

105 - Lets Get Organized - Using Six Sigma & Other Programs to Streamline Law Department Procedures

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Faculty Biographies

Jason Anderman

Jason Mark Anderman serves as counsel at Becton, Dickinson and Company, a Fortune 500 medical technology company with headquarters in Franklin Lakes, New Jersey. Previously, Mr. Anderman practiced at the law firms of Paul, Hastings, Janofsky & Walker and Goodwin Procter. Mr. Anderman's current practice includes: providing general advice to medical technology business units, managing procurement agreements for a diverse array of goods and services, negotiating life sciences and diagnostic instrument sales transactions, providing health privacy law advice, as well as facilitating litigation and dispute management.

Mr. Anderman is certified as a Green Belt in the Six Sigma continuous improvement management method, and focuses on ongoing projects using Six Sigma tools to drive efficiency in legal services. Mr. Anderman also leads several knowledge management initiatives. Mr. Anderman also currently co-chairs the Law Department Purchasing Consortium's Procurement Group.

Mr. Anderman graduated Phi Beta Kappa from Washington University in St. Louis. He received J.D. and M.A. from Duke University School of Law and Graduate School.

Heather Boone

Heather Travis Boone is general counsel for Trinity Capital Corporation, a financial holding company, headquartered in Los Alamos, New Mexico. Ms. Boone also serves as general counsel for its subsidiaries, Los Alamos National Bank, Title Guaranty & Insurance Company and TCC Appraisal Services Corporation.

Los Alamos National Bank received the Malcolm Baldrige National Quality Award in 2000 and remains the only financial institution and only New Mexico company to have received this award. Ms. Boone is very active in her company's Baldrige, Lean and Six Sigma efforts. Ms. Boone is also active in Quality New Mexico, a Baldrige-based state quality program.

Ms. Boone is currently the vice-chair for ACC's corporate and securities committee and is the incoming chair of the committee. Ms. Boone also participates in the ACC law department management committee's Six Sigma initiatives. Ms. Boone's practice focuses on corporate law, securities, corporate governance, regulatory reporting, litigation and general guidance for Trinity and its subsidiaries. Ms. Boone previously practiced at Strasburger & Price, LLC in Houston, Texas.

Ms. Boone received her B.A. from Trinity University and J.D. from Washington & Lee University School of Law.

Nathan Nelson

Nathan Nelson is general counsel for Albion Laboratories, Inc. a privately held Utah manufacturer of mineral amino acid chelates for pharmaceutical, dietary supplement, and food additive

applications as well as for animal and plant nutrition markets. He is very involved in the biotech company's initiative to take six sigma, LEAN, and continuous improvement concepts from the manufacturing floor to office workflow and the production of legal work.

Mr. Nelson previously worked in the legal departments of Groupe Laperrière & Verreault Inc. (an international equipment manufacturer headquartered in Montreal) and Cubic Corporation (a defense and transportation company based out of San Diego). Mr. Nelson currently serves as treasurer of the Mountain West Chapter of the Association of Corporate Counsel. He is a member of the Association of Corporate Growth, the Mountain West Capital Network, the Utah Bar Association and its Young Lawyers Division and Corporate Counsel Section, and he is an avid Blogger and has been a contributing writer to Connect business magazine. He writes on issues relevant to startup and emerging companies.

Mr. Nelson's practice comprises intellectual property matters, corporate and transactional work, regulatory and compliance issues, and litigation. Mr. Nelson obtained his B.S. from the University of Utah and his J.D. from the University of San Diego School of Law.



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Six Sigma in Action

IT Procurement Contracts

65% Faster Negotiations

Jason Mark Anderman

Counsel, Becton, Dickinson and Company

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Six Sigma in Action: IT Procurement Contracts Define Measure Analyze Improve Control

Six Sigma

- Continuous improvement management method
- Designed to identify quality standard we strive for, and
- Identifies defects that cause us to vary from the standard of quality we want to achieve consistently

Define Measure Analyze Improve Control

- Five stages used to define the defects
- Measure the defects numerically
- Analyze the data to understand the key defects involved
- Improve upon the defects by designing a pilot process that prevents them from occurring
- Control the process by ensuring that the improvement is sustained

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Six Sigma in Action: IT Procurement Contracts Define Measure Analyze Improve Control

Define Defect

- IT Contract Awareness Defined Defect:
 - Extra Hours Incurred
 - Due to Lack of Effective Communication Between BD Legal, BD CP, BD IT, and BD Vendors

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Six Sigma in Action: IT Procurement Contracts

Define Measure Analyze Improve Control



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Define Measure Analyze Improve Control

