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Role of Accounting Systems on Implementation of Lean Principles

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Abstract:

The adoption of lean principles and practices has become widespread in many industries since the early 1990's. Companies are now beginning to realize that traditional costing and accounting methods may conflict with lean initiatives they are implementing. Consequently, important research questions are being raised. Which cost management and accounting approach required for companies that adopt lean principles and practices?

1. Introduction

Today's manufacturing organizations are required to compete with modern manufacturing paradigms such as lean manufacturing, six-sigma and supply chain management. It is not realistic to obtain all the advantages of these new production paradigms such as automation, flexibility, quality and throughput without accounting systems that supports and sustain the new production paradigm. In the new manufacturing environment, companies attempt to become customer focused and concentrate on quality products at competitive prices. The recent article study states that the most manufacturers at their facilities are not structured to meet customer demands, and there are many roadblocks that make the transition difficult. One of the most important but least understood of these roadblocks is current management systems. These accounting systems do not provide adequate information to companies to manage a production transition. Under these circumstances, many firms are interested in determining and designing management accounting systems that assist to align the customer demands with manufacturing based improvements.

Various management accounting cost systems are used to provide an increased accuracy about product costs, overhead allocation, product-mix and pricing and other investment decision makings. Johnson and Kaplan, who introduced the ABC-accounting, have highlighted the fact that management accounting systems are used for three main purposes: external reporting, operational control and product costing. Accounting is generally classified into Financial Accounting and Management Accounting. The Financial Accounting helps to prepare external reporting and management accounting plays an important role in operational control and product costing. Management accounting information systems should collect data related to performance metrics, classifies the data, and report information to managers for the purposes of planning, control and evaluation of production activities. Planning is basically the process of deciding about the goals of an organization as well as the means to attain those goals. Control refers to the process of influencing the behavior of people to increase the probability that people will behave in ways that lead to the attainment of organizational objectives. It includes pricing, budgeting, performance measurement, integration with financial accounts and investment analysis. It consists of all the information that is officially gathered to assess the performance of the company and to guide future actions.

2. Objective of this Study

Accounting systems must be viewed as an integral part of implementing lean. The purpose of this paper is to compare various management accounting systems in terms of the alignment of each system to the implementation of lean concepts. This study will compare three different management accountings, which are traditional standard costing; Activity-based costing and Value stream-costing under lean manufacturing environment.

Most researchers agree that activity based costing provides more accurate product cost information than any other management accounting system. Most accounting managers assume that this accurate product costs will help to make quality decisions on various issues. This assumption is made without examining the other non-financial operational parameters like small batch size, resource utilization, on-time delivery, and inventory turnover. Moreover manufacturing environments will also play an important role in many decision making process. According to traditional accounting, the inventory is an asset for the company and it will encourage maximizing the inventory. In contrast modern management accounting says building an inventory is a non-value added activity.

3. Problems with Traditional Accounting Methods

Adopting a lean approach promises significant improvements in productivity, quality and delivery, resulting ultimately in substantial cost savings. However, although many companies across a range of industrial sectors have introduced lean working practices, lean initiatives are often not underpinned by appropriate and rigorous cost management and accounting methods. Many authors have identified the limitations of traditional costing and accounting methods. The more common criticisms of standard cost include: too much focus on direct labor efficiency; concentrations on cost rather than other competitive factors such as quality or delivery; variances too aggregate and often too late to provide meaningful information; failure to encourage short-term expenditures on such factors as product quality or process flexibility that have a long-term return; and distortion of product costs. Despite these criticisms, standard cost systems continue to be the most common accounting system used today.

Kaplan argues that cost systems have been designed primarily to satisfy the financial accounting requirements for inventory valuation and as a result, are not appropriate for performance measurement, operational control or product costing purposes. In addition he states that a good product cost system should produce product cost estimates that incorporate expenses incurred in relation to that product across the organization's entire value chain. He claims that standard product costs usually bear no relation to the total resources consumed by a product. This is due to the fact overheads are allocated, often on the basis of direct labor hours, and as a result can cause distortions to product costs. As overheads need not be casually related to the demands of individual products to satisfy financial accounting requirements, many companies continue to use direct labor as a basis for allocating overheads even though it may account for less than 10% of total manufacturing costs.

In addition to product costing, standard costing has also been used for internal decision-making process and operational control purposes. This costing emphasizes maximum utilization for resources (machine, human) in order to minimize the total cost of the product and this encourage the non-lean behaviors. These non-lean behaviors include the manufacture of over production, large batch sizes and holding huge inventory levels to show the balance sheets. Kaplan supports this view and also suggests that cost accounting calculations such as the allocation of overheads or variance analysis should not form part of the company's operational control system because they obscure the information that cost center managers need to operate effectively. As a result, traditional costing and accounting approaches are believed to be a major impediment to lean manufacturing. However, accounting is an integral part of all manufacturing operations and control system and should be able to provide adequate information to make managerial decisions. In order to support the above mentioned, it should include non-financial operational metrics. Consequently, there are calls for a new costing and accounting approach to support lean manufacturing. There is, no clear consensus as to what constitutes appropriate costing and accounting methods for lean manufacturers.

