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HOW CAN I SHOW MY CEO THAT

Since ROI reflects the results of virtually all of a company's activities, it cannot be improved directly. It can only be improved by improving the inputs of the calculation.

LEAN IS THE RIGHT THING TO DO?

OREST J. FIUME

As featured in the seminal book *Lean Thinking*, Wiremold was able to increase its value from \$30 million to \$770 million in 10 years by using lean strategy. The company's lean journey is well known and has been amply documented. However, when lean advocates try to convince their CEOs and CFOs of lean's benefits by using Wiremold and other companies as examples, they generally are met with the same excuse: "But we're different."

Art Byrne, retired CEO of The Wiremold Company and author of *The Lean Turnaround*, is fond of saying, "The winners will be those companies that focus on their processes, not their results." Art was interested in achieving good results; however, he knew that good results required focus on the physical changes that improve financial performance. He came to Wiremold recognizing that lean is a strategy, not a manufacturing tactic, and every process in the company (not just operations) had to conform to lean principles.

From Art's arrival in 1991 to the sale of the company in 2000, the company achieved remarkable results (shown in Exhibit 1).

In spite of the extraordinary results that Wiremold and other lean companies have achieved, there is still widespread skepticism about Art's focus on process as a driver of financial results. Those of us (including me) who have been trying to spread lean knowledge and practice are largely responsible for this skepticism. When confronted with the usual "But ROI is an important metric in my company," we tend to dismiss this concern with "Don't worry about it, that's a 'result' metric. Just focus on doing the right things, and the right results will come." CEOs and CFOs who have built careers on achieving good results consider this response a glib dismissal of a real concern of theirs and, as a result, dismiss us. Maybe we need another approach to show them how lean is the best way to achieve superior ROI.

What is ROI? It is a single number that attempts to reflect both operating efficiency

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EXHIBIT 1 Wiremold Results from 1990 to 2000

	1990	2000
Assessed value	\$30 million	\$770 million
West Hartford:		
Sales per employee	\$90,000	\$240,000
Gross profit	37.8%	50.8%
Throughput time	4–6 weeks	1 hour–2 days
Product development time	2–3 years	3–12 months
Number of suppliers	320	43
Inventory turns	3.4	18.0
Working cap % sales*	21.8%	6.7%

*W/C = A/R + Inv – Trade Payables

1990–2000 Wiremold stock CAG = 34.7% per year

1990–2000 S&P500 CAG = 15.5% per year

and capital efficiency. Exhibit 2 shows a simplified version of the ROI calculation depicted in the classic DuPont model.

Since ROI is a single number that reflects the results of virtually all the activities within a company, it cannot be improved directly. It can only be improved by improving the inputs of the calculation (i.e., the items described at the lowest level of the model). As we look at the diagram in Exhibit 2, we see that ROI is earnings as a percentage of sales (operating efficiency) multiplied by turnover (capital efficiency). On a day-to-day basis, this revelation is not very useful. We need to take a step back to some primary school mathematics to see what this means:

$$\text{ROI} = \text{Earnings/Sales} \times \text{Sales/Investment.}$$

Thus, ROI is influenced by sales, earnings, and investment. Note that sales appears in both elements of the equation, thereby giving it extra weight. Unfortunately, because in algebra the sales elements “cancel” each other out, we often see the calculation as:

$$\text{ROI} = \text{Earnings/Investment.}$$

As a result, we lose sight of the importance of sales in improving ROI. We also look at investment as a long-term thing and not easily changeable in the short term. When trying to improve ROI, the net result is an overweighted emphasis on cost cutting.

