

The Advancement of Lean Accounting

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The most noteworthy evolution of Lean Accounting in recent years is a sharpening focus on value. While lean has always been centered on creating value for customers, and eliminating non-value adding waste, the companies deploying Lean Accounting and the researchers furthering our understanding of it are increasingly moving ‘Value Adding’ and Non-Value Adding’ from the theoretical realm to a very specific, measurable one. From isolating non-value adding expenses on P&L statements to using Value Adding Ratios, Lean Accounting is increasingly enabling manufacturers to specifically measure value in financial terms and to focus improvement efforts on enhancing value.

Origins and Evolution of Lean Accounting

September, 2010 marks the fifth anniversary of a momentous gathering in Dearborn, Michigan of a handful of the leading lean manufacturing practitioners, consultants and academics to formalize and unify the work they had been doing independently on a radically different approach to accounting for manufacturing which has become known as Lean Accounting. Since that time the annual Lean Accounting Summit has grown to include hundreds of participants and companies, and there are now thousands of manufacturing organizations around the world practicing Lean Accounting to varying degrees.

The expansion of Lean Accounting from that original small group has driven an evolution of the principles and practices as more companies are contributing to the body of knowledge based on practical experience, and a growing number of academic and manufacturing experts are studying and contributing to the enhancement of the underlying principles.

Lean Accounting evolved from a concern that traditional accounting practices were inadequate and, in fact, a deterrent to the adoption of some of the necessary improvements to manufacturing operations. While manufacturing managers knew that investments in automation and the adoption of lean manufacturing practices were the right things to do, traditional accounting was often an obstacle to such improvements, yielding numbers that only supported investments when they could be justified by reductions in direct labor, with little benefit ascribed to any improvements to quality, flexibility or factory throughput. Adoption of lean manufacturing practices was treated even worse, as reductions in factory cycle times drove corresponding reductions in

inventories, triggering an under-absorption of overhead expenses and actually making the company appear to be less profitable as a result of their lean strategy.

The problems presented by traditional accounting reached an especially critical point in the 1980's as foreign – largely Japanese – competition took a severe toll on American manufacturing competitiveness. *“Relevance Lost – The Rise and Fall of Management Accounting”* written by Tom Johnson and Bob Kaplan in 1991 gave the problems with traditional accounting a very high level of visibility. A consortium effort coordinated by Computer Aided Manufacturing – International (CAM-I) brought the leading manufacturers and the academic community together over the course of a few years in the late 1980's to develop solutions, and the concept of Activity Based Cost Management resulted from their efforts. At about the same time, Eliyahu Goldratt's Theory of Constraints included the concept of Throughput Accounting, as another solution to the problem.

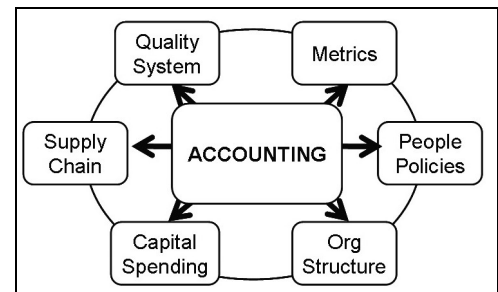
Activity Based Costing turned out to not be the hoped for solution, largely because it is primarily a more sophisticated approach to allocating costs and allocations are at the heart of the problem with traditional accounting. The solution is to eliminate allocations, rather than improve them. Goldratt's Throughput Accounting was much closer to the solution, although it did not provide sufficient structure and information to drive the elimination of non-value adding expenses, or 'waste' in lean terms.

Throughout the 1990's a number of people worked to build on these concepts and resolve their shortcomings, including Brian Maskell and Bruce Baggaley, Orrie Fiume and the management of Wiremold, Mark Deluzio at Danaher, Jean Cunningham and others. The set of principles that evolved and was solidified at that meeting in Dearborn is Lean Accounting. That set of principles was documented in Brian Maskell and Bruce Baggaley's 2006 article, [*“Lean Accounting – What's It All About?”*](#) The purpose of this article is to describe Lean Accounting in its current form, as it has evolved and sharpened in the years ensuing from that first meeting of the Lean Accounting Thought Leaders.

