Accounting for Lean Success

Overcoming the barrier of traditional accounting in lean environments

By John R. Brandt and Mike Frichol

Manufacturing Performance Institute

Executive Summary

Over the last three decades, lean principles have driven massive productivity improvements in manufacturing operations around the world. Manufacturers of all sizes are more efficient, better managed and more profitable because of lean — yet this improvement has plateaued at many companies. What's holding up the progress of lean?

While many factors can stall a lean effort — ranging from a myopic focus on "tools" (e.g., 5S, quick changeovers, etc.) to the removal or retirement of a lean champion — at many firms the culprit is more specific: outdated accounting systems. Rooted in practices designed for the batch-and-queue environments of yesteryear, traditional accounting is often out of sync with modern lean models. Early on, lean worked in spite of this because companies focused on waste reduction on the plant floor, and most of the return on investment was earned in operations. But as lean evolves and spreads beyond the plant floor, its conflict with traditional accounting is escalating — and becoming more dangerous to the financial health of manufacturers.

Savvy manufacturing leaders realize that they must solve this dilemma or else watch their gains from lean either slow or evaporate. These executives are reengineering accounting on two levels — both ***how*** accounting is done (process) as well as ***what*** accounting measures and reports (outcomes). They are not advocating the wholesale elimination of traditional accounting practices; instead, they see the potential for accounting to play a larger role in lean by providing analysis, insight and direction that will support lean gains across all functions. These lean leaders want to reduce the "law enforcement" aspect of accounting and increase its "coaching" aspect. Accountability will not go away, but will increasingly be redefined according to customer value — i.e., what the customer ***wants*** and ***is willing to pay for.***

Leaders in lean accounting face significant hurdles in the form of traditional accounting metrics and rules expressed in a language that few outside the financial culture can understand. These executives must build new systems while still fulfilling accountability and regulatory needs such as GAAP (Generally Accepted Accounting Principles). Nonetheless, successful new models are starting to emerge — demonstrating the value of this new method of financial measurement.

Supporting Lean with Management Accounting

Manufacturers discovered lean during a time of unprecedented technological expansion in both production equipment and process tools. This pairing produced huge gains in productivity in operations; today, leading manufacturers are hoping to build on these improvements by expanding lean to other business functions and departments.

This expansion of lean is sometimes in conflict with traditional financial measurements and accounting practices. Why? Because while the "control" aspect of accounting remains essential for transparency, regulatory reporting and accountability to shareholders and others, there are drastic differences between financial accounting, which currently drives internal and external decision-making, and management accounting, which should drive internal decision-making and planning:

Financial Accounting vs. Management Accounting
Both are needed, but each serves a different purpose

Financial accounting	Management accounting
Recording and examining past activities	Focuses on future decisions and activities
Accuracy and categorization of data	Relevance and extrapolation of information
Statutory reporting (historical, normalized reports)	Actual business performance (now, future improvement)
Budget and expense tracking	Management reporting and analysis
Follows GAAP and other regulatory rules	Uses lean, throughput, other management accounting principles

Financial accounting can work against lean in three major ways:

• **By focusing on internal definitions of value rather than customer definitions of value:** When setting profit goals that determine market price and resource allocation, product inputs are measured as ***fixed*** and ***variable costs*** instead of ***expenses necessary to create value.*** Lean thinking says that pricing should be based on what the customer is willing to pay and what the market is willing to bear — the true measure of the value that manufacturers add to raw materials. No customer is concerned about itemized internal costs at the level of detail that a traditional financial accounting system requires.

• **By requiring time-consuming activities that add no value:** Lean accounting practitioners sometimes distinguish between accounting for lean — meaning lean-style management accounting as discussed in the above chart — and lean accounting — meaning the elimination of waste in accounting processes. (Interestingly enough, the former tends to produce the latter.) Once companies begin to focus their accounting efforts on adding true value, they often realize that many of their previous accounting efforts are no longer necessary. Companies that practice management accounting — even in limited ways — typically report reductions in paperwork, recordkeeping and tasks. And, like lean on the factory floor, the goal of bringing lean to accounting practices is not to eliminate accountants; it is to free up financial managers to provide true value in the form of analysis, insight and performance-improvement coaching.