- Tracked Number of Hours Per Transaction
- Number of Hours Not Helpful Data
 Deals Vary Too Much in Complexity
- Total Number of Days to Complete Deal Helpful Data. Deals Done Quickly Reveals:
 - Good Communication
 - Competition
 - Professional Vendor Business and Legal Representatives
- New Defect Defined:
 - Excessive Days to Complete Deal

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Six Sigma in Action: IT Procurement Contracts

Define Measure Analyze Improve Control

- Established RACI Chart
- RACI
 - Responsible
 - Accountable
 - Consult
 - Inform
- Bottom Line for Responsibility and Accountability:
 - **Competition** CP and IT agreed to wait to choose vendor until contract is concluded
 - BD Legal Contract Control BD Legal took responsibility and accountability for coordinating contract negotiation

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Define Measure Analyze Improve Control

- Coordinated Vendor Communication Context:
 - RFPs/RFQs
 - Multiple Vendors
 - Only Two Vendors
 - Only One Vendor
- Communication States to Vendor:
 - Must use BD form of contract
 - Requires final completion of all revisions and sign off from vendor attorney
 - Informs vendors that this is subject to competitive bidding
 - Sets deadline of a certain number of business days for response
 - Indicates vendor risk of elimination for failure to comply

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Six Sigma in Action: IT Procurement Contracts Define Measure Analyze Improve Control

- Communication States to Vendor:
 - Defines BD team (consisting of CP and Legal only)
 - IT brought in for form/feature/function discussions
 - Requires all communication only be between:
 - BD team (not to IT and not to CP or Legal separately) and
 - Vendor team completely (business and legal and all other stakeholders necessary to close deal)

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Define Measure Analyze Improve Control

Data for RACI Deals

- 43.8 Day Average to Completion (15 Deals)
- 22.3 Day Average to Completion (9 Deals not Involving Significant BD Internal Delay)

Data for Non-RACI Completed Deals

- 127.9 Day Average to Completion (23 Deals)
- Data for Non-RACI Unsigned Deals
 - 151.4 Day Average (5 Deals)

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Six Sigma in Action: IT Procurement Contracts

Define Measure Analyze Improve Control

Financial Productivity Issue:

- Assume blended hourly rate for salary and benefits: \$71.79
- Assume 100% of time spent on contracts
- 65% productivity improvement translates to \$25.13 of blended hourly rate spent on contracts
- Annualized:
 - Instead of approx. \$140,000 of time spent on contracts
 - Process results in only \$49,003.50 of time spent on contracts

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Six Sigma in Action: IT Procurement Contracts Define Measure Analyze Improve Control

Bottom Line:

- Quicker Negotiations, Better Deals. Project Data recommends using RACI process due to substantially quicker contract closure average time with a standard BD oriented contract.
- Greater Employee Productivity. Productivity improvement due to process would allow current employees involved in contracts to spend more time on negotiating a better deal and other vital job responsibilities.
- Less Cost for Future Hires. Productivity improvement due to process means current employees can handle future growth in work without expense of hiring additional employees as soon as otherwise would be necessary
- **Reduced Time to Execution**. Quicker contract negotiations concluded result in receiving our raw materials, goods and services faster, which allows us to produce our products faster and provide them to our customers, which provides us with more revenues more quickly.

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Six Sigma in Action: IT Procurement Contracts

- Future Directions
 - Basis for Designing Other Contract Processes
 - Other Procurement Categories
 - Sales Contracts
 - Using Metrics in Legal Practice
 - Measuring Turnaround Time
 - By Stakeholder
 - Creating a Streamlined, Universal Agreement
 - Modular Contracts

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- Modular Contracts
 - OLSI initiative
 - Standardized "Best in Class" language
 - Taxonomy of concerns

Association of Corporate Counsel

Turn your Mess Into Success by Applying the Trio of Constraint Management, Lean and Six Sigma Principles to your Legal Department Processes (Intellectual Property Case Study)

Nathan Nelson

General Counsel, Albion Laboratories, Inc.