Cornerstone of Lean Management

One of the most significant evolutions in the field of Lean Accounting is a growing awareness that Lean Accounting is actually the cornerstone of a completely different model of manufacturing management – an entirely different business model. By itself, Lean Accounting has limited value, but as the financial basis for the architecture and application of logistics, quality management, factory operations, marketing and pricing, and other critical business functions, Lean Accounting is extraordinarily powerful.

A core principle of Lean Accounting is that the Value Stream is the only appropriate cost collection entity within the organization, as opposed to traditional accounting's use of cells, cost or profit centers,



	TRADITIONAL	LEAN
Quality Systems	Inspection Based	Controlled at the Source
People Policies	Variable Cost	Fixed Cost
Organizational Structure	Heirarchical Functional	Flat - Value Stream Based
Investment Criteria	ROI Based Labor Savings Focus	Quality & Flexibility Focused
Performance Metrics	Detalied, Subordinate Measures	Value Stream Output Based
Production & Inventory Planning & Control	Push / ERP	Demand Pull

or departments normally based on smaller, functional groupings of work activity. The value stream is the complete sequence of activities within the organization that operationally links the incoming supply chain with one or more outgoing distribution channels, as well as the complete sequence of associated business activities required to take a customer

order from start to finish. Only by assessing financial impact in the Value Stream structure can management be assured that a dollar saved at some point in the process did not trigger two dollars to be spent elsewhere.

The former Toyota Manufacturing Director Taiichi Ohno once described their system saying, *“All we are doing is looking at the time line from the moment the customer gives us an order to the point when we collect the cash. And we are reducing the time line by removing the non-value added wastes.”* This accurately describes the driving principle of lean manufacturing, and the model Lean Accounting supports. That “time line” from order to cash is the value stream. As manufacturers deploy lean practices and implement Lean Accounting it becomes increasingly apparent that restructuring the organization formally around value streams, rather than traditional functional, hierarchical lines, makes sense. Further, as the manufacturer increasingly focuses on reducing cycle times through the value stream and using Lean Accounting information to identify and eliminate waste, a number of other alternatives to traditional management theories become more effective.

The driving principle at Motorola behind the origination of Six Sigma was *“The best quality producer is the shortest cycle time producer, and the shortest cycle time producer is always the best cost producer.”* Goldratt’s Theory of Constraints was similarly focused on the rate of flow through the business from start to finish as the critical driver of results. As all the state of the art in manufacturing management thinking aligns with Ohno’s principle of process cycle times of processes – and processes are synonymous with value streams – an entire flow and waste elimination management scheme has emerged. In recent years it has become apparent that Lean Accounting cannot be discussed without discussing the broader lean management infrastructure it entails and supports.

While there is minor disagreement among Lean Accounting proponents and practitioners whether a conversion to Lean Accounting should best lead or follow the deployment of lean manufacturing practices on the shop floor and a transition to a lean manufacturing management model, there is no disagreement that Lean Accounting supports and is tightly integrated with a comprehensive Lean Enterprise, and that it does not stand

alone as an accounting approach within the context of a traditional management scheme, or a factory pursuing old batch production theory of manufacturing

Core Principles

Lean Accounting is based on a number of core principles that represent a departure from traditional manufacturing management accounting principles.

Management First Lean Accounting is based on the idea that accurate information for management analysis and decision making comes first, and that financial statements in accordance with GAAP can be derived from the Lean Accounting data. Traditional management and cost accounting is the reverse of this principle, starting with GAAP compliant accounting statements, and then attempting to derive information for management from those statements. Effective management information cannot be derived from traditionally developed external reports.

Value Centered The most fundamental purpose of management accounting is to clearly differentiate between expenses for activities that add value and expense for activities that do not add value. All financial information presented to management should make this differentiation between value adding and waste clear.

Holistic Approach Products and customers cannot be profitable or unprofitable. All sales (unless a product is being sold at a price below its direct material costs) contribute to the potential profitability of the business to varying degrees. Traditional cost accounting methods that attempt to determine product or customer profitability do so by means of allocations of expenses that are not directly related to the product or the sale, and introduce harmful distortions and lead to erroneous management conclusions. Decisions regarding pricing, make versus buy and capital investments must be made holistically, based on the overall impact the decision will have on the contribution level of the value stream.