4. Activity Based Costing

Activity-based Costing (ABC) was developed as a direct response to the problems that can arise as a result of the allocation of overhead on the basis of direct labor. Its main objective is to provide improved product cost information, using appropriate cost drivers as the basis for overhead allocation. However, some advocates of lean manufacturing do not accept that ABC provides the solution to the problems caused by standard costing, believing that "in reality it's just another method of allocating overhead". Making decisions based solely upon resource usage (ABC) is also problematic because there is no guarantee that the spending to supply resources will be aligned with the new levels of resources demanded in the near future. Consequently, before making decisions based on an ABC model, managers should analyze the resource supply implications of such decisions.

5. Lean Principles

Lean performance measurement begins with deploying lean business policies and strategies, identify the process owners, complete lean value-added process analysis by utilizing lean standardize/do/check/act (SDCA), and then plan/do/check/act (PDCA) of continual improvement. This could be achievable by identifying improved performance measures. Performance measures provide the critical link between strategy and execution by providing a mechanism to evaluate and communicate performance against expected results. Management accounting system should convert this performance measures into cost information, which allows the managers to quantify the cost of the resources consumed in executing organizations strategies. traditional cost accounting tends to impair JIT implementation. This is because the features of cost accounting measures rely on standards, emphasize on variances and efficiencies and preoccupy with direct labor. They further added, In a JIT environment, any system for measuring performance must be designed to reflect the new production philosophy. Such a system should be capable of measuring and reporting progress toward total quality control, reducing inventory levels, faster setup times, reduced lead time and new product launch times. Equally important would be measures indicating improvement in on-time deliveries, floor space utilization and quality yield, such a system may require the elimination of some traditional short-term financial measures and include some new, more relevant non-financial measures of performance.

Lean manufacturing has its roots in the automotive industry. A global study of the performance of automotive assembly plants during the 1980's resulted in the widespread adoption of lean practices in a variety of industries. The application of lean ideas to a range of industrial sectors enabled Womack and Jones to derive five generic, over-arching lean principles. These principles are:

- *Precisely specify customer value by product or family:* A key principle of lean manufacturing is that the customer defines value. Value is viewed "in terms of specific products with specific capabilities offered at specific prices through a dialogue with specific customers".

- *Identify the value stream for each product:* The value stream is defined as “ the set of all specific actions required to bring a specific product through the three critical management tasks of any business: the problem-solving task running from concept through detailed design and engineering to production launch, the information management task running from order-taking through detailed scheduling to delivery, and the physical transformation task proceeding from raw materials to a finished product in the hands of the customer”.
- *Make value flow without interruption:* Once any obviously wasteful steps are eliminated, the remaining value-creating steps need to be organized in such a way that they flow. This involves a move away from the traditional functional or departmental organization towards a holistic, customer-focused organization, laid out along value stream-lines. Lean manufacturers usually adopt cellular manufacturing, where each cell contains all the resources required to produce a specific product or where a series of cell is organized to produce a specific product. In order to enable products to flow smoothly through the factory to customer, batch production is rejected in favor of singly-piece or continuous flow. The emphasis moves away from the efficiency of individual machines and people to the effectiveness of the whole value stream.
- *Let customer pull value from process owner:* When the value-creating steps are organized to flow, the customer can pull the value through the system. Traditional production methods tend to push products through the system in the hope that a customer will buy them once produced. In a pull environment, no work is completed until required by the next downstream process.
- *Pursue perfection:* As companies widely adopt lean practices, it becomes clear that improvement is on-going process. Initiatives to reduce effort, time, space and cost can be conducted continuously. As a result, lean manufacturers adopt a continuous improvement philosophy.

One of the barriers to successful implementation is management accounting system. The company fails to improve performance measures in financial statements. By not communicating in the same language as management, the department or function implementing lean doesn't get the support needed to continue the efforts. However, the traditional management accounting system does not translate the lean improvements from shop floor level to management level. A review of the current literature on the inadequacies of the traditional MAS reveals that several aspects of the new manufacturing environment have the most far reaching implications for its change.

- The relationships between “direct” and “variable” costs as well as “indirect” and “fixed” costs are becoming blurred.
- The focus has turned from a preoccupation with variance and standard costs to source of costs (eg.. drivers).
- Increased recognition of the interdependence between cost and performance among organizational subunits has negated the traditional focus on organization cost control.
- Change in manufacturing process has shifted a significant portion of product cost from traditional direct cost to indirect, resulting in high burden rates with distort true product costs.
- New information gathering devices and techniques have made cost traceability possible on a more detailed level.
- Compression of the life cycle has shortened the period available for recovery of development costs, necessitating efficient and effective production techniques from inception.

Focus on eliminating waste is leading to increased demand for value added measurements of performance. Many cost accounting systems divide the overhead apportionment calculations into fixed and variable elements and allocate a little of the fixed costs to each production job and allocate the variable costs in the traditional manner. The key issue is that overheads are such a large amount of the total product cost that it is important to analyze these overhead costs and develop for applying them as direct costs.