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- Overview of some Continuous Improvement Tools:
 - Constraint management (theory of constraints)
 - Lean
 - DMAIC (revisited)
- Applying the trio of tools to our Intellectual Property acquisition Process

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Turn your Mess Into Success By Applying the Trio of Constraint Management, Lean and Principles

THEORY OF CONSTRAINTS

- 1. Identify constraint
- 2. Decide how to exploit constraint
- 3. Subordinate all else to constraint
- 4. Elevate the constraint
- 5. Pursue perfection

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LEAN

Lean is "a systematic approach to identifying and eliminating waste (non-value-added activities) through continuous improvement by flowing the product at the pull of the customer in pursuit of perfection." - The MEP Lean Network

Value	
Value Stream	
Flow	
Pull	
Perfect	

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Turn your Mess Into Success By Applying the Trio of Constraint Management, Lean and Principles

DMAIC

Define	
Measure	
Analyze	
Improve	
Control	

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How we recently applied these principles to our IP acquisition process

- <u>Theory of constraints</u> We determined what constraints were preventing us from obtaining the overall goal of our department.
- <u>Lean</u> After identifying a major constraint (our IP acquisition process), we asked how we could implement lean tools to eliminate the waste in that process.
- <u>Six Sigma</u> We applied six sigma principles (i.e. DMAIC) to perfect the process.

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Turn your Mess Into Success By Applying the Trio of Constraint Management, Lean and Principles Our intellectual property acquisition process: Identify the Constraint

Our company competes on cost and on innovation—providing a better price for our customers and building a better mousetrap for them. Because innovation is such a vital element of the company's overall objective, our legal department's intellectual property process is one of our most important processes. Our objective is to obtain, manage and protect IP in the most cost efficient way. We evaluated our IP process to determine what constraints kept us from reaching our goals. We determined that the Intellectual Property acquisition <u>process</u> contained our largest constraints.

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Our intellectual property acquisition process: Exploit the Constraint

- Having identified a constraint (our IP acquisition <u>process</u>) we next determined how we would exploit the constraint.
- We looked to <u>Lean</u> principles to assist us in exploiting the constraint.
- Lean is "a systematic approach to identifying and eliminating waste (non-value-added activities) through continuous improvement by flowing the product at the pull of the customer in pursuit of perfection." – The MEP Lean Network

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Turn your Mess Into Success By Applying the Trio of Constraint Management, Lean and Principles

Our intellectual property acquisition process: LEAN – Valuable Process?

The first step in LEAN is to identify what constitutes value to the end customer and what doesn't. What processes are most important to delivering that value to the customer?

We had already identified our IP acquisition process as being a major constraint but we also evaluated each step in the process to see which steps delivered value to the end customer.

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Our intellectual property acquisition process: LEAN – Value stream

The second step in LEAN is to create a value stream map (flow chart) showing all of the steps currently required to flow materials and information to bring a product or service to a consumer.

We created a value stream map and analyzed how the inputs to our IP acquisition process flowed through the process (or didn't flow)

It looked like a spaghetti bowl. We clearly needed to do something about it.

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Turn your Mess Into Success By Applying the Trio of Constraint Management, Lean and Principles Our intellectual property acquisition process: LEAN – Flow

We created the value stream map for every step and we asked whether the end customer would complain if this step were taken out. If the answer was "yes" then it created value. If the answer is "no", then we asked "can you redesign the system to take out this step at this time"? If the answer was "yes" then we redesigned the system without that step to create the future state flowchart of the process. We discovered many non-value added steps that we could eliminate and we redesigned the process without them. Then we implemented the process (flow) 75% time spent

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Our intellectual property acquisition process: LEAN – Pull

After doing the system analysis, eliminating the non-valueadded activities, doing offline testing of the redefined system in single piece flow we discovered the specific bottlenecks. We pulled a lot of inventions through the process and saw where it broke. By pulling, we identified specific steps that were systemic weaknesses. These were the weaknesses that we needed to "perfect". After "fixing" them through system redesigns, we tried to do the same load with fewer resources to see where it would hang up again.

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Our intellectual property acquisition process: LEAN – Perfect

In LEAN, *perfecting* is repeating the process repeatedly to continuously improve the process & reduce waste. If the step that "breaks" when pulling is a quantitative process, we can use DMAIC as a tool to standardize the relevant process steps.

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Our intellectual property acquisition process: Six Sigma - DMAIC

<u>Define</u> – we defined the process and figured out the relevant measures we wanted to analyze.

<u>Measure</u> – we measured each of these processes, the overall system and the throughput times. We also wanted to know wait times and expediting expenses.

<u>Analyze</u> – after we measured, we analyzed the results. We looked at minimum throughput times & non-minimum times. <u>Improve</u> – We wanted to hunt down and kill the backflows to improve our throughput times. Our analysis identified changes we could make to improve the system & eliminate waste.We did! Control – we set up different controls to ensure less variances.

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Turn your Mess Into Success By Applying the Trio of Constraint Management, Lean and Principles

Our intellectual property acquisition process: subordinate all else to the constraint

After having "perfected" some of the steps in our IP acquisition process, we then aligned the other procedures in our process to the constraint.