Value Stream Structured The Value Stream is the appropriate entity within the organization for gathering, summarizing and analyzing expenses for purposes of management control and decision making. A Value Stream includes all of the cross-functional physical and human resources required to process a customer order from creation to collection, linking externally at both ends – from the customer and the supply chain to the customer and the distribution channels. The objective of each value stream is to focus resources and improvement efforts on the creation of value for customers, and the elimination of activities and expenses that do not contribute to adding customer value. Because different customers, or different categories of customers, define value in different manners, a Value Stream should be created for each significant customer defined value requirement. For example a company manufacturing and selling machined components to both the automotive market and the

aerospace market would create a value stream for each of those markets since the requirements of automotive and aerospace will be quite different in a number of ways. This differentiation should occur even if the products sold to each market are quite similar. The objective is not cost reduction through economy of scale, but enhancement of overall value, which is much broader than simple direct unit cost reduction.

Cash Based – Plain English Lean Accounting treats virtually all costs other than direct material as period costs. One critical objective of Lean Accounting is to simplify the financial statements and put them in a format that is easily understood by everyone in the organization in order to more fully engage the organization at all levels in the effort to reduce non-value adding expenses. Full absorption and moving expenses to the balance sheet per the Matching Principle are the primary culprits in creating misleading and harmful accounting information for manufacturing. By minimizing or eliminating allocations of indirect costs to production, and valuing inventories at as close as possible to direct material costs, this effect is eliminated, or minimized. Lean Accounting strives to enable management to understand and interpret the financial information in a manner that closely approximates how people account for their own lives at home, with a heavy reliance on cash flows and the ability to assess spending as it actually occurs.

Fixed Costs Lean Accounting is biased toward an assumption that all costs are fixed, rather than variable. Because all costs are generally fixed in the very short term, and generally variable in the long term, assigning a cost to either fixed or variable status depends entirely on the time frame for which the cost is being assessed. Further, most ‘costs’ are not single costs at all, rather they are collections of like costs. Machine maintenance, for instance, is apt to include both labor and maintenance supplies, and both planned and unplanned activities. It has multiple elements each with multiple drivers. Some aspects of the expense may tend to be fixed – maintenance labor for instance – while other elements may be more variable – breakdown parts and supplies, for example.

Since all costs are both fixed and variable and the true behaviors are likely to be unknowable, the determining factor is management control. If costs are classified as variable (as traditional accounting assumes them to be in allocating them to each unit of production), management has much looser control and visibility than if they were assumed to be fixed. If they are assumed to be variable, then management has essentially given the organization license to increase spending in those cost areas proportionate to sales volumes. A 5% increase in sales, for instance, allows operations to increase spending by 5% even though a significant element of the expense should not vary with volume. On the other hand, when management assumes costs to be fixed, increases in volume do not trigger an allowance to increase spending proportionately, and any increase will generate a spending variance, enhancing management’s ability to delve into and understand cost increases. In summary, an assumption of fixed behavior increases managerial cost control in a growing organization to a much greater degree than assuming costs are variable.

Perhaps most important, a cornerstone of lean is respect for the necessity of involving everyone in the ongoing control and improvement of processes. This cannot be accomplished without providing basic job security. Lean companies cannot succeed by laying off and recalling employees as short term sales volumes may require. Labor, therefore, is a fixed cost and leveraging that cost by steadily increasing volumes is critical to profitability.

The Lean Accounting Value Stream P&L

The chart to the right is an example of the structure of a Lean Accounting P&L statement. Note that all expenses other than SG&A are within Value Streams, and in each Value Stream value adding and non-value adding expenses are segregated.

The value stream structure enables management to see resources and their associated costs aligned with the various channels or market segments the company serves, a critical insight that is usually impossible to discern in companies with traditional organization structures and traditional accounting statements.

