BUSINESS
APPLICATION OF LEAN PRINCIPLES

Last month we established that lean enterprise management provides an ideal way for servant-led companies to maximize both customer satisfaction and effective stewardship of the Lord's resources. Lean companies pursue ideal operating execution to satisfy customers quickly in a way that gets it right the first time by creating a workplace that systematically addresses three continuously improving objectives: satisfy the customer **better, faster**, and at a **lower cost.** We defined seven types of waste that exist in our businesses:

Surplus, **T**ransport, **E**xecution, **W**aiting, **A**ction, **R**eserves, and **D**efects.[1]

Waste always inhibits our progress in satisfying the customer better, faster or cheaper. Consequently, **eliminating waste drives improvement in all three objectives.**

Today we'll focus on satisfying the customer faster by improving our lead-time, response time, or throughput time. To analyze our ability to serve the customer well, we must understand our entire process. The key lean tool for this exercise requires that we map out the flow of work, product, people, and information throughout the entire organization/operation, from taking an order to making a delivery. Lean practitioners call this drawing a "value stream map." Careful observation of the actual process enables us to identify and include the types of waste on the diagram, as well as the time required from beginning to end. This becomes the "before" picture, also known as the "as is" condition. Team members work together to identify and propose ideas to eliminate the waste, creating a "to be" or "after" picture to describe the desired state.

Diagram your current value stream map and identify any waste.

Let's say your business performs a service that involves circulating a customer project file across the desk of eight different specialists before going to a final report writer who produces and delivers the final document to the client. Today, your standard promise is "two to three weeks" to deliver a custom report. If each specialist actually works **30 minutes** to complete their portion and the final report editing takes four hours, **the actual value-added time is eight hours**. Yet the **customer waits 336 to 504 hours for their report** (2.4% to 1.6% of the elapsed time). Why? The reports spend most of the elapsed time waiting for the next specialist to get to their inbox.

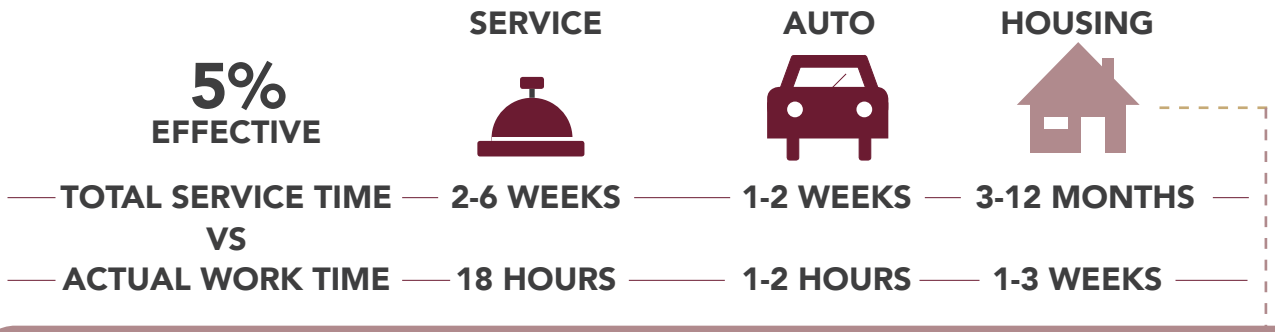
"Value Stream Mapping" - Troy Blackmon, VP of Operations at C12, shares how visually mapping your process can lead to massive removal of waste.[2]

TAKE AWAYS

Compare your current and desired response in these key areas.

Business Function	Current Response	Desired Response
Fulfilling new orders		
Answering requests for quotations or service		
Developing new commercial offerings		
Fulfilling a product or service to order		

The gap between current and ideal performance surprises nearly all of us. **Few companies exceed 5% of attainable response speed (we waste 95% of the clock on non-value-added activity).** Many companies offer products or services that involve just a few hours of value-added work effort, yet we may require 10 days to deliver.



Homebuilding Return On Assets (ROA)

Consider the typical home-building project. Even the best-run home builders take 60 to 90 days to build a modest standard home. Homebuilder contests in southern California and Texas prove that highly coordinated crews using commonly available methods and technology, but radically different lean project management and teamwork methods, construct a nicely featured three-bedroom, two-bath home with attached garage and landscaping in under three hours![3]

Companies making the conversion to lean thinking typically cut their overall effort and response times by 50 to 80%!

If we can rethink our business model to cut cycle time (i.e., order throughput time) in half, getting to just 10% effective utilization of clock time, we would slash inventories, floor space, overhead, and quality problems along the way.

As we often say in C12, "what you measure tends to get better." To measure your customer response time, add up all of the value-added work steps required to produce your product or service and compare it to elapsed time on the clock. Now, compare this to the theoretical ideal.

"Measuring Movement" - Key Player Member, Mike Petrusch, shares how simple tools such as a spaghetti map can accelerate throughput and improve the bottom line.[4]

By now, you've probably already thought of a few reasons why comparing your performance against a 24/7 clock or a continuous flowing "value stream" doesn't apply in your industry. **While you make excuses, what if your leading competitor figures out how to cut response time by 25 to 50%?**

If you don't believe that your typical cycle time takes longer than necessary, ask yourself this question: How long does it take to process our best customer's rush order through our system?

MEMBER CASE STUDY

Company: Nichols Engineering, LLC
CEO: David Nichols
Industry: MEP Engineering
Employees: 25
Member Since: 2016

When starting Nichols Engineering in 2013, David Nichols and his wife Taylor implemented a culture counter to industry norms, taking advantage of lean principles to reduce cycle and response times, allowing them to grow quickly from incpetion. Within the first year alone, David, along with two other engineers, were able to design and consult on over 30 engineering projects, outpacing competitor's benchmarks.

Since then, Nichols Engineering has continued to grow as an industry outlier, leveraging contract employees and automation to reduce delay in their business.

