

About This Article

The following article, *What's Lean Accounting All About?*, appeared in the Association for Manufacturing Excellence's *Target Magazine* in its first issue of 2006. The work, written by Brian Maskell and Bruce Baggaley, is a culmination of an entire groups' collaborative efforts stemming from the inaugural Lean Accounting Summit in September 2005.

For more information about the Lean Accounting Summit, visit...

www.leanaccountingsummit.com

Lean Accounting: What's It All About?

Brian H. Maskell and Bruce L. Baggaley

"What is Lean Accounting?" is an oft-asked question. Everybody working seriously to implement lean thinking in their company eventually bumps up against their accounting systems. It soon becomes clear that traditional accounting systems are actively anti-lean:

- They are large, complex, wasteful processes requiring huge amounts of non-value work.
- They provide measurements and reports like labor efficiency and overhead absorption that motivate large batch production and high inventory levels.
- They have no good way to identify the financial impact of the lean improvements taking place throughout the company. On the contrary, the financial reports will often show that bad things are happening when very good lean change is being made.
- Very few people in the company understand the reports that emanate from the accounting systems, and yet they are used to make important and far-reaching decisions.
- They use standard product costs which are misleading when making decisions related to quoting, profitability, sourcing, make/buy, product rationalization, and so forth. Almost all companies imple-

menting lean accounting are making poor decisions: turning down highly profitable work, out-sourcing products or components that should be made in house, manufacturing overseas products that can be competitively manufactured here at home, etc.

While there is good understanding of the problems, there is not widespread understanding of the solutions. In September 2005, at the *Lean Accounting Summit* in Detroit, co-sponsored by AME,¹ a group of the conference presenters got together and decided to create a definition of Lean Accounting as it stands now. We decided to succinctly document the *Principles, Practices, and Tools* of Lean Accounting. Lean accounting has developed over the last ten years or so and although it continues to evolve, we felt it would be helpful to docu-

In Brief

This article reviews the framework of principles, practices, and tools of lean accounting being developed by a group of lean accounting thought leaders as a result of the Lean Accounting Summit in September 2005. A brief overview was presented at the 2005 AME annual conference. The principles are accompanied by an illustration of financial and non-financial analysis using "box scores," one of the generic techniques being employed.

ment the current "state of the art" as seen by a group of both consultants and practitioners in this area. The purpose of this article is to briefly describe the principles, practices, and tools of lean accounting developed thus far.

Vision for Lean Accounting

We started with a vision statement and then drilled down to the practical tools used to make the vision a reality. Our vision is that Lean Accounting will:

1. Provide accurate, timely, and understandable information to motivate the lean transformation throughout the organization, and for decision-making leading to increased customer value, growth, profitability, and cash flow.
2. Use lean tools to eliminate waste from the accounting processes while maintaining thorough financial control.
3. Fully comply with generally accepted accounting principles (GAAP), external reporting regulations, and internal reporting requirements.
4. Support the lean culture by motivating investment in people, providing information that is relevant and actionable, and empowering continuous improvement at every level of the organization.

Lean Accounting Principles, Practices, and Tools

The Principles, Practices, and Tools of Lean Accounting summarized in Figure 1 are separated into five principles, A-E. The following discussion amplifies them.

A. Lean and Simple Business Accounting

This can also be stated as "applying lean methods to the accounting processes." Some accounting processes contain *muda type 1* (waste that can not be eliminated at the moment) but most accounting processes are *muda type 2* (waste that can be eliminated). The tools of lean must be rigorously applied to our accounting, control, and measurement processes so that waste is relentlessly driven out.

This is achieved in the same way waste reduction is achieved anywhere else, through continuously eliminating waste from the transaction processes, reports, and accounting methods throughout the organization. The tools to achieve this are the value stream maps (current and future state), kaizen (lean continuous improvement), and the venerable Plan-Do-Check-Act (PDCA) problem-solving approach.