We found that when tried to optimize specific procedures in the process that their local optimums it did not always translate into system optimums. Instead it resulted in waste, confusion and chaos.

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Our intellectual property acquisition process: Elevate/Expand the Constraint

After subordinating or system to the constraints, we increased our capacity on those constraints to see if the constraints moved. They did.



Turn your Mess Into Success By Applying the Trio of Constraint Management, Lean and Principles

Our intellectual property acquisition process: Perfect the Constraint

To us, this basically means that we need to continue to repeat the entire process on each constraint that prevents us from meeting our goals.

We will continue to apply the trio of constraint management, Lean and Six Sigma (DMAIC) continuous improvement tools

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Other Approaches to Streamline your Law Department, Change Leadership and Stakeholder Support



Other Approaches to Streamlining Your Law Department

PDCA

- Baldrige and State Quality Programs
- ISO Certification
- Open Legal Standards Initiative (OLSI)

Heather Boone General Counsel, Trinity Capital Corporation and Los Alamos National Bank

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PDCA (Plan, Do, Check Act)

Plan (Find) Do (Formulate) Check (Fix) Act (Feedback)

Record Review Certify Audit



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Departmental Redesign using LANB PDCA



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Baldrige and State Quality Programs

Designed to help organizations use an integrated approach to organizational performance management that results in:

- Delivery of ever-improving value to customers and stakeholders, contributing to organizational sustainability
- Improvement of overall organizational effectiveness and capabilities
- Organizational and personal learning

http://baldrige.nist.gov

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ISO

ISO Certification Standards

Geared toward Manufacturing, but beginning to include Services

- . ISO 9000 Quality Management Systems Requirements
- ISO 9004 Quality Management Systems Performance Improvement Guidelines
- ISO 10002 Quality Management Customer Satisfaction
- ISO 14001 Environmental Management Systems
- ISO 10001 Customer Satisfaction Codes of Conduct
- ISO 10003 External Customer Dispute Resolution

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ISO

- ISO/IEC Draft Guide 76 Development of Service Standards - Recommendations for Addressing Consumer Issues
 - Legal advice included in possible services
 - "Quality" defined as:

"Extent to which the characteristics of a service fulfill the requirements," which is said to include: access to helpful and accurate information, good customer handling and timely provision, environmental impact assessment and sustainable development, ease of use and value.

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Open Legal Standards Initiative (OLSI)

The OLSI Mission is to set the standard for quality and efficient legal services through the development of business process and metrics classification systems for the legal industry, benchmarking surveys and various industry events and publications.

- Industry Standard List of Processes
- Industry Standard List of Metrics
- Metrics Collection and Reporting Methodology
- Certified Metrics Implementation System

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Change Leadership

- The problem is obtaining and sustaining
 - support
 - energy
 - vision and strategy



Key Stakeholder Support

Tone at the Top and Support at the Bottom

Board and CEO Buy-InStaff Buy-In

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RACI Chart for Procurement Contracting

R (responsible) A (accountable) C (consult) I (inform) / P (Procurement)

		Process Step	Legal	Client	Procurement	Vendor
ſ	1.	Desire to purchase		R, A		C, I
ſ	2.	Tell Procurement		C, I	C, I	
	3.	Submit Budget		R, A	C, I	
	4.	Approve Budget				
	5.	Procurement identifies at		C, I	R, A	
		least two vendors				
ſ	6.	IT and Procurement		R, A	C, I	
		determine Vendor order of				
		priority and deadline for				
		contract completion and				
		informs Legal.				
	7.	Legal sends portion of	R, A	C, I	C, I	
		RFI/RFP/communication				
		pertaining to contracting to				
		first Vendor in priority or				
		both Vendors (see Note				
		below)				
	8.	Vendor responds to Client				R, A
		team with redline and letter				
		(see Note below)				
	9.	Legal prepares response and	R, A	С, І	C, I	
		coordinates Vendor				
		clarification calls with				
		Procurement				
	10.	Vendor responds to Client				R, A
		team with redline and letter	-			
	11.	Legal prepares final	R, A	C, I	C, I	
		response and coordinates				
}		call with Procurement				
	12.	Vendor accepts or rejects				К, А
	10	Client response				
	13.	If Vendor rejects, Client			K, A	
		focuses on alternative				
1		vendor	1	1	1	1

Note: Once Vendor responds, all Vendor communications must include P representative and Legal representative, no communication may be made with anyone else at Client regarding contract negotiations (pricing, as well as form, feature and function discussions, independent of the contract provisions, are still appropriate without Legal present).



