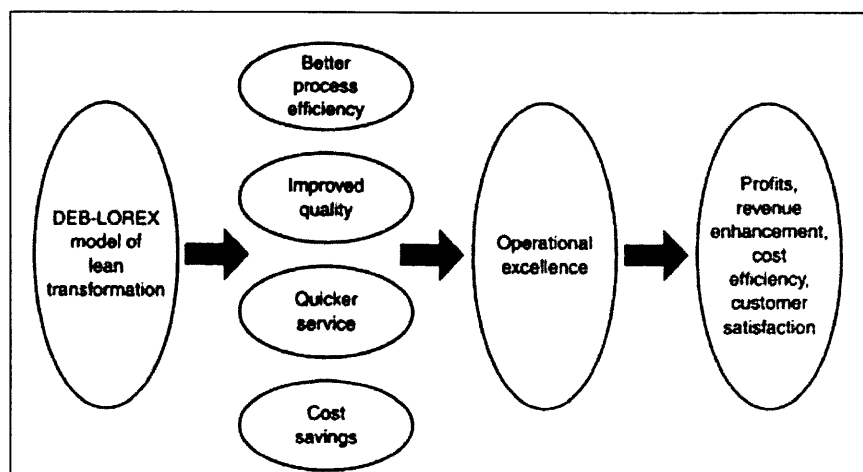
Source: [www.cia.gov/cia/publications/factbook](http://www.cia.gov/cia/publications/factbook).

The order of listing of the countries does not necessarily indicate the rank of the economies.

**Figure 7: Service Sector % of GDP in global economies (Sarkar, 2008)**

The United States is #1 on this list in regards to service sector as a percentage of jobs. The trend of outsourcing by companies in the United States has led to less traditional manufacturing and more service oriented job functions. In order to be cost-effective in this environment Lean must be applied at a macro level in service organizations.

The model created by Debashis Sarkar, which is shown below in Figure 8, provides a great example of implementing Lean in a service organization in a holistic manner.



**Figure 8: Service Excellence Model (Sarkar, 2008)**



The basic purpose of this model is to show that in order to have a successful Lean initiative within an organization, that the organization must take a holistic approach to the initiative. Tackling smaller one-time projects is not going to create the culture or sustainability that is required of a good Lean initiative. “The Lean transformation has to target areas such as process efficiency, quality, cycle-time, and at the end of they must save the company money.” (Sarkar, 2008)

A service organization must have many of the same qualities as a manufacturing organization in order to successfully implement Lean. Lean adoption has to be a tops-down initiative and must be part of the “management strategy” (Sarkar, 2008). Management must have a 100% commitment to Lean implementation and must also show their support. Many companies have managers that say they support Lean, however when it comes down to it short-term business results take priority. Employees within an organization can quickly see if senior leadership truly supports a Lean initiative and this impacts their commitment to the journey. If word gets out across the organization that the support is not genuine this will quickly slow down attempts at business process improvement or Lean cultural adoption. There has to be a strong “visible commitment” from management that a Lean initiative is part of the core strategy of the organization. (Sarkar, 2008)

Metrics are also a key component of a successful Lean service initiative. While many managers find it difficult to decide on the metrics that best reflect the health of their organization, this is a critical step to success. In the plant floor environment this can be a much simpler task. In addition, many times measuring what you find important is not an easy thing to do. Service industry metrics can be a bit ambiguous and capturing the data to report on a metric can be time consuming and tedious. “Regular measurement” must become a way of life and metrics that are deemed important must be part of an employees “performance appraisal.” (Sarkar, 2008) Metrics drive the behavior of an organization and its employees and in order to drive sustainable improvement an employee must be accountable for the key metrics that dictate the health of the service organization.

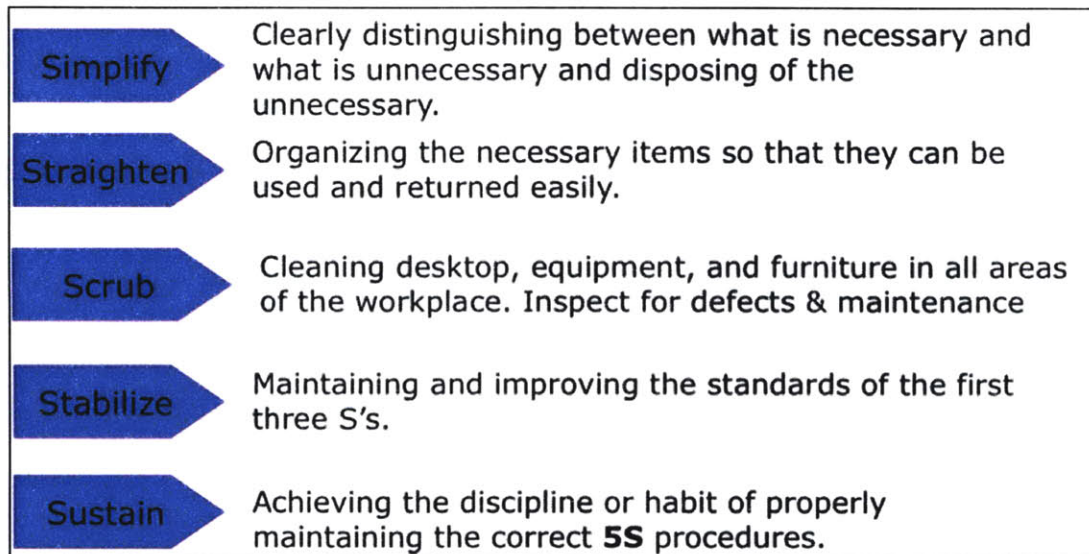
Employee engagement can be much more difficult in a service organization. In a plant floor environment employees can directly see the impact of their efforts, whereas in a service organization it is more difficult to see the impact of your effort. For example, while data entry or invoicing is important functions of the service organization they don't directly tie into a bigger picture or end product that is easily visible. It is for this reason that "employee engagement" and involvement of "front-liners" is critical and must receive extra focus for a successful Lean initiative. (Sarkar, 2008) In the plant floor environment it is generally clear-cut what the needs of the customer are: Low-cost, on-time delivery, and excellent quality. In a service organization it can be a bit unclear. Some customers thrive on over-communication and high quality whereas other customers want their requests handled in a timely manner. Therefore a "proactive effort to understand the unique and changing needs of the customer" is absolutely necessary for success. (Sarkar, 2008)

From a process standpoint a Lean service initiative is very similar to a Lean initiative in a plant floor environment. The end customer defines value and if a process step is something the customer would not be willing to pay for than it is non-value added. Non-value added activity has to be identified and eliminated in a continuous improvement fashion. In addition, all value-added activity should occur in a "tight sequence to ensure that product will flow smoothly downstream." (Sarkar, 2008) As process flow is created and changed through continuous improvement the customer should be able to "pull value" from its upstream supplier. (Sarkar, 2008) In addition to non-value add and value add from a business process standpoint, Office 5S has revolutionized productivity and efficiency improvements in both the physical and virtual workspace.

### **3.2. Office 5S Principles**

Office 5S is when associates take a systemized approach to creating a clean and orderly workspace. 5S generally involves creating an environment where tools to do your job are located within arms reach and are organized in a visual manner. The purpose is that an associate does not have to stop work to find tools to do his/her job. In addition, an associates work area is always kept in a clean and orderly

fashion. This systematic upkeep of a work area has proven to increase worker productivity. The 5S steps, as stated by Fabrizio and Tapping in the book "5S for the Office", are defined below in Figure 9.



**Figure 9: 5S steps defined (Fabrizio and Tapping, 2006)**

I have adjusted the names of a few of the steps as I find that the terms in Figure 9 better help define the objective of each step. For example, I changed "Sort" to "Simplify" as I found simplify better explains how items must be removed to create an environment that is more orderly. I also changed "Set in order" to "Straighten" as straighten was more synonymous with getting items in order. The third step "Shine" was changed to "Scrub" as scrub better portrays the need to get your hands dirty. Regardless of the term associated with the step, the general action and principle behind the steps is very similar.

I have listed some important principles about 5S in Figure 5 below, which are based on my experiences with 5S and key points from the book "5S for the office."

<b><u>5S Is Not</u></b>	<b><u>5S Is</u></b>
<ul style="list-style-type: none"> <li>• Just about good housekeeping</li> </ul>	<ul style="list-style-type: none"> <li>• It is a fundamental mind shift about making orderly and standardized operations the norm</li> </ul>
<ul style="list-style-type: none"> <li>• Just a tool for manufacturing floors</li> </ul>	<ul style="list-style-type: none"> <li>• The heart and soul of visual control over all processes</li> </ul>
<ul style="list-style-type: none"> <li>• Just a reflection on workplace housekeeping</li> </ul>	<ul style="list-style-type: none"> <li>• One of the most powerful metrics that reveals your personal commitment to Lean</li> </ul>
<ul style="list-style-type: none"> <li>• Just about improving workplace productivity</li> </ul>	<ul style="list-style-type: none"> <li>• A way to create pride and personal responsibility for the workplace</li> </ul>

**Figure 10: 5S Fundamentals (Fabrizio and Tapping, 2006)**

5S is a great Lean tool to begin a Lean journey with because it drives personal accountability. It also forces individuals to change bad process habits when nobody is looking. 5S is generally not on the highest radar of management and 5S scores are usually not monitored in an organization. If they are measured it is generally not high on the radar in relation to other metrics that depict the health of the organization. It is for this very reason that when individuals commit to 5S they are also much more likely to commit to a Lean journey. If an associate is not buying into 5S this is a red flag that either there is an issue with this associate or that the culture of the organization is not ready for Lean tools.

Many individuals confuse 5S with a one-time housekeeping chore and in the long-term they fail to realize the productivity improvements associated with a strong 5S initiative. As a Lean leader within an organization it is absolutely essential to emphasize the fourth and fifth steps of the 5S process. Stabilizing and Sustaining are critical for the very reason that 5S is a process and not a one-time solution.

5S is widely considered the foundation of the Lean tool journey. It is one of the easiest tools to learn and also a fairly short Kaizen event. It is also a great way for individuals to see the power of Kaizen within a few days. With that being said, 5S is also very difficult to sustain. Based on my experience I have detailed some of the difficulties and benefits of 5S:

**Difficulties of 5S:**

- 5S relies on extreme personal discipline and commitment

- Firefighting and work-arounds are sometimes easier to do in comparison to implementing 5S
- 5S is an afterthought when addressing other critical business issues
- 5S can be overdone and too stringent rules can cause associates to rebel
- 5S is sometimes not adapted to the company or process resulting in the wrong tool for the given situation
- It is very difficult to break bad process habits and human nature to revert back to the “old way of doing things”

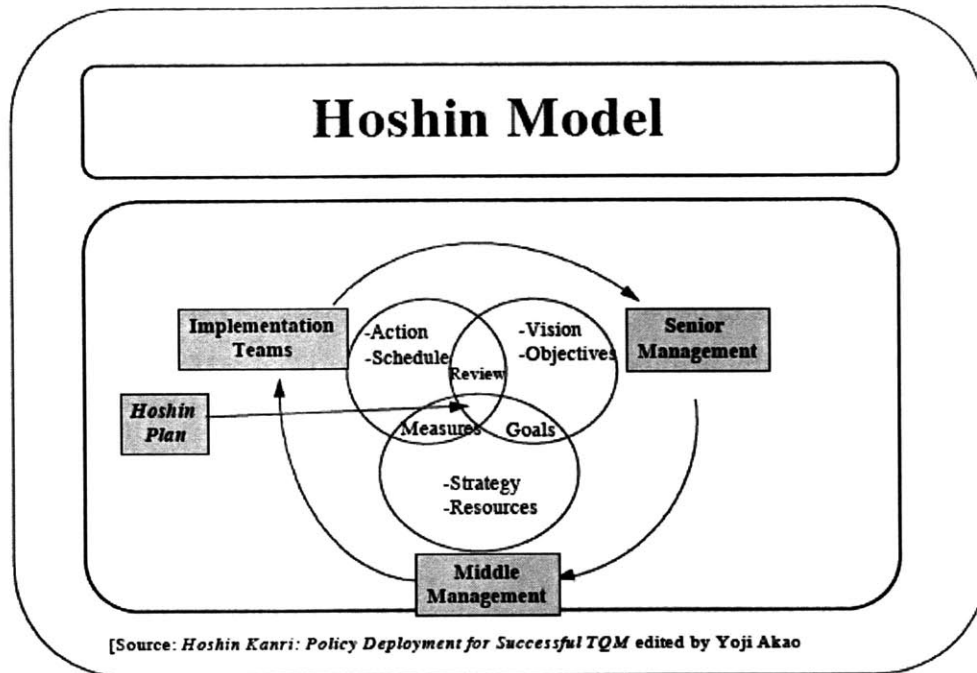
**Benefits of 5S:**

- Improved customer satisfaction
- Improved employee satisfaction
- Improved communication both internally and externally
- Reduced search times thereby improving productivity
- Reduced defects, thereby improving quality
- Reduced delays in execution or finding the tools to do a job, thereby improving on time delivery to internal and external customers
- Improved safety
- Increased creativity and clear thinking. A clean workspace allows an associate to think clearer without the distraction of excess clutter

While Office 5S can address many productivity issues at a macro level, Policy Deployment is a revolutionary management tool to address accountability on a macro scale across an organization.