• **By advocating principles diametrically opposed to lean:** Financial accounting places value on inventory by considering it an asset and by "hiding" the cost of excess finished goods by calculating margin on goods sold, not goods produced. This thwarts the waste-elimination principles of lean, which stress reduction in total inventory (almost always a favorable outcome). Additionally, financial accounting does not acknowledge and reward waste-reducing or value-adding behavior because the value of such activities often does not appear immediately. For instance, a request to purchase color-coded bins to reduce inventory and material handling via ***kanban*** methods would be noted as a cost with no immediate benefits, and possibly denied. Third, financial accounting does not support root-cause thinking and problem-solving, which requires the expense of time and travel for ***gemba*** or "going to see" what really is happening. Finally, financial accounting does not support planning based on customer demand, instead encouraging resource use based on preconfigured calculations.

Management Accounting Thinking and Processes

One of the first steps many companies take toward reengineering their accounting practices is to reorganize accountability based on value streams — by creating a single value stream for each product, with one accountability statement for each value stream. (Note: A product value stream encompasses all activities from new product development to materials acquisition, from shipping to customer and support.)

The metrics tracked in a value stream will vary based on what managers consider important to their decision-making and to internal and external reporting. The example on the next page illustrates how to track accountability by value stream (as well as plant-wide) on a current-month and year-to-date basis using a "lean income statement."[1] (This shows the first month of a fiscal year and reflects a plant that produces three products.) Note that only 12 measurements are tracked, yet the system is transparent with everyone working toward the same goal (20% return on sales [ROS]).

Current month					Year to date			
Value streams			Total plant		Value streams			Total plant
Product 1	Product 2	Product 3			Product 1	Product 2	Product 3	
$3,000	$1,500	$500	$5,000	**Net sales**	$3,000	$1,500	$500	$5,000
$2,000	$900	$250	$3,150	**Inventory purchases**	$2,000	$900	$250	$3,150
$500	$30	$10	$540	**Personnel expenses**	$500	$30	$10	$540
$10	$5	$25	$40	**Shop supplies**	$10	$5	$25	$40
$500	$75	$100	$675	**Facility expenses**	$500	$75	$100	$675
$0	$20	$10	$30	**Distribution expenses**	$0	$20	$10	$30
$50	$20	$10	$80	**Office and other expenses**	$50	$20	$10	$80
$150	$25	$10	$185	**Other allocations**	$150	$25	$10	$185
($210)	$425	$85	$300	**Value-stream margin**	($210)	$425	$85	$300
($400)	$100	($100)	($400)	**Inventory**	($400)	$100	($100)	($400)
$190	$325	$185	$700	**Earnings**	$190	$325	$185	$700
6.3%	21.7%	37.0%	14.0%	**Return on sales**	6.3%	21.7%	37.0%	14.0%
			20.0%	**Goal**				**20.0%**

Setting Up A Lean Income Statement

Accounting by value stream supplies a more accurate statement of the expenses it takes to add value to raw materials and to make products that customers want. In many corporations, "standard overhead costs," "cost variances," and other imprecise measures make it nearly impossible for operations to make deep, lasting process improvements because managers don't know what's really happening — and, even worse, must measure performance according to metrics that actually discourage lean management.

A lean income statement is an attempt to correct this while still providing accountability. It uses as few measures as possible and reflects the actual cost of resources expended. What's measured will vary by manufacturer based on the information deemed important to both operations (visibility for control and improvement) and financial managers (visibility for reporting, planning and accountability). It will also vary based on which functions are represented in the value stream. Ideally, all labor (both direct and indirect) and other expenses associated with making a product out of raw materials will be part of that product's value stream.