6. Accounting System Strategies

6.1. Traditional Cost Accounting

Traditional cost accounting system has been widely used by many industries to measure the organization performance internally as well as report the financial accounting to management and shareholders. This costing computes the product cost based on direct labor, direct material and overhead allocation. This overhead allocation is based on the percentage of direct labor usage. The traditional costing is summarized as follows.

- Assigning all manufacturing overheads to production and service cost centers / departments.
- Reallocating the costs assigned to service cost centers to production cost centers / departments.
- Computing separate overhead rates for each production cost centre/department.
- Assigning cost centre overheads to products or other chosen cost objects.

Traditional Costing is still favourite, because of the following reasons:

- Simplicity of traditional costing over the complexity of modern costing (ABC)
- Internal organizational problems such as resistance
- Problems associated with implementation such as finding out cost drivers, identify activities and lack of resources.
- Lack of top management support for ABC.

6.2. Activity-Based Costing

Activity-based costing is a measure of cost drivers based on resource usage by each activity. It comprises a different, more logical approach to determine the product costs. It emphasizes the need to obtain a better understanding of cost behavior and it divides overhead costs into various process activities. A process could be described as logical series of activities, which can be linked together to produce reasonably homogeneous output. The figure 5 shows the link between cost drivers and activity drivers to trace the overhead costs associated with the resource and work station.

- *Cost drivers* are the casual factors that cause costs of an activity to change
- *Resource driver* describes the relationship between cost element and the activity
- *Cost elements* are traced to activities through the resource driver.

The steps behind Activity based costing is as follows:

- Identify the major activities that take place in an organization:
- Assigning costs to activity cost centre
- Selecting appropriate cost drivers (ex. Transaction drivers, duration drivers)
- Assigning the cost of the activities to products:
- The cost driver measure must be capable of association with specific products.
- Cost driver rate must be predetermined based on estimated level of activity cost and cost driver volumes for the current period.
- Activity based costing system maintains and processes financial and operating data on a firm's resources, activities, cost objects, cost drivers and activity performance measures.

Although Activity based costing has many advantages over traditional standard costing. By comparing the success rate and failure rate of ABC, the success rate for ABC implementation is low. The project success rate is low because of the following reasons.

- The project was launched from finance, not pulled through from operations.
- Cost accounting is outside most everyone's comfort zones
- It competes with the official regulatory accounting system as a parallel and offline information system.
- There is an underestimated degree of employee resistance to change and of corporate disbelief with the new costs.
- Sales and marketing personnel do not know how to react to the new profit winners and losers.
- ABC/ABM does not provide all the information needed to make customer and product decisions.
- ABC/ABM competes with other improvement programs without integration.
- Acting on the data involves pain-refocused strategies usually require some different people and equipment, implying job eliminations and write-offs.
- The project loses initial management buy-in by not maintaining a brisk pace and momentum.
- There is no true profit-and-loss responsibility at the pilot site.
- There is minimal end-product diversity, resulting in little change in individual net costs.
- ABC/ABM's reputation is maligned as too costly to maintain or as a wrong tool.
- Training was inadequate or poorly timed and failed to include the right level of people. Activities are incongruently related with cost drivers, many of which are not the cause of cost.
- Scope is restricted to operations cost, not total integrated value-chain cost.

6.3. Value Stream Costing

A value stream is a group of products that belongs to one product family and follows same production routing. Value stream not only consider production steps but also it takes into account of each activity that adds value to customer from order placement to shipping of products. It creates value to the customer along the whole stream. Value stream costing allocates all the costs incurred for this stream as direct cost. Typically, the costs include product labor, direct materials, equipment usages and other support functions.

Lean value stream costing is entirely different from traditional approach. Because standard costing assumes that all overheads need to be assigned to the product and that these overheads relate to the amount of direct labor required to make the product. This costing violates the above assumption and calculates the total cost required to run the whole value stream. It typically calculated biweekly or monthly. Production labor cost includes all the labors who works or supports in the value stream. The total raw material purchased for the whole value stream is considered production material. The other activities that supports value stream will be converted in terms of cost and included in this value stream total cost calculation. Space occupied by the value stream is allocated based on square footage cost of the facility. Value stream costing is simple because the detailed actual costs are not collected by production job or product. Value stream cost reduces the overhead allocation process, which improves cost calculation and profit information. The non-value stream costs are inevitably small because most of the work of organization will be associated with value streams. The value stream is far more than just manufacturing processes.

7. Conclusion

Accounting systems indeed has very important role to play in modern manufacturing environments. It can be concluded that

- The management accounting system can create impetus for changes in the direction of lean production, but not until traditional performance measures have reached a certain threshold. Therefore, an important managerial task will be to influence the location of this threshold, by making it easier to reach.
- Another important way to create impetus for change is to raise the level of the unit of analysis in the management accounting system. First, there is a need to shift the focus from single machines and/or operators to the whole production flow. Second, there is a need to shift the focus from the operating level to the whole production system.
- When making these changes it is important to take into consideration that the management accounting system affects the adoption process in three concurrent ways: technically, through its design; formally, through its role in the organization and cognitively, through the way in which actors think about and use the accounting system.

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