Hiring contractors in various time zones allows Nichols to service project needs (designing tasks, scheduling, documenting, collecting data, and creating proposals) within 24 hour time frames, increasing the number of projects they complete each year.

Nichols also relies on trigger based software to reduce the number of non-producing administrative support staff. For example, they use software to automatically create a task list based on a set of specific criteria.

Pairing contractors with key software frees up Nichols to complete the tasks only he can complete, and employ the right number of people at any given time. This strategy has allowed Nichols to grow 37% from year one to two, and 21% from years two to three.

TAKE AWAYS

Not surprisingly, lean firms find that achieving the quickest throughput rates involves valuable learning and problem solving along the way that also serve to drive improved quality and reduced cost. **Pursuing the shortest cycle time generally achieves the best quality, highest customer loyalty, lowest cost, and highest ROA.**

Identifying and eliminating waste and shortening our response time to improve overall business performance requires that we engage our teams of employees and suppliers in a continuous learning culture aimed at reaching theoretically ideal performance.

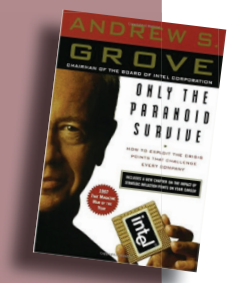
See **Appendix C** to further look at the impact of reducing cycle times.

What competitive advantage or new marketing possibilities would open up if you cut your customer delivery times in half?

Where specifically can you begin to remove limitations or interruptions to the continuous flow of work through your company?

PARANOIA JUSTIFIED

The retail world has been buzzing since the 2017 announcement that Amazon was officially entering the grocery business with its acquisition of Whole Foods.[5] Stock prices experienced wild spasms as titans of a mature industry assessed what an aggressively lean-oriented competitor would mean for the status quo. In 1996 the then CEO of Intel, Andrew Grove, authored "Only the Paranoid Survive: How to Identify and Exploit the Crisis Points that Challenge Every Company."[6] Grove famously advocated for leaning into the threat of disruption and rigorously looking for opportunities to preserve dominance through proactive process and product evolutions – before a competitor does! No industry, geography, or business is immune to these scenarios. Likely, you're already experiencing this at some level!



Where could you lean into the forces of change for a competitive advantage?

Putting Value Stream Improvement Concepts to Work to Reduce Lead Time

The following functional case study examines a Professional Services Provider and identifies several operational improvements and great results. Can you spot parallels in your firm?

COMPANY PROFILE

Jeremy, a well-respected expert in providing feasibility studies, analyzes power generation options and environmental impact for small-to-midsized businesses and public institutions. His company provides two product categories—a standard analysis in three weeks and a customized analysis within four weeks (the industry norm). They pride themselves on their specialized expertise and ability to handle custom projects in a four-week turnaround.

THREATS

Jeremy observed that his industry was beginning to see sustained 15-20% annual growth. A friend, working in a more mature industry, warned him that **unless they became highly responsive and cost-effective, competitors would soon covet this growth rate and invade his market to capture market share by driving down prices.** Perhaps offshore the "grunt work," and leave them to focus on the custom reports that represent just 30% of their revenue.

IDENTIFY WASTE

Sobered by this credible long-term threat, Jeremy conducted a complete analysis of the business:

Ten engineers occupied independent office spaces **(Transport)**.

Each engineer had individual in/out boxes **(Waiting)**.

Each engineer was assigned responsibility for all standard and custom projects **(Execution)** within a specific industry or territory.

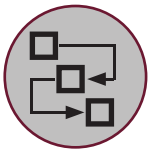
Half of the engineers needed Jeremy or his most senior engineer to provide input on challenging custom jobs **(Execution)**.

Standard applications comprised 80% of all jobs, lending themselves to proprietary expert computational and report writing software **(Execution)**.

Engineers loved conducting analyses but despised writing. Consequently, all draft reports required proofreading by Jeremy or his top engineer **(Defects)**.

Northstar won half their quotes, but many clients decided to skip the analysis, choosing to "fly by the seat of their pants" **(Defects)** to avoid waiting for the analysis due to their short timeline. Jeremy estimated that such last-minute requests might comprise 30% of potential demand.

The actual value-added engineering on a typical job took 1-8 hours depending on the project scope (i.e., just 1-5% value-added time vs. overall clock time). Most of the clock time was spent waiting—in the inbox, for report writing, and for proofreading and checking **(Defects)**. Often, custom requests waited two weeks before the assigned engineer saw them, and he might then decide their complexity required Jeremy's attention.



PROCESS IMPROVEMENT

Jeremy mapped the company's value stream, taking particular care to think about the difference between standard and custom jobs. The current-state map clearly showed the many flow interruptions which turned an eight-hour task into four weeks.

Jeremy then interviewed a dozen clients to better understand how radical changes in content, value, or response time might change Northstar's business potential with them. What he learned made him excited to redesign the firm's workflow to get to a preferred future-state as quickly as possible.

LESSONS LEARNED

They told him that high prices, long lead times, and lack of Saturday availability kept them from ordering as many analyses as they'd really like. If prices dropped by 20%, volume would likely rise 50%.

If standard analysis could be turned around in a week, another 50% increase in volume would result.

Customers weren't always thrilled with their custom reports. In fact, some had already moved their business due to the inability of their Northstar engineer to quickly respond to questions.

Based on the information provided, work together as a group to describe potential changes you would like to see made and the expected results in the below areas. When you are done, compare your suggestions to the actual changes Northstar made on the next page.

Change Area	Suggested Changes	Expected Outcome
Office Layout		
Manpower		
Standard Area Flow		
Custom Area Flow		

FUTURE-STATE VALUE STREAM

After just a week of planning and team discussion, Jeremy devised a future-state value stream as follows:

1

Office layout

Separate "flow" areas for standard jobs and custom jobs, each without walls but with all the resources and visual tracking aids necessary to optimize first-in-first-out (FIFO) flow and improve real-time, peer-to-peer communication. Jobs no longer route through (Transport) individual in/out boxes (Waiting), but flow one at a time across a standard visual path so any delays are visible.

