Exploring the Role of lanagement Standard Costing in Lean Manufacturing **Enterprises:** A Structuration Theory Approach

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DO MATURE LEAN MANUFACTURERS CONTINUE TO USE STANDARD COSTING AND VARIANCE ANALYSIS? THE AUTHORS PRESENT A RESEARCH PROTOCOL TO DETERMINE IF THIS IS THE CASE AND HOW IT COMPARES TO LEAN ACCOUNTING THEORY.

lthough manufacturing organizations worldwide are moving rapidly to adopt lean management systems, field reports suggest that many lean manufacturers continue to use traditional standard cost accounting control systems, despite the argument by lean accounting experts that they hinder lean implementation.¹ No empirical research study has examined field practices to determine if lean accounting theory matches field practices. In this article, we present a research protocol for determining how mature lean manufacturers' use of standard costing compares to lean

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accounting theory. In addition, we offer perspectives to determine why mature lean manufacturers may continue to use standard costing and variance analysis.

In our study, we use a model from social systems thinking-Anthony Giddens's structuration theory (GST)-to guide the determination of nine relevant variables. We anticipate that this research protocol will lead to a better understanding of the reasons lean manufacturers retain standard costing and variance analysis and of the facilitating factors that allow some companies to discard standard costing as a control system for operations.

STANDARD COSTING VERSUS LEAN Accounting

Standard costing was developed to suit the needs of mass manufacturing. The mass manufacturing environment, which is characterized by high fixed-investment costs in the plant and machinery, involves production of large volumes of uniform output. To reap the economies of scale, high fixed-investment costs are spread (averaged) over volumes of units produced. Standard costing is a convenient way of costing outputs in mass manufacturing environments. Standard costs, which are predetermined unit costs, estimate the costs of the output, which then are compared with actual costs incurred to determine variances that are useful for exercising managerial control. Such controls, however, take place at aggregated levels and often weeks after actual operations, thus obscuring the cause-and-effect connections. For instance, variance reports that provide information at aggregated levels do not provide adequate information to exercise operational controls in a lean environment.

In a lean environment, operational and process controls replace managerial and financial controls at aggregated levels. Also, visual operational controls replace periodic financial controls at aggregated levels. The objective of lean is to prevent deviations from occurring in the first place and not correcting deviations that have already occurred.

Standard costing systems also create a detailed system of accounting for recording each and every transaction to trace the flow of processes through different stages of production. In a single-product environment, standard costing will be easy to maintain and can produce meaningful reports for control. In a multiproduct, lean manufacturing environment, where each process can produce a variety of products, maintaining detailed product accounts is both wasteful and cumbersome.² The use of standard costing in such an environment may produce volumes of variance reports that may not only be difficult to analyze but may also not provide any meaningful information to exercise control.

Further, accounting for fixed overhead costs becomes more complicated in a lean environment. Fixed costs in a lean manufacturing environment cannot be averaged over the outputs produced because of lack of uniformity in the output in the multiproduct environment. In such manufacturing systems, it becomes necessary to trace the input costs to value streams rather than a single unit of output. A value stream consists of a group or family of related products or services that employ the same process steps.³ According to lean accounting, the profitability reporting system should be organized around value streams.

The lean manufacturing environment is characterized by manufacturing in work cells involving multiskilled workers and flexible manufacturing systems.⁴ Lean manufacturers often find visual controls and work-cell metrics superior for controlling operations. Consequently, according to lean accounting theory, it is surprising to find standard costing in *mature* lean manufacturers. The unique features of a lean manufacturing environment have led experts to develop lean accounting that provides various techniques and metrics to measure performance at subtler (and more powerful) levels of operations.⁵ Such measurements are superior to standard costing and variance analysis in several ways because they:

- Are developed by each work-cell team to support value-stream metrics,
- Provide more detailed information for controlling workflow processes,
- Are generated on a more real-time basis (hourly or daily) instead of weeks or months after a production run, and, therefore,
- Provide actionable information for correcting problems quickly rather than guessing retrospectively at what happened and trying to make adjustments.

Brian Maskell and Bruce Baggaley have indicated a three-stage path to lean transformation that should be accompanied by corresponding changes in accounting whereby the organization moves away from traditional costing to lean accounting.⁶ They also say that, ideally, in stage two of lean transformation, companies must move away from traditional standard cost accounting and variance analysis.