**3.3. Policy Deployment**

“Policy Deployment, also known as Hoshin Kanri, provides a step-by-step planning, implementation, and review process for managed change. It is a systems approach to management of change in critical business processes. The system that is being referred to in the book Hoshin Kanri is the core strategic objectives as defined by the organization.” (Akao, 1991) The Hoshin model can best be described visually as shown in Figure 11 below:



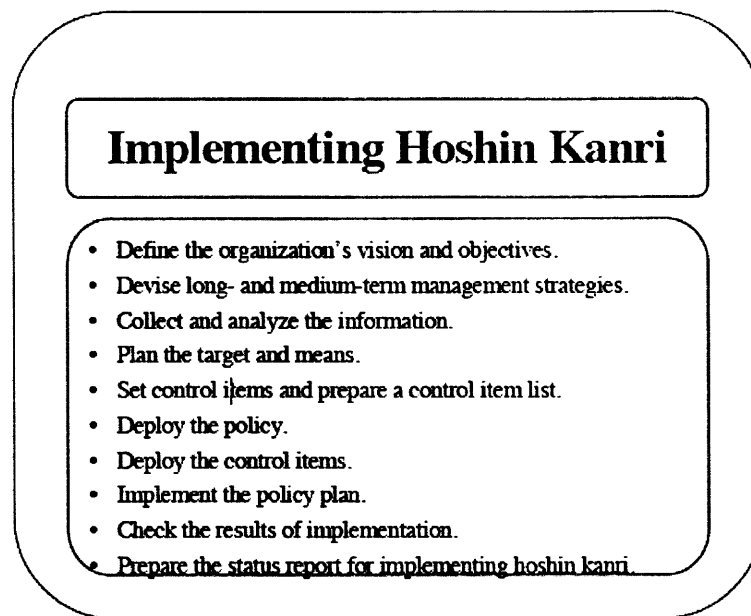
**Figure 11: Hoshin Model (Akao, 1991)**

The Hoshin model shows how Senior Management passes a directive to middle management who in turn filter this message and pass an actionable message to implementation teams. This cycle continues over and over as strategic objectives are obtained. The 3 circles on the interior apply to the 3 groups respectively and detail their responsibilities during the Policy Deployment process. Senior Management is responsible for providing a vision and strategic objectives. Middle management is responsible for providing the vision and strategic objectives in the form of an actionable strategy with available resources. The implementation teams must then figure out what actions need to be taken to make this vision, strategic objectives, and strategy a reality. Senior management provides goals, middle management provides measures/metrics and then the implementation teams review this during the policy deployment meetings. The center of this circle is the Hoshin Plan, or Policy Deployment worksheet, that was created by the management teams at the start of the year.

An important trait of this diagram is that it is circular and conveys that Policy Deployment is not a one-time process and that it is centered on continuous improvement and continuous action. It takes management teams and

implementation teams time to become experts in the art of running a Policy Deployment meeting. These meetings have to be active and management must be engaged in terms of driving individuals that report out. The meetings are meant to leave everyone mentally drained, which is a sign that serious thought and efforts were put into countermeasures and actions. If a leadership team just “goes through the motions” the results will not be realized. Just like with any other Lean tool, Policy Deployment takes personal commitment and a drive for accountability across the organization.

The steps for Hoshin Kanri are shown below in Figure 12:



**Figure 12: Hoshin Kanri Implementation Plan (Akao, 1991)**

Yoji Akao details the steps for implementation of Hoshin Kanri in his book *Policy Deployment for successful TQM*. These steps are shown below:

**“Define the organization’s vision and objectives:** Effective policy deployment begins with a vision of where the business is going. The organization’s vision is foundational in the development of a company-wide policy for quality as well as the development of a plan for promoting improvement throughout all aspects of the firm.

**Devise long- and medium-term management strategies:** Translate policies

and plans developed in Step 1 into long and medium-term strategies for changing company culture to achieve the desired goal(s).

**Collect and analyze the information:** Gather data on the organization's current situation and performance. This data should focus on the previous year's performance, along with the current internal and external conditions. The analysis involves identification of problems discovered during the data collection phase with the primary focus being to ascertain the firm's most critical problems.

**Plan the target and means:** Based on the analysis of the organization's current situation, identify action items (targets) and a plan for achieving them.

**Set control items and prepare a control item list:** Identify specific control items for deploying the plan developed in Step 4 as well as a list of specific jobs, responsibilities, control period, control method, contingency plans, etc.

**Deploy the policy:** Coordinate policy implementation throughout the company by identifying specific targets (goals) for specific divisions, departments, and personnel.

**Deploy the control items:** Identify specific action items required to achieve policy goals for the specific divisions, departments, and personnel throughout the firm. This step involves the development of the action plan sheet for each division, department, individual, etc.

**Implement the policy plan:** After planning and preparation the firm must implement the plan as laid out in the policy plan and, more specifically, the action plan sheets.

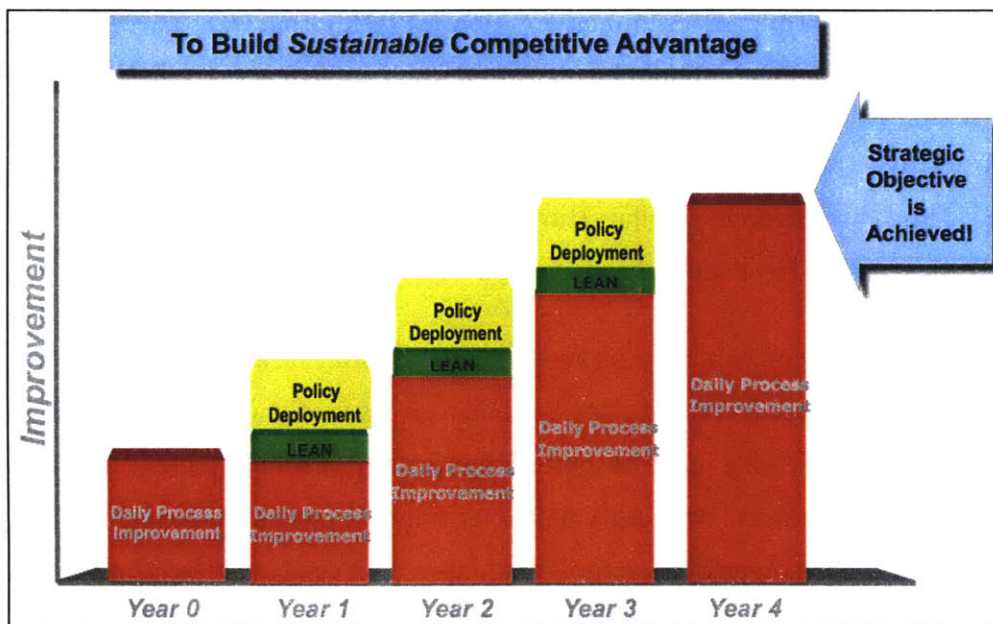
**Check the results of implementation:** As the policy is deployed there will be feedback on results and performance. These should be evaluated and checked against targets and goals. When differences are discovered, identify the causes, identify those causes with the greatest impact on performance and take corrective actions. Successful corrective actions should be incorporated into the



following year's plan.

**Prepare the status report for implementing Hoshin Kanri:** At the end of the year develop a status report that details the results of the policy deployment efforts. These serve as the basis for the development of the next year's policy plan." (Akao, 1991)

I have had 4 years experience working directly with Policy Deployment and have found that when executed correctly it is an extremely powerful business tool. Figure 13 shown below shows how Policy Deployment can help an organization reach long-term strategic metrics.



**Figure 13: Sustainable Advantage of Policy Deployment**

Policy Deployment helps an organization take its strategy and execute upon that strategy with sustained results. While Lean drives some level of improvement across the organization, Policy Deployment is the tool that drives accountability in an organization and helps an organization reach its strategic objectives. It makes strategic objectives actionable and each individual has ownership for the metrics that dictate the health of the organization. Most importantly, Policy Deployment helps create a level of communication across the organization such that individuals at all levels understand the bigger picture and understand how their role impacts the business. This understanding of how each individual is delivering to the success

of the business is transformational in terms of the level of commitment and loyalty associates will have for driving improvement.

### **3.4. Metrics**

Metrics are as important to an organization as its Strategic plan. Many people say that without a Strategic plan and initiative a company has no chance of long-term success. Leadership teams spend days and sometimes weeks hammering out the strategies that will carry them through the year and also the next five years. While all this time is being spent creating strategies and plans to execute these strategies some companies forget to put the same diligence and effort in selecting metrics. “Not only must the right metrics be selected but the frequency of measurement is also a critical piece of metrics implementation.” (Blackburn, 2007) There are three frequencies that a metric should be measured upon and a few examples of each:

1. Daily – Quality yield, On-time delivery, Productivity, Sales
2. Monthly – Inventory dollars/turns, Budget
3. Quarterly – Headcount, Employee turnover

The examples vary by company, as some companies may be able to decrease the frequency of a metric if it is not a serious business issue. Generally, any business issue that needs extreme focus becomes either a daily or monthly measurement. Issues that are in control or require data over time are measured quarterly. “Daily management” is a powerful Lean tool that hinges on strong metrics. The concept of Daily Management is that leadership and implementation teams review a specific metric on a daily basis and address any reasons for missing goal on a daily basis. What this does is provide real-time feedback to a problem rather than when it’s too late to really understand what the issue or root-cause was for not meeting goal. In my experience I have witnessed the power of Daily Management firsthand. My team was able to address a major productivity issue in an Aftermarket repair cell just by creating an hourly measure of productivity, addressing issues as they arose, and empowering employees to make decisions. Within 3 months, the same teams had increased its productivity 250%!

Many years ago, Michael Hammer published an article in the Sloan Management Review titled “The 7 deadly sins of Performance Measurement and how to avoid them.” In this article he discusses how managers and leaders feel unfulfilled by their current metrics yet for some reason do not have the power to put better metrics in place. In addition he states, operational metrics commonly used by companies have little or no basis in rationality or reality.” (Hammer, 2007) The 7 deadly sins as stated in this article are shown below:

1. ***Vanity***: using measures that will inevitably make the organization and its managers look good.
2. ***Provincialism***: the sin of letting organizational boundaries and concerns dictate performance metrics.
3. ***Narcissism***: the unpardonable offense of measuring from one’s own point of view, rather than from the customer’s perspective.
4. ***Laziness***: assuming one knows what is important to measure without giving it adequate thought or effort.
5. ***Pettiness***: measuring only a small component of what matters.
6. ***Inanity***: implementing a metric without giving any thought to the consequences of these metrics on human behavior and ultimately on enterprise performance.
7. ***Frivolity***: the sin of not being serious about measurement in the first place. A sin of character and corporate culture.” (Hammer, 2007)

Many companies have metrics that are simply not robust enough or that may measure areas of performance that can make managers look good. In the Harvard Business Review article, “Coming up short on non-financial performance measurement”, the authors state that “we conducted field research in more than 60 manufacturing and service companies and supplemented it with survey responses from 297 senior executives. To our surprise we discovered that most companies have made little attempt to identify areas of nonfinancial performance that might advance their chosen strategy.” (Ittner and Larker, 2003)

One of the biggest issues that companies make when creating metrics is that they “do not link measures to strategy.” (Ittner and Larker, 2003) Many companies attack this issue through some type of performance measurement system or a “balanced scorecard.” A balanced scorecard “won’t help identify which performance areas and which drivers make the greatest contribution to the company’s financial outcomes.” (Ittner and Larker, 2003) The SPO team is using a balanced scorecard and from speaking to individuals across the organization there is mixed reviews. It is for this very reason that I felt the team needed to make some changes to the current metrics and the system used to measure these metrics and drive accountability.

## **4. Office 5S and Virtual Implementation**

### **4.1. Problem Statement**

The business need for virtual Lean trainings had come to existence as SPO found itself in tough business climate where costs had to be minimized. SPO began its Lean journey in July 2007 and has had some success since that time. However, with budget constraints and travel restrictions it was going to be increasingly difficult to continue to drive Lean culture and drive the necessary business results that are needed to gain buy-in from senior leadership. With limited Lean experts at each facility it would be necessary to somehow deliver Lean trainings and execute Kaizen events without having associates travel from site to site. The goal of this virtual training was to show that a Lean expert could deliver the training virtually to a Lean practitioner at a site and then have that Lean practitioner facilitate a Kaizen event to his/her on-site team. Traditionally, Lean training involves someone at your site who is an expert in a specific Lean tool trains multiple people on site directly prior to participation in an event. We were challenged with finding a new way to do things considering the business climate and our restrictions. "Office 5S" is a natural fit for this initiative as it is a building block upon the Lean journey and also because it is one of the more simple Lean trainings to deliver and Kaizen event to execute upon.

### **4.2. Project Objectives**

The objectives of the Office 5S initiative were two-fold. First and foremost, the SPO organization wanted a cost-effective way to help drive Lean culture. Secondly, the opportunity for productivity and efficiency improvement in the office environment had to be explored as many fabrication facilities in Initech had demonstrated the power of 5S in a plant-floor environment. Virtual implementation of Lean is a new and thought provoking field. Can Lean be implemented virtually through tools such as Microsoft Live Meeting or WebEx? The Office 5S initiative is the starting point to proving if this is feasible. If successful, this could be a breakthrough change in the execution of a Kaizen event.

### **4.3. Approach**

The approach used in the Office 5S initiative was very similar to a 5S initiative on the plant floor. First and foremost, we wanted to understand all the opportunities for productivity improvement in the Office environment. After speaking to many colleagues we found that the Inbox, virtual desktop, and physical office area were the top locations for potential improvement. The core of the issues focused in two areas: an associate's physical workspace and the virtual workspace. The issues we found in the physical workspace included unorganized workspaces, cluttered desktops, excess supplies, and unorganized files. Some of the issues we found in the virtual workspace were cluttered inboxes, a lack of organization with folders, and cluttered virtual desktops.

Our goal was to design an easy to use training that could be delivered virtually that would impact productivity in the both the virtual and physical office environment. The training had to be around 1-2 hours and the implementation phase had to take no longer than 6 hours. The goal for the event was that within 1 day an individual would be able to dramatically improve their office workspace and see an immediate increase in productivity and efficiency. We knew that in order to gain buy-in to deliver this training across the organization that it would have to be simple, easy to deliver, and not a major time constraint for associates.