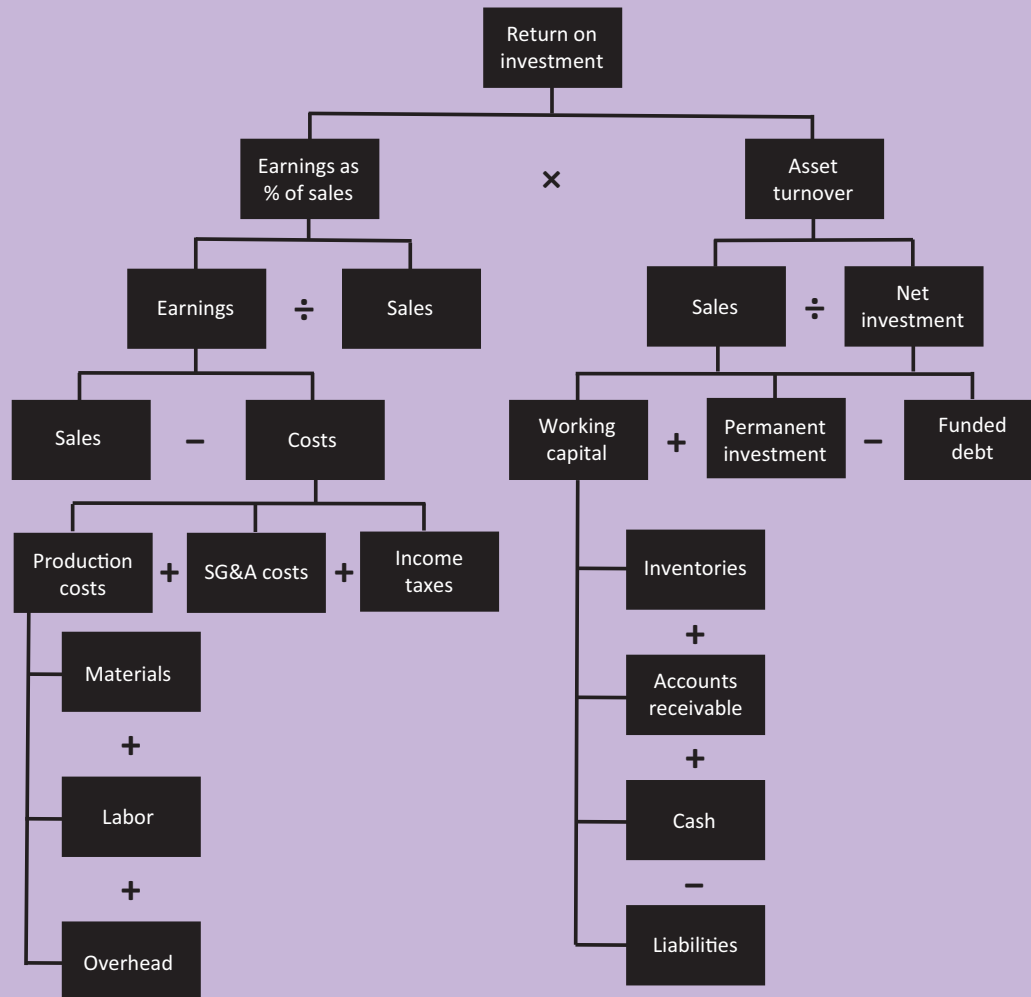
The early history of Toyota was not focused on reducing costs. Rising out of the ashes of World War II, the question for Toyota was: How do we increase production to meet increasing demand using the existing investment? This was not a financial (ROI) question. Rather, Toyota wondered: How do we increase the flexibility and velocity of production in order to meet increasing demand without new investment, because we do not have the money to invest?

The answers they came up with created an approach that focused on the knowledge of the people doing the work to eliminate work that did not add value for the customer (i.e., waste), thereby providing a source of growth (i.e., capacity) from the same assets — both people and facilities. They simply focused on what was necessary for their survival: satisfying the customer with limited resources. The net effect, however, is that they discovered a new lens with which to view virtually everything that impacts ROI. Because of the multiplier effect embedded in the ROI formula, they created a way to get exponential increases in ROI. Each of these contributing factors is discussed in the following sections.

