

MANAGING COSTS ACROSS THE SUPPLY CHAIN

Goals of Price/Cost Management

- ✦ Develop accurate price/cost information to enhance negotiating effectiveness
- ✦ Drive continuous price/cost improvement
- ✦ Effectively beat out the competition
- ✦ Improve supplier relationships through mutually beneficial improvement activities

Managing Costs

✦ Best practice firms...

- Have leaders who understand that the pressure to reduce costs is relentless and severe
- Understand when to apply price analytic techniques and when to apply cost analytic techniques
- Pursue cooperative cost management approaches (rather than non-cooperative approaches) with key supply chain members wherever possible

Example—how “cooperative” are reverse Internet auctions?

Managing Costs

✦ Best practice firms...

- Use an activity-based accounting system to properly assign overhead during outsourcing analyses
- View the domain of supply chain price and cost management approaches to be broad
- Develop a variety of total cost models that capture more than unit price or material costs (supplemental TCO presentation available)
- Work with finance to translate the impact of cost savings activities on key corporate performance indicators

Managing Costs

★ Best practice firms...

- Understand how to configure a lean supply chain that is internally and externally focused
 - Lean supply, lean transportation, lean operations, and lean distribution
- Recognize the importance of considering intangible cost categories such as supplier switching costs and supply chain transactions costs when making supply chain decisions
- Have the ability to measure supply chain accomplishments rather than supply chain activities

Managing Costs

★ Best practice firms...

- Have information systems in place that capture and report supply chain cost performance across the organization
- Realize cost advantages from early customer and supplier involvement
- Routinely benchmark their cost performance against other leading firms

Price and Cost Analysis

- ✦ What is price analysis?
- ✦ What is cost analysis?
- ✦ Cooperative versus non-cooperative techniques

Segmenting Supplier Relationships and Approaches

Value	High	Critical Items Collaborative relationships <u>Cost focus</u> Win/win approaches	Leverage Items Cooperative relationships <u>Cost focus</u> Usually win/win approaches
	Low	Transaction Items Transactional relationships <u>Transaction cost focus</u> Win/lose approaches	Market Items Competitive relationships <u>Price focus</u> Win/lose approaches
		Few	Many

Qualified Suppliers

Items = purchased goods and services

Cost-Related Concepts

- ✦ A cost is a resource sacrificed or forgone to achieve a specific objective
- ✦ A cost object is anything for which a separate measurement of costs is desired. Examples include:
 - Product
 - Service
 - Project
 - Department
 - Others

Cost-Related Concepts

- ✦ A cost driver is any factor that affects costs. A change in the cost driver will cause a change in the total cost of a related cost object
- ✦ Cost management are actions that managers take to satisfy customers while continuously reducing and controlling costs
- ✦ Supply managers need to be cost managers!

Cost Behavior

- ✦ Cost behavior refers to the way costs change with respect to a change in an activity level or cost driver
- ✦ Typical cost behavior patterns include:
 - Fixed costs
 - Variable costs
 - Mixed costs

Cost Behavior Patterns

- ✦ Fixed costs are costs that do not change with changes of a cost driver
- ✦ Variable costs are costs that increase directly and proportionately with changes of a cost driver
- ✦ Mixed costs are costs that have both a fixed and a variable component

Cost Assignment

- ✦ Direct costs are costs that are related to the cost object and can be traced to it in an economically feasible manner
 - Direct materials (e.g., raw materials, purchased components, expendable packaging associated with a given product)
 - Direct labor (e.g., all labor traceable to a given product)

Cost Assignment

- ✦ Indirect costs are costs related to the cost object but cannot be traced to it in an economically feasible way. Indirect costs are allocated to the cost object using a cost allocation method (e.g., overhead costs)
- ✦ Indirect costs may have both a fixed and a variable component

Overhead Cost Assignment

- ✦ Three common overhead assignment approaches include:
 - Overhead cost per direct labor hour
 - Overhead as a percent of direct labor cost
 - Overhead per machine hour

Overhead allocation is often arbitrary and inaccurate!