We tried to utilize the 7 deadly wastes as defined by Fabrizio and Tapping to help provide us focus areas for the Office 5S initiative. The 7 wastes are shown below:

1. "Correction and rework
2. Waiting
3. Unnecessary Motion
4. Over processing
5. Equipment downtime
6. Inventory and Storage
7. Inspection" (Fabrizio and Tapping, 2006)

The first area the Office 5S training focuses on is the physical workspace. The physical workspaces suffered from similar issues including excess supplies, insufficient supplies, cluttered work areas, and disorganized filing systems. We also found that many associates did not have their go to items at a point of use. In a plant floor 5S initiative it is imperative that production workers have their tools at point of use so that they never have to leave their production area to find what they need to do their job. The theory behind this is simple; every time an associate leaves his/her work area time has to be spent looking for a tool and walking back and forth. This is a huge productivity waste and if it occurs multiple times in a day this can be lead to serious production deficiencies.

The second area of focus is the Virtual workspace. From observing associates it became clear the top issues were cluttered inboxes, disorganized virtual workspaces, and excess time spent on emails and finding files. Most virtual workspaces lacked visual triggers and a system to help create an organized workspace. The training had to focus on visual triggers and simplifying the workspaces. An example of using visual triggers to help drive efficiency improvements is shown below in Figures 14 and 15:

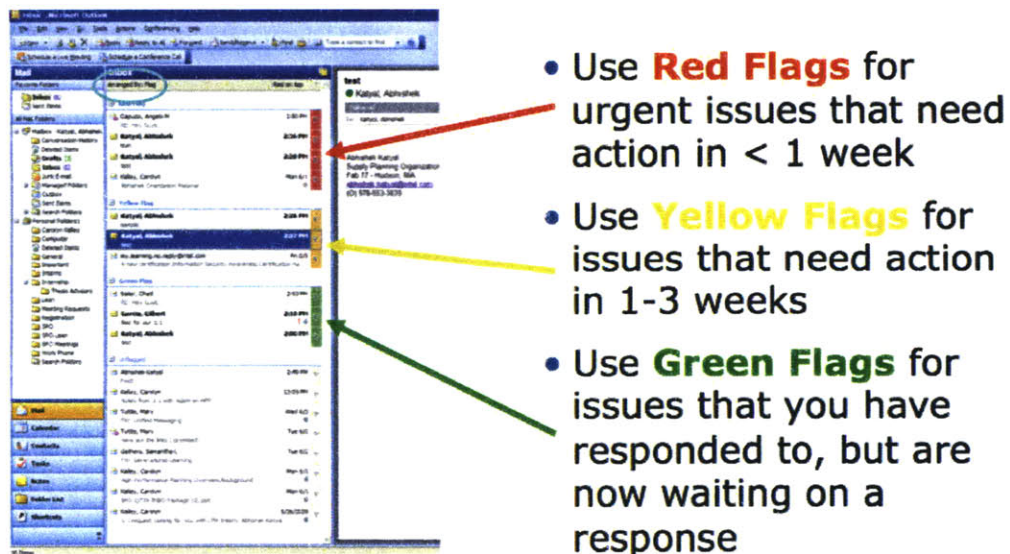


Figure 14: Outlook Inbox with colored flags

CIT DCS Test (NIH/CIT) - Inbox						
From	Subject	Sent	Received	Size	Categ...	
Date: Today						
Culbreth, Justin (NIH/CIT) [C]	TEST #2	Mon 11/19/2007 11:56 AM	Mon 11/19/2007 1...	4 KB		
Culbreth, Justin (NIH/CIT) [C]	TEST	Mon 11/19/2007 11:55 AM	Mon 11/19/2007 1...	4 KB		
Gonchar, Jesse (NIH/CIT) [C]	Testing again	Mon 11/19/2007 11:45 AM	Mon 11/19/2007 1...	3 KB		
Gonchar, Jesse (NIH/CIT) [C]	Testing	Mon 11/19/2007 11:44 AM	Mon 11/19/2007 1...	3 KB		
Date: Last Month						
Wilkerson, Jeff (NIH/CIT) [C]	test 3	Fri 10/19/2007 2:19 PM	Fri 10/19/2007 2:...	5 KB		
Wilkerson, Jeff (NIH/CIT) [C]	Test 2	Fri 10/19/2007 2:16 PM	Fri 10/19/2007 2:...	5 KB		
Wilkerson, Jeff (NIH/CIT) [C]	Test	Fri 10/19/2007 2:04 PM	Fri 10/19/2007 2:...	3 KB		
Gonchar, Jesse (NIH/CIT) [C]	Test Message	Fri 10/19/2007 1:55 PM	Fri 10/19/2007 1:...	6 KB		
Fabrikant, Judy (NIH/CIT) [E]	Re: Testing	Tue 10/16/2007 2:03 PM	Tue 10/16/2007 2...	9 KB		
Gonchar, Jesse (NIH/CIT) [C]	Testing	Tue 10/16/2007 1:13 PM	Tue 10/16/2007 1...	8 KB		

Figure 15: Color-coded emails by sender

In addition, the virtual desktop of many individuals was cluttered with hundreds of icons making it extremely inefficient to find a shortcut or saved file. An example of a tool to help drive efficiency in the virtual desktop environment is shown below in Figure 16:

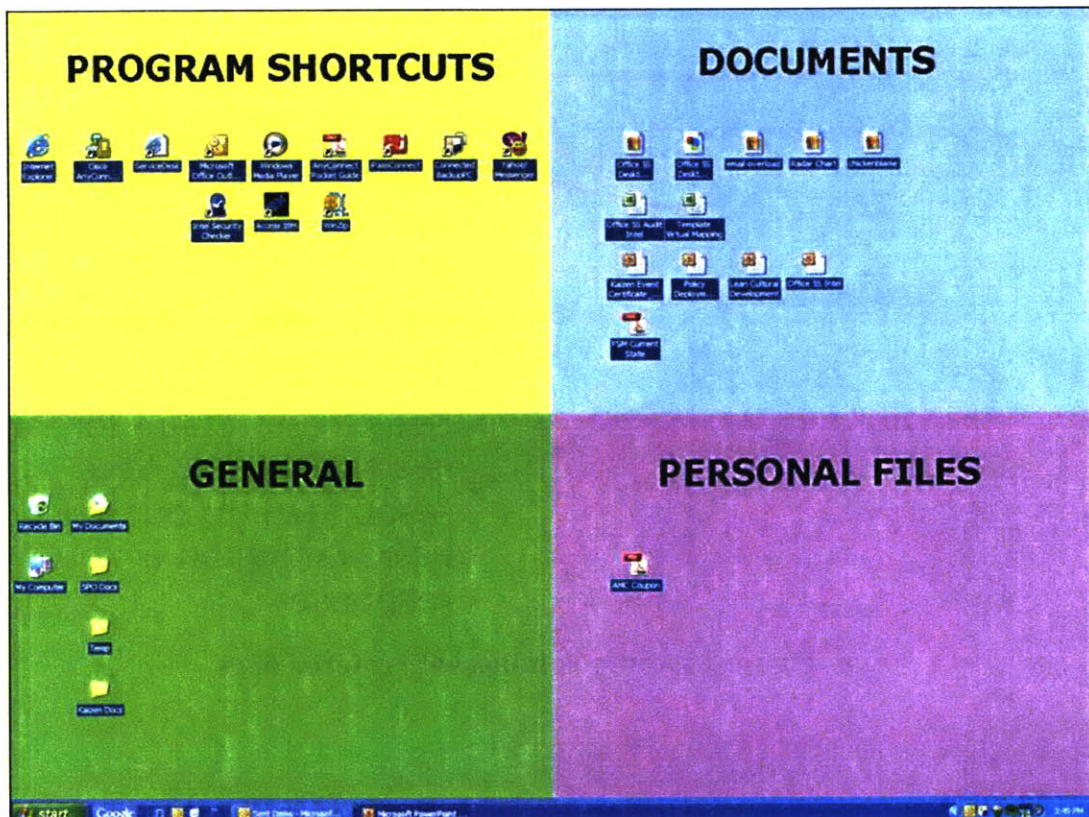


Figure 16: Lean Virtual Desktop



In order to help with stabilizing and sustainability we created a sustainability checklist and an audit sheet that would be used during the first 3 months to help ensure that this was not just a housekeeping effort. The sustainability checklist that is shown below in Figure 17 is used to help remind associates of the key process changes they need to adhere to after the event. It is very easy for an associate to revert back to bad habits after the Kaizen event and it is for this very reason that “Stabilize” is such a crucial piece to the 5S implementation process.

Name:																																
Month: October																																
Day of month:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Daily Tasks: ✓																																
Review WIP and store appropriately																																
Office tools present and in correct location																																
Update OUTLOOK Calendar																																
Dispose of unnecessary paperwork/items																																
Review in-box and prioritize accordingly																																
Weekly Tasks: ✓																																
Clean virtual desktop																																
Move documents to file folders																																
Purge e-mail in-box																																
Monthly Tasks: ✓																																
Scrub work area																																
5S Sustainment Audit																																

**Figure 17: Stabilization Checklist**

In addition to the associate stabilizing, it is important for the Kaizen event leader to audit each individual’s physical and virtual workspace to ensure that associates have not reverted back to bad habits and old processes. The auditing process should occur every two weeks for the first 2 months and then can be done on a monthly basis. At Initech, we tried to create a contest out of sustainment and for associates that were interested we posted the 5S logo outside of each individuals cube. As associates progressed along the 5S journey each “S” was colored in to show where they were in this process. This helped drive a friendly competitive environment to reaching “5S” and sustaining the results of the event. The 5S logo is shown below in Figure 18:

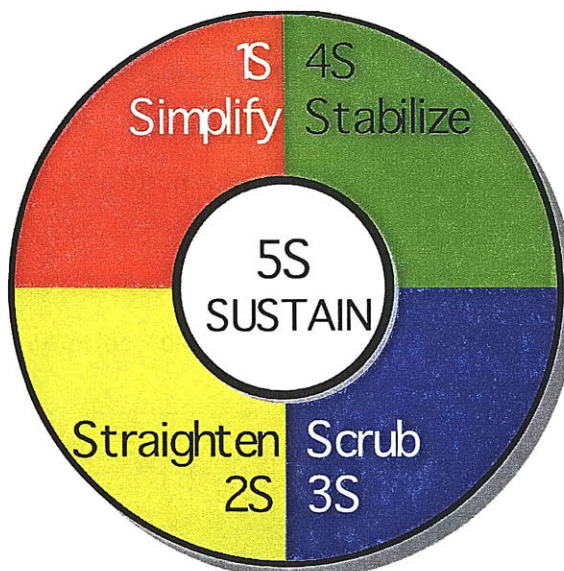


Figure 18: Office 5S Logo

The audit check sheet that was used as a way to drive sustainability is shown below in Figure 19:

Office 5S AUDIT CHECKLIST							
Date:	Area:				Auditor:		
Responsible Associate(s):		Answer YES or NO circle answer		Area or Manager Approval:			
"S"	CHECK ITEM	YES (4 or 5 pts)	NO (0 pts)	COMMENTS	WHO	WHEN	COMP
<b>1S Simplify - Clearly distinguishing between what is needed and what is not. Pertains to job assignments and supplier orders as well.</b>							
SIMPLIFY	1. Do work centers only have needed materials and items?	5	0				
SIMPLIFY	2. Are only utilized office equipment, furniture and work centers present?	5	0				
SIMPLIFY	3. Are reference materials minimized and neat?	4	0				
SIMPLIFY	4. Are personal items of professional nature & neat?	4	0				
<b>2S Straighten - Standardizing the way necessary things are kept, making it easy for anyone to find and use them.</b>							
STRAIGHTEN	5. Is the equipment and work center organized in an ergonomic fashion?	5	0				
STRAIGHTEN	6. Are office supplies identified and clearly labeled?	5	0				
STRAIGHTEN	7. Are office supplies arranged so they are easy to use and return?	5	0				
STRAIGHTEN	8. Are storage areas clearly organized and identified?	5	0				
STRAIGHTEN	9. Do documents have specified storage locations (filing cabinets, in/out trays)?	5	0				
<b>3S Scrub - Sweeping floors and wiping off equipment, finding ways to prevent dirt and debris from accumulating in the work area.</b>							
SCRUB	10. Are floors free of papers and office supply scraps?	5	0				
SCRUB	11. Are windows, shelves, desk tops and equipment free of dust?	5	0				
SCRUB	12. Is the equipment and work center organized in an ergonomic	4	0				
SCRUB	13. Are aisles free of obstructions?	5	0				
SCRUB	14. Are cleaning supplies easily accessible and stored in a visible area?	4	0				
<b>4S Stabilize - First 3S's are being maintained. This is a state achieved when cleanliness is performed consistently over time.</b>							
STABILIZE	15. Is 5S checklist present?	4	0				
STABILIZE	16. Are office and equipment on a regular cleaning schedule?	5	0				
STABILIZE	17. Is last audit sheet visible?	5	0				
STABILIZE	18. Are waste and recyclable material receptacles emptied regularly?	5	0				
<b>5S Sustain - Making a steady habit of adopting the discipline of properly maintaining correct 5S procedures.</b>							
SUSTAIN	19. Has/have area associate(s) completed 5s training?	5	0				
SUSTAIN	20. Does office give the impression of cleanliness at first sight?	5	0				
SUSTAIN	21. Associate(s) does/do exhibit ownership of 5s?	5	0				
TOTAL SCORE (100 POSSIBLE POINTS) (Total your circled numbers)							
		SCORE:	1s	2s	3s	4s	5s
			20-39 pts	40-59 pts	60-87 pts	88-95 pts	96-100 pts

Figure 19: Office 5S Audit Checklist

The audit checklist asks pointed questions around each of the 5S steps and then attributes a score based on whether the associate is in compliance. After completing

the checklist each associates points are summed and a rating is giving from 1S-5S. This check list now part of monthly walk around review that is completed by a portion of the Supply Planning team.

