



Value Analysis From A Financial Standpoint

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Abstract

Actually, every product has its own value stream during its manufacturing process. It begins with “designing a new product” and ends with “after-sale supports”. Encountering waste along value stream is not easy task. Overproduction, inventory, motion, waiting, transportations, over-processing and defects will affect the analysis about value along value streams. Important point is to determine waste systematic in order to get a perfect stable value which suits customer expectations. New manufacturing philosophies change the business nature and seek waste with bigger lens, because of that, Accounting shifted its paradigm and can help to determine waste in a value stream. This article compiles and analyzes the literature to show how accounting helps to find waste, which affects the entire value stream and analysis about it.

Keywords: Value, Value Stream, Value Stream Costing, Waste.

JEL Codes: M41, M21, M31, M11.

Finansal Bakı Açısından De er Analizi

Özet

Üretimleri sırasında her mamulün kendine ait bir de er akı ı vardır. De er akı ı yeni bir mamulün tasarlanmasından ba lar, satı sonrası destekle biter. De er akı ı boyunca israfı belirlemek kolay bir görev de ildir. Fazla üretim, stok tutma, hareket, bekleme, nakliye, fazla i leme ve mamulde bozukluklar de er akı ı boyunca de erle ilgili analizleri etkileyecektir. Dikkat edilmesi gereken ise mü teri beklentilerini tam olarak kar ılayacak istikrarlı de eri elde etmek için israfı sistematik olarak belirlemektir. Yeni üretim felsefeleri i in do asını de i tirerek israfı büyük merceklerle aramaktadırlar. Bu nedenle muhasebe de paradigmasını kaydırarak de er akı larında israfın bulunmasına yardımcı olabilir. Bu makale, de er akı ının tamamını ve ili kili analizleri etkileyen israfın muhasebe tarafından nasıl belirlenebilece ine ili kin yazında yer alan bilgilerden olu an derleme ve incelemedir.

Anahtar Kelimeler: Value, Value Stream, Value Stream Costing, Waste.

JEL Kodları: M41, M21, M31, M11.

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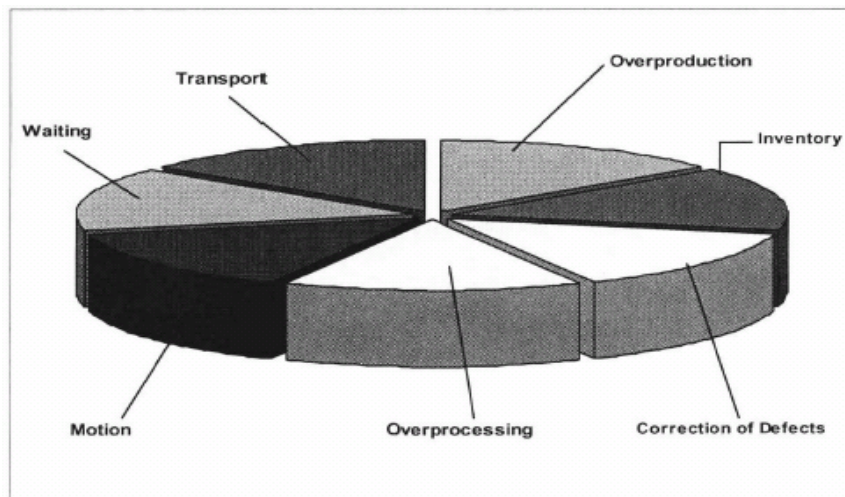
Introduction

Companies, which trade globally, try to be competitive by being cost leader. Being a cost leader in the market without lowering customer value is a big challenge for every business. To get this advantage, Lean Accounting, Activity-Based Cost Management, Target and Kaizen Costing, Total Quality Management, Just-In-Time, Life-Cycle Costing are the new management techniques that emerged after 2nd industrial revolution, which appeared during 80s. The main objective of these new initiatives is to detect and remove the waste from the firm by organizing the firm according to value streams. The inventors of these new initiatives understood the more natural way of doing and interpreting business, which results simplistic calculations for the business affairs that save time and money. On the other hand, costing system, which is the financial dimension of the created value, must be visible enough for implementing these new initiatives.