2

Manpower

Redeploy 10 engineers—five now dedicated to full-time standard analysis, two alternating days between standard and custom jobs with desks in each area, two dedicated to full-time custom analysis, one as web/software developer and custom report checker. [Note: This change dictates specific training, enables focus on discipline for those dedicated to standard or custom work, increases capacity for high margin custom projects, creates reliable "in-flow" checking, and supports vital web/software development.]

3

Standard Area Flow

One-week delivery guarantee with a two-day improvement target; co-located senior checker within "cell" (reduce Transport) serves as overflow help; rotating Saturday coverage to ensure availability for clients' questions (reduce Defects); also provide digital report copy with email contact and web link for future client follow up. Further productivity improvements via expert software automation of calculations and text (eliminate Execution).

4

Custom Area Flow

Two-week delivery guarantee for normal scope custom jobs with a one-week improvement target; co-located checker and reference library, web-based customer project centers with confidential chat capability (reduce Waiting) and in-cell video conferencing (reduce Waiting, Transport, and Defects) to aid real-time research, client communication, and delivery of consulting services.

Overall Impact: Better utilization of employee talent; improved flow eliminates delays; expert software to ultimately automate 50% of manual value-added effort and eliminate 80% of rework (reduce Waiting and Defects); tripled capacity for standard reports, doubled capacity for custom reports with existing manpower. Currently, they enjoy a reputation as a 6-day-per-week "category killer" that discourages potential competitors from entering the industry.

Discuss your current customer response time and possible solutions to non-value-added activities.

Cut **prices 20%**

Reduced **lead times** by **50-75%**

Eliminated **80% of rework** by reducing waiting and defects

Doubled capacity for customer reports with existing manpower

Tripled revenues with increased margins in three years

Automated **50%** of manual value-added effort

How do these opportunities apply to your company? Compare your opportunities with the others around the table.

Are your teams engaged with you in a continuous learning process aimed at reaching theoretically "perfect" performance? Have you provided the vision, framework, and impetus for them to do so?

See Digital **Appendix B** for a second case study of a Construction Products Distributor.

Consider selecting from the list of suggested To-Dos or use the space below to create your own. *Be sure to enter your monthly To-Dos in Barnabas.*

- ◯ Research my competitors' response times, and compare them to my current and desired response times.
- ◯ Watch the following YouTube videos to prompt lean enterprise thinking in my business: *Lean Simplified - Value Stream Mapping*, *Lean Simplified - Spaghetti Diagramming*, and *The Toyota Way.*

- [ ] Read *The Toyota Way* (Jeffrey Liker, McGraw-Hill, 2004) or another book on lean from last month's appended reading list.
- [ ] Take on one of the value streams in my business as a pilot project to help demonstrate how efficient my team can become.
- [ ] _____
- [ ] _____
- [ ] _____
- [ ] _____
- [ ] _____

ANNOTATIONS

[1] For a Lean glossary of terms, see Digital Appendix A.

[2] See Appendix B for an example of a value stream map.

[3] See www.2hourhouse.com for more details.

[4] See Appendix C for an example of a spaghetti map.

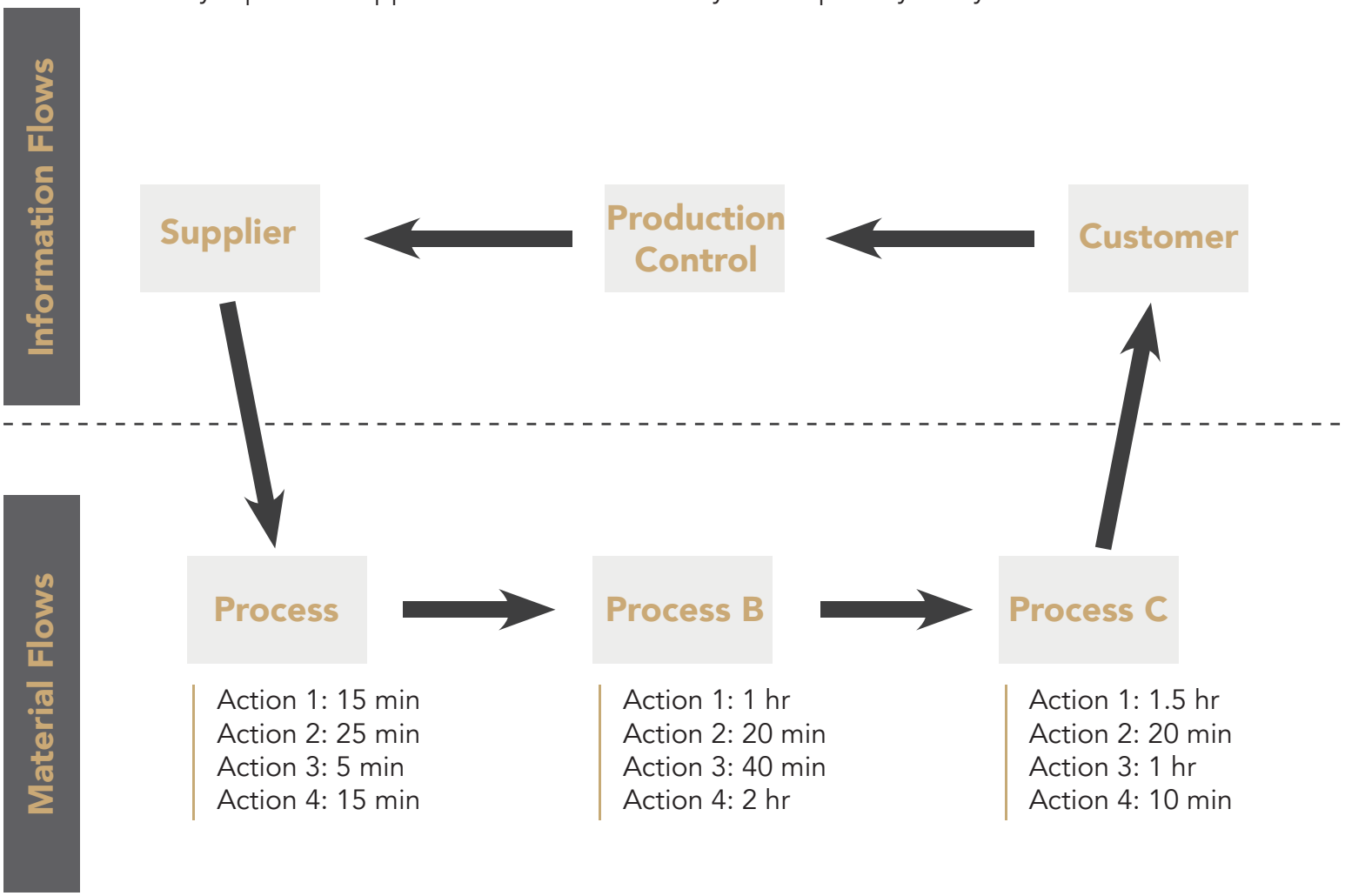
[5] Meyer, Zlati, "Get Ready. Amazon-Whole Foods deal Will Change How You Buy Food Forever," USA Today, June 19, 2017.