#### 4.4. Project Timeline

The Office 5S research study was a supplementary project to the enterprise transformation and therefore started a few months after the current state-mapping portion of the project. August was used to meet with stakeholders and create the Office 5S training. In September, the training was delivered to a pilot group of 8 participants. Feedback from this pilot group was incorporated into the training and then redelivered to a different group of individuals in October. In November, a participant of the pilot event delivered the Office 5S training to the planning department. In December, the training was delivered virtually to a group of 50 individuals with the intention that this group would then implement the tool at their respective site. The Office 5S project timeline is shown below in Figure 20:

- **August** – Create virtual Office 5S training
- **September** – Office 5S training and implementation with initial pilot group
- **October**– Office 5S training and implementation with second test group
- **November** - Office 5S training and implementation delivered to planning group by 5S trainee
- **December (Internship END)** – Office 5S training delivered virtually to SPO organization
- **Q1/Q2 2010** – Office 5S initiative across SPO

**Figure 20: Office 5S Project Timeline**

The strength to any Lean training is when the creator is willing to deliver the training to multiple groups and then continue to update the training based on feedback. Overall, the Office 5S training was delivered 4 times and feedback was incorporated after each training delivery.

#### 4.5. Challenges

The major challenge of the Office 5S initiative was gaining buy-in and convincing individuals across the organization that this was a valuable investment in time. An additional challenge that we did not anticipate was that many Lean leaders within the Supply Planning Organization had input and suggestions on how they felt a

virtual training had to be structured and delivered. It was challenging initially to incorporate everyone's input and still deliver a training that we felt would be both a minimal resource investment and low-cost through virtual delivery.

The issue of gaining buy-in we attacked in the same manner as if this were a plant floor initiative. We wanted to select an initial pilot group of forward thinking change agents and let them test the tool. If there was positive response we knew that the word of mouth would generate a buzz across the organization. It is critical that the sales pitch for Lean and Kaizen come from participants rather than "Lean Leaders". We have found that buy-in and trust are developed through the results and positive experiences event participants receive when completing a Kaizen event. Lean culture is rarely adopted from leaders preaching about the successes of Toyota and Alcoa; the power of a cultural transformation has to be from the word of mouth of associates. As in most marketing initiatives, there is nothing stronger than positive feedback and word of mouth.

After running the initial event with the hand chosen pilot group we got great feedback on the training and tool and this feedback quickly spread to many others in the office staff. We were surprised to find that over the next 2-3 weeks colleagues approached us to inquire about the next Office 5S training and to make sure that they were included in this event. This was exciting to see and once again proved the point that word of mouth with Kaizen is exponentially stronger than any Lean training or case study given by a Lean leader. While educating associates is important, at the end of the day it comes down to creating a positive experience for associates that translates into business results and a positive working environment.

#### **4.6. Results**

The results of the Office 5S initiative were much better than expected and also quite surprising! The response from the multiple Office 5S events included increased productivity and efficiency, less time searching for documents and office supplies, and also less time spent managing emails. A few of the Office 5S testimonials are shown below:

*"This is the best training that I have had at Initech!"*

*"I feel like I lost 20 pounds"*

*"An amazing transformation for just 1 day of my time!"*

*"Every associate at Initech should be required to have this training"*

*"I look forward to coming into my workspace, and I can think clearer now"*

*"I got my inbox down from over 400 emails to 50 emails! I am responding quicker and spending less time on daily emails"*

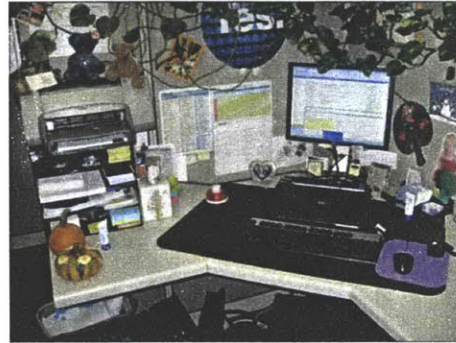
*"My time spent on emails each day reduced from 90 minutes to 30 minutes!"*

Shown below in Figures 21 and 22 are before and after pictures of the physical workspace of many individuals at Initech that completed this training:

**BEFORE**

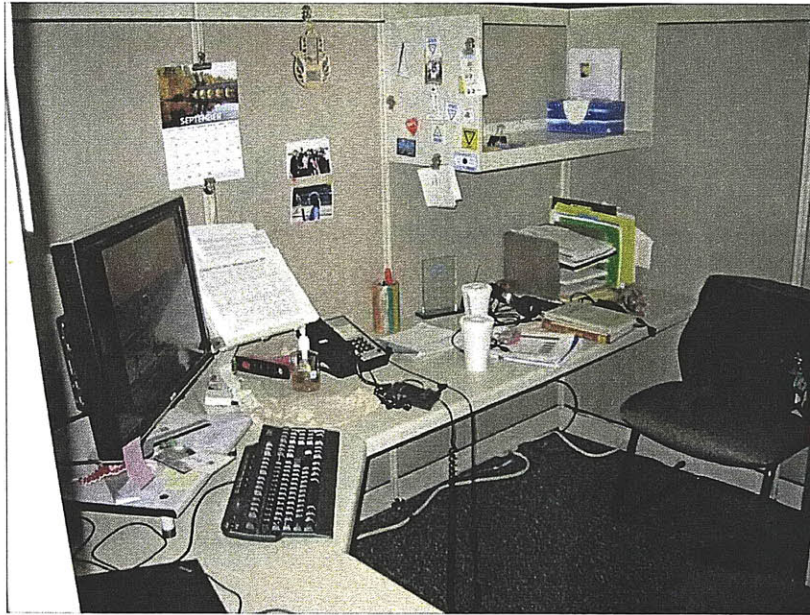


**AFTER**

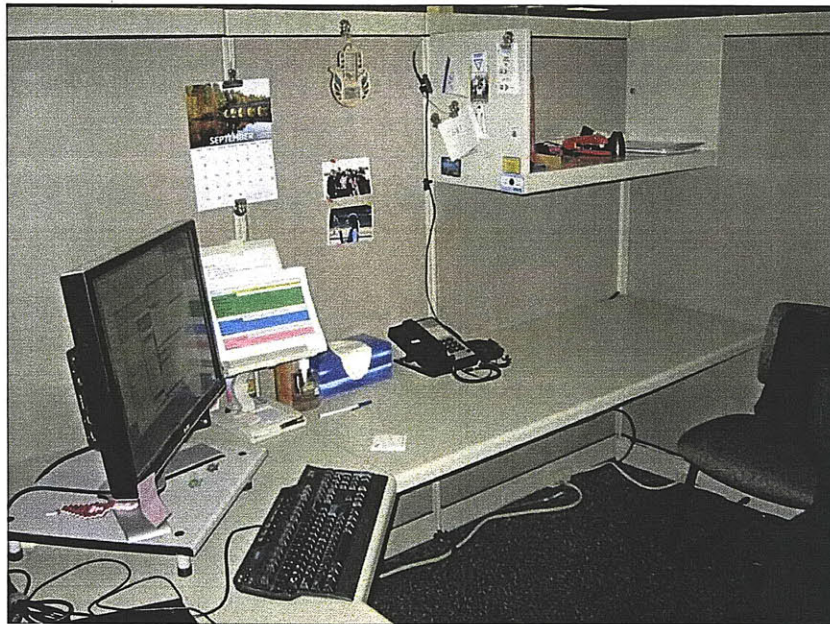


**Figure 21: Before and after pictures Office 5S**

### BEFORE



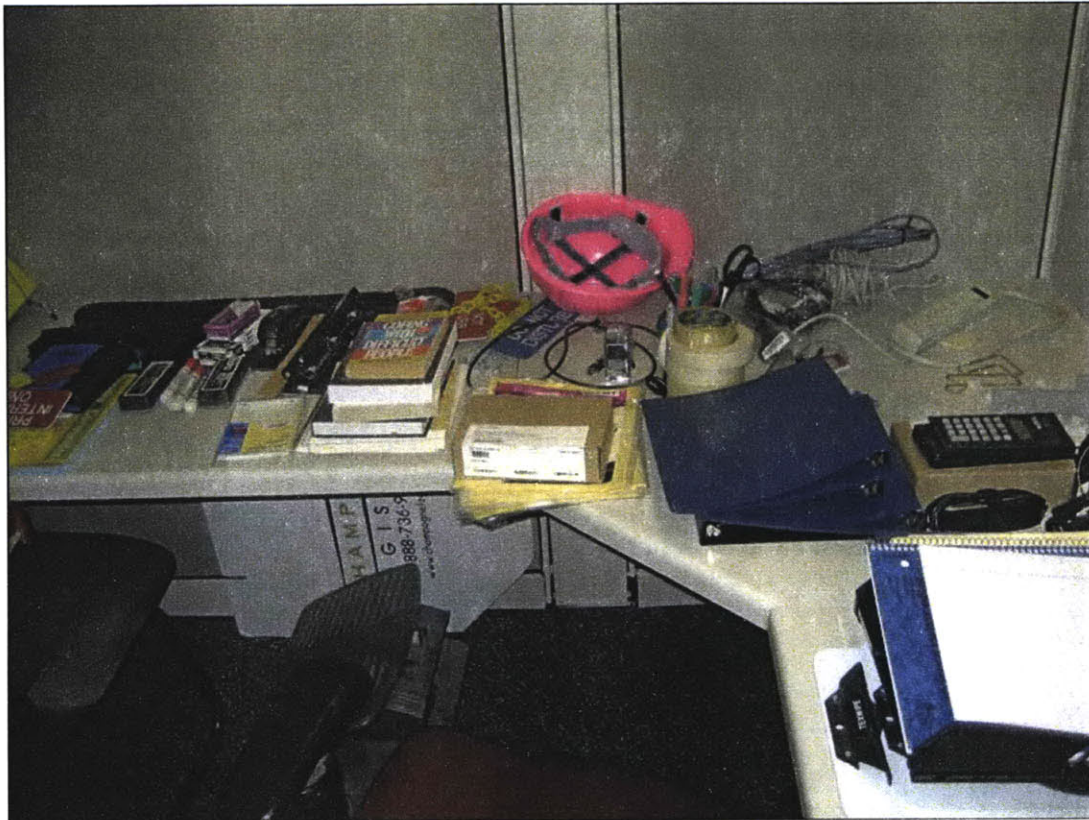
### AFTER



**Figure 22: Before and after pictures Office 5S Workspace**

It is clear from Figures 21 and 22 that the impact of the Office 5S initiative was real and physically visible. Similar to plant floor 5S events, before-after pictures help illustrate the work that was displayed during a Kaizen event. In addition, associates can look back on these pictures as a reminder of their success. Figure 23 below shows over 50 excess office supplies that were removed from 8 cubicles. These

office supplies can now be used by those that need it rather than having to purchase these supplies.



**Figure 23: Excess office supplies from 5S initiative**

#### **4.7. Chapter Summary**

The Office 5S initiative provided a great deal of learning on gaining buy-in and driving Lean culture. It also helped substantiate the fact that Kaizen can be conducted virtually and does not have to be an expensive initiative or major resource constraint. This virtual training initiative can open the door for many new Lean trainings that can be delivered virtually. SPO can also continue to drive Lean culture regardless of budget and travel constraints. The team also learned that similar to traditional plant-floor Kaizen events, non-traditional Kaizen events require event participation, positive experiences, and results for sustained buy-in. Training will only take an organization so far, at some point the rubber has to meet the road and major business issues have to be attacked using Lean tools. The office 5S initiative was a way to get the SPO organization's

feet wet with Lean tools and a precursor to the much bigger mapping initiative that was going on in the organization.



## **5. Current State Mapping SPO Organization**

### **5.1. Project Objective**

The focus of the internship is around creating a more efficient Supply Planning Organization through rigorous analysis of existing configurations and opportunities for process improvement and waste elimination. A focus on interactions and how information is transferred between major divisions is critical to the success of this project. A specific lens must be taken to understand how these groups can communicate more effectively and efficiently. From a research perspective the purpose of the project is to prove or disprove the hypothesis that, *“Lean tools can be as effective in non-traditional environments where information is the product as they are in traditional plant floor environments”*. Another research area of the project is to show that Lean tools cannot be applied in a cookie cutter fashion in an organization. To elaborate, a company can't simply take a Lean training off the web and then expect that it will have a similar result as it did for another company. For example, companies in the auto industry could not figure out why they did not achieve the same results as Toyota when using the same process improvement tools. This project will help elaborate on this phenomenon.

The current state analysis is focused on identifying non-value added activity and identifying opportunities for improvement through simplified connections and streamlined processes. This process must also drive improvement and help eliminate the current silo's that exist within the divisions. A final actionable improvement plan that will help SPO close the gap between the current state of the organization and the target future state is critical to meeting the objective and needs of the organization. This action plan and the learning's that come from this research study will ideally be rolled out to other organizations within Initech and SPO that face similar problems. The improvement activity and process used will help embed Lean culture and also positively impact the customer through a more efficient and reliable supply availability. The internship should also impact cycle time, productivity, Lean, and other business process metrics that are critical to the organization.

