

FIX THE PROCESS, NOT THE PEOPLE

Medtronic, Inc. successfully applied its unique Lean Sigma formula to global finance.

BY RENEE CVEYKUS AND ERIN CARTER, CPA

Just a few years ago, most finance professionals would have been skeptical if someone had told them that two process-improvement methodologies originating in manufacturing could be applied to core financial processes. Medtronic, Inc., the global leader in medical technologies, has dispelled that skepticism by successfully deploying its own unique blend of Lean Sigma principles—pioneered as Lean and Six Sigma by Toyota Motor Corporation and Motorola, Inc., respectively—in several financial transaction scenarios starting in 2005.

To address improvement opportunities in Accounts Payable (AP) processes, for example, Medtronic's Lean Sigma team chose a *kaizen* (*kai*=continuous, *zen*=improvement in Japanese) from its arsenal of powerful Lean Sigma tools. The accelerated, week-long *kaizen* resulted in measurable improvements to the processes, substantial cost savings, and a culture change. One of five global AP *kaizens* in seven months (see "AP *Kaizens* Completed," right), the event demonstrated how Lean Sigma, proven and fine-tuned by Medtronic in numerous global applications, is readily deployable in any business scenario today, including Finance.

Before we describe this initiative, though, we want to share some background about Medtronic.

THE UNSURPASSED STANDARD OF COMPARISON

When Earl Bakken co-founded Medtronic in 1949 as a medical equipment service company, he couldn't have predicted that 57 years later his company would have almost 36,000 employees (35,618 as of April 29, 2006) in more than 120 countries and be recognized as the global leader in medical device technologies. Enjoying a five-year compound annual growth rate of 15%, the company today measures its success by a remarkable statistic: A Medtronic® device is used every five seconds around the world.

With the emergence of numerous innovative medical device technologies over the past decade and the proliferation of medical device companies globally, the competitiveness of this market had intensified incredibly. Medtronic responded by diversifying its portfolio, broadening its business focus from the original core cardiac devices to seven business units: Cardiac Rhythm and Disease Management, Spinal & Navigation, Neurological, Vascular, Diabetes, Cardiac Surgery, and ENT. The fact that about two-thirds of Medtronic's \$10.055 billion revenues for FY 2005 are from products introduced in the last two years reflects that explosive growth. Acquisitions; the need to continuously train a rapidly growing, diverse employee population; and the adoption of complex technologies and processes on both the manufacturing and business sides of the organization are just a few of the challenges accompanying that growth.

To continue "...to be the unsurpassed standard of comparison," as postulated by one of the core tenets of its mission, Medtronic needed to deploy an organization-wide, disciplined approach to managing growth. True to the entrepreneurial spirit of the company, Medtronic's businesses were experimenting with different initiatives in the late 1990s, including Lean and Six Sigma. These

AP KAIZENS COMPLETED

Four of the AP *kaizens* completed to date targeted the following processes:

- ◆ Receipt-through-payment distribution for non-PO invoices (achieved a post-*kaizen* lead-time reduction of 53%).
- ◆ Front-end invoice processing from mail to index (lead time reduced from three days to one, optimized vendor discounts—see section on Measurable Results in Five Days.) The front-end lead-time reduction resulted in a monthly increase of approximately 15% in prompt payment discounts captured through invoice processing.
- ◆ Paper check printing process (payment processing time reduced by 50%). The freed-up time can be spent on other payables functions, in essence increasing the "bandwidth" within the AP department.
- ◆ Rework and backlogs after implementation of a new software tool (lead time reduced by 85%, daily volume up 70%).

early adopters practiced process-improvement methodologies independently in different areas of the company. For example, Medtronic Xomed, Inc. in Jacksonville, Fla., adopted the Lean philosophy in 1999, building a showcase of Lean best practices within two years. Also, the distribution system at Medtronic Xomed underwent a pioneering "Lean transformation" that resulted in an 80% reduction in the lead time for packages to be ready to leave the plant. The transformation involved reconfiguring the entire traditional "pick-check-pack-freight" distribution process into a continuous flow from which waste and inefficiencies—even the conveyor and freight station—were removed. The rapid, breakthrough successes Medtronic Xomed achieved helped accelerate the expansion of the disciplines across the organization and resulted in Medtronic Xomed winning the *Industry Week* Best Plant Award in 2002.