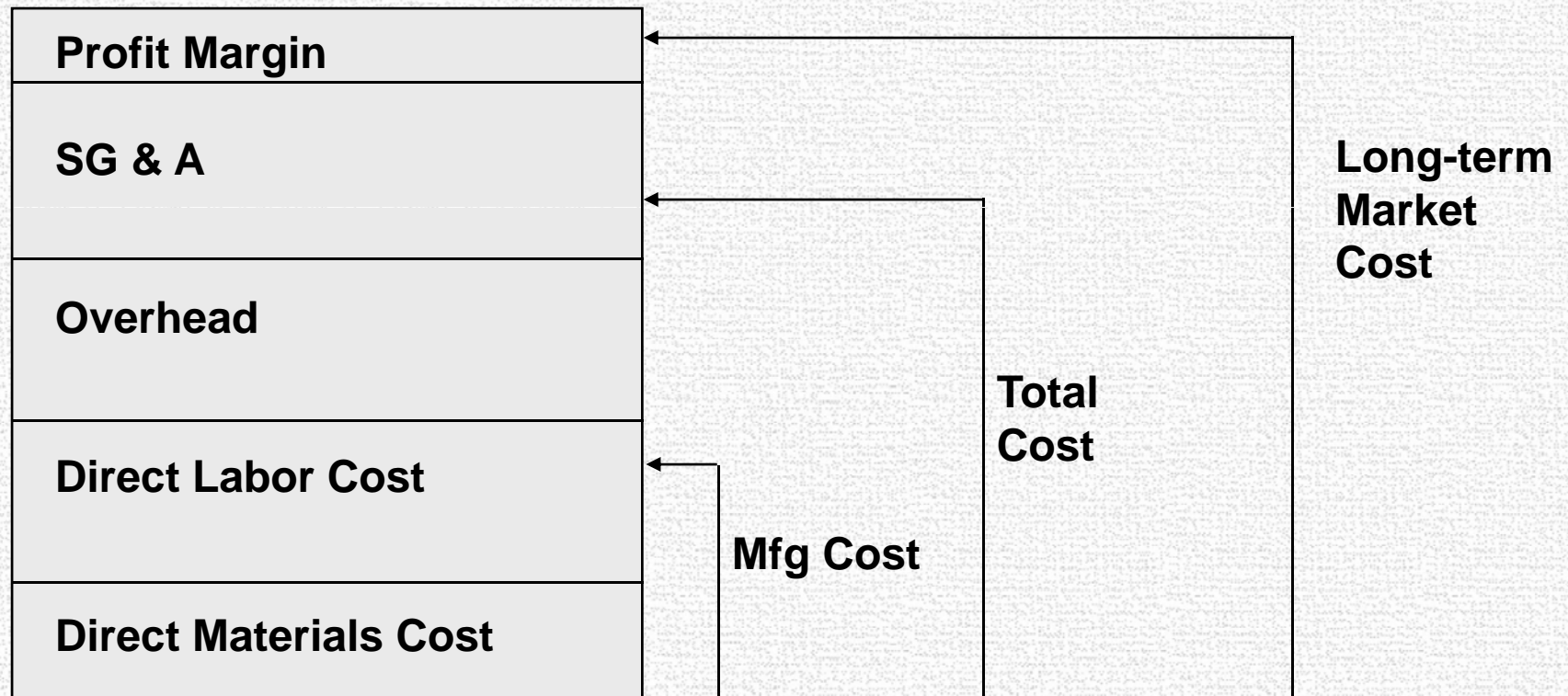
SG&A Expenses

- ★ SG&A expenses that are associated with supporting the interface between buyer and the supplier as well as those expenses that are not directly related to the organization's primary operations but are required to support these operations

SG&A Expenses

- ✦ SG&A will typically include:
 - Sales salaries and commissions
 - Advertising
 - Administrative salaries
 - Research and development

Product / Service Cost Elements



Price Analytic Techniques—

- ✓ Configured Supply Networks
- ✓ Market Testing
- ✓ Comparisons against External Indexes

Creating a Configured Supply Network

Per Unit Costs:

Item/Part Number	Supplier A	Supplier B	Supplier C	Supplier D
442311 Gloves	\$1.26	\$1.65	\$1.45	\$1.29
338922 Wax	\$7.45	\$7.61	\$6.15	\$6.90
9963782 Glasses	\$2.10	\$2.54	\$2.43	\$2.91
746322 "D" Batteries	\$.40	\$.30	\$.36	\$.35
854471 Soap	\$4.45	\$4.01	\$4.55	\$4.50

Note: Shaded areas represent the lowest price for each item across each row

Creating a Configured Supply Network

Total Dollars Based on Volume:

Annual Volume	Supplier A	Supplier B	Supplier C	Supplier D
Gloves—80,000	\$100,800	\$132,000	\$116,000	\$103,200
Wax—5,250	\$39,112	\$39,952	\$32,287	\$36,225
Glasses—3,000	\$6,300	\$7,620	\$7,290	\$8,730
Batteries—30,000	\$12,000	\$9,000	\$10,800	\$10,500
Soap—8,000	\$35,600	\$32,080	\$36,400	\$36,000
Total	\$193,812	\$220,652	\$202,777	\$194,655

Note: Each cell = (price x volume)

The sum of the shaded areas represents the configured supply network total cost, or \$180,467

Market Testing

- ✦ Market testing involves going to the marketplace, perhaps every year or every other year, to request bids from suppliers
- ✦ It is an important way to ensure we are receiving the best prices available, introduce competition to existing suppliers, and avoid complacency
- ✦ This approach applies best to standard items where supplier switching costs are low

Comparisons against External Indexes

- ✦ This approach features the use of objective, third-party information to verify that prices paid are reasonable and are behaving as expected across a marketplace
- ✦ External indexes are often used to adjust contract prices for market-based items
- ✦ External indexes can be used to compare buyer or commodity team performance against the marketplace

Illustration of a Market Index Measure

- Market based index March 31 = 125
- Market based index June 30 = 137.5
 - Index change rate = $(137.5 - 125)/125 = +10\%$
- Company price paid
 - March 31 = \$150
- Company price index
 - June 30 = \$160
 - Price change = $(160-150)/150 = +6.67\%$
- This indicates “better than market” performance by 3.33% for the quarter

Using the Producer Price Index—Motor Vehicle Parts

Series Id: WPU1412 Not Seasonally Adjusted Group:

Transportation equipment

Item: Motor vehicles parts

Base Date: 198200 Download:

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2002	113.2	113.4	113.5	113.3	113.2	113.1	113.0	112.5	112.2	112.2	112.5	112.5	112.9
2003	111.7	111.8	111.9	111.7	112.0	112.0	111.8	111.7	111.7	111.6	111.6	111.6	111.8
2004	111.5	111.5	111.5	111.5	112.0	112.1	112.2	112.1	112.3	112.3	112.4	112.6	112.0
2005	112.8	112.9	112.8	112.7	112.9	112.8	113.2	113.2	113.3	113.4	113.7	113.9	113.1
2006	114.2	114.6	115.1	116.0	116.0	116.4	117.0	117.3	117.4	117.1	117.3	117.3	116.3
2007	117.4	117.2	117.1	117.6	117.8	118.1	118.2	118.3	118.3	118.2	118.3	118.4	117.9
2008	118.3	118.3	118.1	118.5	118.8	119.1	120.2	120.7	121.1	121.3	121.3	121.3	119.7
2009	121.2	120.8	120.9	120.9	121.0	120.7	120.4	120.2	120.4	120.9	120.8	120.9	120.7
2010	120.7	120.9	120.9	122.1	122.0	122.0	121.3	122.2	122.2	122.2	122.2	122.2	121.8
2011	122.7	123.1	123.3	123.6	123.7	123.8	124.4	124.9	124.4	124.5	124.4(P)	124.7(P)	124.0(P)
2012	124.8(P)	124.6(P)											

P : Preliminary. All indexes are subject to revision four months after original publication.

Source: www.bls.gov

Cost Analytic Techniques—

- ✓ Learning Curve
- ✓ Target Pricing
- ✓ Theoretical Best Pricing
- ✓ Supplier Suggestion Programs
- ✓ Drop Shipping
- ✓ Cost-based Pricing and Contracting
- ✓ Total Cost of Ownership Models

Learning Curve

- ✦ Learning curve is based on the principle that as individuals become more familiar with a task or process, the average amount of direct labor to perform that task or process declines a predictable rate
- ✦ Learning rates represent the predictable reduction in *direct* labor requirements as production doubles from a previous level
- ✦ Learning curves also do not apply to simple items or items where the supplier has extensive experience

Learning Curve

A company is submitting an order to a supplier for 100 units of an engineered item. The buyer estimates the learning curve for this item to be 85 percent. The supplier provides the following *per unit* information:

Materials	\$28
Direct Labor	\$32 (2 hours on average per unit @ \$16 per hour)
Overhead	\$40 (125% of direct labor)
Total costs	\$100
Profit	<u>\$12</u> (12% of total costs)
Unit Price	\$112

Several weeks later the buyer submits an order for 300 more units (making the total order 400 units). What should the buyer expect to pay per unit for the next order?