## 5.2. Project Timeline

The project was divided into intervals. The first 3-4 months were centered on capturing current state processes and data across the core divisions of the organization. The next two weeks focused on Kaizen prep and Kaizen event facilitation. The remaining 6 weeks of the research study were centered on gaining buy-in and beginning implementation of the actions that came from the current state mapping and the Kaizen event. A detailed project timeline is shown below in Figure 24:

- **June/July** – Complete virtual mapping of FSM Planning at Fab X
- **August** – Travel to Costa Rica complete virtual and F2F mapping of ATM
- **September** – Travel to Folsom, complete virtual and F2F mapping of DIV.  
Consolidate current state data
- **September** – Travel to New Mexico or AZ to ensure incorporation of new system architecture and tool suites
- **October**– 1st face to face with 1-2 reps per group to finalize current state and create future state/action plan (**Value Stream Mapping Kaizen**)
- **December (Internship END)** – Finalize future state and action plan, deliver to SPO leadership team
- **Q1/Q2 2010** – Implementation of action plan within SPO

**Figure 24: Project Timeline**

## 5.3. Project Approach/Process

The non-traditional format looked at in this research study is on the globally dispersed Supply Planning Organization, where information is the product. Information in this organization includes customer demand, marketing forecast, and all the communication from individuals in the supply chain that is intended to create a plan for where and when product should be built so that the customer can receive the final product in the timeliest fashion. Traditional Lean implementation has generally been completed in a plant floor environment where a physical product was being manufactured. This originated with Toyota and the Toyota Production System, which focused on production floor

improvement. The “traditional environment” also usually had clear metrics such as on-time delivery, line yield, quality defects, and inventory turns that could be measured to determine the success of a Kaizen event or Lean implementation initiative. As discussed, selecting metrics in a non-traditional environment or service organization is much more difficult.

Upon thoroughly understanding the scope and objective of the project I began contemplating what approach I would use to capture the current state of the organization, while also capturing how different roles throughout the organization interacted. With such a large organization and project scope it was critical that the process used was stringent enough to capture the appropriate data but also flexible enough to adapt to the diverse teams, processes, and divisions that I would be interacting with. I also had to be cognizant of capturing the right data, as the overabundance of information could add unneeded complexity to the analysis.

Initially, I began by interviewing individuals and then capturing the information in a traditional note format. I found that the volume of information I captured and the number of individuals I met with would lead me down the path of not being able to consolidate my notes into a format that would be usable later on in my internship. Written descriptions of processes and job responsibilities are great pieces of information to have. However, if the information can't be communicated effectively to others, especially leadership, then it loses its value. It was clear that the information had to be visual and had to be in a form that someone with no familiarity with the process could quickly understand the flow.

At the start of my internship I began reading Jeffrey Liker's book “The Toyota Way.” (Liker, 2004) In this book, Liker describes 14 management principles that drove the culture behind the Toyota Production System. Shown below are the 14 management principles as depicted by Liker:

**“Principle 1:** Base your management decision on a long-term philosophy, even at the expense of short-term financial goals

**Principle 2:** Create continuous process flow to bring problems to the surface

**Principle 3:** Use "pull" systems to avoid overproduction

**Principle 4:** Level out the workload

**Principle 5:** Build a culture of stopping to fix problems, to get quality right the first time.

**Principle 6:** Standards task are the foundation for continuous improvement and employee empowerment

**Principle 7:** Use visual control so no problems are hidden

**Principle 8:** Use only reliable, thoroughly tested technology that serves your people and processes

**Principle 9:** Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others.

**Principle 10:** Develop exceptional people and teams who follow your company's philosophy

**Principle 11:** Respect your extended network of partners and suppliers y challenging them and helping them improve.

**Principle 12:** Go and see for yourself to thoroughly understand the situation

**Principle 13:** Make decision slowly by consensus, thoroughly considering all the options implement decisions rapidly

**Principle 14:** Become a learning organization through relentless reflection and continuous improvement" (Liker, 2004)

The core purpose of my internship was to identify opportunities for improvement that would yield tangible results for SPO. An implied objective of my work was to continue to drive a Lean cultural change and provide a positive example of how powerful Lean tools can be when used correctly. I used Liker's 14 management principles to help guide my thinking at the beginning of my internship. A few of the principles were core to the philosophy I embraced as I traveled from division to division within SPO.

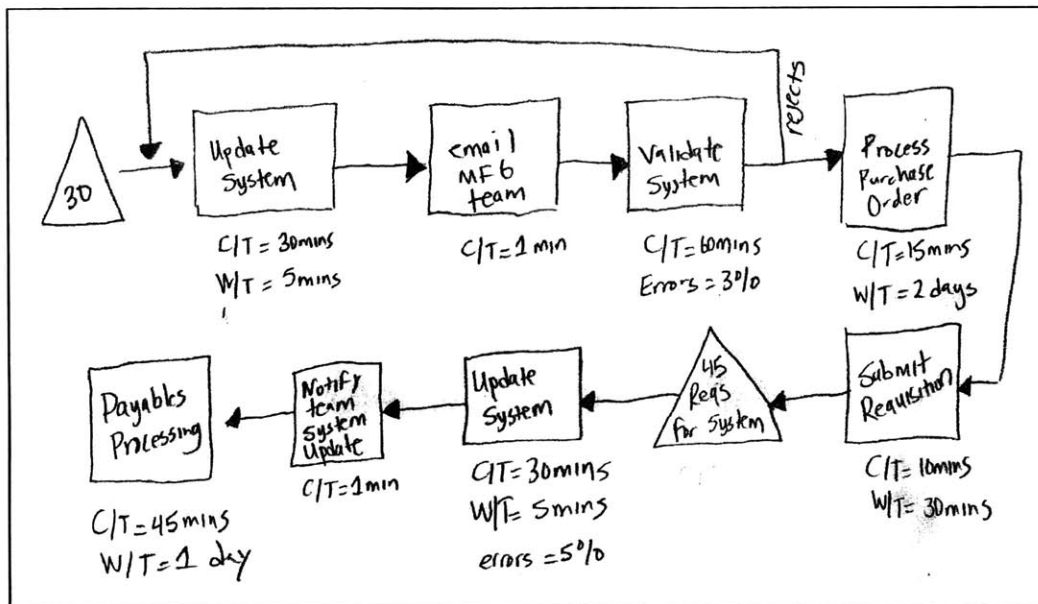
Principle 1 focuses on long-term philosophy; it was imperative for me that the divisions within SPO start to behave this way. The divisions had to start thinking about the bigger picture and the results of the customer and SPO organization must be prioritized over local results. Principle 2, which focused on continuous uninterrupted process flow, was core to my project. This principle focused on

creating a process where work is uninterrupted and any non-value add activity or wait-time had to be eliminated. Principle 4, which focused on leveling out workload, was a core philosophy behind my role-merging initiative. In order to merge roles across the organization workload and responsibilities had to be divided evenly. Principle 5, which focused on addressing quality problems with root-cause actions, was key to eliminating many of the bad habits developed across the organization. Individuals that ran into quality issues would normally go into a fire fighting process to make sure the customer was not impacted. The issue would fly under the radar once the fire was put out, however no action would be taken to completely eliminate the issue from recurring. This type of behavior was core to what I wanted to eliminate from the future state of the organization.

Principle 12, which I refer to as the “Gemba” principle, basically states that in order to understand a process you have to go and see that process. Throughout my process mapping I made sure that I spent a significant portion of my time seeing people do the work and witnessing it myself in order to draw conclusions. For many complex issues or processes the issue and the problems behind that issue cannot be understood or addressed without seeing it real time. Principles 13 and 14 were core to the culture I was trying to create when getting individual input from people across the organization and when creating the future state with an action plan to get there. It was extremely important that every voice was heard and that people felt they were being listened to with the creation of the future state of the organization. In addition, it was critical that the actions and experiments that were created were quick and easy to implement. These guiding principles helped pave the road for the process I used over the course of my internship.

I began by using a traditional form of Value Stream mapping that you can find virtually anywhere on the Internet. This basic form of Value Stream Mapping involved using simple rectangles to depict process steps and triangles to depict inventory. The basic Value Stream Mapping was a step forward from the traditional interview and note taking process that I found to be inefficient and limited in its practicality. I captured cycle-time, wait-time, and errors in the

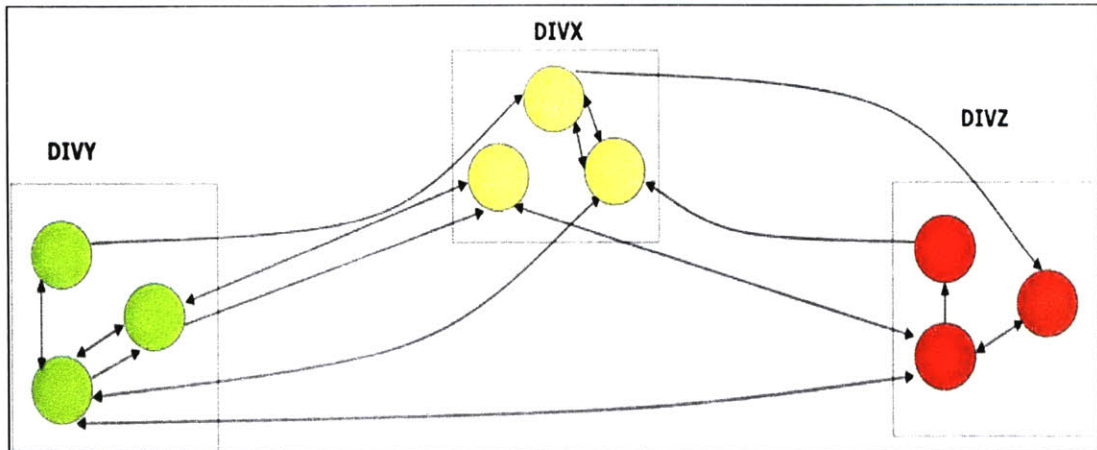
process. An example of this value stream mapping technique is shown below in Figure 25:



**Figure 25: Value Stream Mapping Example**

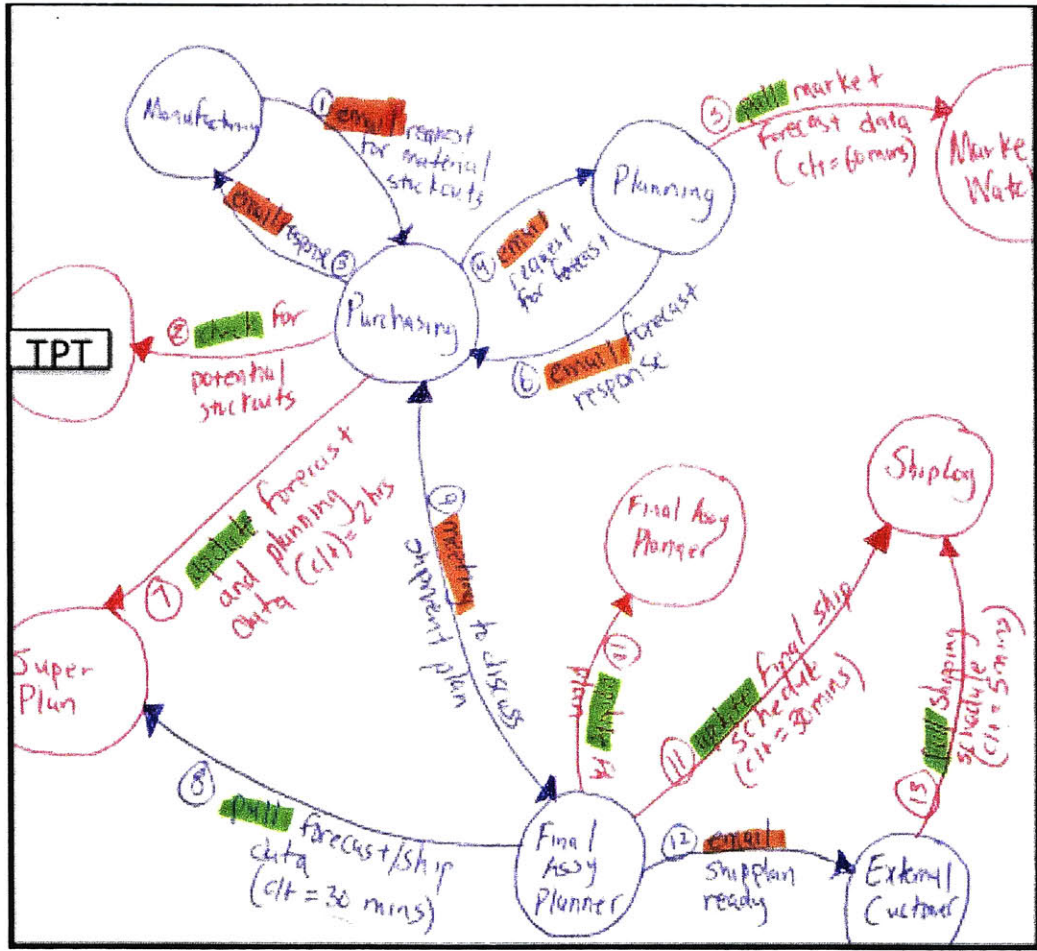
The Value Stream mapping example in Figure 25 captures two key pieces of data, C/T = cycle time and W/T = wait time. Upon analysis of this process I quickly realized that there were issues with this approach. First and foremost, my method was not capturing the extensive communication and connections between the different roles in the Supply Planning Organization. Secondly, this approach would take entirely too much time to map an organization this large and a scope this broad considering my project timeline. I concluded that I needed to adapt my Lean tool for my process and for the end result I was trying to achieve. This was a major revelation in my internship that will also be discussed later in more detail.