Operating efficiency

We begin with operating efficiency, or earnings as a percentage of sales:

EXHIBIT 2 DuPont Model: ROI Calculation



(Sales – Costs)/Sales.

Accountants like to classify costs as production, sales, administrative, and other. But in reality, incurred costs are materials, people, facilities (buildings and machines), and other. Additionally, many manufacturing companies still use standard cost accounting as their management accounting system. Later in this article, we will see the impact of this choice.

Materials. In most companies, the production process generates a considerable amount of wasted materials. Such waste may occur because of poor product design, poor manufacturing practices, or both. However, in many organizations, this is not recognized, as the standard cost accounting system builds a “yield” factor into the

material standards based on historical averages. As long as the company stays close to that historical average, the accounting system shows little, if any, material usage variances. In other words, the waste has been institutionalized by the cost system, and the small “variance” leads one to believe that there is no problem. If the typical manufacturing company’s cost of sales is 60 percent of sales and material costs are 60 percent of cost of sales, and scrap is 5 percent, eliminating that scrap can improve cost of sales — and therefore operating income — by 1.8 percentage points. For most companies, this is significant. So how does lean eliminate scrap? In a batch production model, lots of defective product can be made at a single process step but

may not be discovered until that batch is used in a subsequent process, which can be days, weeks, or even months later. By that point, thousands of items may be defective, in need of rework, or thrown away. When a lean strategy is used and flow lines are established, a defective product is discovered immediately, and the amount of material wasted is close to zero since the stop-the-line discipline requires a countermeasure be put in place before production can resume. Lean improves product quality exponentially and virtually eliminates wasted materials, thereby improving the earnings component of ROI.

People. Although accountants in many manufacturing companies like to say that direct labor is less than 10 percent of their total costs, the reality is that the total “people cost” is often their number one cost, whether it is called direct, indirect, sales, or administrative. Most companies do think of people as a cost. The historical management approach to people treats those costs as variable and “right sizes” the workforce (i.e., hires or fires) to maintain people cost as a constant percentage of sales. In a people-centric lean company, people are considered human resource capital. Other capital, such as buildings and machines, depreciates over time; however, because lean creates a learning environment to improve certain skills, people become more valuable over time. In a lean culture, people learn how to optimize their work by eliminating time devoted to non-value added activities and consequently freeing up capacity to do more value-added work. Lean empowers people to change the historical equation. People cost can be maintained as a constant amount, so it becomes a variable percentage of sales. Over 10 years, Wiremold doubled the size of its West Hartford plant’s business without increasing the number of people employed in the factory. By teaching its people how to identify and solve problems, it achieved a continuous stream of annual productivity improvement. In constant dollar terms, Wiremold reduced its production people cost by 50 percent over those 10 years. A significant portion of Wiremold’s 13 percentage point increase in gross profit, as shown in Exhibit 1, was achieved by growing the business without increasing the number of production people.

Facilities (buildings and machines). The annual period cost of facilities is merely an accounting phenomenon (i.e., calculated depreciation of those assets based on their estimated useful lives). The real cost is reflected in investment, which is discussed in the section “Capital efficiency.”

Other. This catchall category is made up of the true overhead items (e.g., supplies, energy, insurance, property taxes). In total, for most companies, the true overhead cost usually represents the smallest category but can still yield cash savings. For example, when a *kaizen* team in the Wiremold office looked at office supplies, their efforts resulted in a 48 percent annual reduction of these costs. There are many other examples of improvements in the use of these other resources, and the amount of time spent on improving any one of them will depend upon its importance to the individual business.

Capital efficiency

Investment is comprised of working capital plus permanent investment (buildings and machinery). How can a lean strategy have a positive impact on each of these inputs?

Working capital. Although the accounting definition of working capital is current assets minus current liabilities, for all practical purposes, it is accounts receivable plus inventories minus accounts payable. Almost everything else in working capital is the result of some accounting rule (e.g., prepaid insurance, deferred taxes).