PARADIGM SHIFT

The shift in emphasis from traditional standard costing to lean accounting in lean enterprises can be considered a shift in focus from a cost-based approach to a valuebased approach to management accounting. For example, IMA® (Institute of Management Accountants) published a Statement on Management Accounting (SMA), *Accounting for the Lean Enterprise: Major Changes to the Accounting Paradigm*, which describes the paradigm shifts necessary for accounting in lean enterprises.⁷ It describes five major changes in accounting for lean enterprises:

- Preparation of value-stream income statements to control costs, promote lean behavior, and monitor performances;
- New decision-making methods without using standard costing as base;
- ◆ A product-family view of product costs;
- Budget and financial planning based on a box score format and value-stream statements; and
- Transaction elimination and reduction in collection and recording of data in favor of simple visual management methods.

Thomas Kuhn coined the term "paradigm" in 1962 to denote the models or broad concepts within which theories are built in any field.8 He studied the history of scientific developments and in Structure of Scientific Revolutions described how scientific changes occur through periodic upheavals. According to Kuhn, scientific progress occurs not through a steady process of evolution or linear accumulation of facts but through revolutionary periods involving shifts in paradigms. During these times, there is a struggle between competing paradigms to dominate the field. When new, contradictory evidence appears against existing paradigms, the proponents of the existing paradigms in the field discount the new discoveries and defend the existing paradigms. The proponents of new knowledge, however, develop new paradigms outside old paradigms and struggle to gain acceptance. The new paradigm eventually replaces the old paradigm as a new generation grows up with it and the opponents die or convert to a new paradigm.

Today the management accounting field is characterized by paradigm shifts. This shift began with the publication of *Relevance Lost* in 1987 by H. Thomas Johnson and Robert S. Kaplan, which highlighted the serious shortcomings of traditional cost accounting methods in meeting the needs of current manufacturing systems.⁹ But while standard costing has been criticized as not relevant in current manufacturing environments, it is still used most widely in manufacturing companies throughout the world, according to empirical findings.¹⁰ Even Japanese manufacturing companies continue to use standard costing for different purposes, despite its apparent weaknesses.¹¹ A field study of integrated cost management systems by Robin Cooper and Regine Slagmulder in 2006 found that standard costing continued to play an important role to achieve cost containment in a network organization that also used lean accounting techniques such as kaizen costing and target costing for product costing.¹²

In 2003, IMA and Ernst & Young conducted a joint survey to assess the current state of management accounting. Among other findings, this survey indicated that, despite introducing new tools, companies still frequently used traditional management accounting tools. In fact, traditional costing techniques such as fullabsorption costing and overhead allocations were popular with more than 70% of the respondents.¹³

Why do lean enterprises continue to use standard costing? The question reflects the debate that is going on in the broader field of management accounting where alternative cost accounting techniques are struggling to gain acceptance as a replacement for traditional cost accounting methods. But traditional cost accounting methods, such as standard costing, continue to find relevance in actual practice.

THEORETICAL FRAMEWORK

In 1984, Anthony Giddens proposed the theory of structuration to provide theoretical constructs with which to analyze social systems.¹⁴ This theory not only explains the nature of social institutions, but it provides a means to understand the conditions for their transformation. Management accounting systems increasingly are being considered social systems.¹⁵ In 1991, Norman Macintosh and Robert Scapens used structuration theory to describe the nature of management accounting systems, explaining how it can provide a holistic perspective with which to examine management accounting and control systems and how they can bring about transformational changes in organizations.¹⁶ In our study, we use structuration theory as a sensitizing device to analyze and understand factors that may impact management accounting systems in lean manufacturing plants. We apply the concepts from managerial accounting to the constructs of structuration theory to make propositions about the probable reasons lean manufacturing plants retain standard costing.

CONSTRUCTS

Figure 1 gives the framework of the structuration theory. The theory provides for three levels of constructs: core concepts of structuration, dimensions of structuration, and elements of structuration. It shows the constructs of structuration theory, their interactions, and the variables that operationalize the constructs for this research.