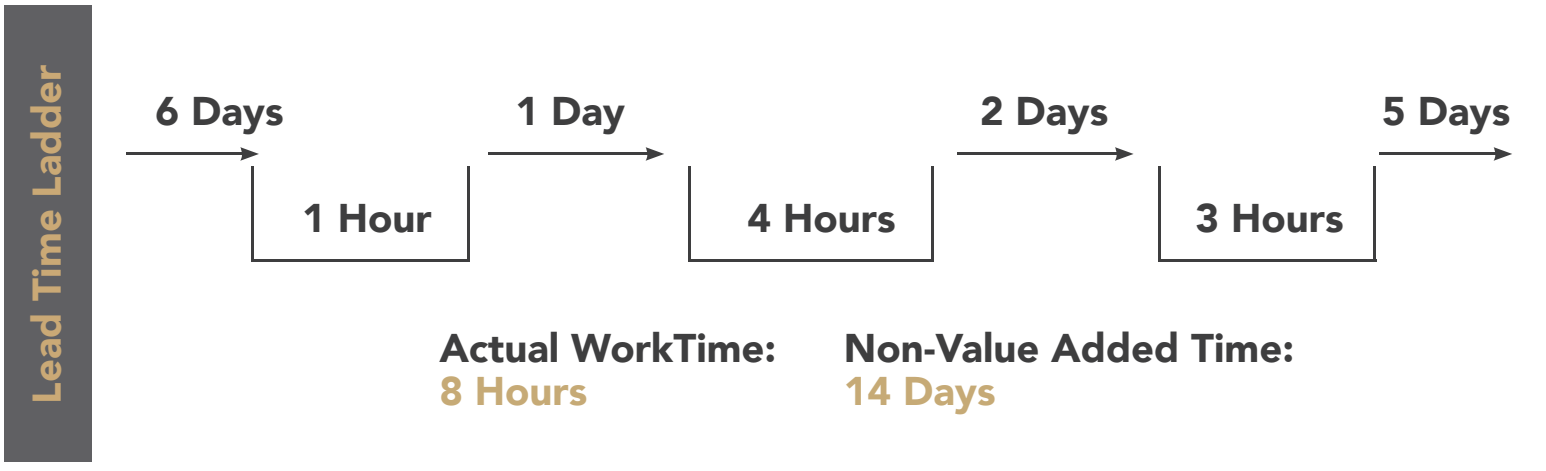
[6] Andrew Grove, Only the Paranoid Survive: How to Exploit the Crisis Points that Challenge Every Company (Crown Business, 1999).

VALUE STREAM MAP EXAMPLE

A

A value stream map is a visual representation of a process in which each box represents an action in the process, and each arrow represents the delay that occurs in between each action. The value stream map identifies waste in the workflow and visually represents opportunities to reduce delay and improve your cycle time.