Accounts receivable. If you were to ask most CFOs if they know what their accounts receivable days outstanding (DOS) are, they could probably tell you off the top of their head. However, if you ask them what they *should* be based on the company’s sales terms, they will look at you with a blank stare. It is not uncommon for companies to have 50 percent or more DOS than they should, based on their payment terms. And they consider that normal. When a company investigates the root causes of late payment, it discovers that only a small portion results from customers either in financial trouble or “stretching” out payment. However, in most cases, customers do not pay on time because of a problem that the *company* created and has not solved yet, such as



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invoice discrepancies, short shipments, wrong product shipped, damaged product, etc. When the people working in the processes eliminate these issues, most customers pay on time. Once it focused on these defects, a medical equipment manufacturer reduced the number of DOS from 57.8 to 43.3 over an 18-month period — a 25 percent improvement that generated a significant amount of cash.

Inventory. In a traditional batch-and-queue system, large quantities of parts are created or worked on at each step in the process. These batches are typically moved to work-in-process storage areas between stages, extending products' total processing times from minutes to weeks. When Wiremold reorganized into value streams and moved equipment into flow lines within those value streams, production moved from one step to the next in a continuous flow. The inventory between process steps was not needed. As discussed in the section on materials, not only did this change improve quality, but it also reduced the amount of inventory held throughout the process. Our largest division, the wire management division, carried finished goods inventories because its distributors expected immediate shipment upon placing an order. Nonetheless, inventory turns improved from 3.4 times to 18 times. Some of our other divisions, which supplied products to OEM customers and therefore carried no finished goods, had inventory turns in excess of 30 times. With regards to ROI, reducing inventory reduces investment.

Accounts payable. Of course, a well-known way to improve working capital is to delay payment to suppliers. However, good relationships are critical to having suppliers adhere to the just-in-time supply chain ideal of 100 percent on-time delivery with as little inventory as possible. If we expect vendors to deliver quality product on time, we need to pay on time. Increasing accounts payable by intentionally delaying payment is simply not a lean option.

Improving working capital by reducing accounts receivable and inventory has a dramatic impact on the cash position, as the money used to finance the receivables and inventory is released. This cash windfall is usually the earliest sign of lean progress and comes in handy to sustain further

improvements. For instance, if in 1993 Wiremold had the same inventory turns that it had in 1990, it would have had \$16.7 million of inventory. Instead, the inventory had been reduced to only \$5.6 million, thus freeing up \$11.1 million.

Permanent investment. Permanent investment consists of machines and buildings, and although this is often forgotten, it is at the heart of Toyota's just-in-time thinking. Kiichiro Toyoda coined the term "just-in-time" in English while devising new ways to increase production without increasing investment and specifically sought to realize his belief that "the ideal conditions for making things are created when machines, facilities, and people work together to add value without generating any waste." Just-in-time is a countermeasure that reveals wasteful use of investment.

Machines. For the past century or so, manufacturing has been driven by the ideas of division of labor and economies of scale. Both of these ideas have been codified in the modern standard cost accounting system that most manufacturing companies use.

The economies of scale thought process says, "If we can produce more units in less time, we can reduce the cost of the item and therefore justify a lower selling price." As a result, companies invest in bigger and bigger machines capable of running at faster and faster speeds.

The lean thought process says, "Let's build only what we need, only in the amounts that we need it, and only at the time that we need it. And let's do it in a flow that avoids work that doesn't create value for our customer." When we think this way, we realize that most of the large machines (affectionately called "monuments") are overkill for the task at hand.