I decided to experiment with a form of value stream mapping called “solar mapping” that I had picked up from my colleagues at Initech. An example of solar mapping is shown below in Figure 26:



**Figure 26: Solar Mapping Block Diagram**

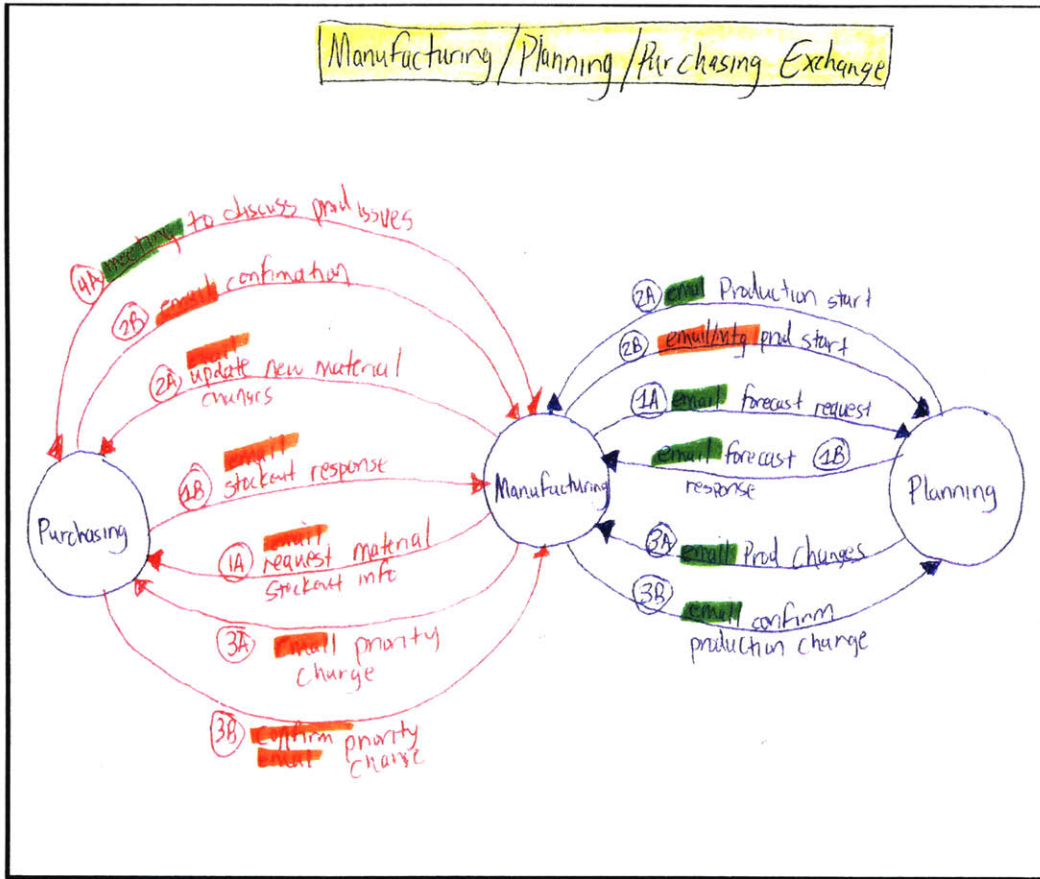
After experimenting with the Solar Mapping process it became quite clear to me that I would use this approach to capture connections and how information was exchanged across organizations. In combination with solar mapping I would use an adapted form of Value Stream mapping to capture the core processes across the organization and also how loaded each role was. The solar mapping processes allowed me to not only capture critical process steps and the cycle/wait times associated with them but also the numerous connections between different roles and divisions within the organization. I also found that this form of value stream mapping was efficient and would allow me to map a large organization in the time constraints of my research study. Solar mapping is a technique that was new to me however I found that it was quick and easy, yet also visual and easy to understand. An example of my solar mapping example is shown below in Figure 27:



**Figure 27: Solar Mapping Process Example**

The solar mapping example in Figure 27 contains a great deal of information that is easy to understand visually. Each circle in blue represents a role or individual in the organization, whereas the circles in red represent IT systems that are used to complete tasks. Each connection arrow shows when information is sent either through phone, meeting, IM, or email and also when a process step is completed. The process steps also show the time of completion and the length to complete a certain task. It is clear from Figure 27 that the information captured is in line with the scope of the project and the objectives set forth by the Supply Planning Organization.



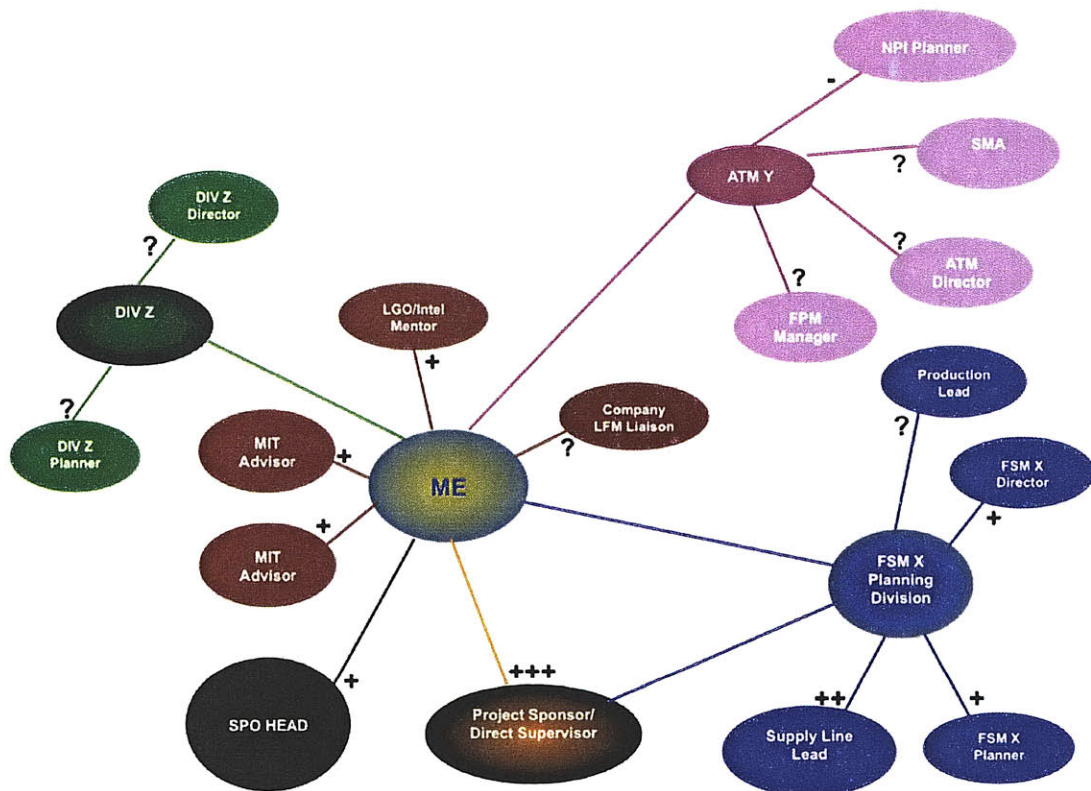


**Figure 28: Solar Mapping High Level Example**

Figure 28 shows the solar mapping at a much higher level than what is shown in the process solar mapping in Figure 27. The purpose of the high level solar mapping is to show the amount of connections that exist between different divisions within the Supply Planning Organization and also why those connections are being made. This information is extremely important when looking to eliminate or streamline processes. Mapping in this form also provides data that can be used when considering an ideal or future state and is a way to quantify information processes. Also this solar map clearly depicts which divisions within SPO communicate more frequently and the SPO leadership team can use this as a data point in restructuring the organization.

Upon completing much of the solar mapping across the organization I felt it was important to reflect on the buy-in of the stakeholders involved in my project. Prior to moving further with any of the team members I had to understand who still needed convincing and who were my biggest proponents for success. I

never felt that anyone within the organization wanted the project to fail, but felt that some individuals needed more convincing on the process, approach, and intended final result. This is a common roadblock that comes up when driving cultural change in any organization and I welcomed push back and concern. Successful Lean initiatives must not ignore problems, as problems are gems that allow for improvement. Shown below in Figure 29 is a stakeholder analysis I completed during this critical junction of my internship:



**Figure 29: Stakeholder Analysis**

The Stakeholder analysis shows the symbols “?, +, -, ++, and +++”. The “?” symbol refers to a stakeholder that is either not committed or has not communicated any involvement. The “-” symbol depicts a stakeholder that is pushing back on the project. The “+, ++, +++” symbols depict stakeholders that are supporting and helping make the project happen. The analysis clearly shows that while there were limited individuals that seemed to be pushing back on the project, there were many question marks in terms of support. I felt that this was more because of me needing to spend time with individuals that I simply had not had

the chance to engage with enough. The stakeholder analysis was a critical piece of my internship as it helped me capture my thoughts on paper and then focus my energy as needed.

Key Stakeholders	Block It	No Commitment	Let It Happen	Help It Happen	Make It Happen
1. Project Sponsor/ Direct Supervisor					X0
2. SPO Head				X0	
3. MIT Advisor				X0	
4. MIT Advisor				X0	
5. FSM X Director			X →	0	
6. ATM X Director			X →	0	
7. Divisional Lead		X →		0	
8. FAB Y Lead			X →		0
9. ATM Y Planner				X0	
10. DIV Z Planner			X →	0	

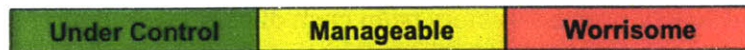


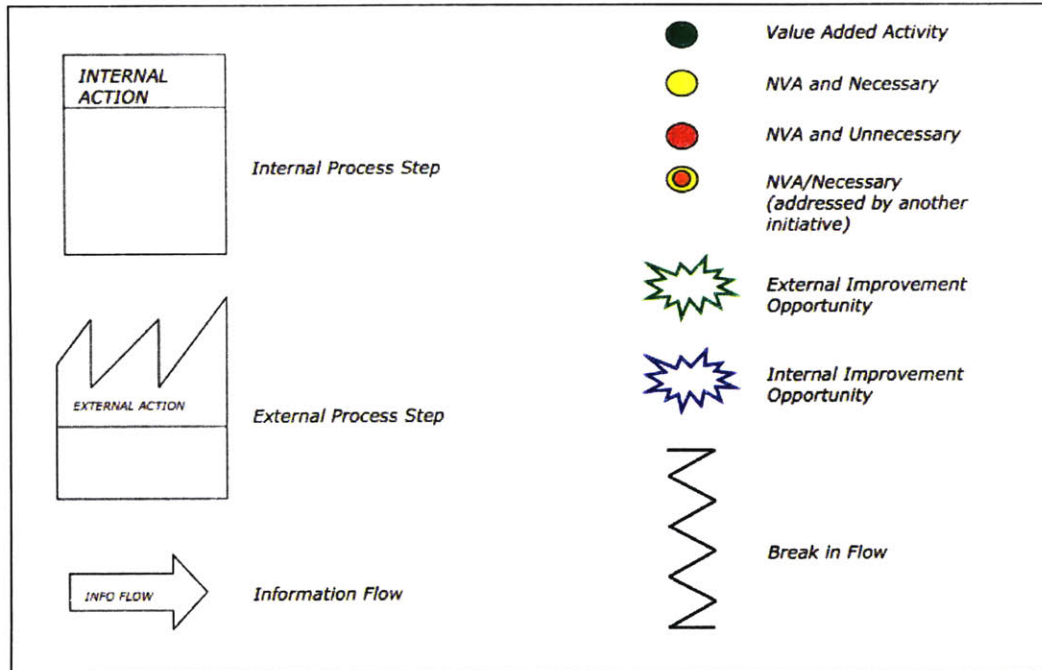
Figure 30: Commitment Chart

The commitment chart shown in Figure 30 above was the next step of analysis after completing the stakeholder analysis. Each “X” in the chart represents the current level of support from a stakeholder and each “O” represents where each stakeholder needs to be moved in terms of support. Commitment was determined based on the initial few months of the internship. The level of commitment that was determined is purely qualitative and for the purpose of this study did not need to be exact. It was important for us to understand what level of commitment we wanted from the different stakeholders of the project. For example, one individual may have no commitment, but it may not be necessary for that person to be committed to the project. This chart helped us focus our energy in the critical places that needed additional commitment or buy-in. The bulk of this initiative simply required time and focus in explaining the project and what we needed in terms of support from the specific stakeholders. We spent the majority of the time after this analysis engaging and meeting with the specific stakeholders that we felt needed to move on this chart.

When working in a large global organization on a cross-functional project there simply isn't enough hours in the day to meet with everyone and gain buy-in from everyone. This commitment chart created a priority that allowed us to focus our energy in the most efficient manner. We found that much of the movement needed on this analysis simply required our effort in reaching out to the various stakeholders.

The next stage of this research study was to conduct a Kaizen event using the extensive solar mapping as an input. The goal was to use the Lean tool Value Stream Mapping (VSM) and run the event in similar fashion to a Kaizen event that would be executed in a plant floor environment. The value stream, as defined by Womack and Jones, "is the set of all the specific actions required to bring a specific product (whether a good, a service, or a combination of the two) through the three critical management tasks of any business: problem-solving task, information management task, and the physical transformation task." (Womack, 1996) In order for the event to be a success, participants ranging from management to key process owners from each division would be required to participate. Key management were needed as the changes in this event could be quite political and also so that there was a leadership push and buy-in towards change. Gaining buy-in from leadership was also extremely important. Initech, in general has a tops down approach to leadership and execution. Generally, bottoms up movements do not work in large organizations and it was imperative that we had a tops-down push. Key process owners were critical so that we could finalize a current state of the core processes and also gain insight into opportunities for improvement. Without input and buy-in from the key process owners it would be extremely difficult to drive any type of sustainable changes. History has proven that without support of the process owners it is futile to expect buy-in and sustained changes. Gaining buy-in of process owners begin with listening to their opinions and ends with them implementing and driving the changes on a daily basis.

A current state mapping legend that was used throughout the Kaizen event and that can be used to understand the mapping shown in this thesis is shown below in Figure 31:



**Figure 31: Current State Mapping Legend**

It's important to note that the first draft of the process mapping was done by hand and with sticky dots rather than done electronically. Hand drawing allows teams to quickly capture information and also better engage in a collaborative process. In addition, it is easier to correct and make changes as inputs are received. Also the form of the value stream mapping that was created was specifically designed for the business need of the team. The team wanted to capture process steps by day by role, which in turn would allow SPO to have a loading chart by role of the core roles to the organization.