EXPANDING IN STRATEGIC WAVES

When Vice President of Global Business Solutions Scot Webster joined Medtronic in early 2003 to lead the company's newly formed Global Quality Solutions group, he pulled together a diverse team of Lean, Six Sigma statistical, and Quality experts from areas across the company, such as Information Technology, Sales, and Quality. That

group undertook the strategic implementation of the disciplines across the company's seven businesses globally.

In a global sweep of process-improvement initiatives, the two disciplines quickly evolved into Medtronic's own unique Lean Sigma blend that combines best practices from both into a powerful set of tools for an ever-expanding range of applications. In October 2003, Global Quality Solutions initiated so-called Lean Sigma "waves," four-week training classes covering the principles of Lean Sigma. These training waves have resulted in the formation of an extensive Lean Sigma infrastructure throughout the company, with 60 waves completed to date and approximately 10 more expected to be completed by the end of 2006.

A core team of 10 Master Black Belts and four Black Belts in the Global Quality Solutions group helps identify and prioritize opportunities and works closely with approximately 400 trained Black Belts throughout the company and a growing population of part-time Green Belts. While Black Belts are fully dedicated to the practice of Lean Sigma, Green Belts dedicate half their time to Lean Sigma and the other half to their regular jobs. According to Medtronic's custom-blended Lean Sigma discipline, "Six Sigma makes a science out of process capability," and "Lean makes a science of process flow." DMAIC serves as the commonly shared methodology. (DMAIC steps are Define (the opportunity), Measure (performance), Analyze (causes), Improve (performance), and Control (causes).)

All practitioners are highly proficient in the language of Lean Sigma. Japanese words such as *muda* (waste), *pokayoke* (mistake-proofing), and *kanban* (literally signal, a pull system based on waiting until something is needed), or *takt* time (a German musical term that means rhythm or pace) have become common usage.

Lean Sigma practitioners choose the appropriate process technology for a specific project, mixing and matching parts of the two philosophies as deemed appropriate in each case. Lean is generally put into play if the project focus is on cycle time, inventory, basic quality, and floor space. Six Sigma is the method of choice for addressing tougher quality issues, such as processes that don't produce the desired results and require quick solutions—improved time for paying invoices, for example. Typical Lean Sigma benefits are defined in these improvement benchmarks:

- ◆ Productivity increase of more than 20% per year,
- ◆ Lead time reduced to a few days (75%),
- ◆ Manufacturing space cut in half,

- ◆ Overhead and quality cost reduction of 20% per year,
- ◆ Little or no capital investment, and
- ◆ Cycle times at three to four times "one-piece touch time."

In most of the close to 800 projects completed since December 2003, actual improvements have regularly exceeded these benchmarks, with an average of approximately \$150,000 saved per initiative.

QUICK FIX FOR BROKEN PROCESSES

Medtronic's growing cadre of Lean Sigma practitioners quickly realized that the processes could be applied to scenarios outside traditional production-line challenges such as bottlenecks, excessive inventory, or scrap. In finance, for example, instead of widgets moving along the production line, invoices move through the processing steps of the transaction. According to the new Lean Sigma mantra, "*a process is a process...is a process.*" Any process, including business transactions, can be broken into steps and optimized with DMAIC.

Kaizen has emerged as the tool of choice for the fast transformation of transactional business processes because it focuses on specific functional areas where change must happen quickly to gain efficiency and ultimately achieve customer satisfaction. Medtronic's Lean Sigma *kaizen* prescriptively applies the five DMAIC steps over the five days of the "event," which is carefully planned in pre-work by the assigned Lean Sigma practitioners and the project champion. During the *kaizen*, the team isn't just led through exercises—it does all the work. Team members measure and time the existing process, identify the waste, dismantle the old process, and create the ideal state by implementing the new process. The team's ownership and buy-in are essential prerequisites of the *kaizen* approach.