The sorting by expenses into value adding and non-value adding, then

	VALUE STREAM A
Sales - Gross	\$ 40,00
Direct materials	<u>\$ 19,00</u>
Gross Contribution	\$ 21,00
Value Adding	
Applied Direct Labor	\$ 90
Payroll Associated Costs	\$ 30
Shop Supplies	\$ 25
Product Engineering	\$ 10
Depreciation	\$ 25
Preventive Maintenance	\$ 10
Utilities	\$ 30
Other	\$ 30
TOTAL	<u>\$ 2,50</u>
VALUE ADDING TOTAL	\$ 21,50
VALUE ADDING RATIO	74.8%
Operational Non-Value Adding	
Quality Control	\$ 65
Unapplied Labor	\$ 20
Facilities expenses	\$ 95

further breaking the non value adding expenses down into operational waste of the sort which is the focus of lean

manufacturing tools; management controlled expenses which do not add value to the customer but may add value to the business or represent investments in improving the value adding capability in the future; and required expenses which include items that do not add value to the customer but are necessary to comply with laws and regulations, is an important breakdown in Lean Accounting statements in that it provides management with a clear picture of the organizations ability to add value, and where waste can be found that may be a target for elimination.

Elimination of Waste

The goal of the lean manufacturer is not cost reduction so much as it is the elimination of expenses that do not add value in the eyes of the customer. The lean manufacturer does not necessarily seek to be the lowest cost producer so much as to be the best value producer.

The VALUE ADDED RATIO, indicated on the sample Lean Accounting P&L as 74.8%, 74.9%, and 72.4% for the three Value Streams respectively, and 63.4% for the company overall is perhaps the most important number on the report. It is a calculation of the percentage of total cost that was incurred in adding value customers are willing to pay for.

Often manufacturers will include a corollary metric, SALES TO VALUE ADDING RATIO, calculated by dividing sales by the amount of value adding expense (in the case of Value Stream 1 this would be $\$40,000 \div \$21,500 = 1.86$) as a measure of the rate at which customers are willing to pay for the value created.

The objective is to continuously improve the VALUE ADDED RATIO by eliminating waste and devoting an ever increasing share of money spent to activities that create value for customers, while holding the SALES TO VALUE ADDING RATIO steady or even improving it. A decrease in the SALES TO VALUE ADDING RATIO is an indication that the activities the firm believes add value in the eyes of the customer is mistaken.

Breaking the P&L for each value stream down in this manner clearly identifies the nature and location of waste, and serves as the source of targets for improvement efforts, such as kaizen events or Six Sigma projects, or the deployment of lean tools such as kanban or preventive maintenance techniques.

Sales & Operations Financial Planning (SOFP)

The monthly SOFP meeting is the critical management process for planning and executing activities in the Value Stream. Typically it will encompass the previous three months actual results and plans for the upcoming three months. In some cases the planning period is expanded, normally in the case of manufacturers of long lead time, capital equipment when the order to shipment cycle time exceeds the three month horizon. The SOFP meeting is preceded by a number of detailed meetings within the Value Stream in which the details of the sales plan, capacity requirements and other critical inputs are developed.

The SOFP meeting is normally attended by senior management, as well as the cross functional leadership of the Value Stream. Note that senior management will participate in an SOFP meeting with each Value Stream in the company, and often there is a higher level SOFP meeting in which all of the Value Stream managers meet with senior management to review a consolidated SOFP plan. This additional meeting is helpful to keep each

VALUE STREAM A SOFP		
	JANUARY ACTUAL	FEBRUAR ACTUAL
Sales - Gross	\$ 41,000	\$ 36,000
Direct materials	<u>\$ 20,500</u>	<u>\$ 17,500</u>
Gross Contribution	\$ 20,500	\$ 18,500
Value Adding		
Applied Direct Labor	\$ 925	\$ 900
Payroll Associated Costs	\$ 365	\$ 300
Shop Supplies	\$ 300	\$ 225
Product Engineering	\$ 125	\$ 75
Depreciation	\$ 250	\$ 250
Preventive Maintenance	\$ 150	\$ 125
Utilities	\$ 550	\$ 325
Other	\$ 200	\$ 225
TOTAL	<u>\$ 2,865</u>	<u>\$ 2,425</u>
VALUE ADDING TOTAL	\$ 23,365	\$ 19,925
VALUE ADDING RATIO	73.1%	72.6%
Operational Non-Value Adding		
Quality Control	\$ 600	\$ 700
Unapplied Labor	\$ 275	\$ 300

Value Stream informed of the overall status and outlook for the company, but especially necessary in cases where the Value Streams must share critical resources or support each other in the execution of their plans.