Traditional profit-and-lost statements attempt to impose accountability from afar and do not reflect reality on either the plant floor or in the marketplace. Conversely, lean income statements exist to provide accurate, actionable information and support standard processes.

Like most manufacturers adopting management accounting, Parker Hannifin's Racor Division in Beaufort, S.C. (where the previous lean income statement originated), faced skepticism about these new accounting methods from executives and employees alike. The Division held multiple meetings to define goals, create timelines, test procedures and educate management and workers about the benefits of applying lean principles to accounting.

Even at this early stage of the transition to lean accounting, a readily apparent benefit is the "true" valuation of inventory. Everyone knows that reductions in inventory improve cash flow, yet traditional accounting continues to reward inventory buildup and penalize inventory reduction. The new income statement offers the Division a better tool for decision-making — and increases the likelihood of better financial results.

To further illustrate the power of management accounting, consider this scenario for a single period of production:

Sales	$10,000,000
Production output	$11,000,000
Direct materials	40% of finished goods
Production costs	$2,000,000

Financial accounting rewards inventory buildup because it measures the direct material and production costs associated with finished goods ***sold,*** and not finished goods ***produced.*** So the scenario to the right would produce more than $1 million in operating income with financial accounting:

Revenue	$10,000,000
COGS*	($5,820,000)
Gross margin	$4,180,000
Selling and general administration	($3,000,000)
Operating income	$1,180,000

*Cost of good sold = $4,000,000 in direct materials (40% of $10,000,000) + production costs of $1,820,000 (10/11 of $2,000,000 because $10,000,000 of $11,000,000 of finished goods was sold)

Yet considering the true costs of what was produced, operating income is actually much lower:

Direct materials	$4,400,000*
Production costs	$2,000,000*
Total production costs	$6,400,000
Gross margin	$3,600,000
Selling and general administration	($3,000,000)
Operating income	$600,000

*Materials and production costs calculated on $11,000,000 of finished goods.

In contrast, management accounting calculates ***throughput margin*** (sales minus direct materials) and then applies operating expenses. This reflects the true state of expenses and income considering total inventory:

Revenue	$10,000,000
Direct materials	($4,400,000)
Throughput margin	$5,600,000
Value-stream expenses	($2,000,000)
Selling and general administration	($3,000,000)
Operating income	$600,000

Another area in which management accounting provides more accurate data is in production planning. Consider a plant that is starting to produce two new products and needs to determine a production mix to maximize profits. Each product has the same categories of per-unit costs, but different profit margins. Forecasted demand for each unit is 300 per week, but the plant has limited capacity — and an unavoidable constraint in one area of production that affects both products. The constraint is limited to 2,400 minutes per week. Product B moves through the constraint at six units per minute, while Product A moves through the constraint at four minutes per unit.

Product A	Product B
Cycle time: 19 minutes	Cycle time: 27 minutes
Per-unit costs: $68.17 • Material $27.00 • Labor $9.50 • Overhead $31.67	Per-unit costs: $93.50 • Material $35.00 • Labor $13.50 • Overhead $45.00
Selling price: $90.00	Selling price: $120.00
Profit margin: $21.83 per unit	Profit margin: $26.50 per unit

Financial accounting dictates production of the maximum number of Product B units to meet demand and a limited number of Product A units in order to maximize capacity for highest profits:

300 Product B units per week at $26.50 profit per unit = $7,950.00
150 Product A units per week at $21.83 profit per unit = $3,274.50
Total gross profit = $11,224.50

This decision relies entirely on a margin created by fixed and variable production costs. Yet financial accounting does not accurately calculate these numbers; looking at what is actually happening in the factory, the seasoned executive quickly sees that the limit on profitability is not batch size or product mix, but the unavoidable constraint. Therefore, calculations used to plan production to maximize profitability should be based on the constraint alone, and which product moves through this constraint at a higher rate. The management accounting formula looks like this:

1. Calculate throughput margin (selling price-direct materials) for each product:
Product A: $63.00 ($90.00 – $27.00)
Product B: $85.00 ($120.00 – $35.00)

2. Calculate ***throughput margin per constraint minute:***
Product A: $15.75 ($63 ÷ 4)
Product B: $14.17 ($85 ÷ 6)

Based on this formula, Product A generates more throughput margin. This would suggest producing more Product A units than Product B units — the opposite of the financial accounting suggestion. This mix would produce a higher total gross profit when using the profit-per-unit calculation:

300 Product A units per week at $21.83 profit per unit = $6,549.00
200 Product B units per week at $26.50 profit per unit = $5,300.00
Total gross profit = $11,849.00

The difference in this example is a 5.6% increase in gross profit using lean accounting vs. traditional financial accounting methods without any additional expense or capacity.

Another downside of using financial accounting for production planning is financial accounting's propensity to view all expenses as fixed or variable costs that must be allocated on a per-unit basis; this tends to encourage larger batches to maximize costs. This means that production is then scheduled based on utilization rates, rather than on actual demand. Batch size, therefore, can be seen as a financial accounting fabrication based on misleading per-unit costs, one that contradicts basic lean principles such as:

- Encourage smaller batch sizes to increase flexibility and responsiveness,
- Use value-stream alignments in which expenses are unrelated to batch size, and
- Require production to be based on demand to eliminate waste.

Challenges to Introducing Lean Accounting

Companies that successfully transition to lean accounting principles generally start with changes limited in scope — and also plan for the new processes to run concurrently with present accounting processes for a period of time. This allows for review of results and modification of processes; and also gives a level of comfort to company executives.

It's important to note that there are as yet relatively few companies with mature lean accounting programs. Lean accounting programs at these firms are generally limited to one (or a few) plants or divisions, with the goal of eventually expanding these programs to other parts of the company.

At Parker Hannifin's Racor Division[2], managers used employee input to determine which measures would support lean efforts and executive input to determine which measures were required for internal and external reporting requirements. The Division then reorganized accounting based on value streams and a mix of measures to satisfy both groups of stakeholders.

The plant was able to meet its lean accounting objectives in several ways:

Goal	Current result
Eliminate transactions	25% reduction in journal entries; purchase orders replaced with blanket orders
Provide simple, meaningful reporting to support a lean operation	Created a "lean income statement" with 12 measures for value-stream managers
Implement actual costing	Started using actual costs of materials and developed an accurate per-unit cost as a corporate reporting standard; the per-unit cost is used to calculate cost of sales for margin reporting and to calculate scrap for quality metrics
Improve accountability and empowerment	Accountability and control of value-stream resource allocation and expenses were moved to the value streams from accounting

Another company adopting lean accounting companywide is Yorktowne Cabinetry, a private producer of household cabinets in Yorktowne, Pa.[3] The firm began using lean production principles in 1998; it decided to simplify its accounting to reduce the time spent recording transactions in its enterprise resource planning (ERP) program. Yorktowne began the program in its mill, where raw lumber is converted to dried lumber. The company has been successful in reducing time spent on ERP transactions by:

- Reorganizing product families into value streams and establishing accounting methods based on value streams,
- Eliminating the distinction between direct and indirect labor and applying labor to value-stream expenses based on actual labor expended, and
- Reducing the number of ERP-reported inventory transactions to three visual inventory reports: lumber coming in, lumber in process, lumber leaving.

The company does not reveal operations metrics or financial results, but the lean accounting program has increased efficiency enough that the management team was given approval to replicate the program at two other plants.

Getting Started Now

Educating future accountants will go a long way toward realigning corporate accounting to more efficient models of lean production. For now, however, savvy executives will begin with a limited program that focuses on one area, reorganizing the function by capturing expenses and output by value streams. These leaders will refine the process until a model emerges that can be applied companywide.