Figure 32 shows a detailed example of the current state mapping with improvement that was created for the key roles and processes of each of the divisions that were addressed in this project.



The importance of this data is to show how loaded each role is by day and to also show any excess cycle-time and wait-times that are associated with the core process steps. The data can be used when considering role merging opportunities, as some roles may be heavily loaded early in the week and fairly flexible towards the end of the week or vice-versa. Overall, the processes and mapping connected between the solar mapping and the current state mapping during the Kaizen event. This was extremely important to prove that two different tools and processes could provide both similar and different data that was valuable to the overall goal of this internship. The slight disconnect that was found was that wait-time associated with key requests and processes differed depending on the individual that was interviewed. From a management standpoint it was an eye opener to see how some roles were abnormally loaded on certain days and fairly flexible on other days. For example, a planner role that was observed was loaded with 11 hours of tasks on Monday but then only loaded for 4 hours of tasks on a Thursday. As in plant floor operations it's important to create linearity in the workload and having this data brought us one step closer to doing that. This was also important to employee morale, as it is very difficult and draining to work long stressful hours for consecutive days.

The Value Stream Mapping Kaizen event was a major success, details of which will be discussed later in the research study. Overall the participants left feeling that the discussion was cross-functional across divisions and mutually beneficial. As a facilitator it is extremely important that all voices are heard and that no team, person, or division leaves feeling that the decisions made are unfair or biased. Specific feedback directly following the Kaizen event is shown below:

*"Coming into this I was worried about win-lose, but we were able to leave with a win-win situation"*

*"This was the hardest value stream mapping that I have done, but it opened my eyes more than any other value stream mapping process I have participated in"*

*"This process/event is long overdue, this event puts it back on the stakeholders to not wait for other larger initiatives"*

*"I was surprised by how many opportunities there are that don't require systems resources"*

*"This process helped expose how disconnected/siloed the planning organizations really are"*

*"I was amazed to see the impact of the wait-time throughout the entire process"*

*"Passionate discussion in a F2F environment enables root-cause identification"*

*"Having change agents in this event was very helpful for the success of the event"*

*"It was amazing to see how different tools such as value stream mapping and solar mapping could be used concurrently to create an improvement strategy for the organization"*

*"This was the first time that I asked my "internal customer" what she needed from me and if I was making her job easier to do"*

This specific feedback is extremely valuable when determining if value stream mapping and Lean tools can be successfully implemented in a non-traditional environment. Kaizen events are not only designed to drive business results, but they are also used to drive Lean culture across an organization. In the Supply Planning Organization it would be hard to argue which is more important to the organization. Results and cultural buy-in go hand in hand, if you have one you generally get the other. However, if you fail at one of these it is extremely difficult to succeed on the other. Many companies blindly focus on results and miss the cultural piece, which does not drive a sustainable process. In converse, nailing the cultural piece is not sustainable without delivering results. In general, employees like to win and they must see the fruits of their effort. Therefore its important to focus on both and understand that there has to balance and not too much of either.

#### **5.4. Challenges**

The research study at Initech consisted of many challenges that often come up when trying to implement change in a large organization. First and foremost, the *scope* of the project was extremely difficult to tackle. The project spanned over multiple sites, divisions, individuals, and processes. Capturing the necessary vs. unnecessary information was a challenge that had to be thoughtfully addressed. The current state solar mapping exercises would be used in the Kaizen event and



it was essential that the information was relevant in order to have a successful Kaizen event. This is a challenge that was specific to a non-traditional Kaizen event, as traditional events generally focus on improvement within one division or one manufacturing facility. In addition, *resource constraints* across the divisions that were part of this project were a major hurdle to overcome. Due to the inefficiency across the organization, manual processes, and other strategic initiatives many employees were fully loaded. Management was a great support in terms of freeing up resources, but in some cases a process mapping initiative that needed 2-3 weeks to complete would have to be completed in 1 week because of the resource constraints. These constraints made it imperative that the most important processes and roles were mapped initially. It was also essential that the mapping process was efficient in capturing the appropriate information in a timely manner.

*Gaining buy-in and trust* of leadership and process owners was critical to the success of the research study. Similar to traditional plant floor observation, the true data can be lost if the process owners do not trust the individual mapping or capturing the data. We focused a great deal on understanding the individuals and their concerns prior to beginning any type of mapping. This was critical to the quality of data that was obtained during the current state mapping process. In addition, we reported out to senior management on a bi-weekly basis detailing our progress and key insights on processes observed. This structured forum allowed us to show the leadership team the power of the solar mapping tool and the value of the insights that were obtained. This in turned help develop management buy-in and support.

An additional challenge was that the *siloed divisions* focused on local concerns more so than overall organizational needs. There were also quite a few *political issues and power struggles* within the organization that had to be carefully considered during the current state-mapping portion of the research study. As we became aware of the power struggles between divisions, most of which were based on a lack of information sharing, we tried to envision a future state where these issues were eliminated. We also focused on allowing the process to point us in the right direction rather than making assumptions on what needed to be

done. We captured our ideas for a future state, but it was imperative that the solar mapping and Kaizen event were completed in an unbiased manner in order to create the most efficient future state of the organization.

## **5.5. Chapter Summary**

This chapter has focused on both the purpose behind this research study and the process used to prove whether Lean tools can be used to drive improvement across an organization in a non-traditional format. The results of this research study will be shown in later chapters, however it is clear to see that the process is quite effective considering the scope of the work and the high expectations for change from leadership.

A key learning from this research study and the process discussed in this chapter is that the Lean tools must be trusted. There are always challenges in implementing Lean in any business environment and one must trust the process that comes with the tools. Every Lean implementation has a challenge and point where it is unclear whether anything positive will come from the initiative. If this does not happen, then you may have to consider that the business issue you are tackling is not worthy of a 3-5 day resource investment.

The challenges of applying Value Stream Mapping in a non-traditional manner are very similar to challenges faced in a plant floor environment. Understanding the scope of the study, how detailed to do the mapping, whether the mapping can be completed in the duration of the event, and also what actions would take us to our future state all came up during this research study. It is imperative that one understands that Kaizen tools should not be applied blindly and should be adapted to the process and the business situation. The Kaizen tool has to be adapted to the situation or the end results could be jeopardized, or even worse the team loses faith in Kaizen and Lean.

The output of this study led the team to the realization that the silo's and disconnects were directly tied to the lack of strong metrics and a system to drive those metrics. Policy Deployment was a natural fit to address this issue.

## **5.6. High Level Results Visited**

The focus of this research study was around proving/disproving whether Lean tools could successfully drive an improvement effort in a non-traditional environment. In order to prove this hypothesis, a process had to be followed and tangible results had to be shown. We are excited to say that the process of current state mapping, solar mapping, and a Kaizen event led to many potential results for the SPO organization. Shown below are the high level results from this internship/research study:

- **22 actions/experiments** defined and **5 actionable role change/merge** opportunities defined
- **2.7 weeks of wait-time** identified for elimination
- **247 connections** by role identified for elimination
- **6 over processing wastes** identified for elimination

The 22 actions and experiments are all short-term initiatives that can be completed by the team without a major resource investment. The actions encompassed the following work areas:

- IT system improvements
- Elimination of handoffs and duplicate tasks
- Elimination of meetings
- Increased information sharing across the supply chain
- Responsibility change across roles
- Streamlined processes through the elimination of many non-value added activities

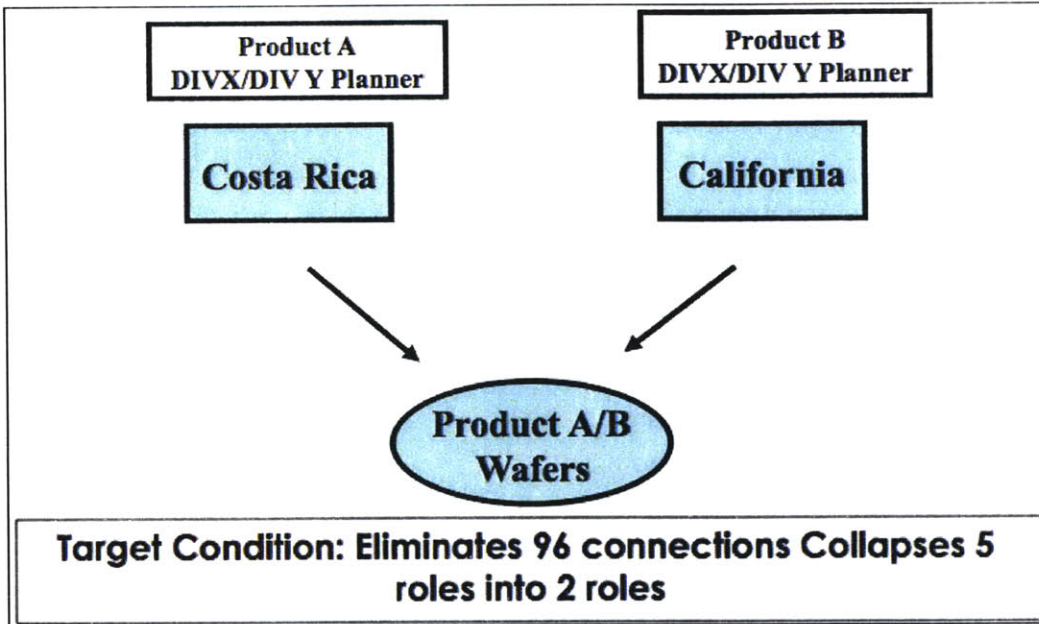
As mentioned earlier, the goal of this internship was not to create a strategic vision for SPO, but to create a short-term improvement initiative in 2010. Lean, when done correctly is about short-term actions and experiments that can quickly be tested and learned from. It's important with Lean activity that the team can quickly see if they need to course correct or proliferate their work across the organization. The actions

that came out of this internship were cross-functional and involved engagement and commitment across the core divisions of the Supply Planning Organization.

The 5 role-merging opportunities are the major win of this improvement initiative. The current state mapping and solar mapping proved to provide enough data around connections between roles and loading by role to allow the team to make these recommendations. The role merging allows for 247 connections to be eliminated by role. When considering that there are approximately 5-7 core roles and also at least 20 individuals in each role the results are quite extensive and can have a major impact on SPO. The role merging also helps eliminate many of the silo's that exist between divisions by forcing cross-functional work and interaction. Divisions will be forced to share information that previously was not communicated to those that needed it. In addition, the role merging will create new super roles that planners will strive to achieve to. Only the top performing planners will be considered for these "super" roles and it is felt that this will help energize and motivate planners. Many planners that do not want to take on managerial roles and find that there is a ceiling on professional development. This new super role will help provide another level or responsibility to strive for.

A major win and data point to the internship was that 2.7 weeks of wait-time was identified for elimination! This will be achieved through both the 22 actions and experiments and the 5 role merging opportunities. Much of this wait-time reduction is achieved by eliminating middleman roles and also through streamlining core processes across roles.

An example of a role-merging opportunity is shown below in Figure 34:



**Figure 34: Role-merging opportunity example**

The basic premise of this role-merging opportunity and the other 4 that were created as a part of this improvement initiative is that connections and handoffs must be eliminated between roles. In addition, any non-value add activity or middleman handoffs must also be eliminated. By keeping this focus, we were able to reduce wait-time and create a more streamlined process. Figure 34 shows an example where 5 roles are collapsed into 2 roles. The current state of this role-merging example shows 2 planners for both product A and B and also a lead planner that interacts with these 4 planners. The future state of this role merging is 2 super roles, one of which is based in Costa Rica in Division X and the other based in California in Division Y. The super roles combine the two planners for both product A and B into 1 planner for product A and 1 planner for product B. The two planner roles also absorb responsibilities from the lead planner role, which is not eliminated. The new super roles are cross-functional across divisions in SPO and will force the organization to eliminate silos for this to be operational. As a result, 96 connections are eliminated for this small sub-set of the Supply Planning Organization. As this is proliferated to multiple other groups within SPO, the results can be extremely powerful for the organization.

Shown below are the potential productivity savings that will be achieved upon implementation of the 22 actions/experiments and the 5 role-merging opportunities:

- Short Term Productivity Savings:

- ~**370 minutes saved** per planner/week

- Long Term Productivity Savings:

- ~**165 minutes saved** per planner/week

- ~**560 minutes saved** by SDA/week

- ~**480 minutes saved** by FAB/week

The results are quite significant when considering the number of subgroups and planners that this initiative can be proliferated to.