Make it Stick

Build a Culture that embraces and develops innovation and improvement

Walk the talk!



Los Alamos National Bank

Creating a better way.

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Process Improvement Template

- 1. Find the Opportunity For Improvement (OFI)
 - · Refine the problem statement with more knowledge and/or data
 - What is the affect on customers, employees, investors
 - OFIs requiring minimal resourcing can be presented informally (using this sheet only) If more significant resourcing is required follow address the following pages. As a quideline:

Cost and length to improve OFI

<=\$10,000, and less than three month to implement-- Informal (this sheet only) >\$10,000 and more than three months to implement-- Formal (answer questions pages that follow)

Complete Team Charter

2. Formulate

- Describe the problem in terms of what is and what should be
- · Flowchart the current process, Validate with owners, users, and customers
- Identify measures for OFI, Benchmark
- Establish essential process controls

3. Fix

- Develop a Solution
- Construct a plan of action
- · Report to Quality Council; obtain validation
- Implement

4. Feedback

- Monitor the process
- · Review the results
- Revise if necessary (return to 1.)
- Register process flowchart

IMPORTANT

The following pages are intended to serve as a guideline on how to address the five steps listed above. This template should be scaled according to the size and complexity of the process change to which it is being applied. The more resource expected to be consumed by implementing an OFI, the more documentation should be generated in support of it and the more detailed the cost/benefit analysis should be.

1) Find the Opportunity for Improvement (OFI)

a. Gather any preliminary data.

This should include a brief description of the OFI, articulating specifically how the Bank will benefit by adopting the OFI. The value of implementing the OFI to the Bank should be quantified to whatever extent possible (recognizing the difficulty of estimating the impact of some OFIs on the financial statements).
 i. Determine the OFI's impact on all stakeholders.

Negative, as well as positive impact must be documented. A stakeholder, in this case, refers to direct stakeholders, or those who are directly impacted by the OFI. Secondary, tertiary, etc. stakeholders may constitute too large a population to be encompassed by a preliminary analysis.

ii. Compare the data to any existing benchmarks if available.

A benchmark can consist of an internal or external measure of performance. Performance can be cast in terms of processing efficiency, financial results, an increase in capacity, etc. Process cycle time is considered a key measure by Baldrige (reference Agility section).

- b. Add your findings to the Quality Council agenda
- c. Give your initial presentation to QC
 - Present your Team Charter Outline to QC.

2) Formulate the Solution

- Complete a Team Charter found at: (pathname)
- a. Document the current process
 - This step is only required when modifying an existing process. This will serve as a baseline against which the process modification can be compared.
 - Develop a visual depiction of the current process (ex. Flowchart, diagram, etc) See appendix A for a description of data flow diagrams. This type of documentation is recommended because it is process-oriented and implementation-independent.
- Describe the opportunity for improvement in detail. Perform a Root Cause Analysis (see appendix C for cause and effect diagramming)

Describe how changing the process will improve it. Why will a benefit accrue to the Bank? A root cause analysis can be performed with a cause and effect diagram. It involves identifying which cause(s) on the diagram are critical.

- c. Identify Functional Requirements of the Solution
 - Functional requirements answer the question what must a system do, not how or why it is to do it. It specifically addresses the properties or constraints a solution must encompass, usually expressed as a process that must be performed.
 - i. Prioritize the requirements

Functional requirements should be prioritized in terms of cost versus benefit. This will usually be based upon the instincts of a knowledgeable employee, but should still be quantified to whatever extent possible. Significant efficiencies can be achieved by applying Pareto's Principle (80 - 20 rule). As applied to solution development this principle would be interpreted as 80% of the functional requirements can be addressed by the first 20% of effort.

d. Verify the findings with the Stakeholders

A formal walkthrough should be performed by the OFI team in concert with the stakeholders and the results should be documented and signed-off by all parties.

3) Fix (i.e., implement) the OFI

- a. Research potential solutions and their cost.
 - If a solution requires the acquisition of hardware or software, there are LANB policies and procedures that should be followed (see appendix D). If a number of software applications are available as potential solutions, it can be helpful to create a function matrix for evaluating them (see appendix E for sample matrix).
- b. Weigh the potential solutions against the functional requirements established in 2.d.
 - If you are using a function matrix for evaluating solutions, make sure it is aligned with the functional requirements. If a matrix is not being used, potential solutions must be compared directly against the functional requirements established in 2.d.
- c. Ensure all appropriate SOX404 controls are embedded in the solution. Most processes are required by Sarbanes-Oxley legislation to have controls associated with them, particularly if the process impacts the general ledger. It is best if the necessary control can be built into the process itself.
- d. Select a proposed solution.
 - The proposed solution should have the lowest cost/benefit ratio and should be validated with all stakeholders. Where costs and benefits are difficult to quantify, estimates can be used.
- e. Present to Quality Council
 - It is important for Quality Council to be kept apprised of the progress of all projects. Also, QC can provide a second level of validation.