New initiatives focus on Value Streams that are natural chains in entities. Instead of departmental classification of an organization, tracking the costs by value streams, make waste visible (Hale and Kubiak, 2007:37). Accounting can help to determine waste along value streams.

Seven types of waste exist along value streams, which are shown in the pie chart of Figure 1.

Figure 1: Sources of waste in any production system (Woehrle and Abou-Shady, 2010:68)



- Defects: making mistakes that results rework.
- Inventory: binding the funds to excessive inventories as raw material, work-in-process, and finished goods.
- Motion: unnecessary movements of workers or machines.
- Over-processing: non-value added usage of equipment, tools, and materials.
- Over-production: manufacturing more than required.
- Transportation: unnecessary movement of materials.
- Waiting: materials waiting in queues.

Every type of waste has a financial burden for the firm and must be removed. These wastes are hidden between values in the processes. To find out the wastes, the term value and value streams have to be analyzed in the next section.

1. Value and Mapping It

Creation of value for the customers is a fundamental role of management of a contemporary company. Value is perceived as the total worth what the firm provides to its customers' satisfaction and is created from selling, to manufacturing, shipping and collection of cash, as well as after-sales support (Baggaley, B.L., 2003a:23). The new issue of management accountants is to move from cost to value creation.

Value stream is the work that flows smoothly from one step to another and finally to the customer (Baggaley, B.L., 2003a:23). It covers all the activities that a company must do to design, order, produce, and deliver the products or services to customer (Kennedy and Huntzinger, 2005:32). It is the flow of activities required to transform raw materials or information into a product or service for customer use (Kroll, 2004). The value streams are the places where the waste can be eliminated. Contemporary management control and manage through value streams. Value streams can be extended into suppliers, customers, and partners.

Improvements should be done by a value and flow point of view. Standard cost, variances and allocations are not used in Value Stream Management, because it is assumed that these kinds of metrics and methods are results waste. Every value stream should be mapped out by other special metrics that is used

to monitor the achievement of the company's main strategies. They are related with safety, quality, delivery and cost (Brosnahan, 2008:61). These special metrics give the opportunity to evaluate from operational, capacity and financial aspects the value streams instead of to analyze just the profitability of a single product. Only the directly incurred costs of the value stream are used for decision making. Value stream managers are appointed for doing these issues (Baggaley, 2003a:24). One-page summary called a box score is the financial statement which combines the metrics.

Main value streams of the company must be identified to manage the corporation according to Value Stream Management. The first issue is to determine the types and the number of value streams. Once the type and number of value streams are identified, the next major step is to map the value stream, by using simple graphics that show the movement through the entire value stream. To create a value stream map, the first step is to select a product or product family (Woehrle and Abou-Shady, 2010:70). A Current State Map will be drawn by using a paper and pencil for the selected product or product family to show the information and material flows in the value stream. The third step is to identify and analyze the seven possible sources of waste in that map. Waste's root causes and its impact on the company's strategic goals must be seen clearly and has to be removed (Melton, 2005). Value streams have to be uninterrupted flow from raw material to delivered products and services, because interruption in this flow generates waste. Lastly, a Future State Map will be drawn after removing the identified sources of waste. A value stream map is depicted in Figure 2.

Figure 2 : Value Stream Map (DeLuzio, 2006:84)