## 6. Metric Selection and Policy Deployment

### 6.1. Problem Statement

Over the course of this research study, we were able to meet with many individuals across the organization and understand many cross-functional processes. The common theme that stuck out was that the internal supplier to customer connections were weak and had major opportunities for improvement. After investigating the metrics that these cross-functional groups were measuring our team came to the conclusion that there was a huge opportunity for strategic alignment through metric selection and implementation. Upon speaking to planning manager, Carolyn Kelley, she introduced us to an X-matrix analysis that she had recently led. The X-matrix analysis is shown below in Figure 35 (all data has been scrubbed for confidentiality):

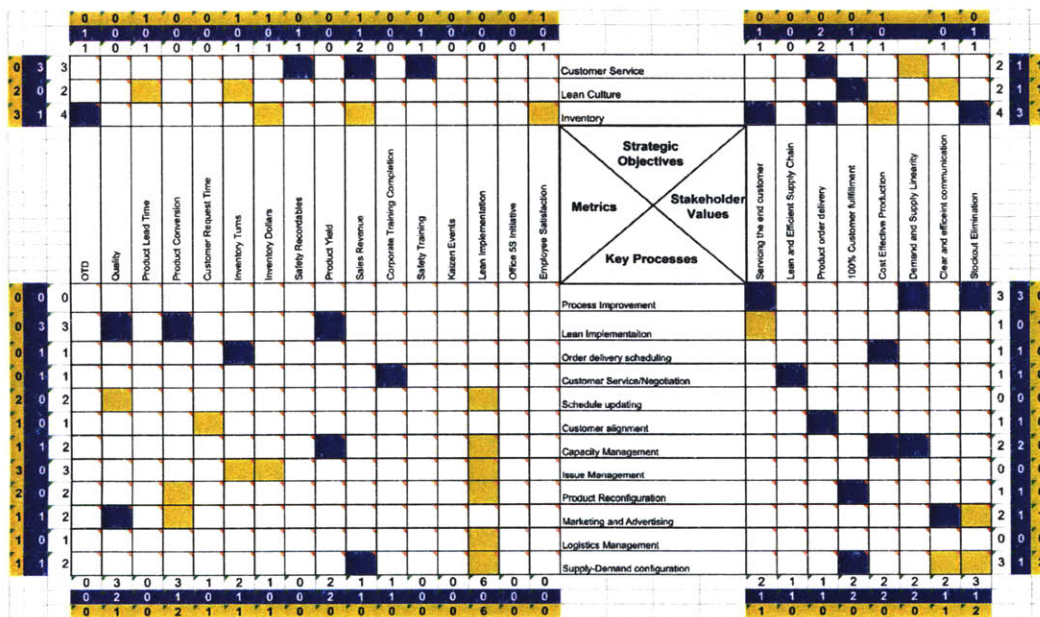


Figure 35: X-Matrix Analysis SPO (Nightingale, Stanke, Bryan, 2008)

The orange blocks depict a weak correlation and the blue blocks depict a strong correlation in the X-matrix shown above. The X-matrix analysis showed that metrics across the organization did not have a strong correlation to the strategic objectives or the key processes of the organization. This meant that metrics, which ultimately drive associate behavior, did not drive the core strategic objectives and key

processes organization. This could either mean that both the strategic objectives and key processes were not accurate or that the metrics were not accurate. One of the biggest issues that companies make when creating metrics is that they “do not link measures to strategy.” (Ittner and Larker, 2003) This phenomenon is something we saw directly when analyzing the results of the X-matrix in Figure 30. The fact that two mutually exclusive approaches came to the same conclusion provided significant data that metrics across SPO had to be investigated.

## **6.2. Approach**

In order to further understand how strong the current metrics in the organization were we spent some time researching metric selection criteria and metric evaluation criteria. Our goal was to get a thorough understanding of metrics inside and out and then create a tool that could be used to evaluate the current metrics within SPO. We decided that the Strategic Objectives and key processes of the organization could not be changed in the short-term and focused our energy on metric selection and implementation.

The core criteria we took away from this study was that metrics must have a *customer focus, drive the right human behavior, must be stretch* in nature, and as *all-inclusive* as possible. The stakeholder analysis completed by the SPO Planning team led us to add two additional criteria that metrics must *align to strategic objectives and to key processes*. In addition, as we identified many silos across the organization from the current state mapping work in Chapter 4 it was important that metrics were *cross-functional* across the divisions within SPO. In addition, any metric that was put in place had to be *actionable* and *easy to measure*. We wanted to create an organization that focused on the long-term rather than short-term results and financials. This led to the creation of another selection criteria, *long-term focus*.

## **6.3. Analysis**

The next step in the metric selection process was to create a way to score metrics based on specific evaluation criteria. The metric evaluation matrix that we created is shown below in Figure 36:



Metric	Metric Evaluation Criteria 0-10 (low-strong correlation)											Score (Weighted)	Score (Sum)
	Align to Strategic Objectives	Aligns to key Processes	Actionable	Cross-Functional	Minimal Data Collection	All-inclusive measurement	Long term focus	Customer Focused	Drives the right human behavior	Value added activities	Stretch Metric		
Spending	3	0.5	8	8	8	8	3	2	5	1	1	20.4	47.5
Headcount	8	1	6	8	8	8	3	2	5	1	1	23.0	51.0
Lead time	8	4	5	8	7	6	3	8	5	8	1	27.5	63.0
Customer Requests	6	3.5	2	8	7	4	3	10	5	7	1	29.6	66.5
Office Assessment	6	3	5	8	9	6	3	8	4	5	5	30.0	62.0
Safety training	6	3	5	8	9	6	3	8	4	5	5	30.0	62.0
Injury Issues	4	1	8	8	9	4	3	1	4	2	2	20.5	46.0
Corporate Training	4	1	8	8	9	4	8	1	8	4	4	25.8	69.0
Process Lead time	3	1	8	8	9	2	5	1	4	1	0	18.5	42.0
Safety	4	1	8	8	9	2	5	1	4	1	0	20.3	43.0
Inventory turnover	6	1	8	8	9	2	5	1	4	1	0	20.8	45.0
Inventory lead time	6	7	8	2	9	3	5	1	2	6	0	28.3	51.0
Manufacturing Lead Time	4	2	8	8	9	3	6	1	6	4	0	23.8	51.0
Supply chain score	4	2	8	2	9	3	5	1	5	3	4	21.8	46.0
Capital	4	1	8	2	8	2	5	1	2	1	2	0.0	34.0

Metric Criteria	Align to Strategic Objectives	Aligns to key Processes	Actionable	Cross-Functional	Minimal Data Collection	All-inclusive measurement	Long term focus	Customer Focused	Drives the right human behavior	Value added activities	Stretch Metric
% Weighting	75%	75%	75%	25%	25%	25%	25%	75%	50%	75%	25%

**Figure 36: Metric Evaluation Matrix**

The data, metrics, and results from Figure 36 have been altered for confidentiality reasons. The metrics are measured based on 11 criteria which have a percent weighting from 0-100 based on it's importance to the operational results of the organization. The 11 criteria for evaluation include, "align to strategic objectives, align to key processes, actionable, cross-functional, require minimal data collection, all-inclusive measurement, long-term success, customer focused, drives the right human behavior, value added activity, and stretch metric." (Blackburn, 2007)

The results show that only 5/15 metrics have a relatively high score when comparing to the scores of all the metrics. The remaining metrics score fairly low, which provides another data point beyond the X-matrix that the metrics have room for improvement. This metric evaluation matrix is not meant to be a standalone evaluation for metrics, but can help management attribute data to the strength of their metrics. Management teams can then use this data to facilitate their decision making on which metrics to incorporate.

#### 6.4. Next Steps – Policy Deployment

The logical next steps for SPO are to 1) select the core metrics that will be used to drive the organization and its divisions and 2) drive these metrics in a sustainable manner with accountability across the organization. In order to drive these metrics and create a sense of accountability, we suggest that Policy Deployment be



While the research around what form of Policy Deployment and how to implement it in SPO still has to be done, the basis for why Policy Deployment is needed is concrete. Two separate, mutually exclusive processes, X-matrix analysis and current state mapping of SPO organization showed disconnects between suppliers and customers throughout the value chain and a lack of metrics that were important to the stakeholders. The Policy Deployment implementation is the backdrop for the next internship within SPO.

## **7. Next Steps**

### **7.1. Implementation Plan**

Implementation and sustainability are the most critical steps in the Kaizen process. Many organizations that fail at Lean culture adoption, fail because they forget to focus on the implementation and sustainability. These slow moving organizations think that simply completing a Kaizen event is the solution to all their problems when in reality it is just the beginning. The Kaizen event is the first step in a long process for improvement, with implementing the actions a core portion of the Lean process. The work after the Kaizen is where most successful Lean practitioners feel that the Lean culture adoption and business results are realized.

With this in mind, it was imperative for us to create a long-term sustainability and implementation plan, as we knew the core actions could not be completed during the term of my internship. We worked with one of the original Lean guru's in the Supply Planning Organization, Divya. Our goal was to keep her heavily involved in the internship with plans to handover the implementation plan upon the completion of the internship. Divya is a firm believer in Kaizen and Lean and has a strong understanding of what it takes to transform an organization. In addition, she is intimately familiar with the Supply Planning Organization and has the ability to influence the organization. It was for all these reasons that Divya was an ideal candidate to move forward with this initiative. Divya is successfully running the core actions from the event in a Project Management style. She understands the reasoning behind why specific actions were taken and also the political issues that are involved in this initiative.

The timeline for implementation is Q1/Q2 of 2010, with some of the actions and role-merging opportunities flushed out in greater detail in December 2009.

### **7.2. Barriers/Challenges to change**

Every large organization has its barriers to change. The Supply Planning Organization within Initech is no different. Some of these barriers are common in globally dispersed organizations, such as resource constraints, gaining buy-in of key

leadership, and breaking down silos. Other barriers are very specific to the Supply Planning Organization, such as political issues and information sharing.

The political issues tie directly to gaining buy-in of key leadership and also information sharing. As discussed earlier in this research study, there are specific groups within SPO that control key information and make decisions with this information. The information is tightly guarded, as it is a source of power across the organization. The goal of this internship and research study was to prove that Lean tools could be used to help breakdown some of these barriers to change. In order to eliminate the political issues, buy-in of key leadership has to be gained. Leadership across the organization has to agree that both the Supply Planning Organization and the end customer are better off if the divisions communicate and work together. The Kaizen event and internship focused on an inclusive approach to bringing the core power divisions into a harmonious working arrangement. The action plan, role-merging, and potential results that come from these initiatives are all a step in the right direction. However, political issues around organizational change are still a major issue and must be carefully considered when making the necessary changes. Any time an organization takes on a major structural change or power is shifted sensitivity has to be taken when doing this.

The implementation team is aware of these issues and will work to keep all divisions engaged and committed through communicating results that will be achieved from executing the action plan.

### **7.3. Specific Recommendations/Research Findings**

The knowledge that was gained through this process proved to be quite valuable for the Supply Planning Organization. It also proved that the process used was more than adequate for driving Lean improvement across a major organization. While our main goal during this internship was to create a target future state and action plan to get there, it was also important to get an unbiased outsider's view on the Supply Planning Organization. It was very important to Viju, the head of the Supply Planning Organization, that he gets specific qualitative feedback on

SPO so that he can use this information when deciding on the strategic direction of the organization in 2010. Much of this information has been scrubbed in order to protect the Supply Planning Organization, however this information will paint a strong picture for why this research study was such a success and that the hypothesis that was posed earlier in this thesis was proven to be accurate.

Non-value added activity and ad-hoc requests were two major issues that came up across the organization. In some roles, over 50% of an individual's time could be spent on non-value add or ad-hoc activity. The purpose of Lean tools is to identify waste and find the root cause so this waste can be eliminated. Much of the role-merging initiatives were focused on reducing the ad-hoc and non-value added activity. In addition, the process showed that the IT and systems issues have a profound impact on the organization. Tools that should be improving productivity are actually hurting productivity because of various bugs and systems issues. This also confirmed that the need to drive improvement that did not require IT resources was imperative and this group was already resource constrained.

The internship process also specifically found that duplicity of work is commonplace as organizations grow quickly. Duplicity also is evident when groups are simply not communicating well or when trust is an issue between groups. The Supply Planning Organization had pockets of duplicity, but much of it was due to a lack of communication or individuals wanting to validate information before sending it along the process. Many non-value add exchanges were identified for elimination, and the process proved robust at finding these opportunities.

#### **7.4. Future internships and research**

In continuation of the value stream mapping work in this internship SPO will have an internship beginning in June 2010 which will focus on Policy Deployment implementation. This internship will directly focus on addressing the issues of weak metrics that do not align the many supplier and customer connections with the Supply Planning Organization. Further research on the

types of metrics to implement and also on how to implement and drive accountability with Policy Deployment are critical to the success of this internship and the Supply Planning Organization.

### **7.5. Chapter Summary**

The purpose of this chapter was to detail the results from this internship and the implementation plan. In addition, the barriers and challenges to implementation were discussed. The chapter also discussed the specific learning's that came from this study, both from an SPO perspective and Lean implementation in a non-traditional environment perspective. This chapter provides a high level summary of the success of this research study and internship and for the results from this internship.

## **8. Final Thoughts**

### **8.1. Final Thoughts**

The Supply Planning Organization has positioned itself for success over the next three to five years. The talent level from bottom to top is quite impressive, and the organization has a leader, Viju, that understands the importance of both micro and macro level improvement. The recommendations from this internship and the current/future state mapping process was well received across the organization. In addition, there was strong buy-in from Viju and his staff that the specific actions and role-merging opportunities would be a key strategic focus for 2010.

Lean implementation in a non-traditional environment proved to be challenging however not impossible. There was a great deal of learning that came from this research study and internship, including that Lean has to be adopted to the process, product, and organization. Lean tools that may be used in a plant floor environment with a physical product at Toyota may not be directly applicable in a different environment or different company. In addition, Lean culture must be carefully considered when running Kaizen events. A poorly organized event or a lack of energy around implementation and sustainability after an event can be crippling to an organizations Lean journey.

In conclusion, this research study shows that Lean tools can be used successfully in a non-traditional environment. The tools used in this research study, such as Solar Mapping and Value Stream Mapping, were adapted to the product, process, and desired end state. Lean tools are not cookie cutter solutions to business problems; they must be molded to an organization and its needs.

The Office 5S initiative was a great experiment to show that Lean tools can be successfully delivered virtually. The training has to be simple and easy to execute in order for this to be a success. In addition, the commitment to receive Lean training virtually has to be significantly higher than the formal Lean training process. This is a powerful win for SPO as it can move further along the



path of virtual trainings and continue to develop its Lean culture regardless of budget constraints.

Final remarks on the organization include that the division of power between many groups needs to be balanced in order for the organization to run smoothly. In addition, the need to run more experiments and take more calculated risks will benefit the organization greatly. Not having all the data to make a decision is normal and sometimes risks have to be taken and experiments have to be tested. High velocity organizations are known for rapid improvements, experiments, and reacting quickly with a new experiment when something does not work as planned. SPO is well on their way to being one of these organizations.

The experience working with SPO was amazing and the business impact of this internship should help guide SPO to a successful future.

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