Implement Action Plan

- f. Identify resources, such as employees and equipment, which will be needed for implementation.
- This section must identify ALL resources that will be required to implement this project, including the approximate timing of when the resource will be applied. Larger projects should include cost estimates. g. Establish a timeline for implementation.
 - A timeline should consist of a list of all tasks that must be completed in order to accomplish the process implementation or improvement. The list should include a task description, a start date, an end date, and a list of resources required for that step. If there are significant task interdependencies, they should also be noted.
- h. Set a frequent team meeting schedule.
 - i. Review progress.
 - ii. Identify the next steps.
- Extra meetings should be scheduled to coincide with significant project milestones on larger projects. i. Coordinate any training, if required.
 - If the project involves a significant modification of a process, the introduction of a new, complex process or will impact a large number of people, the training should be involved in determining what training would be appropriate.
- j. Validate completion.
 - This step involves tying up any loose ends, ensuring all tasks have been completed successfully, and reviewing the project accomplishments against the original goals.

4) <u>Gather Feedback</u>

- a. Analyze Process Improvement as applied to the OFI at hand
 - Did the process improvement adequately assist in planning for the process improvement? What issues arose during the process improvements that were unforeseen? Are there additional steps that would have made the process improvement effort more efficient?
- b. Document any "Lessons Learned".
- c. Compile all project documents and save under: (pathname convention)
- d. Make a final presentation to Quality Council.

Appendix A

Traditional Project Documentation

Commercial Proposal

Answers the question "why should we do this?" Justification will always come down to 1) increase revenue, 2) decrease cost Enhance quality of product/service Increase sales volume Make process more efficient Create a competitive advantage Reduce overhead

Proposes a new product/service or modification of thereof Provides specific details about product/service (nothing left to imagination)

Presents economic justification (cost/benefit analysis)

Suggests a general timeline if relevant

Business Requirements

Description of processing requirements from a business perspective

What needs to be done, but not how

Establish relevant business rules

Functional Requirements

Description of processing requirements from a logical perspective

Answers how the processing needs to be done

Defines logical data stores

Technical Requirements

Description of processing requirements from a physical implementation perspective

Defines physical data stores

Appendix B

Data Flow Diagrams

Data flow diagrams (DFD) are used to present a logical view of a process or system. DFDs employ only four symbols so they are simple to understand and use, yet they can represent the most complex systems. The four symbols of DFDs are shown below.



Some of the advantages of data flow diagrams over traditional flowcharts include the following:

- · DFDs present a logical implementation while flowcharts suggest a physical implementation
- DFDs are process oriented while flowcharts have no specific orientation
- DFDs are easy to understand (only 4 symbols)
- DFDs include a methodology for showing many levels of detail (i.e., drill-down or explosion)

DFDs were introduces along with structured systems analysis as a comprehensive methodology which focuses on building a complete logical representation or model of a system in order to provide a clear and complete understanding of how all of the components work together to accomplish a goal. Simplicity is important because it is imperative that a common understanding is achieved among everyone working on a project to ensure success.

Entities

Entities are logical classes of people or things which represent a source or destination of transactions (e.g., customers, employees, suppliers, etc.). By convention, entities should be named uniquely.

Processes

Processes represent actions that are to be executed. They are usually named with a verb followed by an object clause. Processes are also uniquely numbered beginning with 1.0, 2.0, 3.0, etc. Diagramming the next level of detail for process 1.0 we would use 1.1, 1.2, 1.3, etc. to number the processes. If more detail were required for process 1.2, the numbering would be 1.2.1, 1.2.2, 1.2.3, etc.

Data Flows

Data flows show between entities, processes, and data stores. Data flows should be named with a meaningful description of the contents. By convention, data flows are transformed by processes and therefore should be uniquely named.

Data Stores

Without making a commitment to a physical implementation at times it is useful to show that data must be stored between processes. By convention, only a process can store or retrieve data from a data store. Data stores are numbered D1, D2, D3, etc.