These improvements can be made early in the transformation to lean and will open up time for the accounting personnel to work on other Lean Accounting changes. Inevitably these early projects improve processes that will later be eliminated, but they make a good start to the introduction of Lean Accounting into the business.

B. Accounting Processes that Support the Lean Transformation

Lean accounting reports and methods actively support the lean transformation. This information drives continuous improvement. The financial and non-financial reporting reflects the overall value stream flow, not individual products, jobs, or processes. Lean accounting focuses on measuring and understanding the value created for the customers, and uses this information to enhance customer relationships, product design, product pricing, and lean improvement.

Visual Performance Measurement

Control of production processes (and other processes) is achieved by *visual performance measurements* at the shop-floor and value stream level. These measurements eliminate the need for the shop-floor tracking and variance reporting favored by traditional cost accounting systems.²

Continuous Improvement

Continuous improvement (CI) is motivated and tracked using *value stream performance boards*. Typically these visual boards are updated weekly and used by the value stream CI team to identify improvement areas, initiate PDCA projects, and mon-

PRINCIPLES	PRACTICES	TOOLS OF LEAN ACCOUNTING
A. Lean & simple business accounting	1. Continuously eliminate waste from the transactions processes, reports, and other accounting methods	a. Value stream mapping; current & future state b. Kaizen (lean continuous improvement) c. PDCA problem solving
B. Accounting processes that support lean transformation	1. Management control & continuous improvement	a. Performance Measurement Linkage Chart; linking metrics for cell/process, value streams, plant & corporate reporting to the business strategy, target costs, and lean improvement b. Value stream performance boards containing break-through and continuous improvement projects c. Box scores showing value stream performance
	2. Cost management	a. Value stream costing b. Value stream income statements
	3. Customer & supplier value and cost management	a. Target costing
C. Clear & timely communication of information	1. Financial reporting	a. "Plain English" financial statements b. Simple, largely cash-based accounting
	2. Visual reporting of financial & non-financial performance measurements	a. Primary reporting using visual performance boards; division, plant, value stream, cell/process in production, product design, sales/marketing, administration, etc.
	3. Decision-making	a. Incremental cost & profitability analysis using value stream costing and box scores
D. Planning from a lean perspective	1. Planning & budgeting	a. Hoshin policy deployment b. Sales, operations, & financial planning (SOFP)
	2. Impact of lean improvement	a. Value stream cost and capacity analysis b. Current state & future state value stream maps c. Box scores showing operational, financial, and capacity changes from lean improvement. Plan for financial benefit from the lean changes
	3. Capital planning	a. Incremental impact of capital expenditure on value stream box-score. Often used with 3P approaches
	4. Invest in people	a. Performance measurements tracking continuous improvement participation, employee satisfaction, & cross-training b. Profit sharing
E. Strengthen internal accounting control	1. Internal control based on lean operational controls	a. Transaction elimination matrix b. Process maps showing controls and SOX risks
	2. Inventory valuation	a. Simple methods to value inventory without the requirement for perpetual inventory records and product costs can be used when the inventory is low and under visual control.

Figure 1. Principles, practices, & tools of lean accounting.

itor their progress. These boards show the value stream performance measurements, Pareto charts (or other root cause analysis), and information about the CI projects. The boards also show the current and future

state maps together with the project plan to move from current to future state. The value stream performance boards become "mission control" for both breakthrough improvement and CI of the value stream.

Value Stream Costing

Cost and profitability reporting is done using *value stream costing*, a simple summary direct costing of the value streams. The value stream costs are typically collected weekly and there is little or no allocation of "overheads." This provides financial information that can be clearly understood by everybody in the value stream which in turn leads to good decisions, motivation to lean improvement across the entire value stream, and clear accountability for cost and profitability. Weekly reporting also provides excellent control and management of costs because they can be reviewed by the value stream manager while the information is still current.