Learning Curve

Analysis:

If the 100 unit order required an average of 2 hours of direct labor to produce a unit, then a doubling of production to 200 units should require only 85 percent of 2 hours, or 1.7 average hours per unit. A further doubling to 400 units should require 1.45 average hours per unit (85 percent x 1.7 average hours).

The total direct labor hours required for 400 units should be 580 total hours (400 x 1.45 average direct labor hours per unit). Since 200 direct labor hours were expended to produce the first 100 unit order (2 hours on average x 100 units), these hours need to be subtracted. The 300 unit order should require 380 additional direct labor hours (580 total hours - 200 hours consumed during the first order).

Next, 380 hours x \$16 per hour direct labor costs means the next order will consume \$6,080 in total direct labor costs. This is equal to \$20.27 in labor costs per unit (\$6,080/300 units).

Learning Curve

For the next 300 units:

Materials	\$28
Direct Labor	\$20.27 (\$6,080 direct labor costs/300 units)
Overhead	\$25.34 (125% of direct labor)
Total costs	\$73.61
Profit	<u>\$8.83</u> (12% of total costs)
New Unit Price	\$82.44

Target Pricing

$$\begin{aligned} & \text{Costs} \\ + & \text{Profit} \\ = & \text{Selling Price} \end{aligned}$$

Traditional Pricing

$$\begin{aligned} & \text{Selling Price} \\ - & \text{Profit} \\ = & \text{Allowable Costs} \end{aligned}$$

Target Pricing

Theoretical Best Pricing

- ✦ This approach uses cost data provided by suppliers to identify a theoretical best price
- ✦ The theoretical best price represents a composite price after examining the best cost elements available across a pool of potential suppliers
- ✦ This technique provides a benchmark or target to measure actual prices against
- ✦ It also identifies specific areas where costs are out of line for each supplier or where possible improvement efforts should be directed

Theoretical Best Pricing

Calculating the Theoretical Best Price per Unit:

	Supplier A	Supplier B	Supplier C	Supplier D	Best Cost
Direct Labor	\$12.55	\$11.78	\$13.10	\$11.22	\$11.22
Direct Materials	\$9.78	\$9.10	\$10.50	\$10.75	\$9.10
Overhead	\$15.06	\$11.78	\$19.65	\$14.25	\$11.78
SG&A	\$4.90	\$5.75	\$4.75	\$6.04	\$4.75
Profit	\$4.10	\$4.75	\$4.50	\$3.95	\$3.95
Price	\$46.39	\$43.16	\$52.50	\$46.21	\$40.80

Highlighted areas represent the lowest or best value in each row.

Theoretical Best Pricing

Standardized against the best cost:

	Supplier A	Supplier B	Supplier C	Supplier D	Best Cost
Direct Labor	1.12	1.05	1.17	1.00	1.00
Direct Materials	1.07	1.00	1.15	1.18	1.00
Overhead	1.28	1.00	1.67	1.21	1.00
SG&A	1.03	1.21	1.00	1.27	1.00
Profit	1.04	1.20	1.14	1.00	1.00
Price to Best Price	1.14	1.06	1.29	1.13	1.00

Supplier Suggestion Programs

- ✦ Most firm do NOT have a formal supplier suggestion program or system in place
- ✦ Best-practice supply organizations track the suggestions they receive from suppliers, respond to suggestions in an agreed-upon time frame, and report to executive managers any savings achieved through the system
- ✦ The suggestion system should serve as a central repository for all ideas received from suppliers
- ✦ Developing a web-based supplier suggestion program may be one of the most cost effective ways to manage costs

Supplier Suggestion Programs

- ✦ Firms that are serious about a supplier suggestion program must commit resources to evaluate the suggestions they receive, including a program manager or steering committee to oversee the process and making engineers available to evaluate the technical merits of a suggestion
- ✦ Suppliers will quickly become disinterested in any program they perceive is unresponsive to their suggestions