Data Flow Diagrams

Data flow diagrams employ multiple levels in order to show greater and greater detail for complex systems. The highest level traditionally shows one process and the entities that are related to it and is called the context diagram. By convention, data stores for a purchasing process might look like the following:

Purchasing Process Context Diagram



The next level of detail is referred to as the Level 0 (zero) diagram and it might look something like this (data stores have been omitted because a vendor application is being deployed which will dictate the stores):

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Another convention of data flow diagrams is to have a maximum number of processes of seven to nine per page. As you can see, the above diagram has nine and it can take a little time to work through all of the processes. It is also a good idea to number the processes in the (logical) order in which they will be executed.

Note that we still have the same number of entities (four) as were displayed on the context diagram. This should always be the case for the level 0 diagram.

Also note there is no error or exception handling indicated in any of the above processes. That level of detail is usually left to the level one diagram and below.

The next diagram is an example of how process 4.0 above might be "exploded" in a level 1 diagram. It represents the next level of detail. Note that all the entities and processes that are connected to process 4.0 above are also shown on the level 1 diagram. This is required by convention.



It is important to understand there is no right and wrong in formatting and labeling data flow diagrams, but there are good and bad diagrams. Drawing DFDs is very much an art form and practice and experience are essential for proficiency.

Guidelines for Creating Data Flow Diagrams

- Start by identifying the entities involved. This helps in establishing a preliminary system boundary. Draw the context diagram first.
 Breakdown the system into its major subtasks. It usually takes a few iterations to get it right. Don't bother with data stores yet. It is just as easy to add them later. Make sure the level 0 diagram includes all the entities that the context diagram shows.
- When exploding the major subtacks in level 1 diagrams, show the predecessor and successor subtacks and well as any entities that are involved. It is against the DFD rules to introduce entities and data stores at lower levels that did not appear at higher levels.
- 4. The lowest level of detail is reached when a subtask can no longer be (reasonable) subdivided into discrete steps.

Appendix C Cause & Effect Diagram

The cause and effect diagram is used to explore all the potential or real causes (or inputs) that result in a single effect (or output). Causes are arranged according to their level of importance or detail, resulting in a depiction of relationships and hierarchy of events. This can help you search for root causes, identify areas where there may be problems, and compare the relative importance of different causes.

Causes in a cause & effect diagram are frequently arranged into four major categories. While these categories can be anything, you will often see:

- manpower, methods, materials, and machinery (recommended for manufacturing)
- equipment, policies, procedures, and people (recommended for administration and service).

These guidelines can be helpful but should not be used if they limit the diagram or are inappropriate. The categories you use should suit your needs.

The C&E diagram is also known as the fishbone diagram because it was drawn to resemble the skeleton of a fish, with the main causal categories drawn as "bones" attached to the spine of the fish, as shown below.



Cause & effect diagrams can also be drawn as tree diagrams, resembling a tree turned on its side. From a single outcome or trunk, branches extend that represent major categories of inputs or causes that create that single outcome. These large branches then lead to smaller and smaller branches of causes all the way down to twigs at the ends. The tree structure has an advantage over the fishbone-style diagram. As a fishbone diagram becomes more and more complex, it becomes difficult to find and compare items that are the same distance from the effect because they are dispersed over the diagram. With the tree structure, all items on the same causal level are aligned vertically.



To successfully build a cause and effect diagram:

- 1. Be sure everyone agrees on the effect or problem statement before beginning.
- 2. Be succinct.
- 3. For each node, think what could be its causes. Add them to the tree.
- 4. Pursue each line of causality back to its root cause.
- 5. Consider grafting relatively empty branches onto others.

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- 6. Consider splitting up overcrowded branches.
- 7. Consider which root causes are most likely to merit further investigation.

Cause and effect diagrams can be drawn using Word, Excel or Visio, but with some difficulty. Excel might prove to be the least awkward of the three applications

Appendix D

Purchasing Policy Currently being amended.

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Appendix E Evaluation Matrix

