

JIT & KAIZEN Costing

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Abstract

Lean Manufacturing or Toyota Production System is commonly known as Just-In-Time (JIT) manufacturing. The fundamental tenet of JIT is to identify and eliminate wastage in a system, thereby creating higher value for the customer. Kaizen is a continuous improvement process, and the concept of Kaizen costing is working on continuous cost reduction in any system to create incremental value for the customer on a continual basis. This paper is an attempt to examine the application and the benefits of Kaizen costing in a system in comparison with standard costing and target costing which is a common practice in any business environment.

Keywords : *JIT, Kaizen, Kaizen costing, Standard costing, Target costing, Customer value*

Introduction

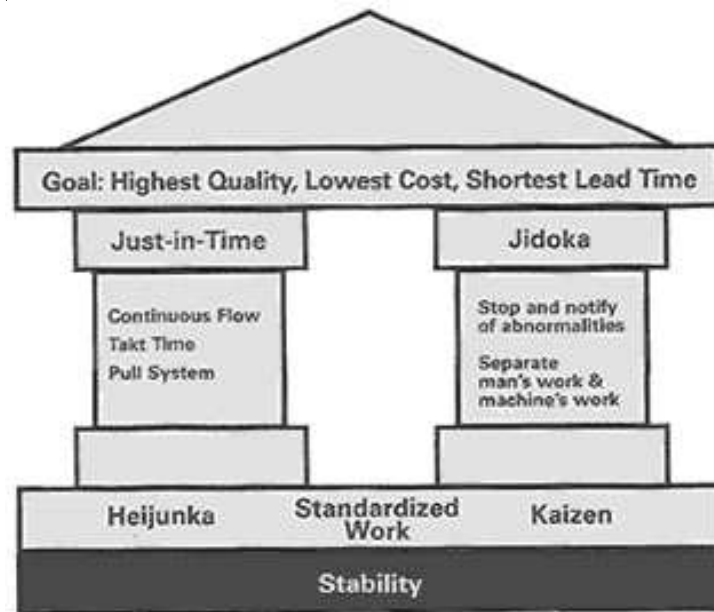
Toyota Production System (TPS) was borne out of necessity. The phrase Just-In-Time was coined by Kiichiro Toyoda in 1937 after the start of Toyota Motor Corporation. The company was quite poor and could not afford to waste

money on excess equipment or materials or production. Everything was expected to be procured just in time not too early or too late. Later elements developed in the 1950's including takt time, standardized work, kanban and supermarkets added to the basis of JIT.

After World War II Taiichi Ohno a promising engineer of the Toyoda Spinning and Weaving Corporation was brought over to the automotive side of the business. He was given the task of improving operational productivity and driving in the concepts of Just-In-Time and Jidoka. He was eventually appointed machine shop manager of an engine plant and experimented with many concepts in production between the years of 1945-1955. Largely his work and effort resulted in to the currently existing Toyota Production System (TPS).

The Goals of the TPS are mainly three fold; provide world class quality products with lowest cost possible in the shortest possible time with empowered employees' being in the centre to enable the same. Toyota Production System has primarily two pillars viz: Just-in-time and Jidoka.

Concept behind JIT is to produce right parts, in the right quantity and at the right time using minimum resources. JIT helps to uncover the underlying problems and thereby work to fix those problems at the root to perfect the system. (www.artoflean.com, TPS Handbook)



Toyota Production System "House"

**Figure 1 : Adapted from TPS Handbook
(www.artoflean.com)**

The other pillar of the TPS is Jidoka which is basically to stop and notify any abnormality so that it does not allow defects to flow downstream. Thus if a problem arises one can arrest and fix the problem before proceeding with the production. Additionally it has also got to do with separating men's work from machine work and thus optimize the utilization by eliminating waste.

The foundation of TPS is level production through standardized work and Kaizen a continuous improvement framework.

Kaizen

Imai (1986) defines Kaizen as continuing improvement in personal life, home life, social life and working life. When applied to the workplace KAIZEN means continuing improvement involving everyone, managers and workers alike.

Kaizen means change for good. Kaizen is a philosophy of continuous improvement. This advocates continually improving products, processes, and activities of a business to effectively and efficiently meet or exceed changing customer requirements and standards set by the organization. Continuous improvement focuses on the elimination of waste or non-value added activities across the organization. This also means processes are improved continuously to create more value for the customer.

Cost Reduction Concept

Toyota Production System drives profits through the principle of cost reduction. In a market place selling price is determined by the customer and company has very little control on the selling price and customer expects higher quality and lower cost on an ongoing basis. So in order to make profit one must continuously eliminate waste and reduce costs to make desired profit as cost is under the control of a company. The profit equation can be written as below under this concept.

Selling price - Cost = Profit (Cost reduction principle)

This also drives proactively sustainability for a company. By driving cost down continuously one can achieve desired profit earnings to survive and thrive in the business with a competitive edge of high quality low cost and meeting customer expectations on continuous basis.

Kaizen Costing

According to Yasuhiro & Kazuki (1991), Kaizen costing is the system to support the cost reduction process in the manufacturing phase of the existing model of product. Kaizen costing is called “Genkakaizen” in Japanese. The Japanese word “Kaizen” in Kaizen costing may be somewhat different concept from the English word “improvement”. “Kaizen” refers to continuous accumulations of small betterment activities rather than innovative improvement. Therefore, “Kaizen costing” includes cost reduction in the manufacturing stage of existing products. Innovative improvement based on new technological innovations is usually introduced in the developing and designing stage.