The primary objective of the SOFP meeting is to assure that a plan for successful execution is in place and that everyone involved understands the plan and is committed to its execution. Potential problems with its execution are raised and plans put in place to resolve them. It is also used to review cost trends and to identify costs that should be attacked by upcoming kaizen or other improvement efforts. Note that the focus is on continuous tracking and improvement of costs on a trend basis, a marked difference from the traditional approach of calculating variances from an annual budget set long before and often outdated; and a difference from tracking variances against standard costs that tend to trivialize many non-value adding overhead expenses, and treat all overheads as variable costs.

The scope of the SOFP includes both financial and non-financial performance indicators. Often additional items are tracked and managed through the SOFP process of a strategic nature. These might include the status of new product development efforts, or the status of new equipment or computer software acquisitions.

Strategic Planning & SOFP

Through Hoshin Kanri (or Hoshin Planning), A3 Planning or Policy Deployment, it is necessary for companies to supplement the short term execution through SOFP with occasional and ongoing longer range plans. These techniques are all aimed at defining ‘true north’ – the direction of the company, then cascading down through the organization and linking each person and resource in the execution of the long term actions required to continually strive for that true north. Those plans may include new products, new customers or other specific objectives to grow or increase the profitability of the company.

Those planning activities result in milestones and the SOFP process includes tracking progress toward the strategic objectives by measuring progress to those milestones. In this manner, the continual short term planning and execution of the Value Stream through the rolling three months of SOFP is kept on track to long range goals and objectives, and incorporating tracking Value Stream progress to strategic goals is an essential element of SOFP.

Pricing Without Standard Costs

In a radical departure from evaluating and establishing prices based on their relationship to fully absorbed standard costs, pricing is a strategic endeavor in a Lean Accounting environment, with the focus on the impact of pricing on Value Stream contribution levels, regardless of the costs that might be associated with making any individual item.

The process for integrating sales and marketing strategy with operations can be seen on the next page where a pro forma value Stream P&L is created to compare current prices, sales volumes and expenses (and the

		<i>CURRENT PRICING</i>				
		PRODUCT A	PRODUCT B	PRODUCT C	PRODUCT D	PROF
	Price	\$ 20.00	\$ 25.00	\$ 30.00	\$ 35.00	\$
	Volume	300	400	250	300	15
Sales - Gross		\$ 6,000	\$ 10,000	\$ 7,500	\$ 10,500	\$
Direct materials						
Gross Contribution						
Value Adding						
	Applied Direct Labor					
	Payroll Associated Costs					
	Shop Supplies					
	Product Engineering					
	Depreciation					
	Preventive Maintenance					
	Utilities					
	Other					
	TOTAL					
VALUE ADDING TOTAL						
VALUE ADDING RATIO						

resulting contribution) with a planned or proposed level. In the example shown the changes in prices and the resulting impact on volumes will increase the Value Stream contribution by \$1.353.

The proposed prices are not a function of costs, but strategy. They reflect what customers will pay (based on the customers' perception of value), and/or strategic concerns, such as pricing necessary to take market share from a competitor, or the pricing necessary to break into a new customer or a new distribution channel.

Clearly changes in pricing will not always result in increases in contribution. When the price structure needed to execute the sales strategy does not result in an acceptable contribution level, this format will enable Value Stream management to assess the cost structure and determine how much cost will need to be taken out of the Value Stream to succeed, and the changes and projects needed to accomplish the desired reduction in overall Value Stream expense can be initiated. The Lean Accounting model is not built around target unit costs since they rely on allocations; rather it enables a 'Target P&L' approach. This is in keeping with the principle that products and customers cannot be profitable or unprofitable – only Value Streams and companies can be measured in terms of their profitability.

Note at the bottom of the example, a figure called “Cost Structure Capacity Utilization”. This a number determined by the Value Stream management that reflects the amount of volume the Value Stream can process with the existing cost structure. The price changes caused small increases in a few expenses – direct labor, training, utilities – but the Value Stream was able to accommodate the additional volume without having to make a significant change to the cost structure. The Cost Structure capacity Utilization figure is a critical piece of information determined by the Value Stream management and it reflects the amount of production volume the Value Stream can produce with its current cost structure.