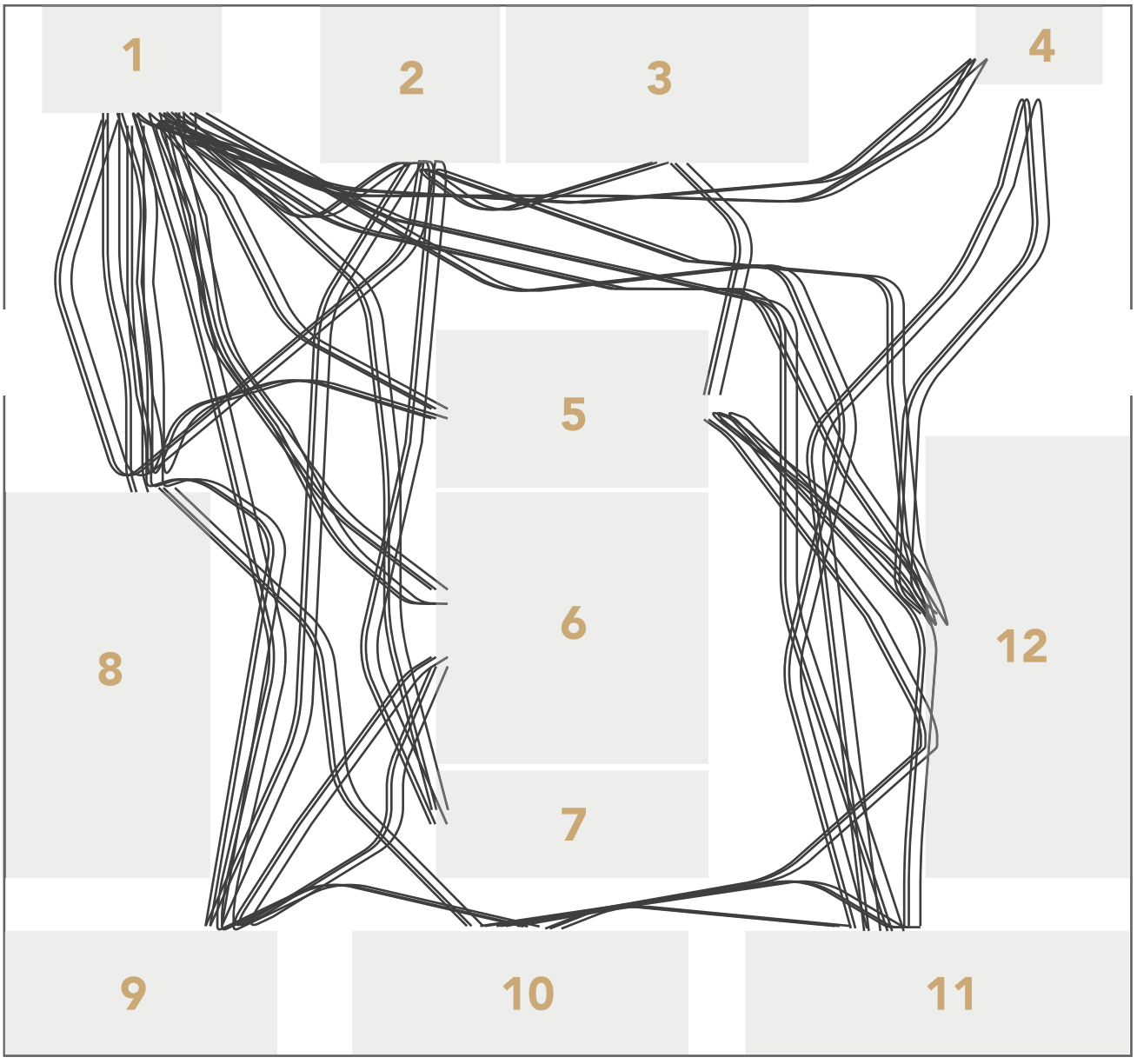




SPAGHETTI MAP EXAMPLE

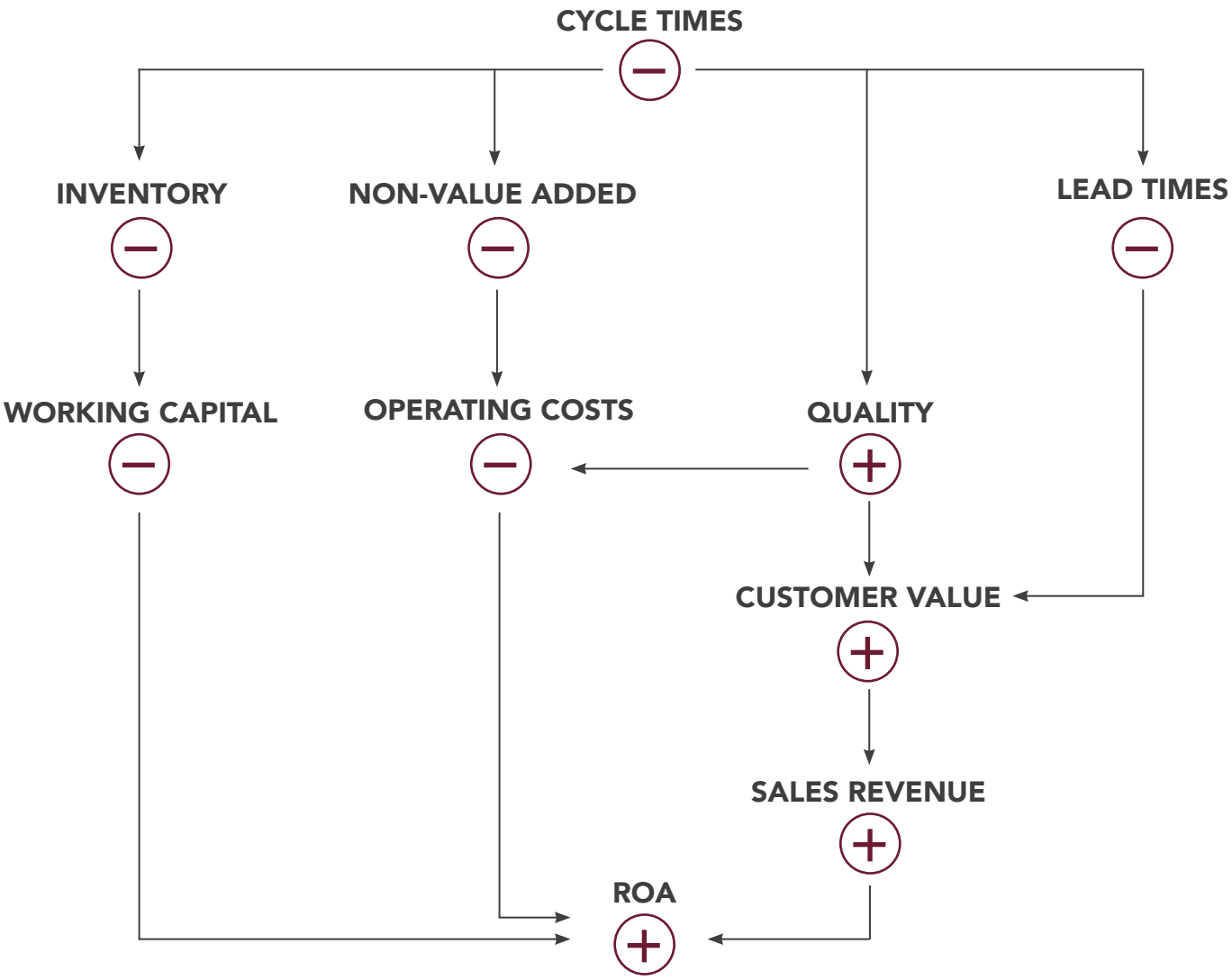
B

A spaghetti map is a visual representation of the path of a person or activity. The continuous flow line identifies redundancies in the workflow and opportunities to reduce travel and other types of waste.