CORE CONCEPTS

Giddens provides three core concepts: systems, structures, and structuration.¹⁷ At the heart of structuration theory lies the concept of system. We can describe a system as practices or activities that are regularly produced or reproduced by collective social actors. Giddens describes systems as reproduced relations that are organized as regular social practices between people.¹⁸ When we consider "systems" as regularly produced or reproduced practices, we can describe management accounting as a system in which management accountants regularly organize, produce, and reproduce management accounting practices like standard costing.

Structures are the rules that govern the regularly reproduced practices in social systems and the resources that are organized through such practices. Thus Gid-

Figure 1: Constructs of Structuration Theory



DIMENSIONS

(Figure adapted from Anthony Giddens, The Constitution of Society, 1984, p.29. Items shown in parentheses were added by authors.)

dens describes structures as "rules" and "resources" that are organized as properties of social systems. Macintosh and Scapens describe structures as the codes, templates, blueprints, rules, or formulas that shape and program social behavior.¹⁹ In the context of this study, we consider practices like standard costing as structures of management accounting systems that provide rules, templates, and formulas governing management accounting systems.

Structuration also is the process whereby social actors use structures to maintain or change systems.²⁰ An understanding of the process shows how accounting control systems are maintained or changed to facilitate resource management. In the context of this research, management accountants are the social actors who support lean management objectives by maintaining or changing management accounting practices.

DIMENSIONS OF STRUCTURATION

Management accountants as social actors are involved in structuration through three dimensions of interactions in social systems. First, they exercise power over system resources (e.g., inventories). Second, they communicate and exchange meaning with other social actors (e.g., through management reports). Third, they perform social activities within accepted norms of behavior (e.g., supporting managerial controls). Giddens calls these three dimensions domination, signification, and legitimation.²¹ For our study, it is necessary to understand these three concepts of structuration in the context of standard costing practices in lean manufacturing enterprises.

In 1988, Kaplan analyzed the reasons for using costing systems and posited that there are different reasons why costing systems can exist in an organization. Further, he asserted that a single costing system cannot meet all the objectives of management accounting in any organization. He suggested that management accounting systems should be designed to meet three distinct objectives: inventory valuation, product costing, and control.²² Our research uses three distinct objectives of standard cost accounting practices to represent the three structural dimensions of management accounting systems in lean manufacturing plants. These objectives are inventory valuation (domination), reporting (signification), and control (legitimation).

Inventory Valuation (Domination)

In a social system, domination refers to how social actors exercise power over resources to apply their transformative capabilities.²³ In manufacturing companies, management accountants assist decision makers by tracking how resources and related costs accumulate through the production process leading to inventory valuation. Such asset valuation is critical for a variety of subsequent decisions about product pricing and possible changes to production methodologies. For our study, the nature of inventory valuation in lean manufacturing plants represents the domination dimension of the structuration theory.

Reporting (Signification)

Signification refers to the way social actors make sense of the social world and exchange and communicate meaning of their understanding of the social world with other social actors.²⁴ In our study, signification is represented by reporting practices in lean manufacturing plants. Reports are the devices through which management accountants communicate their understanding and interpretations of the economic impact of operations in lean manufacturing plants.

Managerial Control (Legitimation)

Legitimation denotes accepted value standards for social behavior.²⁵ Our study considers the nature of managerial control as a legitimation dimension of management accounting systems in lean manufacturing plants. Controls aim at ensuring that operations are carried on for legitimate purposes in an organization and provide sanctions only for activities that are carried on in accordance with predetermined standards or plans.

ELEMENTS OF STRUCTURATION

The three concepts of structuration—structures, systems, and structuration—interact with the three dimensions of domination, signification, and legitimation. This interaction results in a 3×3 matrix that provides nine elements of structuration (see Figure 1).