Target Costing

Target Costing is the tool for understanding how the company creates value for the customer and what must be done to create more value. Target Costing is used when new products are being designed and/or when the value stream team needs to understand the changes required to increase value for the customers. The outcome of this highly cross-functional and cooperative process is a series of initiatives to create more value for the customer and to bring the product costs into line with the company's need for short-term and long-term financial stability. These improvement initiatives encompass sales and marketing, product design, operations, logistics, and administrative processes within the company.

C. Clear and Timely Communication of Information

Lean accounting provides financial reports that are readily understandable to anyone in the company. The income statements are in "plain English" and the information is presented in a way that is no more complicated than a household budget. Plain English income statements are easy to use because they do not include misleading and confusing data relating to standard costs together with hosts of incomprehensible variance figures. When used in meetings, plain English financial statements change

the question from "What does this mean?" to, "What should we do?"

Visual Management

Visual management is a cornerstone of lean management. Lean accounting requires visual presentation of both financial and non-financial measurements. The "Box Score" format commonly used in lean accounting provides a one-sheet summary for a value stream showing the operational performance, the financial performance, and how well the capacity is being used. Figure 2 shows an example of box score used for weekly performance reporting.

Decision-Making and Box Scores

Routine decision-making — including quotes, profitability, make/buy, sourcing, product rationalization, and so forth — is achieved using simple yet powerful information that is readily available from the box score. There is no need to use a standard cost again for these important decisions. Figure 3 shows a box score used to present decision-making information related to sourcing of a new product.

D. Planning and Budgeting from a Lean Perspective

Lean planning starts with *hoshin policy deployment* and runs through to the monthly *Sales, Operations, and Financial Planning* (SOFP) process leading to an integrated game plan for the organization. These plans are all made at a value stream level and use lean accounting information.

Hoshin Policy Deployment

Hoshin policy deployment starts with the company's business strategy. The business strategy will often look out three to five years whereas the hoshin policy deployment establishes what must be done during the coming year. The top-level hoshin plan has a handful of break-through changes required to support the business strategy together with the measurements to monitor the achievements, and the resources needed to complete the plan.

Example Box Score for Weekly Performance Reporting

		6/2	6/9	6/16	6/23	6/30	7/7	7/14	7/21	7/28	8/4	8/11	8/18	8/25	Goal
OPERATIONAL	Units per Person	15.10	15.63	14.7	15.91	15.90	16.32								20.7
	On-Time-Shipment	100%	100%	100%	100%	100%	100%								100%
	Dock-to-Dock Days	6.00	6.00	6.00	6.00	6.00	5.5								5.5
	First Time Through	80%	80%	81%	85%	85%	87%								92%
	Average Cost	\$343	\$337	\$362	\$338	\$337	\$325								\$262
CAPACITY	Productive	29%	29%	29%	28%	28%	28%								40%
	Non-Productive	54%	54%	54%	52%	52%	52%								33%
	Available	17%	17%	17%	20%	20%	20%								27%
FINANCIAL	Revenue	\$471	\$485	\$456	\$490	\$488	\$526								\$576
	Material Cost	\$123	\$125	\$129	\$132	\$135	\$137								\$139
	Other Variable Costs	\$49	\$50	\$51	\$54	\$76	\$87								\$51
	Fixed Costs	\$120	\$120	\$118	\$116	\$116	\$116								\$108
	Profit	\$179	\$190	\$158	\$188	\$161	\$186								\$278
	Return on Sales	38%	39%	35%	38%	33%	35%								48%

Box Score used for weekly value stream performance reporting. Note the “Goals” set from the future state value stream map.

Figure 2.