SPEED WINS - CYCLE TIMES AND ROA

Most businesses take far more time to respond to customer orders than justified by the value-added work involved, usually by a ratio of >20 to 1! If we can rethink our business model to cut cycle time (i.e., order throughput time) in half, getting to just 10% effective utilization of clock time, we would slash inventories, floor space, overhead, and quality problems along the way.



LEAN GLOSSARY (ABRIDGED)

Creating a 'lean' culture requires thoughtful product and service offerings designed to satisfy the 'voice of the customer' and executed using high quality processes. Designs and processes are 'error-proofed' via built-in product features and by the way we equip, layout the workplace and train our staff. Highly cross-trained staff begin to act as productivity engineers, quality inspectors, safety specialists, maintenance workers, janitors, and customer advocates. Along the way, we constantly work to eliminate interruptions or delays to the steady flow of work by designing quick job 'changeover', increasing workplace orderliness and discipline, and improving real-time coordination with suppliers. Employees routinely engage in problem-solving, process improvements, and performance reporting. This is done while pursuing a 'make to order' flow of activity that minimizes inventories and buffers which 'de-link' us from real-time customer demand. Lean cultures produce what's needed, when needed, without waste. This is true for medical clinics, distribution companies, bakeries, and professional service firms, any business with repeatable activities.

5S
A system of workplace standardization and organization ("a place for everything and everything in its place") to help create a highly productive, visually organized and safe workplace. The 5S's are Sort (remove unnecessary items), Set in Order (neatly arrange, lable, reduce wasted motion/action), Shine (scrub, keep clean and in top condition), Standardize (maintain the first three S's according to standard method), and Sustain (reinforce and make a habit of the first four S's).

A3
A standardized report in a consistent storyboard format (11 x 17 paper) used in strategic planning, project planning and reporting, and problem-solving.

Balanced production
All operations or cells produce at the same cycle time. In a balanced system, the cell cycle time is less than the 'takt' time.

Benchmarking
Comparing performance (products, services, practices) against best-in-class firms.

Bottleneck
Any resource whose capacity is equal to or less than the demand placed on it.

Catch-Ball
A series of discussions between managers and employees or team members in a value stream during which data, ideas, and analysis are thrown from one to another like a ball to open up productive dialogue aimed at generating shared understanding and 'alignment'.

Cells
An arrangement of people, equipment and materials such that processing steps are adjacent and in sequential order to achieve a smooth and efficient continuous flow in any value stream.

Continuous Flow
A key lean goal in which a value stream flows continuously from the first step until the last (e.g., raw materials to finished product or service) as if all efforts were tied to a continuous conveyor. This ideally involves producing and moving one item at a time through continuous processing steps with each step performing just what's needed by the next step (also called single-piece flow).

Current State Map
Visualizing the current value stream process and identifying sources of waste.

Cycle Time
The time required to complete one cycle of an operational process.

DFMA
Designing products for ease of error-proof and efficient manufacturing and assembly, including minimizing part numbers to support lean/JIT supply with minimum complexity.

Error Proofing
Eliminating the possibility of product and process error by 'designing out' potential mistakes, failure 'modes,' and/or their root causes by making it physically impossible to make an error or by building into the process the ability to immediately see errors when they occur.

Five Whys
A problem-solving method in which one repeatedly probes the most expert in a process, asking "why?" five times in series or until the problem/mistake's root cause is uncovered.

Functional Layout
The traditional practice of grouping activities or operations by type which results in separated departments of 'silos' instead of continuous flowing values streams.

Future State Map
Your organization's current version of your future vision, which forms the blueprint for your lean implementation plan by helping to design how the process should operate. This keep changing and refining as you learn more along the way in your lean journey.

Just-in-Time (JIT)
Principles that are fundamental to Time-Based Competition - waste elimination, process simplification, setup and batch-size reduction, parallel processing, and layout redesign - are critical skills in every facet of the lean organization. JIT produces and delivers just what's needed, just when it's needed, in just the amount needed. The key elements of JIT are flow, pull, standard work, and takt time.

Kaizen
"Change for the better," a rapid improvement team process aimed at driving continuous improvement of an entire value stream or an individual process to create more value with less waste. There are two kaizen types: (1) system or flow kaizen focuses on the overall value stream and (2) process kaizen attacks individual processes.

Kanban
A signaling device (typically a card) that gives instruction to produce or convey items in a pull system. Continuous Improvement or Kaizen is achieved by reducing the number of Kanban in circulation, which highlights line/flow problems.

Lead Time
The total time a customer must wait to receive a product after placing an order. When a scheduling and production system is running at or below capacity, lead time and throughput time are the same. When demand exceeds the capacity of a system, there is additional waiting time before the start of scheduling and production, and lead time exceeds throughput time.

Lean-friendly culture and leadership
Respect for the individual, humility, commitment to continuous learning/improvement/teamwork; holistic long-term focus coupled with daily discipline on details. Begins with hearing the 'voice of the customer' to ensuring all 'critical characteristics' are addressed.

Lean Operation
Seeking the ideal state for any business systems is the goal. This includes organizing and managing product development, operations, suppliers, and customer relations in a manner that requires less human effort, less floor space, less capital, and less time to produce products with fewer defects to precise customer desires (contrasts with mass production approach).

Mass Customization
The ability to produce a high volume throughput that is tailored to each individual customer of the product or service (a value stream with both high 'volume' and 'mix').

Monument
A work center in a value stream that is very difficult to change or move (due to size, cost or complexity), requiring 'special feeding', inventory, special handling, and reduced flexibility.

Non-Value Added
Activities or actions taken that add no real value to the product or service making such activities or action, a form of waste ('muda' in Japanese), meaning anything that interrupts or delays the flow of products/services through the value stream and out to the customer.

Overproduction
Producing more, sooner or faster than is required by the next process.