As the Parker Hannifin example illustrates, it's important to set standards first — both to maintain necessary internal and external reporting and to transfer responsibility for resource allocation and expense tracking to operations managers. Simple language and metrics that everyone can understand will ease acceptance, as will diligence about eliminating unnecessary transactions and tracking measures.

Fortunately, numerous resources are available to companies and financial executives contemplating a transition to lean accounting. In addition to case studies, a lean accounting movement is being fostered by conferences, training and research reports produced by the Lean Accounting Summit, the Institute of Management Accounting and the American Institute of Certified Public Accountants. Additionally, a group of university professors, led by Frances Kennedy at Clemson University, is pushing for the inclusion of lean accounting principles into business and accounting classes.

Lean accounting principles seek to move companies toward continuous improvement by using accurate information to empower managers and direct decision-making. Lean cannot survive in isolation; it requires support from all functions — including finance and accounting — in order for it to produce gains in efficiency and value for manufacturers and their customers.

[1] "Accounting In A Lean Operation," presented by Mark Kovtan, division controller, Parker Hannifin Racor Division, Lean Accounting Summit, Sept. 21-22, 2006 ***(www.leanaccountingsummit.com)***

[2] "Accounting In A Lean Operation," presented by Mark Kovtan, division controller, Parker Hannifin Racor Division, Lean Accounting Summit, Sept. 21-22, 2006 ***(www.leanaccountingsummit.com)***

[3] "Yorktowne Cabinetry: lean accounting and the lean journey," presented by Bob Godin, vice president and controller, Yorktowne Cabinetry, Lean Accounting Summit, Sept. 21-22, 2006 ***(www.leanaccountingsummit.com)***

Mike Frichol

Mike Frichol is Vice President, Global Industry & Product Marketing, of Infor. He is responsible for global industry and product marketing across all business units and product lines. His team is charged with setting strategic positioning, marketing campaigns, value propositions, sales enablement resources and establishing market awareness and presence. His team also provides competitive analysis, pricing strategy and solution partner management.

Mike joined Infor in 2005, after six years with Microsoft and Great Plains, where he was Director of Manufacturing Industry Solutions & Strategy with Microsoft Business Solutions.

In 1992, Mike founded Enterprise Solutions Inc., a successful IT consulting and services firm that he led through 1998. Prior, he served as Director of Worldwide Manufacturing, Customer & Product Support for Dun & Bradstreet Software, where he developed integrated support services across multiple product lines. He also served as General Manager of Business Applications at Corporate Management Systems. His extensive manufacturing industry experience includes positions with British Tyre & Rubber, Datsun-Nissan and Chrysler Corporation.

Mike has Computer Science and Business Management degrees and CPIM certification from APICS.

About Infor

Infor delivers business-specific software to enterprising organizations. With experience built in, Infor's solutions enable businesses of all sizes to be more enterprising and adapt to the rapid changes of a global marketplace. With more than 70,000 customers, Infor is changing what businesses expect from an enterprise software provider. For additional information, visit *www.infor.com*.

John Brandt

John R. Brandt is CEO of The MPI Group Inc. (MPI). Previously editor-in-chief of both IndustryWeek and Chief Executive magazines, John has earned more than 20 awards for reporting and writing on economics and finance; management; and sales and marketing. His background also includes a decade of successful management and consulting experience in economics; health care; human resources and management training. He lectures frequently around the globe on topics including leadership and strategy, customer value, manufacturing, and regional economic development. He can be reached at *jbrandt@mpi-group.net*.

About MPI

The Manufacturing Performance Institute is a Cleveland, Ohio-based research organization specializing in research development, analysis, and communications. MPI services include:

- Survey creation and fielding,
- Research analysis and white paper development,
- Webcast and live presentations of research findings,
- State-of-industry reports, and
- Creation of online, interactive database tools that house performance data, whether developed by MPI or others.

MPI's customized products and services are designed for organizations, associations, and economic regions facing critical development issues. MPI's core research services address operational excellence, employee development, customer value, leadership and strategy, and innovation.