Example Box Score for a Sales Order Sourcing Decision

		CURRENT STATE	ORDER USING STANDARD COST Std Cost = \$42.44	OUT SOURCE TO CHINA Landed Cost = \$30	MAKE IN HOUSE BUY ADDITIONAL MACHINES
OPERATIONAL	Sales per Person	\$29,789	\$29,789	\$33,647	\$33,647
	On-Time-Shipment	95%	95%	90%	95%
	Dock-to-Dock Days	16.4	16.4	21.1	15.1
	First Time Through	80%	80%	75%	81%
	Average Cost	\$29.95	\$29.95	\$30.18	\$29.48
CAPACITY	Productive	48%	48%	48%	52%
	Non-Productive	28%	28%	28%	26%
	Available	24%	24%	24%	22%
FINANCIAL	Revenue	\$1,042,631	\$1,042,631	\$1,177,631	\$1,177,631
	Material Cost	\$399,772	\$399,772	\$455,513	\$466,909
	Other Variable Costs	\$24,991	\$24,991	\$66,000	\$24,844
	Fixed Costs	\$392,089	\$392,089	\$392,089	\$400,756
	Profit	\$225,779	\$225,779	\$264,029	\$285,122
	Return on Sales	21.65%	21.65%	22.42%	24.21%

This Box Score illustrates a sourcing decision for a potential new sales order. If the decision is made using a standard cost the company will turn down the order because it does not have sufficient “margin.” If they buy it from China, the order is profitable. If they make it in-house they must buy additional equipment and hire more people, but in this example, this provides the best profitability and operational performance.

Figure 3.

This top-level hoshin plan is then rolled-out to the first-level executives, their first-level managers, and down to the value streams.

Hoshin is not the traditional command and control plan where (often unattainable) goals are set by managers for their underlings. The hoshin process includes at each level timely and detailed "catch-ball" steps whereby the people required to achieve the results are very much involved in the planning and goal-setting for their own areas of responsibility. Hoshin is a cooperative and empowering business transformation process. Hoshin plans are typically developed annually and reviewed monthly.

Sales, Operations, and Financial Planning (SOPF)

SOPF is typically done every month and is a comprehensive, company-wide process for short- and medium-term planning. SOPF is a formal and rigorous planning process completed for each value stream. Sales and marketing provide forecasts for the number of products that will be sold by a value stream each month for the next 12 months (for example). These are high-level forecasts of total unit sales, although sometimes it is helpful to go one level down and forecast by product families within a value stream. The operations people provide forecasts of the value stream capacity each month for the next 12 months, and product engineering brings the plans for new product introductions.

Through a series of formal, tightly-scheduled meetings the customer demand is matched by production capabilities. The final *executive SOPF meeting* is chaired by the most senior person in the organization — often the president or CEO — and a company wide *game-plan* is developed. Everybody in the organization can buy in to this game plan because it has been developed cooperatively. SOPF is *the* planning process in lean companies. It provides both short-term updating of such things as kanbans and cell manning, and longer-term planning such as capital equipment, and hiring or redeploying people.

The financial planning outcome of the

SOPF process is to update budgets each month and thereby largely eliminate the wasteful annual budgeting choreography most companies engage in. Calculating short-term month-end results also decreases the need for month-end reporting processes.

Financial Impact of Lean Improvement

The true impact of lean improvement must be understood at the outset of any lean transformation. Using the current state and future state value stream maps, lean accounting tools are used to understand how the changes taking place in the value stream will affect the operational performance, the financial performance, and also how the capacity usage changes within the value stream. This analysis often shows excellent operational improvement but little improvement in cost or bottom-line profitability.³ What bridges the gap between these? The answer is capacity change.

Most lean improvement projects eliminate waste and create available capacity in the form of machine time, people's time, and physical space. The financial impact of lean improvements on the company's bottom-line comes from the decisions made by management on how this newly freed-up capacity will be used. Figure 4 shows a real-life example of this from a company making temperature and pressure gauges used on off-shore oil rigs.

One of the most difficult changes made by senior managers when they are beginning the process of lean transformation is to stop thinking about production improvements in terms of short-term cost reductions. This is very much mass-production, standard cost thinking. This thinking will limit the progress the company can make with lean manufacturing and other lean initiatives. We need to start thinking about customer value and business growth. This *does not mean* that cost information is unimportant; cost is very important. So important, in fact, that we need much better tools to show the cost information: tools like value stream costing and box scores.