Table 1 shows the nine elements in terms of operational variables in the context of management account-

			Propositions		
	Structural	Operational		Discarding	Retention
	Dimensions	Variables		of Standard	of Standard
			Measure	Costing	Costing
	DOMINATION				
Structure	Domination structures	Level of inventory	Days of inventory	Low	High
			on hand		
System	Facility	Machines	Nature	Flexible machines	Monument machines
Structuration	Power	Manufacturing strategy	Extent of JIT	High	Low
	SIGNIFICATION				
Structure	Signification structures	General Ledger COA	Nature	Modified	Not modified
System	Interpretative scheme	Attitude toward GAAP use	Attitude	Not relevant to management accounting	Relevant to management accounting
Structuration	Communication	Reporting	Туре	Box scores, reports on CSF	Variance analysis and variance reports
	LEGITIMATION				
Structure	Legitimation structures	Responsibility centers	Туре	Value streams/profit centers	Cost centers
System	Norm	ERP	Nature	Modified	Legacy
Structuration	Sanction	Top- management support	Support to lean accounting	High	Low

Table 1: Elements of Structural Dimensions and Propositions

ing practices in lean manufacturing plants and indicates the proposed impact of these variables on the decision to retain or discard standard costing in lean manufacturing plants.

ELEMENTS IMPACTING INVENTORY Valuation (Domination)

Days of Inventory on Hand (Domination Structures) Domination structures refer to resources over which agents use their power.²⁶ In connection with inventory valuation, we are concerned with one important resource in manufacturing plants—inventory. The volume of inventory on hand has an impact on the nature of inventory valuation. Low levels of inventory can be valued at actual cost, but high levels of inventory require the use of estimated costs or standard costs. In a lean plant, a high volume of inventory may be necessary to balance workflow through bottleneck constraints that have not yet been streamlined. In addition, external linkages to suppliers and customers may not be developed sufficiently to minimize inventory. The volume of inventory in a plant can be measured in terms of days of inventory on hand. With this understanding, we state our first research proposition. **Proposition 1.** In lean manufacturing organizations with a high level of inventory as indicated by the number of days of inventory on hand, the probability of retention of standard costing will be high.

Monument Machines (Facility)

According to structuration theory, the agent uses "facilities" to harness resources through their transformative capabilities. In lean manufacturing plants, the machinery can be considered a "facility" through which agents exercise transformative capabilities over inventory (resources). The existence of monument machines may create problems for lean transformation. Monument machines typically are large, expensive pieces of equipment with large batches, long lead times, and a slow changeover and that serve more than one value stream. They act as bottlenecks, and, in the short run, the solution would be to work around such machines. Because monument machines have a tendency to produce large batches, they may create a huge buffer stock of inventory in the downstream value streams, which may require the use of standard costing to monitor and control production made in large batches.²⁷ Thus we create the second proposition.

Proposition 2. In lean manufacturing plants with monument machines, the probability of retaining standard costing for inventory valuation will be high.

Just-in-Time Production (Power)

In structuration theory, power represents the capability of agents to bring about transformative changes.²⁸ In connection with inventory valuation, the agents use their power over inventories by applying appropriate operational strategies. Lean enterprises follow the strategy of Just-in-Time (JIT) production. To keep a very low level of inventory, lean managers adopt operational tactics such as kanban (visual control) and create upward and downward linkages on the supply chain. The valuation of low levels of inventory can be done on actual cost. On the other hand, in mass manufacturing the operational strategy is to produce in anticipation of demand to accumulate inventory for the future. High levels of accumulated inventory require standard (estimated) costs to value inventories. With this understanding, we create the third proposition.

Proposition 3. In lean manufacturing plants where the extent of JIT strategy is high, the probability of retaining standard costing for inventory valuation will be low.

ELEMENTS IMPACTING REPORTING (SIGNIFICATION)

General Ledger Chart of Accounts (Signification Structures)

In structuration theory, signification structures are described as codes or modes of coding to communicate meaning. Accounting constitutes signification structures within organizations because accounting is the language of business and finance with its terminology and symbols that create and communicate meaning concerning resources and their use. As with any other language, accountants use their own vocabulary and signification structures to record, report, and interpret the financial implications of operations.

The general ledger is the heart of accounting systems. The scheme of the general ledger, which is laid out in the chart of accounts (COA), provides a structure for recording and reporting financial impacts of transactions. We can consider the chart of accounts as codes for accounting language and tools for cost accumulation. In the standard cost accounting environment, accountants create virtual factories in their books to track each and every transaction for the purpose of product costing and reporting, and periodically they reconcile the cost accounting records with the general ledger figures.²⁹ Maskell and Baggaley suggest that lean enterprises should move away from the traditional functional chart of accounts and use a simplified COA to trace transactions directly to value streams.³⁰ They say that lean enterprises must simplify the chart of accounts, streamline their general ledger accounts to clearly capture the benefits of lean, and prepare value-stream income statements. Ideally, the changed chart of accounts and accounting entries should reflect the value-based approach of lean strategy against the cost-based approach of mass manufacturing. Appendix 1 shows new accounts and journal entries that a lean manufacturing plant may use to reflect the value-stream approach of lean accounting as opposed to the costbased approach of standard costing. Thus we create the

fourth proposition.