During its lean journey, Wiremold discovered it was frequently guilty of investment overkill. For example, Wiremold acquired a company that made surge suppression products. It had a very large wave-soldering machine for soldering PC boards, a component of every surge suppressor. The PC boards were first stuffed with components, boxed, and placed in inventory. When needed, they were retrieved, removed from their boxes, processed through the wave-soldering machine, re-boxed, and moved back into inventory. Eventually, they were

moved from inventory to the assembly line, removed from the boxes, and installed in the final product. Only one type of PC board could be made at a time, which resulted in big batches of PC boards in inventory. This process had three people stationed at each end of a 12-foot machine, in addition to material handlers. In order to provide flexibility, increase quality and productivity, and reduce inventory, the company built its own small (about two feet by five feet) one-piece-flow wave-soldering machines that fit directly into the production flow lines. These appropriately sized machines were built in-house at a cost of about \$5,000 each. They allowed the company to make multiple products at the same time on different lines, resulting in vastly improved flexibility, quality, and response time to their customers and reduced space requirements. In addition, fewer people were required in the process, thereby freeing them up to handle the increase in customer demand Wiremold was experiencing.

Like the economies of scale mentality, faulty financial analysis can result in overinvestment as well. Wiremold acquired a company that made a system of long steel channels that are embedded in the concrete floors of buildings to manage wiring. The channels were formed on a large rolling mill and coated with primer paint to keep the steel from rusting. However, in the forming process, the steel was covered with oil to reduce friction, so the channels had to be washed and treated with chemicals before they could be painted. This was a multistage process that had inventory between steps. We asked why the channels were not made from galvanized steel, which would not rust and would eliminate the need for painting. The response was that galvanized steel costs x cents per pound more, and their standard cost system indicated painting the channels was the cheaper option. However, a visual inspection of the work area defied this logic (and this is why “go-and-see” is so important): A deeper analysis revealed that because there were few direct labor people involved in the process, only a small amount of overhead was allocated to these products even though many material handlers were required. The total of the actual people cost required by the current process and the cost of the

chemicals and paint was many multiples of the extra cents for galvanized steel. We just had to substitute vanishing oil for the traditional oil used in the rolling mill process, which also happened to have clear environmental benefits. The standard cost system had been distorting the real costs all along, driving bad decisions. This is not a unique situation.

Traditional management theory drives overinvestment due to its focus on specialization, vertical organizational structures, economies of scale, and manufacturing planning software. Standard cost accounting reinforces this type of decision-making and hides the real problems that are created.

Another capital investment benefit is created by eliminating unplanned downtime. Often additional capital investment is requested to increase capacity to meet demand; in reality, if the sources of unplanned downtime were eliminated, companies would discover that they had plenty of capacity still available. One notable example occurred during a workshop I did for a golf ball manufacturer. During our discussion of capital investments, the company mentioned that it had just approved an investment in an additional “golf ball-making machine” — a very expensive proposition. When I asked them to compare the takt time for golf balls (i.e., the sales rate) with the rated cycle time of the existing machine (i.e., the production rate), they discovered they had plenty of unused capacity, but it was being consumed by unplanned downtime. The already approved capital request was cancelled that day. How many companies compare the takt time (demand rate) and cycle time (production rate) of their equipment when analyzing requests to invest in increasing capacity?

Buildings. Lean companies free up so much space within their facilities (mostly thanks to flow processes that require less inventory) that they quickly discover they can grow the business well into the future without adding any new buildings. This falls into the category of “investment avoidance” but in the long term can have a significant impact on the company’s total investment base, and therefore ROI. Over a 10-year period, we made 21 acquisitions and were able to incorporate some of them

LIKE THE ECONOMIES OF SCALE MENTALITY, FAULTY FINANCIAL ANALYSIS CAN RESULT IN OVERINVESTMENT AS WELL.

into existing facilities that had freed-up space, which eliminated all of the facilities costs of those acquired companies.

Sales

Since lean frees up a lot of people and machine capacity, it is really a growth strategy that focuses on the regular — and relatively rapid — introduction of new products. Although growth can be achieved by taking market share from competitors (an expensive method since it can lead to price wars), the preferred method is to increase the size of the market via new products of higher value to customers and capture all of that market growth.