By understanding this true nature of lean, we change our question from, "How

		Current State Before Lean Dec '02	Future State Lean Step Two Dec 2003	Future State Longer Term including New Products
OPERATIONAL	Sales per Person	\$224,833.00	\$224,833.00	\$277,031.00
	Inventory Turns	6.5	15	20
	Average Cost per Unit	\$31.32	\$29.88	\$24.25
	First Pass Yield	81%	95%	95%
	Leadtime in Days	25	5	2.5
CAPACITY	Productive	55%	52%	79%
	Non-Productive	42%	12%	12%
	Available	3%	36%	9%
FINANCIAL	Revenue	\$4,062,000	\$4,062,000	\$5,686,000
	Material Costs	\$1,164,184	\$1,109,327	\$1,552,839
	Conversion Costs	\$1,483,416	\$1,483,416	\$1,657,500
	Value Stream Profit	\$1,414,400	\$1,469,257	\$2,475,661
	Value Stream Return on Sales	35%	36%	44%
	Hurdle Rate Variance (40%)	-5%	-4%	4%

As the company moves from the current state to the future state the operational measurements improved, but there was little financial improvement. The real change is that available capacity and cash (from inventory reduction) was freed up. Tangible financial benefit comes when the company introduces new products that use that newly-freed up capacity.

Figure 4.

large a cost will we save?" to, "How can we use our newly-created capacity to increase customer value and make more money?" It is important to ask this question every time a future state value stream map is developed because the answer gives us the true financial impact of lean changes, both short term and longer term.

Capital Planning

The lean approach to capital acquisitions is quite different from the traditional return-on-investment calculations. When approaching a major decision relating to the purchase of capital equipment a lean organization will perform a 3P.⁴ The 3P team is required to develop several solutions to the problem. Often they are forced to "think outside the box" because each solution must be quite different: fully automated, fully manual, similar to current approach, opposite to current approach,

etc. 3P also requires the team to evaluate each alternative using an extensive checklist of lean attributes, most of which are non-financial. The financial impact of each alternative is presented on a box score as a part of the decision process. Figure 5 shows a box score used for capital planning.

Investment in People

Two issues are perilously neglected by many companies attempting the lean journey. One is the need for active senior management leadership and involvement. The second is a focus on "lean tools" rather than on people. Successful lean organizations radically change their culture to make the training, involvement, and empowerment of their people of paramount importance.

Lean accounting contributes to this effort by providing appropriate measurements. While it is difficult to measure employee empowerment directly, such

A Box Score Showing the Impact of Three Capacity Alternatives on a Value Stream

		CURRENT STATE	SINGLE FULLY AUTOMATED CELL 42% more capacity	THREE MANUAL CELLS 60% more capacity (but only 42% sales increase)	OUTSOURCE
OPERATIONAL	PRODUCTIVITY Conversion Cost per Sales Dollar	\$0.2386	\$0.2856	\$0.1932	\$0.1680
	PROCESS CAPABILITY On-Time-Shipment	82%	97%	98%	97%
	MATERIAL FLOW Days of Inventory	29	12	18	21
	PROCESS QUALITY Parts per Million (Internal)	18,892	4,250	15,000	10,000
	PRODUCT COST Average Cost	\$3.62	\$3.60	\$3.16	\$3.61
CAPACITY	Productive	48%	72%	42%	52%
	Non-Productive	28%	16%	32%	26%
	Available	24%	12%	26%	22%
FINANCIAL	Revenue	\$10,677	\$15,161	\$15,161	\$15,161
	Material Cost	\$3,758	\$4,585	\$4,890	\$6,393
	Conversion Costs	\$2,547	\$4,330	\$2,929	\$2,547
	Profit	\$4,372	\$6,247	\$7,342	\$6,221
	Return on Sales	40.95%	41.20%	48.43%	41.03%

The box score compares three alternatives: Fully automated, a classic lean cell approach, and outsourcing. In this case, lean wins.