ONE CLOSED-LOOP PROCURE-TO-PAY PROCESS

Now let's look at Medtronic's Accounts Payable innovations. With close to 1,300 employees worldwide, Medtronic's Global Finance organization processes huge volumes of transactions a day. As a global organization it must comply with rules on many levels, such as meeting business conduct standards for medical device companies, accommodating country-by-country differences in taxation and business practices, and fulfilling regulatory requirements for detailed line itemizations on invoices.

In today's world where time zones, languages, taxes, and country-specific laws no longer present substantial barriers, customers everywhere demand speed and the

same high level of service. That requires globalization and the elimination of decentralized silos. Ultimately, in the highly efficient, truly global finance organization, the different financial processing centers are virtually consolidated and capable of processing work 24/7. Potential overloads in Europe could now be processed in the U.S. and vice versa. Medtronic's financial management realized that achieving this level of seamless global efficiency would require shared learning and a unifying technology that would provide all financial employees with access to one source of the truth whether they are performing a transaction in Asia, Europe, or the U.S. Technology also is key in moving toward a largely paperless, electronic process and eliminating some of the costly, manually intensive processes, such as printing a check.

Medtronic's Global Disbursement Council, the company's governance body for global disbursement policies whose members are Accounts Payable managers from around the world, captured this globalization strategy in a new Global Finance vision and mission. The new vision calls for "One global disbursement process and organization, which will have proven value through operational excellence." The new mission challenges Global Finance to "Be a catalyst for one exceptional Medtronic closed-loop Procure-to-Pay Process."

A TEXTBOOK KAIZEN

Finance adopted a dual strategy: the implementation of a new IT system (SAP) and partnering with the Global Business Solutions Lean Sigma practitioners to optimize its processes. The steep learning curve experienced during the global implementation of the new SAP software system initially caused delays in some financial processes, motivating Global Finance to adopt Lean Sigma quickly.

Since May 2005, Medtronic Global Finance has successfully completed five AP *kaizens* in the U.S. and Europe, each addressing specific lead-time reductions. Today there are more than 50 Lean Sigma Black and Green Belts in Medtronic's worldwide Finance organization.

The AP *kaizen* conducted August 8-12, 2005, at Medtronic's Shoreview, Minn., facility is a textbook example of the rigorous discipline applied with this custom-optimized Lean Sigma tool and the significant benefits the quick-fix *kaizen* approach achieved.

MEASURABLE RESULTS IN FIVE DAYS

AP Operations Manager Rick Pottratz, who manages 30 employees in AP System Support and AP Operations (including Customer Service) at Medtronic's Shoreview

facility, calls himself "both a stakeholder and the project champion of the *kaizen*." He summarizes the initiative's objective in simple terms: "reducing the time from receipt of mail to vouching the invoice." But shortening the lead time for the three front-end processes preceding vouching—Mail-Scan-Index—wasn't a simple proposition. The old pre-SAP system had two separate front-end processes for purchase-order-related and nonpurchase-order-related invoices that needed to be brought together. On average, this AP group processes more than 900 P.O.-related and more than 500 non-P.O.-related invoices a day. The front-end process for the non-P.O. invoices involves multiple entries as required by the system interface with the AP Purchasing system.

Monthly spikes in workload caused by variations in purchasing and sales volumes, for example, challenged the capacity of the group, creating backlogs of unprocessed mail. The team realized that to achieve the complete satisfaction of their outside vendor and internal customers and maximize the value of prompt payment discounts from vendors, they would need to optimize a "first-in/first-out process." Here's what they did.

Kaizen Pre-Work

During pre-work, the Lean Sigma leaders and the project champion defined the *kaizen*'s project charter: *Reduce the front end for mail to index from three days to one.* They also aligned support groups including Facilities and IT and prepared the logistics for the event.

Day 1

During an intense kickoff session, the 14-member *kaizen* team, which included front-line workers in AP, a Master Black Belt, and a Black Belt, closely examined the existing processes, identified areas of inefficiency, and completed the current value-stream map. Non-P.O. invoice processing surfaced immediately as a key factor for the long lead times because of the multiple entries required during the front-end process for non-P.O. invoices. During a tour of the existing invoicing processes, the team identified several opportunities for improvement:

- ◆ Eliminate invoice, attachment, and P.O. batching;
- ◆ Eliminate invoice and attachment sorting;
- ◆ Reduce daily distance walked;
- ◆ Eliminate redundant inspections;
- ◆ Eliminate mail sorts.