Pacemaker Process
Any process along a value stream that sets the pace for the entire stream. (The pacemaker process should not be confused with a bottleneck process which necessarily constrains downstream processes due to a lack of capacity).

Plan, Do, Check, Act (PDCA)
A repeating 4-stage improvement cycle (also known as the 'Deming Cycle') based on the scientific method of proposing a change in a process, implementing the change, measuring the results, and taking appropriate action:
Plan: Determine goals for a process and needed changes to achieve them.
Do: Implement the changes.
Check: Evaluate the results in terms of performance.
Act: Standardize and stabilize the change or begin the cycle again, depending on results.

Policy (or Strategy) Development
Lean's approach to cascading strategic goals into detailed operating goals and metrics throughout the organization while maintaining alignment/teamwork. A means by which goals are established and measures are created to ensure progress toward those goals (i.e., what/who/how). This is often done visually with an integrated chart that shows important linkages, systematically exploiting high level goals into lower level goals and activities across the entire organization. Also known as Hoshin Planning.

Process
The flow of material or information in time and space. The accumulation of sub-processes or operations that transform material from raw material or information to finished product.

Processing Time
The time a product is actually worked on in a machine or work area.

Production Lead Time (also Throughput Time and Total Product Cycle Time)
The time required for a product to move all the way through a process from start to finish. At the plant level this is often termed door-to-door time. The concept can also be applied to the time required for a design to progress from start to finish in product development or for a product to proceed from raw materials all the way to the customer.

Pull System
One of three key elements of JIT. In pull systems, the 'downstream' process takes the product they need by pulling it from the previous operation or supplier. Customer orders are a pull signal to the producer that a demand has been placed. The pull system links accurate information with the process to minimize waiting and overproduction.

Push System
Traditional batch mass production where product is produced to a schedule regardless

of whether the customer requires it. The pushed product goes into inventory, and lacking a pull signal from the customer indicating a requirement, more of the same product could be overproduced and added to inventory.

Quality Function Deployment (QFD)
A visual decision-making procedure for multi-skilled project teams which develops a common understanding of the voice of the customer and consensus on the final engineering specifications of the product that has the entire team's buy-in. QFD integrates the perspectives of team members from different disciplines, ensures that their efforts are focused on resolving key trade-offs in a consistent manner against measurable performance targets for the product, and deployed these decisions through successive levels of detail. Using QFD eliminates expensive backflows and rework as projects near launch.

Quick Changeover
Techniques designed to enable rapid or instantaneous changeovers of job types or tooling in a process (typically be eliminating 'internal' changeover time and replacing it with 'external' time) so as to improve flexibility and not interfere in any way with continuous flow.

Queue Time
The time a product waits for the next design, order processing, or fabrication step.

Sensei
An outside lean teacher/consultant that assists in implementing lean practices.

Sequential Changeover
Also sequential set-up. When changeover times are within Takt time, changeovers can be performed one after another in a flow line. Sequential changeover assures that the lost time for each process in the line is minimized to ne Takt beat. A set-up team or expert follows the operator, so that by the time the operator has made one round of the flow line (at takt time), it has been completely changed over to the next product. The ultimate quick changeover.

Single-Piece Flow
When orders/products proceed, one complete item at a time, through various operations in design, order taking, and production, without interruptions, backflows, or scrap.

Standard Work
A precise description of repeatable work activity usually specifying cycle time, takt time, sequencing of tasks, and the minimum inventory on hand needed to conduct the activity.

Supermarket
An array of a part queues where the minimum/maximum inventory amount that can be stored in each queue is regulated. Supermarkets are the buffers between push and pull systems in a value stream.

System Kaizen
An improvement 'blitz' project aimed at an entire value stream.

Takt Time
Available production time divided by customer demand (e.g., if a widget factory operates 480 minutes/day and customers demand is 240 widgets/day, takt time = two minutes...or if customers want two new products/month, takt time - two weeks. Takt time's purpose is to match production with demand and provide the 'drumbeat' for a lean production system.

Throughput Time
The time required for a product to proceed from concept to launch, order to delivery, or raw materials into the hands of the customer, including both processing and queue time.

Total Productive Maintenance (TPM)
A series of methods, usually performed 'within station or cell' aimed at ensuring that every machine in a production process is always able to perform its required tasks so that production is never interrupted.

Toyota Production System (TPS)
The production system developed by Toyota Motor Corporation to provide best quality, lowest cost, and shortest lead time through the elimination of waste. TPS is comprised of two pillars, just-in-time production and real-time station quality control. TPS is maintained and improved through iterations of standardized work and kaizen, following the scientific method of the PDCA cycle.

Value
What a customer would be willing to pay for. A capability provided to a customer at the right time at an appropriate price, as defined in each case by the customer.

Value-Added Analysis
An activity in which a process improvement team strips the process down to it essential elements, isolating the activities that actually add value to the product or service in the eyes of the customer. Remaining non-value adding activities (waste) are targeted for extinction.

Value Chain
Activities including those outside of your organization that add value to your final product, such as the value-adding activities of your suppliers.

Value Stream Mapping (VSM)
A simple diagram of every step involved in the material and information flows needed to bring a product from order to delivery. A current-state map follows a product's path from order to delivery to show current conditions (including both value-creating and non-value creating activities). A future-state map shows opportunities for improvement identified in the current-state map to achieve a higher level of performance in the future. Once we 'learn to see' in this way, it's common to find 95+% waste in a value stream! Two brief YouTube videos explain: Lean Simplified - Value Stream Mapping and Lean Simplified -

Spaghetti Diagramming. Once your appetite is whetted, consider reading Learning to See (Rother & Shook, Lean Enterprise Institute, 1998) or Value Stream Management for the lean Office (Shuker & Tapping, Productivity Press, 2003).

Visual Control

The placement in plain view of all tools, parts, production activities, and indicators of production system performance so everyone involved can understand the status of the system at a glance and manage the real-time flow of work through a value stream.