The increase in contribution and the improvement in the Value Added Ratio from 74.8% to 76% largely reflect leveraging available capacity and the Value Stream fixed costs. The objective of a Value Stream should be to fully utilize capacity to the extent possible and continually seek the optimum volume level to leverage fixed costs. The cost structure capacity reflects whatever is constraining the Value Stream, but is not necessarily a machine. It may be the amount of work that can be handled before additional engineering staff is required, for instance, or an additional production shift must be added.

Make versus Buy and Capital Investment Decisions

The decision to outsource or insource work, or a decision whether to acquire capital equipment is made in a fashion similar to the pricing process in a Lean Accounting environment. A pro forma P&L is created reflecting the current state and the proposed future state. In the case of these decisions the additional financial and non-financial metrics from the SOFP process are also included in the current state – future state analysis; and the decision is made based on the anticipated impact it will have on all of these metrics.

Lean Accounting versus GAAP

The Lean Accounting P&L statements can be constructed to comply with GAAP with the simple addition of a line at the bottom reflecting the transfer of expenses to the balance sheet in the form of inventory. Firms managing with Lean Accounting typically perform very simple allocations of overheads for GAAP purposes since the only purpose the allocation serves is to comply with GAAP. Often it is as simple as one number for all products. In the case of our Lean Accounting P&L shown previously, we reflected \$9,725 of total Value Stream expenses other than direct materials to produce 1,400 units of all kinds. GAAP compliance can be achieved with a simple assignment of \$6.95 to each unit for total conversion costs ($\$9,725 \div 1,400$). Since no management decisions will be made regarding pricing, make/buy, cost analysis or capital investments based on these unit costs there is no reason to make the assignment process any more complicated than necessary to achieve GAAP compliance.

Many companies choose to run parallel systems, however, performing a monthly reconciliation between the Lean Accounting statements and externally published GAAP compliant statements for the simple reason that

they do not want to confuse investors or bankers with the Lean Accounting format. They avoid confusion or resistance to change by maintaining a reconciliation log off-line for purpose of satisfying auditors and assuring Sarbanes-Oxley compliance. While working from one statement is easier for accounting, either approach is acceptable.

Conversion To Lean Accounting

The transition from traditional management – from a functional organizational structure and traditional accounting to Value Streams and Lean Accounting – is best viewed as an ongoing process, rather than a project. The transition from the old structures to the new can be lengthy and difficult. Often firms have expensive, major pieces of equipment, such as paint systems, heat treat equipment or other ‘monument’ equipment that must be shared across two or more Value Streams. Such sharing necessitates continuing to allocate the costs of the equipment until such a time as it can be economically replaced with smaller, dedicated machines in each Value Stream.

Similarly, human resources may need to be shared until sufficient cross training can be accomplished. An example might be a company with one buyer and two schedulers that is converting to three Value Streams. The buyer and schedulers will have to be cross trained into three buyer-schedulers, each handling both the buying and the scheduling in a Value Stream.

Finally, management may choose to limit the resources put into the Value Streams until the Value Stream management has climbed the necessary learning curve and can handle some of the more difficult and critical functions. Examples might include new product development or supplier selection, which management may want to keep out of the Value Streams and in their functional area for a matter of months or even years until the Value Streams can manage them effectively.

While the transition is taking place there will be shared resources and shared people, and a degree of allocation of the expenses to the Value Streams will be necessary. This is entirely normal and reasonable. Each dedicated resource and each expense that can be directly charged to a Value Stream is a step toward greater accuracy. All that is required is a dedication to continually increasing the resources in the organization assigned directly to Value Streams and continually reducing the percentage of expenses allocated and correspondingly increasing the direct expenses to the Value Streams.

Conclusion

The first five years since the initial Lean Accounting Summit have been exciting ones as the inherent value of structuring accounting in a manner that directly records and encourages manufacturing progress toward the best global practices has become more widely known and adopted. The rate of progress in expanding and improving on the principles and their application has been dramatic. Certainly the next five years will be even

more exciting. The leadership role of accounting in the manufacturing transformation to excellence – to lean – has come into focus and more and more accounting professionals are embracing the challenge and seizing the opportunity to serve a greater role than simply acting as the record keeper.