Figure 5.

measurements as the number of improvement suggestions implemented, the percentage of people actively involved in continuous improvement, and the level of cross training within the value streams are helpful. Annual surveys of employee satisfaction can also help to gauge the company's management capabilities and success with employee empowerment. Many lean organizations also use a simple profit-sharing process that gives everyone a stake in the company's success.

E. Strengthen Internal Accounting Controls

Accounting controls have always been important, and it is essential that Lean Accounting enhance these controls, and does not weaken them. It is important to bring the company's auditors into the Lean Accounting process at the earliest stages. A primary tool to ensure that Lean

Accounting changes are made prudently is the *Transaction Elimination Matrix*. Using the transaction elimination matrix we can determine what lean methods must be in place to enable us to eliminate traditional, transaction-based processes without jeopardizing financial (or operational) control. These decisions are made ahead of time and become a part of the overall lean transformation; in some cases driving the lean changes and improvements.

The new Sarbanes Oxley regulations⁵ (SOX) are met by including SOX requirements in the standardized work whenever improvement projects are applied to the company's administrative processes. When process maps are drawn the SOX risks are included and color-coded, and any changes required to mitigate and test these risks are built into the improvement project or kaizen event.

An important aspect of financial con-

trol is the evaluation of inventory. Lean manufacturing always leads to substantial inventory reductions. When inventories are low and under good control (using pull systems, single-piece flow, supplier partnerships, etc.), the valuation of inventory becomes much less complex. Lean Accounting contains a number of methods for valuing inventory that are simple, accurate, and often visual. Several of these methods do not require any inventory tracking at all.

Conclusion

While Lean Accounting is still a *work-in-process*, there is now an agreed body of knowledge that is becoming the standard approach to accounting, control, and measurement. These principles, practices, and tools of Lean Accounting have been implemented in a wide range of companies at various stages on the journey to lean transformation. These methods can be readily adjusted to meet your company's specific needs and they rigorously maintain adherence to GAAP and external reporting requirements and regulations. Lean Accounting is itself lean, low-waste, and visual, and frees up finance and accounting people's time so they can become actively involved in lean change instead of being merely "bean counters."

Companies using Lean Accounting have better information for decision-making, have simple and timely reports that are clearly understood by everyone in the company, they understand the true financial impact of lean changes, they focus the business around the value created for the customers, and Lean Accounting actively drives the lean transformation. This helps the company to grow, to add more value for the customers, and to increase cash flow and value for the stock-holders and owners.

Brian Maskell, a well-known speaker, and the president of BMA Inc., has written six books on topics related to lean accounting, and has 25 years' experience in industry. Bruce Baggaley, the senior partner of BMA Inc., is a regular presenter of workshops on lean accounting at AME events, and is co-author of a book on practical lean accounting.

Footnotes:

1. Other sponsors included the Society of Manufacturing Engineers (SME), the Institute of Management Accountants (IMA), Lean Enterprise Institute (LEI), and Financial Executives International (FEI). The Lean Accounting Summit was underwritten by FlexwareInnovation.
2. A "starter set" of lean performance measurement is available from www.maskell.com/LeanAcctg.htm. (free of charge).
3. Often there is an improvement in cash-flow as inventory levels are reduced, and there are often reductions in material costs as product quality improves. Sometimes these kinds of cost savings can be substantial, but often the short-term affect of lean improvement does not "hit the bottom line."
4. Production Preparation Process (3P) is a disciplined method for designing or redesigning a production process. See *Lean Lexicon* by Chet Marchwinski and John Shook (LEI, Brookline, MA, 2003).
5. The Sarbanes Oxley laws were Congress' response to the recent accounting scandals associated with such companies as Enron, Tyco, and Global Crossing. This series of regulations seeks to monitor companies' compliance to generally accepted accounting principles in relation to internal financial control and accuracy of external reporting.