Day 2

The team began Day 2 by documenting the sequence of

Figure 1: Value-Stream Map of AP Processes Before and After the *Kaizen*

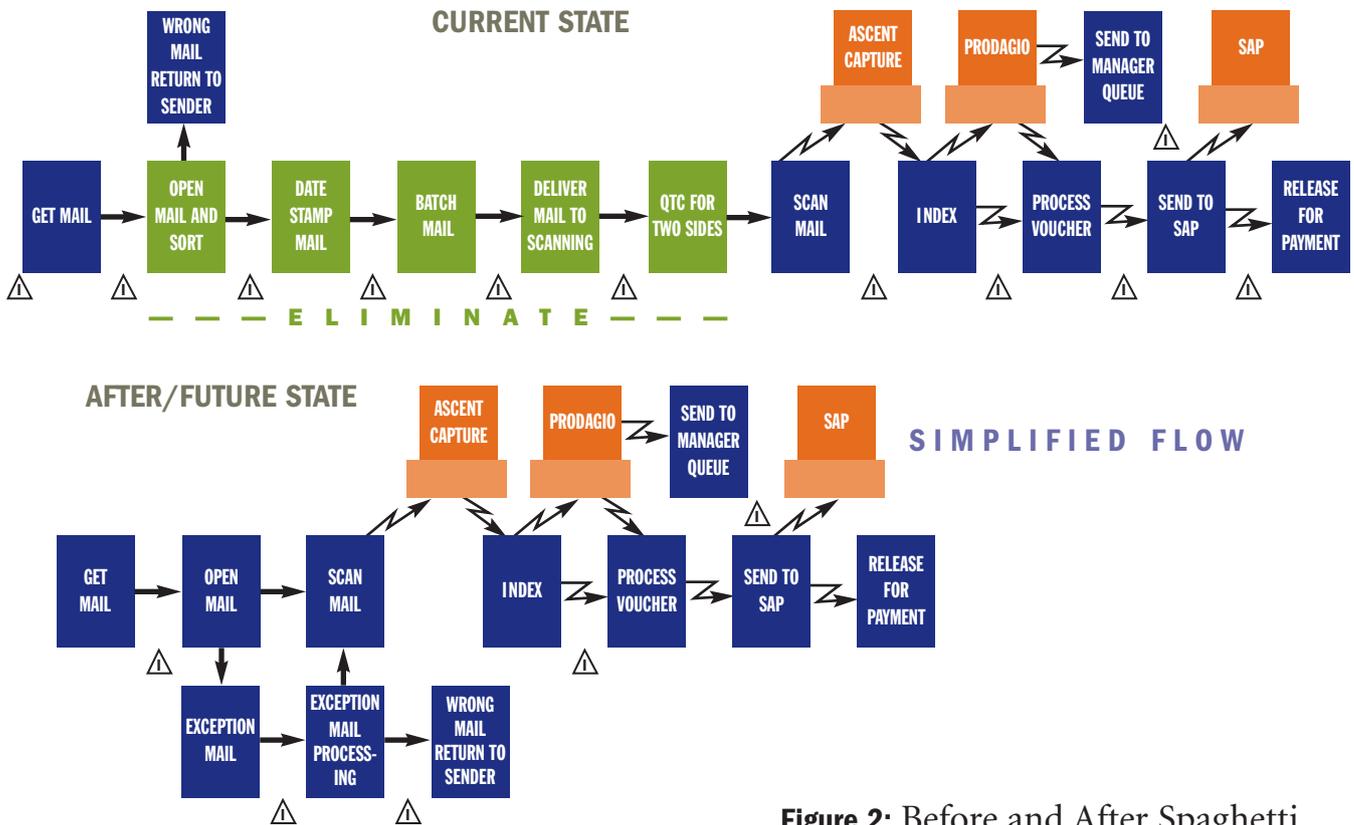
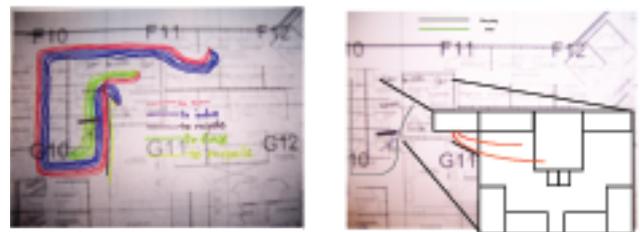