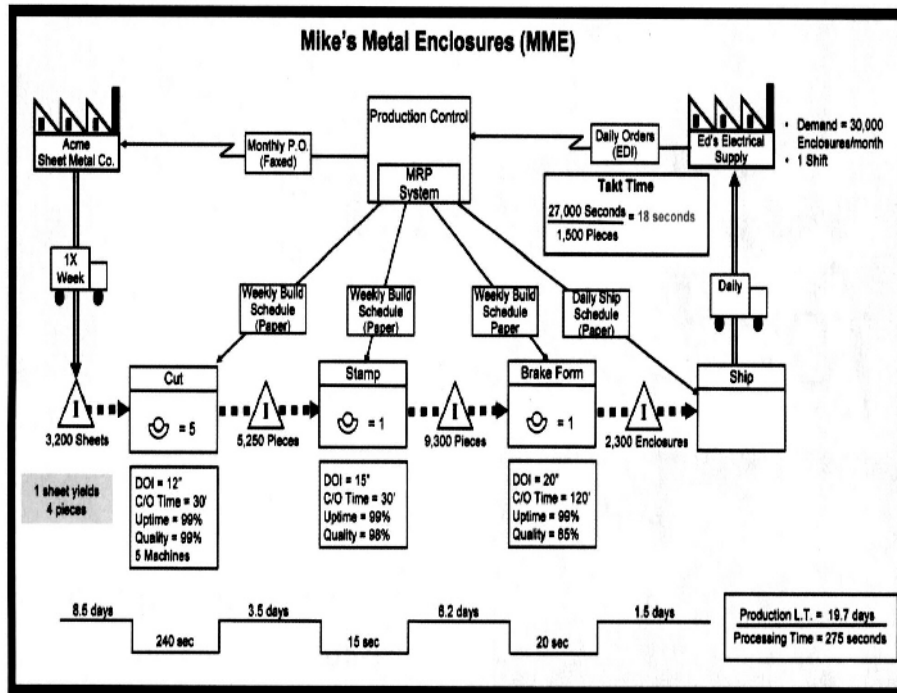


Figure 2 shows material flow along the bottom and information flow across the top of the map. Information on top of the map flows from customer to supplier. Customer Ed's Electrical Supply has a monthly demand of 30,000 pcs. The daily orders consist of 1,500 pcs., which show a Takt Time of 18 sec., and transmitted by electronic data interchange (EDI). Depending on this demand, MME faxed its monthly purchasing orders to supplier Acme Sheet Metal Co. Acme sends every week 3,200 metal sheets, in a average of 8.5 days, which will be cut, stamped and formed. The MRP system of MME, manage, control and track the entire manufacturing process by sending weekly schedules, which are in form of paper, to the process units and daily shipping schedule to the shipping department. The processing times of the processes are respectively, cutting 240 sec., stamp 15 sec., forming 20 sec., which equals 275 sec. for each product. When the days at the bottom of the map are added, Lead Time of order are reached, which is 19,7 days.

2. Value Stream Costing

Value is created when the works flows without any interruption through the company's value streams. When the flow stops, value is no longer created and waste begins. Costing systems must have a way to show this waste and the root causes clearly and timely.

Certainly, costing systems are the one of the financial standpoints that has to be considered. Generally they hide the waste through standards and inadequate reporting. Additionally, overhead allocations and volume driven cost drivers distort also the product costs. By the way, standard costing requires an expensive and wasteful data collection system which needs computer systems that tracked the actual costs at each phase in production (DeLuzio, 2006). Launching such systems lead to reports and meetings that are again wasteful. Eventually, information is reported too late to be useful (Baggaley, 2003b).

Resources utilized by a value stream are assigned directly to it. The entire material which is used in value stream will be written as cost. Labor costs are simply the sum of the wages paid to the people working in the value stream. Value stream management configuring machinery and equipment so that, it is used solely by a particular value stream. The cost of these machinery and equipment can be assigned to those value streams. Entire cost of maintaining facilities is assigned on the basis of the square footage used by each value stream for production, storage, and shipping. Assigning capacity costs on the basis of usage encourages the value stream team to use less. As capacity is freed up, it can more easily be recognized and used to grow the business rather than to support the current business. (Kennedy and Huntzinger, 2005:33-34)

When managing by value stream, the information needs to be presented in a format and language that is easily understood by the members of value streams. Creating a single value stream for each product and an income statement for each value stream will increase the accountability of value stream costing as stated in Table 1. This report focuses on simplicity by attaching actual costs to each component of the value stream, isolating the impact of inventory fluctuations on profits by creating a separate line, and separating organization-sustaining costs like "corporate overhead" costs from value stream profitability. Arbitrary cost allocations are avoided except in the case of occupancy cost, which are allocated to the value streams based on square footage to encourage minimizing space occupied.