Proposition 4. In lean manufacturing plants where the general ledger chart of accounts has been modified to support the lean strategy, the probability of retaining standard cost accounting for reporting purposes will be low.

Attitude Toward GAAP (Interpretative Schemes) In structuration theory, "interpretative schemes" represent standardized elements of stocks of knowledge applied by actors in production of meaning.³¹ Interpretative schemes are at the core of mutual knowledge that actors use to understand interactions. Agents (actors) apply interpretative schemes to signification codes to arrive at a common understanding in activity. In connection with accounting, we consider the general principles that accountants use to prepare accounting reports as interpretative schemes. The application of uniform accounting principles prescribed by U.S. Generally Accepted Accounting Principles (GAAP) is mandatory in financial accounting and reporting, but the use of GAAP is not necessary for internal management reporting. Still, several lean accounting experts indicate that some management accountants act under a belief that standard costing is a GAAP requirement.³² This clearly indicates a situation of applying wrong interpretative schemes, which results in wrong communication in reporting. Thus we state our fifth proposition.

Proposition 5. In lean manufacturing plants where the management accountants believe that the use of standard costing techniques is a requirement under GAAP, the probability of retaining standard costing for reporting purposes will be high.

Communication (Reporting)

According to the structuration theory, regular reproduction of structural properties takes place across time and space through communication.³³ Applying this to a lean manufacturing context, we can say that lean manufacturing strategies can be sustained only when the structural properties of a lean environment are reproduced regularly within organizations. This is possible only through sustained communication of shared meanings on lean practices across time and organizational domains.

Instead of standard costing and variance analysis, Maskell and Baggaley recommend the use of special reports called "box scores" in lean enterprises to report on performance measurement based on key critical success factors, such as value, flow and pull, empowered people, perfection, and value stream, that are linked to strategic objectives. Also, they recommend preparation of a periodic value-stream income statement to facilitate managerial control.³⁴ In theory, variance analysis reports have little meaning in lean environments. The continued use of standard costing and variance analysis may contribute to continuing the use of existing structures and hinder the progress on the lean path. Anecdotal evidence suggests that companies may even stop pursuing lean strategies because of the failure of traditional standard costing to capture the financial benefits of lean. Thus Proposition 6 expresses the connections between the type of management reports generated and the need for standard costing.

Proposition 6. In lean manufacturing plants where the management accountants prepare specialized reports to capture the financial impact of lean, the probability of retaining standard costing for reporting purposes will be low.

ELEMENTS IMPACTING MANAGERIAL CONTROL (LEGITIMATION)

Responsibility Centers (Legitimation Structures) Legitimation structures refer to accepted value standards of behavior in a social system and appeal to the sense of what is right and what is wrong in social actors. The concept of legitimation is different in a lean manufacturing environment and in a mass manufacturing environment. In lean enterprises, customer value creation is considered the legitimate objective of effective operations; in mass manufacturing organizations, the emphasis is on low-cost production. This shift toward value creation has an important bearing on the nature of organizational structure. For the purpose of fixing accountability and exercising control, organizations are divided into various types of responsibility centers, such as cost centers, profit centers, and investment centers.

In traditional mass manufacturing companies, cost control forms the basis for managerial control, so the responsibility centers are classified as cost centers. Standard costing systems accumulate cost data on the basis of cost centers and provide variance reports at the costcenter level to enable managerial control. Lean accounting theory, however, suggests that in lean enterprises the concept of cost centers should be replaced by the concept of value streams. The continued use of the concept of cost centers in lean manufacturing enterprises may be a reason for continued use of standard costing there. Our seventh proposition addresses responsibility centers.

Proposition 7. In lean manufacturing plants where the organizational responsibility centers are classified as cost centers, the probability of using standard costing for control purposes is high.