One of the goals that Art Byrne set was to double in size every three to five years — half by organic growth and half by selective acquisitions. The company actually doubled in size in four years and again in another four years. Wiremold's organic growth focused on improving both production (i.e., “fix the base”) and product development (i.e., growth opportunities). We realized that if you have poor quality and poor on-time delivery, customers will not listen to your story about new products. By fixing the base, quality improved and on-time delivery jumped from less than 50 percent to 97 percent. Customers were then willing to listen to our new products stories. Thanks to the adoption of quality function deployment, the new product introduction cycle was reduced from years to months; instead of introducing two to three new products every year, the company was releasing four to five additions each quarter. Wiremold increased its growth rate from a historical GDP growth rate to accelerated growth. It made the size of the pie bigger. And it satisfied this accelerated growth without needing to increase the size of its production workforce. When you look at the ROI formula, sales appears in both the numerator and denominator of the equation. Therefore, the need to accelerate sales growth is imperative.

Summary

How does a lean strategy work to improve a company's ROI? By applying the four underlying building blocks of lean (flow,

pull, takt time, and standardized work) to each of the organization's processes, we can significantly improve the inputs of the ROI formula:

- Material costs are reduced by improving quality and eliminating scrap.
- Labor costs are reduced as a percentage of sales by eliminating non-value work and creating free capacity for growth.
- Overhead costs are reduced by reducing waste.
- Accounts receivable are reduced by eliminating the product and invoicing defects that cause customers to delay payment.
- Inventory is reduced by implementing flow in a just-in-time environment.
- Capital investment is reduced by eliminating unplanned downtime, which frees up capacity for growth and reduces the need for additional capacity investments, and using “right-sized” equipment instead of creating monuments.

One very sensitive issue is the need to discontinue the standard cost accounting system. It was developed in the early 1900s when there was very little automation, direct labor was about 60 percent of total manufacturing costs, and overhead was about 10 percent. Today, overhead averages about 300 percent of direct labor, and because of all the allocations that take place in the standard cost system, problems are hidden. In addition, the gains made during a lean transformation are also hidden; even worse, they are sometimes portrayed as a negative. We have the tail wagging the dog. The standard cost accounting is obsolete and needs to be retired. Instead, companies need to adopt lean accounting. Not only does this approach eliminate waste by applying the principles of lean to the accounting processes, but it also creates GAAP-compliant financial statements that are much more transparent. Often referred to as the “plain English” financial statements, they allow management to really see what is happening inside the company.

Adopting a lean strategy enables a company to improve every significant element that goes into the ROI calculation. It also generates enormous amounts of cash. Naturally, if it just stays in the bank, it is



ADOPTING A LEAN STRATEGY ENABLES A COMPANY TO IMPROVE EVERY SIGNIFICANT ELEMENT THAT GOES INTO THE ROI CALCULATION.

not providing a lot of additional benefit. In fact, total investment stays the same: It is just that more of it is in cash. As already mentioned, the second leg of Wiremold's growth strategy was to double in size every three to five years. In addition to the organic growth element, half was accomplished through selective acquisitions. This is the right way to use that newly generated cash.

Time is the currency of lean. When we talk about the waste of labor, we are talking about the waste of time. Time is the one resource that we have that is finite — we can't create more hours in the day. Thus, when we waste time, we waste capacity. As we eliminate the sources of wasted time, we free up people and machine capacity so

that as sales volume increases we have the means to satisfy demand without hiring more people or buying new machines. We have made our existing capital structure — both human capital and machine capital — more productive, which finances growth. In addition, with a lean strategy, we use time to gain a competitive advantage by doing things that our competition cannot match, which further accelerates our growth.

From 1990 to 2000, Wiremold improved its ROI by 500 percent. When trying to convince your CEO and CFO that lean is the best growth strategy, explain how each element of ROI is improved by lean. Then it should be clear that lean is the best way to achieve dramatic increases in ROI. ■