Table 1: Multiple Value Stream Cost Statements (Kennedy and Huntzinger, 2005:35)

	VALUE STREAMS			TOTAL PLANT
	Kitchen Gadgets	Household Storage	Garage Storage	
Sales	\$ 310,250	\$ 158,560	\$ 145,576	\$ 614,386
Material	97,432	72,540	65,439	\$ 235,411
Labor and Benefits	42,592	36,452	18,420	\$ 97,464
Services and Supplies	22,704	8,560	5,786	\$ 37,050
Occupancy Cost	18,500	16,420	9,005	\$ 43,925
Distribution	36,450	25,430	25,468	\$ 87,348
Support	32,500	8,452	12,534	\$ 53,486
Change in Inventory	(13,458)	8,578	(18,432)	\$ (23,312)
Value Stream Profit	\$ 73,350	\$ (17,872)	\$ 27,356	\$ 83,014
ROS	23.7%	-11.3%	18.8%	13.5%
		Unused Occupancy Cost		8,573
		Corporate Overhead		18,870
		Plant Profit		\$ 55,571
		Plant ROS		9.0%

Table 1 depicts three value streams. It is a value stream cost statement but also contains revenue and income information. Direct costs are added to value stream cost pool which includes also distribution and after sale costs. Change in inventory is highlighted with a special line. Deducting the 13,458 \$ capitalized indirect costs embedded in inventory of kitchen gadgets gives a meaning that there is an increase in the inventory of kitchen gadgets. Adding the 8,578 \$ capitalized indirect costs embedded in inventory of household storage gives a meaning that there is a decrease in the inventory of household storage. Calculating the 8,573 \$ unused occupancy cost motivates to use it in another field of the facility. Value stream statements can be understood clearly by everyone. This visibility enhances team accountability for results, as well as offers all members of the value stream easy access to understandable

information. Value stream cost statements use actual costs and are prepared on a weekly basis. As a weekly statement, it presents information that relates to the most recent activities and that means value-added cost information (Kennedy and Huntzinger, 2005:36).

Another format for value stream costing is introduced in Table 2.

Table 2: Value Stream Cost Analysis (Kennedy and Brewer, 2005:31)

	TOTALS	SALES & MARKETING	PRODUCTION CONTROL	MACHINING PARTS	QUALITY	ASSEMBLY	MFG. ENGINEERING	SHIPPING	MATERIAL HANDLING	PROD. ENGINEERING
EMPLOYEES										
Cost	\$48,743	\$11,000	\$5,899	\$9,100	\$2,600	\$4,550	\$8,576	\$2,275	\$1,950	\$2,793
Productive	27%	18%	8%	81%	0%	40%	10%	20%	0%	0%
Nonproductive	51%	60%	65%	16%	69%	25%	58%	42%	55%	76%
Other	5%	5%	5%	3%	6%	4%	6%	5%	5%	5%
Available Capacity	17%	17%	22%	0%	25%	31%	26%	33%	40%	19%
MACHINES										
Cost	\$20,548		\$15,000				\$3,000	\$2,548		
Productive	68%		71%				65%	55%		
Nonproductive	21%		20%				20%	24%		
Other	1%		0%				5%	6%		
Available Capacity	10%		9%				10%	15%		
Average Conversion Cost	\$109.64	\$17.41	\$9.33	\$38.13	\$4.11	\$7.20	\$13.57	\$8.35	\$7.12	\$4.42

Table 2 depicts a value stream cost analysis report. This report focuses only on employees and machines because material cost is direct cost and all the consumption is used totally by the value stream. Employee time is broken down into four categories and four numbers sum to 100% for each column. In Assembly, 40% of the employees' time is productively deployed, 25% is nonproductive, 4% is categorized as other, and 31% is currently idle. The

average conversion cost shown at the bottom of each column is calculated by dividing the total costs incurred as shown in each column by the total number of salable units actually produced during the period. Material costs must be added to this calculation's numerator to provide an actual average total cost per unit produced.