Enterprise Resource Planning (ERP) Systems (Norms)

Norms are rules of behavior that reflect or embody values, either prescribing a given type of behavior or forbidding it.³⁵ In the context of management accounting systems, we can describe norms as procedural routines through which management exercises control. In our study, we examine the nature of ERP systems in lean manufacturing enterprises.

ERP systems act as normative structures in organizations by embedding norms of actions. They automate accounting process flows, such as matching invoices, order management cycle, ledger management, automated accounting, scheduled reporting, and the like, thereby redefining rights and obligations of organizational actors (accountants).³⁶ Organizations that have invested heavily in legacy ERP systems may continue to use standard costing if such systems support only standard costing or if such systems accumulate costs only on the basis of cost centers. Further, it can be expensive to modify existing ERP systems because of cascading impacts of ERP changes. Thus we create the eighth proposition.

Proposition 8. In lean manufacturing plants where the ERP systems have not been modified to suit lean initiatives, the probability of using standard costing for control purposes will be high.

Top-Management Support (Sanction)

Giddens describes sanctions as a mode of reward or

punishment that reinforces expected forms of behavior.³⁷ In an organization, top management provides sanctions to encourage or discourage certain norms through inducement or coercion. Top management must understand and lead the way toward changing management accounting systems. As long as it thinks the traditional practices are still relevant, then traditional practices will be retained. When top management understands and supports the importance of lean accounting initiatives, standard costing will tend to be eliminated. Thus, the ninth proposition addresses top management's role.

Proposition 9. In lean manufacturing plants where there is little support from top management for lean accounting initiatives, the probability of retaining standard costing will be high.

SUGGESTED RESEARCH METHODOLOGY

Despite the many lean accounting articles and books that say that standard costing and variance analysis (SCVA) will be eliminated in mature lean manufacturing companies, field reports suggest that many companies are retaining SCVA. No empirical research study has quantified the state of the practice with respect to this issue. A researcher who pursues this issue empirically is faced with the challenge of developing a testable proposition.

The key question becomes "What is the threshold for knocking down a testable hypothesis?" In the absence of any research on this topic, we suggest the following proposition: The majority of mature lean manufacturers will eliminate use of SCVA. In this proposition, it will be important to determine the criteria for "mature" lean. There are a variety of standardized survey instruments available with which to ascertain the degree of lean and the maturity of lean practices.³⁸ Because field reports suggest that some mature lean manufacturers are retaining SCVA, we should not anticipate 100% compliance with this theoretical expectation. A test of proportions can be used as the statistical method for evaluating survey results. Beyond our basic proposition to evaluate the state of current practice, the accounting profession could benefit by understanding how accountants perceive why their company may be retaining SCVA even though

lean theory suggests that it is a nonvalue-added activity. With the framework provided here, future researchers can clarify the extent to which mature lean manufacturers may be continuing to use SCVA and, through the nine propositions we presented earlier, the logic for retaining SCVA.

MORE RESEARCH IS NEEDED

For a long time, management and organizational theorists have debated whether structure or strategy is the most important element for driving organizational change. Giddens's structuration theory takes a holistic perspective by providing three concepts (systems, structures, and structuration) for analyzing organizational change dynamics.³⁹ Through the holistic lens of his structuration theory, we have developed nine propositions to examine why mature lean manufacturers continue to use standard costing and variance analysis.

Propositions 1, 4, and 7 relate to the organization's existing structural framework that governs management accounting practices. Propositions 3, 6, and 9 relate to the structuration of management accounting practices. Propositions 2, 5, and 8 relate to the systemic factors that impact the nature of management accounting practices.

Structuration theory is considered a "meta theory" that can be used to build theories in specific domains. It can be adapted to lean manufacturing environments to provide new theories that can help design appropriate management accounting methods to capture the beneficial financial impact of lean operations.

Based on the nine propositions we presented, we encourage management accountants and researchers to reflect on current accounting practices and to discover pathways to better support lean initiatives in adding value to customers while streamlining operations.