Visual Workplace Discipline

Transparency and immediate feedback is critical to facilitate real-time decision-making and value-added activity. People and processes won't improve without standards continually refined. Lean improvement results from a healthy blend of adhering to proven processes and continually improving the status quo. Early in the process of adopting lean methods, companies conduct '5S' events (see Glossary) to organize work areas for maximum clarity, quality, flow, ergonomics, and productivity. The idea is to have a visually self-governing workplace in which "there's a specific place for everything with everything always in its place." Visual workplace labeling, recording and display of key information is vital to daily performance tracking and communicating with others. When workflows are engineered to be clearly visual, it's easy to see when bottlenecks or interruptions impede performance.

War Room

A dedicated project management room, used especially in product development, to enhance effective and timely communication, displaying highly visual charts and graphs depicting program timing, milestones and progress to date and countermeasures to existing timing or technical problems. Project leaders will often have desks in the war room as will others at appropriate points in a program's life. The purpose is to ensure project success and shorten the PDCA cycle. Project/Program managers typically use A3 Reports to communicate periodic status.

Waste

Any activity that consumes resources but creates no value for the customer. Lean practitioners identify seven types of waste. Remember the seven types of waste with the mnemonic STEWARD:
Surplus: expending resources to produce/sustain anything that's not needed (overproduction)
Transport: moving material, product, supply, or people (conveyance)
Execution; performing duties that do not add customer value (over processing)
Waiting: idled resources starved for something required to complete necessary work
Action: excessive physical motion beyond what's necessary to perform work (excess motion)
Reserves: assets that aren't necessary to operate the business and serve customers (inventory)
Defects: time/energy/resources used to check, inspect, repair products/processes (correction)

Workplace Organization

(see 5 S)

Sarah succeeded her father in building a regional distribution company, Crown Supply, to serve site infrastructure contractors across their state. They built the business by being highly responsive, and now had seven metro locations. Crown's reputation for prompt, friendly service had enabled them to periodically acquire local distributors. They maintained a local presence in each market with on-site inventory warehouses and sales people. While excited to have a growing platform for ministry, Sarah was becoming increasingly frustrated by her inability to "get ahead of the curve" financially. It seemed that c Customer desire for local inventory, coupled with the prohibitive expense of re-shipping bulky commodity products, kept Crown from attaining major advantages versus smaller local competitors. Their overhead leverage was limited to regional advertising and centralized administration (i.e., HR, accounting, and purchasing). Crown generated a mere 8% ROA in its relatively high volume, low margin, inventory-intensive business. When construction inevitably softened, financial pressure due to high levels of slow-moving inventory intensified.

Sarah's operations VP, Frank, knew that he should be able to generate advantages compared to smaller local competitors beyond slightly sharper supplier pricing due to higher volumes. He knew that many inventory items were 'slow moving,' but conventional wisdom said that it was necessary to maintain local stock for all key items and that it wasn't profitable to transfer items between warehouses using costly 'less than trailer load' (LTL) shipping. In fact, the freight savings seemed so big on most items that Crown's policy was to set each supplier's replenishment orders to the quantities needed to achieve full trailer loads (TL). Still, he knew that there must be a better way than maintaining six months' supply in inventory! When benchmarking stocking distributors in other industries, Frank noticed that many somehow turned their inventories 4-6 timesX per year (i.e., maintaining 2-3 month's supply on-hand). If only Crown could do the same, the company would shed inventory amounting to 40% of its overall assets and improve ROA by 67%!

Frank decided to take a fresh look at how material and information flowed through the company by mapping Crown's overall value stream (supplier - warehouse - customer). He had recently read about 'just-in-time' (JIT) product delivery in lean thinking, and was particularly intrigued by the way that soft drink bottlers managed freight between bottling plants, distribution centers, and retailers, using coordinated 'milk route' logistics to 'make the rounds' to each location every week. This enabled all shipments to enjoy TL freight economics while meeting weekly demand. Though Crown's incoming materials came from external suppliers, Frank knew he was already paying for freight and could negotiate to 'carve-out' (or credit) this cost to fund his own dedicated in-bound freight using a contract carrier. This would be a challenge, since he had 1,000 stocked items and 39 suppliers, many from out-of-state.

Frank knew that supplier consolidation is often helpful in enabling lean operation.

He began to streamline his supply base and give far fewer 'partner' suppliers, located within a 400-mile radius, more of Crown's business. This helped him to negotiate deeper volume discounts and enabled suppliers to ship full trailers twice as frequently, thereby cutting his average inventory levels nearly in half. Next, Frank began managing a weekly milk route for many key items in which smaller quantities were picked up from each supplier on trucks which stayed fairly full en route. Ultimately, two full-time trucks each visited half the suppliers and all Crown warehouses on a fixed weekly schedule. This also provided a cost-effective and reliable way to transfer 'emergency' inventory between internal warehouse locations. Over time, the resulting two-thirds reduction in inventory enabled Crown to reduce its warehouse space and staffing costs without harming customer service. In fact, by 'hitchhiking' on the milk route to provide expedited service for emergency orders, Crown instituted an industry-leading 'quick-ship' program which enabled them to attract additional business and charge a small premium on 10% of incoming order. This new level of responsiveness made them indispensable to many major customers (and suppliers) who greatly appreciated this new capability.

Within two years, Frank was dealing with just 12 key suppliers and receiving 80% of Crown's product flow via the weekly milk routes. Moreover, ROA had doubled to 16%! Frank began lobbying Sarah to have Crown expand statewide so he could leverage the added volume and increase his milk route frequency to twice per week, further reducing inventory and customer lead-times, and improving ROA to 20+% (see table below). With such a healthy ROA in a mature business, Crown was on its way to becoming a profitable 'big dog' with a growing regional platform for ministry!

Value Stream	Sales ($mil)	Profit ($mil)	Inv ($mil)	Inv T/O	Tot Assets ($mil)	ROA
Old	$100	$4	$30	2	$50	8%
New	$100	$5.5	$7	8.5	$27	20.4%