3. Value Stream Box Score

The disconnection between value streams and the financial statement can be bridged by utilizing and choosing some special metrics that support continuous improvement. Table 3 depicts the comparison between continuous improvements, along value streams, versus financial view. Value stream management tries to reduce Lead time, floor space; increase the quality of the product, on-time delivery and inventory turns, but none of them has an impact on financial figures of the firm in traditional accounting system. To prevent this result, the mentioned metrics above identified and put in one report called box score, also known as box scorecard. After tracking the metrics by box score, accounting of the firm will be more sensitive and motivated to understand the impacts of these metrics on firms' financial position.

Table 3: Operational improvement vs. financial view (Woehrle and Abou-Shady, 2010:71)

Operational Improvement	Financial view
Lead time reduction	Not recognized
Quality improvement	Not recognized
On-time delivery improvement	Not recognized
Reduction in floor space	Not recognized
Increase in inventory turns	Decrease in operating profitability

Box score format is used to summarize value stream by weekly basis (Woehrle and Abou-Shady, 2010:72). It is used to bridge the financial and operational views in one pool. The metrics tracked in a value stream will vary based on the managers' consideration. The purpose of the Box Score is to provide a detailed view of the value stream's performance. It is divided into three fields: operational, capacity and financial. Operational metrics are physical information. These physical information improved by continuous improvement events. Improvements impact should be seen in capacity and financial field, because according to these improvements some capacities would

be freed up and could be evaluated in another field of the firm. These improvements should also affect the financial figures in a positive way.

Weeks are compared in box score and the planned future state figures are the targets for every metric. For example in Table 4, the target figure for “Units per person” is 510 pcs. Last week was lower than this week. But it is understood that there is a progress to reach the target. Dock-to-dock is the time from the moment the materials arrive at the receiving dock until the finished product is shipped. First time through is a metric of quality and is the percentage of product that is without being defective. AR means Accounts receivable days. Capacity is categorized as productive (value-added), nonproductive (non-value-added – used but wasteful) and available (unused) capacity, which is freed up for another fields’ use (Guan et al., 2009:575).

Table 4: Value Stream Box Scorecard (Kennedy and Huntzinger, 2005:37)

	Last Week 9/4/xx	This Week 9/11/xx	Next Week 9/18/xx	Planned Future State 12/31/xx
Operational				
Units per person	360.16	420.05		510.39
On-time shipment	98.0%	94.0%		98.0%
Dock-to-dock days	23.58	20.50		16.50
First time through	46%	42%		50%
Average product cost	\$25.60	\$25.85		\$21.50
AR days	34.5	37.0		35.0
Capacity				
Productive	10.8%	10.8%		24.7%
Non-productive	54.8%	54.8%		23.4%
Available	34.4%	34.4%		51.9%
Financial				
Sales	\$334,010	\$310,250		\$3,242,000
Material Cost	\$115,600	\$97,432		\$1,750,000
ROS	22.5%	23.7%		25.0%
Value stream profit	\$75,132	\$73,530		\$810,500

4. Conclusion

New management initiatives try to find and remove waste systematic from their firms’ value streams, to calculate the proper cost amount without lowering customer value of the products and services. On the other hand, costing system

must be visible enough for implementing these initiatives. Instead of departmental classification of an organization, tracking the costs by value streams, make waste visible. Accounting can help to determine waste along value streams.

Value is perceived as the total worth what the firm provides to its customers' satisfaction and value stream is the work that flows smoothly from one step to another and finally to the customer. Once the type and number of value stream is identified, the next major step is to map the value stream for finding waste in that flow.

Costing systems must have a way that clearly and timely show that waste. Generally they hide waste through standards and inadequate reporting. On the contrary, Value stream costing calculates the total actual costs of value streams by regarding the direct cost components of those value streams. The information prepared by value stream costing is represent in value stream cost statements.

Lastly, another important report is the box scorecard. Continues improvements of the value streams are reported in these reports, according to several physical metrics and their impacts on the capacity and financial view of the firm.

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