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	Bookkeeping Entries in Traditional Standard Costing (Cost-Based Approach)			Suggested Double-Entry Bookkeeping Entries for Lean Accounting (Value-Based Approach)			
1	Material control Direct materials price variance Accounts payable control (Materials are purchased based on MRP/Bill of Materials. These schedules are prepared based on sales forecast.)		1	Capacity control Salaries payable, accumulated depreciation, development costs, and other period costs (Organizations create flexible capacities based on contin- uous process improvements. The capacity costs are relat- ed to period rather than output. This account helps accounting to monitor unutilized capacity.)			
2	Work-in-process control Direct materials efficiency variance Material control (Materials charged to work-in-process on standard costs. Production is done for full capacity utilization according to preplanned production schedules.)		2	Accounts receivable control Value stream on shop floor (1, 2, 3, 4, 5) (Order received from customer, and a liability for value stream on shop floor is created. Value stream on floor rep- resents the liability to complete the received orders. This account is necessary to pull appropriate resources for production.)			
3	Work-in-process control Direct manufacturing labor variance Direct manufacturing efficiency variance Wages payable control (Direct labor cost. Labor is classified into direct and indirect labor based on units of output.)		3	Value stream on shop floor (1, 2, 3, 4, 5) Material control (Materials are issued to the shop floor against the orders on value stream pending on shop floor. Accountants ensure that no material is issued unless there is a pre- existing liability to manufacture as per order.) (Where necessary, buffer stocks are maintained to bal- ance machineries. In such cases, a constant buffer stock reserve may be maintained and appropriately accounted at cost.)			
4	Variable manufacturing overhead control Accounts payable control (Variable manufacturing overhead incurred.)		4	Material control account Accounts payable control (Accounting for materials purchased. Material purchases are triggered by a credit balance in material control accounting, indicating that purchases are made only against open orders from customers.)			

Appendix 1: Suggested Double-Entry Journal Entries for Lean Accounting

	Bookkeeping Entries in Traditional Standard Costing (Cost-Based Approach)		Suggested Double-Entry Bookkeeping Entries for Lean Accounting (Value-Based Approach)
5	Work-in-process control Variable manufacturing overhead allocated (Variable manufacturing overhead allocated to production.)	5	Value stream on floor (1, 2, 3, 4, 5) Conversion costs (Conversion costs are charged to value streams on shop floors based on actual costs/target costs/differential cost or hourly as convenient. There is no concept of direct labor here because multiskilled labor produces a variety of products. Labor is charged at value-stream level and not at product level.)
6	Variable manufacturing overhead allocated Variable manufacturing overhead efficiency variance Variable manufacturing overhead control Variable manufacturing overhead spending variance (Accounting for variable cost variance.)	6	Value stream on shop floor (1, 2, 3, 4, 5) Capacity costs control (1, 2, 3, 4, 5) (Capacity costs charged to value streams on floor on the basis of hourly utilization calculated on the basis of hourly requirement for value stream on floor. This is an important entry that helps management track how much of the capacity has actually been utilized.)
7	Fixed manufacturing overhead control Salaries payable, accumulated depreciation, and other accounts (Fixed variable overheads incurred.)	7	Value stream on shop floor (1, 2, 3, 4, 5) Value stream realized account (1, 2, 3, 4, 5) (Accounting for revenue on shipped units out of shop floor. Entries made to this account are based on shipping documents.)
8	Work-in-process control Fixed manufacturing overhead allocated (Fixed manufacturing overhead allocated on predeter- mined standards to production.)	8	Value stream on shop floor Liability for unfulfilled orders (Accounting for any order that could not be shipped owing to defect, etc. Any order not shipped out within the predetermined throughput time can be transferred to this account by accountants for follow up with operations. The transfer should be made for the entire order amount. This account will provide adequate and very timely mon- itoring of operations by accounting department without depending on intricate variances. This entry may be reversed if goods are shipped to customer satisfaction or charged to abnormal loss in other cases.)

	Bookkeeping Entries in Traditional Standard Costing (Cost-Based Approach)		Suggested Double-Entry Bookkeeping Entries for Lean Accounting (Value-Based Approach)
9	Fixed manufacturing overhead allocated Fixed manufacturing overhead spending variance Fixed manufacturing overhead production volume variance Fixed manufacturing overhead control (Fixed manufacturing overhead variances recorded.)	9	Value stream realized (1, 2, 3, 4, 5) Net income control account (Transfer of all realized values to net income at the end of the period.)
10		10	 Net income control account Capacity control account (Any unutilized capacity at the end of a period will be charged to income account and will be an indication of slack in operations.)