Figure 2: Before and After Spaghetti Diagrams of Distance Traveled



1,464 Feet

165 Feet

events for each major process step (Mail-Scan-Index) and gathering information about tasks, work steps, cycle times, inventory, defects, and distance traveled for each. They calculated a *takt* time for specific functions, which was the rate at which each functional work step would have to be completed to meet customer demand. They also *measured* workload and the time each work step took as well as the number of employees performing the function, be it sorting mail, scanning, or indexing each invoice—for example, each of the three employees needed to index invoices at a *takt* time of 470 a day to meet customer demand. At the end of Day 2, the team had completed the future value-stream map (see Figure 1).

Day 3

On Day 3, the team focused on making the necessary physical changes to achieve the simplified workflow. They prepared before-and-after spaghetti diagrams that illustrated how the physical flow needed to change to make the process highly efficient and reduce travel distance significantly (see Figure 2). The team reconfigured desks and workspaces and added wheeled mail racks and

paper bins to facilitate flow from workstation to workstation. Work-balancing techniques, including single-piece flow, standardized work methods, reducing nonvalue-added time, and changing work sequence, streamlined the process further. The Japanese concept of 5S housekeeping—*sort, straighten, scrub, systemize, standardize*—was applied to organize the work areas for optimal efficiency, ergonomics, and logical sequence.

Day 4

The team now put final improvements in place, transformed workstations into work-smart spaces, and turned

Table 1: AP Kaizen Event Goals and Results

METRICS	ORIGINAL	GOAL	POST-EVENT	% CHANGE
Lead Time (front-end invoice processing)	3 days	Same day	1 day	67%
Walking Distance (Mail-Scan-Index area)	1,464	50%	165	89%
Total Cycle Time (front-end processes)	477 seconds	1% reduction	453 seconds	5%
Mixed Model Integration (P.O. and non-P.O. invoices)	P.O. and non-P.O. separate process	Single Process	Single Mixed Model Process	N/A

on new software improvements and visual management boards. Among the improvements was a modification of the imaging-capture software for multiple invoice headers that helped recognize different invoice types, enabling prioritization during indexing. Also, all invoice types were brought into one queue for processing. After this reorganization, each workstation had an operation method sheet that pictorially showed all the steps to be followed. The two flat-screen monitors installed high on the walls to be visible from anywhere in the area enabled managers and the entire team to observe work demand and work completed and to monitor all processes real-time. A new training certification board was also installed to display the level of process training that the employees completed. The two flat-screen monitors and the certification board cost less than \$1,000—a small price to pay for the ability to continuously monitor progress.

Day 5

On Day 5, the team reviewed the event goals and “walked” the new process implemented during the week. The physical layout of the area had changed dramatically, and new operational changes and software were in place to optimize the flow of the front-end P.O. processes. Use of a batch header helped prioritize pieces of mail, such as bumping invoices with vendor discount offers to the top. The newly refined AP processes would now be put to the test and analyzed 30 days later, the standard post-kaizen procedure for closing a project.

MEASURABLE RESULTS AND BOTTOM-LINE GAINS

While AP processes had clearly improved and become more efficient, a major challenge remained at the time of the 30-day post-kaizen review. The pre-kaizen processing backlog persisted, masking the actual results of the project. After the team made a focused effort to eliminate that backlog—additional data entry resources were added to work down the indexing backlog—it finally reached its

ultimate goal: processing each invoice on the same day it is received. With the backlog eliminated, improvements could be measured in percentages gained and their positive impact to the bottom line (see Table 1). Using a single portal to all functions, the new SAP software had streamlined the front-end interface for all AP transactions. The team’s focus could now shift to sustaining the improvements over the long term.