The concept of Kaizen costing is an extension of cost reduction concept which is built upon JIT, Kaizen and cost reduction. It is also based on the belief that every activity can be done better next time and hence there is an opportunity to reduce cost on a continuous basis. End of the day perfection can't be claimed nonetheless one has to strive for perfection on a continuous basis and work on eliminating waste and thereby reducing cost day in and day out and increasing customer value.

There are two types of Kaizen Costing. First one is for a specific product. This consists of activities for improving the cost performance of the product, when the difference between actual cost and target cost is significantly high even after three months of launch of the new product. This could be a requirement owing to market dynamics.

The second one consists of activities implemented continually every period to reduce difference between target and estimated profit to achieve allowable cost.

The above cost reduction is achieved either through value engineering(VE) or value analysis(VA).VE involves basic functional changes in the new product development stage leading to cost reduction while VA involves design changes in the existing product leading to cost reduction.

Kaizen Costing Vs Standard Costing

In Japanese companies Kaizen costing is implemented outside the standard cost system as a part of the overall budget control system. Kaizen cost budget equals to actual cost per unit of the most recent period. This has to be further reduced month on month to achieve the target profit.

Standard costing is limited by its financial accounting purpose and is not suitable for cost reduction in the manufacturing phase dynamically. Standard costs are changed only once in a year whereas Kaizen cost budget is changed every month. Kaizen costing covers a broader scope as compared to traditional cost control concept. Standard costing merely focuses on meeting cost

performance standards and checking and reporting whether standards are met or not. Whereas the Kaizen costing activities include cost reduction activities that require changes in the manufacturing processes of existing products to meet Kaizen costing targets. We can say standard costing is static and open loop system while, Kaizen costing is more dynamic and closed loop system following PDCA cycle for implementing cost reduction every month.

Standard Costing Concept	Kaizen Costing Concept
<ol style="list-style-type: none"> 1. Cost control system concept 2. Assuming current manufacturing conditions 3. Meet cost performance standards 	<ol style="list-style-type: none"> 1. Cost reduction system concept 2. Assuming continuous improvement in manufacturing 3. Achieve cost reduction targets
Standard costing techniques	Kaizen costing techniques
<ol style="list-style-type: none"> 1. Standards are set annually or semiannually 2. Cost variance analysis involving standard costs and actual costs 3. Investigate and respond when standards are not met 	<ol style="list-style-type: none"> 1. Cost reduction targets are set and applied monthly 2. Continuous improvement (Kaizen) is implemented during the year to attain target profit or to reduce the gap between target profit and estimated profit. 3. Cost variance analysis involving target kaizen cost and actual cost reduction amounts 4. Investigate and respond when target kaizen amounts are not achieved

Figure 2: Adopted from Yashuhiro Monden (2012)

Budgeting/Profit Planning Process

It starts with the annual budgeting process or short term profit planning process. This is part of the 3~5 years long range plan representing the first year of the plan.

All departments prepare the following :

Plan 1: Production, Distribution and sales plan (including projected contribution margin from sales)

Plan 2: Projected parts and material costs

Plan 3: Plant rationalization plan (projected reduction in manufacturing variable cost)

Plan 4: Headcount plan (direct labour and service deptt.)

Plan 5: Facility Investment plan (Capital expenditure plan)

Plan 6: Fixed expenses plan (Prototype design costs, maintenance costs, APSP & SGA)

Budgeted operating profit is arrived from the above plans as below,

Budgeted sales - Expected variable cost (=std. cost) =
Estimated contribution margin (From Plan1)

Plus "Target amount of reduction in variable cost" =
Budgeted contribution margin (From Plan 2 &3)

Less Budgeted fixed costs = Budgeted operating profit (From
Plan 4, 5 & 6)

Process of Arriving Target Kaizen Cost

The profit improvement or Kaizen Profit is determined by the difference between target profit and estimated profit. Target profit is computed by top down approach while estimated profit is computed by bottom up approach.

In order to achieve cost reduction, variable as well as fixed costs are considered. However, since fixed costs are needed to maintain continuous growth, Kaizen cost is achieved mainly by reduction in the variable costs, direct material and direct labour costs. In nonmanufacturing departments, reduction is achieved through fixed cost items.

1. Actual cost/unit of product in the previous year (X) =
$$\frac{\text{Total amount of actual cost previous year}}{\text{Total units produced previous year}}$$
2. Estimated amount of actual cost for current year(Y) =
$$\frac{\text{Actual cost/unit of product in the previous year}^*}{\text{Estimated production for the current year}}$$
3. Kaizen target cost for the current year (Z) =
$$\frac{\text{Estimated amount of actual cost for current year}^*}{\text{Ratio of the cost reduction target}}$$
4. Assignment ratio (Z1) =
$$\frac{\text{Cost directly controlled by a single plant}}{\text{Total Cost controlled by all the plants}}$$

5. Kaizen cost target for each plant =
Kaizen target cost for the current year (Z) *
Assignment ratio

Adapted from Yasuhiro Monden (1991)

Conclusion

JIT, Kaizen and Kaizen costing are very closely interrelated and drive continuous improvement and measurement of improvement in terms profit. Kaizen costing is a breakthrough concept which integrates all functional groups including accounting for making continuous improvements across the organization and helps to measure improvements in financial terms. Continuous monitoring helps to dynamically respond to the changing market needs by implementing improvements through Kaizen projects thus eliminating waste and creating additional value to customers on an ongoing basis. This also lends agility and competitive advantage over other companies who practice conventional costing/cost control methods to respond to customers swiftly. This concept of Kaizen costing can be applied across industries including service industry. This is a forward looking philosophy and helps to build a sustainable and customer-centric organization.

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