Importance	Want/Need	Imparative to Process	Improvement to Process	Beneficial to Process	Priority	% of Satisfaction	Score	% of Satisfaction	Score	% of Satisfaction	Score
Supplier Requirement		10	7	4	Р	Compar	ny A	Compa	any B	Compa	any C
	N			х	4	100%	4	100%	4	100%	4
	N		x		7	50%	3.5	80%	5.6	50%	3.5
	N		×		7	100%	7	100%	7	100%	7
	N	×			10	100%	10	100%	10	100%	10
	w		x		7	100%	7	100%	7	100%	7
	w		x		7	100%	7	0%	0	0%	0
	w		×		7	100%	7	50%	3.5	0%	0
	N		x		7	80%	5.6	80%	5.6	80%	5.6
	N	х			10	100%	10	50%	5	75%	7.5
	N	×			10	100%	10	100%	10	100%	10
	N	×			10	100%	10	90%	9	80%	8
	N		×		7	100%	7	50%	3.5	100%	7
	N	×			10	100%	10	100%	10	100%	10
	w			x	4	90%	3.6	75%	3	75%	3
	N	×			10	100%	10	100%	10	100%	10
	N	×			10	70%	7	70%	7	70%	7
	N			x	4	100%	4	100%	4	100%	4
	N		×		7	100%	7	100%	7	100%	7
	w		×		7	100%	7	85%	5.95	75%	5.25
	w		×		7	50%	3.5	75%	5.25	100%	7
	N		×		7	80%	5.6	90%	6.3	90%	6.3
	N	×			10	100%	10	100%	10	100%	10
	w		×		7	100%	7	50%	3.5	50%	3.5
	N		×		7	80%	5.6	100%	7	90%	6.3
	N	×			10	100%	10	100%	10	100%	10
	N		×		7	100%	7	100%	7	0%	0
	N		×		7	100%	7	100%	7	100%	7
	N		×		7	100%	7	100%	7	100%	7
	N		×		7	80%	5.6	90%	6.3	100%	7
	N		x		7	90%	6.3	80%	5.6	100%	7
	w		×		7	100%	7	85%	5.95	70%	4.9
						10070		0010	0.000		
Supplier Totals	·	0	0	0	235	93%	218.3	84%	198.1	81%	191.9
Company A 218.3											
Company B		198.1									
Company C 191.9											
Process Requirements											
	1. Set Supplier Requirements										
	 SetLevel of Priority (0-10) for Supplier Requirements in the corresponding column. 										
	3. Assign a Percentage (0-100%) of Satisfaction for each Supplier Requirement.										
	4. Choose the appropriate Supplier based on results from input.										

LANB Decision Matri

An Evaluation Matrix can be a useful tool in quantifying the differences between various solutions. The above example shows one possibility for laying out a matrix. It lists the functional requirements, and allows for assigning a level of importance for each requirement. A priority value is assigned based upon the level of importance. The percent of satisfaction refers to what extent a product fulfills the requirement. The score can be calculated in a number of ways. In the above example, we simply multiply the priority by the percent of satisfaction to get a score that is then summed for all requirements. The vendor with the highest score is selected.

It is important to note that arriving at the correct solution is heavily dependent upon enumerating all significant requirements and assigning the correct relative importance of each. This should be done in a number of iterations.

Standard Vendor Communication

Introduction and Agreement. My name is [_____] and I am in-house counsel to Client. I understand that you and [____], Client's [Insert role], have recently held discussions regarding an engagement for [____]. To move forward on that transaction, please find attached the [____] Agreement.

<u>Client Form of Contract</u>. We understand that you most likely normally use your own form of agreement, however, Client's policy is to use its own, and we appreciate you accommodating this approach.

<u>Competitive Evaluation</u>. While we would very much like to seriously consider moving forward at this time with you, we are also pursuing a similar form of contract with an alternative vendor in order to receive their reaction as well.

<u>Communications</u>. Please make all communications regarding the contract provisions simultaneously to both [Insert Vendor facing Client team members] and myself. Please do not discuss the contract provisions with anyone at Client other than [Insert Vendor facing Client team members] and myself. Of course, please feel free to discuss the form, feature and function of your offerings, and the pricing, with any contacts you may already have at Client, as long as those discussions do not involve language to place in the contract. Failure to abide by this requirement may disqualify you from consideration.

Final Draft of All Necessary Changes, Ready to Sign. In this competitive evaluation, we respectfully ask that you make the minimum number of changes to the agreement which you feel are absolutely necessary. We also ask that you include an email with your revised agreement from your legal representative indicating that you would be willing to sign the agreement with your changes (subject to resolving the Client highlighted placeholder items). Of course, the greater the number of revisions, the more likely it will be that Client will focus on a deal with your competitor.

<u>Timing.</u> As we are making a competitive evaluation, we ask that you provide clean and red lined copies by the close of business on [_____].

Thank you very much for your kind attention to this matter.

Resources

Lean Six Sigma for Service: How to Use Lean Speed and Six Sigma Quality to Improve Services and Transactions, *Michael George*, The McGraw-Hill Companies, New York City, 2003.

Leading Change, John P. Kotter, Harvard University Press, Boston, 1996.

Malcolm Baldrige National Quality Award Program: http://www.baldrige.nist.gov/

Open Legal Standards Initiative: www.openlegalstandards.org