Rick Pottratz is pleased. “Invoices are now processed into the system within 24 hours of receipt, providing visibility to management and consistently feeding invoices into the vouching process in a timely manner. Most of us used to think that the Lean Sigma methodology was applicable to manufacturing only. The success of this and the other AP kaizens proves that Lean Sigma can be successfully applied to paper-based, transactional processes beyond the shop floor.” During a tour of the optimized AP area, he proudly points to a small cart with a plant—the former wheeled mail cart used during the kaizen to move piles of mail between workstations. No longer needed for the mail, the idled cart is a fitting symbol for the success of the kaizen.

The Shoreview AP team has adopted a new culture of change since their kaizen. Employees tune in to issues as they arise, tweaking and fixing the process on a continuous basis. The faster processing time improved customer satisfaction, greatly enhancing the credibility of AP processing. Employees have a new sense of empowerment. Because of the post-kaizen efficiencies, they are finding it easier to do their work, which makes them feel successful and reenergized. As part of the visual management strategy, Rick Pottratz posts monthly updates of the key improvement measures on one of the walls, enabling the AP team to track results continuously.

FIX THE PROCESS

“The process is OK, but the people are broken” used to be the prevailing assumption in many organizations just a

CREATING CUSTOMER-FOCUSED VALUE

Initial Lean “transformations” at Medtronic targeted inefficiencies in manufacturing and operational processes that could be changed to create customer-focused value. Following the five principles of Lean, Medtronic Global Business Solutions experts and a project champion guided carefully selected multifunctional teams through the process. Team members typically represented areas across the company such as Human

Resources, Manufacturing, Engineering, Sales and Marketing, Information Technology, Supply Chain, Logistics, or Quality Assurance. A Lean transformation begins by specifying customer value and mapping the existing and

future value stream to define what the initiative is to achieve. Next, the team focuses on making value flow by reconfiguring processes (e.g., lead and cycle time, inventory and equipment, or physical layout). Implementing a pull strategy, Lean teams allow customers to pull products and services at a certain rate of production. The teams use one-piece flow to balance the line and avoid inventory buildup. During the final step, teams adopt and practice a new culture of continuously seeking perfection and pursuing new opportunities.

In parallel, the Six Sigma initiatives focused on identifying defects in a process or product. Teams used this data-driven approach to reduce inherent variability and to achieve as close to zero defects as possible (thus the name Six Sigma or “6 σ ”—six standard deviations fit between target and specification). Six Sigma’s five disciplined DMAIC steps closely mirror the five Lean principles:

- 1. Specify customer value** (define your process in terms of adding value to the customer).
- 2. Map the value stream** (draw a map defining the customer-focused value stream).
- 3. Make value flow** (remove waste and inefficiencies from your value stream).
- 4. Pull, don’t push** (let the customer pull products and services from you).
- 5. Seek perfection** (make continuous improvements).

few years ago. According to that old paradigm, the success of a functional area depended on its staff. All you needed to do was to train employees better and they would be able to fix any organizational inefficiencies. That assumption went hand-in-hand with most employees feeling that they had no authority to make changes. Questioning the established ways of doing things carried with it a sense of disobedience. Financial employees were perhaps even more inclined to adhere to established procedures that needed to be followed day-in and day-out in order to safeguard the bottom-line accuracy of transactional processes.

In a complete reversal of that old paradigm, Lean Sigma postulates “Fix the process, *not* the people.” Blaming and fixing the process and not the people removes the stigma of poor performance and of being the root cause of a broken process. Lean Sigma places the power to change things directly into the hands of the front-line workers who have a personal and professional stake in fixing “their” processes.

Scot Webster points to two key takeaways: “By applying both Lean and Six Sigma methodologies to a process, Medtronic knows it is running the most optimized and efficient process possible—in whatever function it may be. More importantly, the hundreds of employees using tools, implementing these changes, showing this passion, and working across boundaries are developing leadership skills to help meet our future talent demands.” ■

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