Drop Shipping

- ✦ This technique involves a supplier buying off the contract of a larger customer when the larger customer receives a better price
- ✦ The objective is to manage costs further upstream from the buying company by forming an informal purchase consortium
- ✦ The objective of this technique is to protect but not give the supplier a higher profit (although profit margin may increase)

Drop Shipping Example

	Current	Revised
Direct Labor	\$.20	\$.20
Direct Materials	\$.30	\$.24
Overhead	\$.30	\$.30
Selling, General, & Administrative	\$.10	\$.10
Profit	<u>\$.10</u> (10% margin)	<u>\$.10</u> (10.6% margin)
Selling Price	\$1.00	\$.94

Cost-Driven Pricing

- ✦ Most applicable when the seller adds higher levels of value through direct and indirect labor or design
- ✦ Joint agreement on the target price, profit, and full cost to produce and item is the foundation for a cost-driven price
- ✦ A supplier's assessment investment and return requirements provide the basis for establishing profit

Cost-Driven Pricing

- ✦ Profit is a result of an agreed to percentage return on assets employed directly by the seller to satisfy the buyer's contract
- ✦ Agreement of product cost, volumes, quality, costs, quantifiable productivity improvements, risk sharing, and contractual sharing of supplier initiated savings are essential elements of cost-driven pricing

Cost-Driven Pricing

- ✦ Pricing improvement results from a better understanding of requirements and costs, information sharing between firms, and the continuous reduction of a supplier's product cost structure

Negotiated or Agreed Upon Contractual Issues

Product:	Subassembly for industrial pump		
Initial Expected Price:	\$98.50 per unit		
Negotiated/Analyzed Cost Structure:			
Direct Labor Rate	\$13.50 per hour		
Burden rate	175% of direct labor		
Scrap Rate	10% of total material, direct labor, and burden		
Selling, General, and Administrative Expense Rate	10% of total manufacturing cost		
Effective Volume Range	100,000 units per year +/- 20%		
Projected Product Life	3 years		
Return on Investment Agreed to	20%		
Contract Length	Life of product with annual pricing recalculation		
Volume Fluctuation Risk	Shared equally if volume fluctuates more than +/-20% in a year		
Contract Specific Investment:	Year 1	Year 2	Year 3
Working Capital	\$2 million	\$2 million	\$2 million
Net Capital Assets	\$3 million	\$2 million	\$1 million
Total Investment over Three Years	\$12,000,000		
Supplier Productivity Commitment:			
Direct Labor Content	10% reduction from previous year level		
Scrap Rate	50% reduction from previous year level		
Joint Effort Design Revision/Cost Reductions:	Savings shared jointly on a 50/50 basis		

Year One Agreement and Events

	Dollars	Economics	Productivity Commitment and Changes
Material Costs	\$36.00	3% increase	\$2 per unit joint design saving
Direct Labor Costs	\$14.85	2% increase	10% annual improvement
Burden (Direct Labor x 175%)	\$25.99		
Total	\$76.84		
Scrap (\$76.84 x 10%)	<u>\$7.68</u>		50% annual reduction
Manufacturing Cost	\$84.52		
SG&A (Mfg. Cost x 10%)	<u>\$8.45</u>		
Total Cost	\$92.97		
Profit Per Unit	<u>\$8.00</u>		
Selling Price	\$100.97		

Year One Notes:

- Cost and procurement engineers determined each unit requires 1.1 hours of direct labor ($\$13.50 \times 1.1 = \14.85 year one direct labor) and material costs are \$36 per unit
- Total profit = $(\$12,000,000 \text{ supplier investment} \times 20\% \text{ agreed upon ROI}) / 3 \text{ year life of contract} = \$800,000$ expected profit per year. $\$800,000 / 100,000 \text{ units per year} = \8 profit per unit

Year Two Agreement and Events

	Dollars	Economics	Productivity Commitment and Changes
Material Costs	\$35.02	5% increase	
Direct Labor Costs	\$13.63	4% increase	10% annual improvement
Burden (Direct Labor x 175%)	\$23.85		
Total	\$72.50		
Scrap (\$72.5 x 5%)	<u>\$3.63</u>		50% annual reduction
Manufacturing Cost	\$76.13		
SG&A (Mfg. Cost x 10%)	<u>\$7.61</u>		
Total Cost	\$83.74		
Profit Per Unit	<u>\$9.00</u>		
Selling Price	\$92.74		

Year Two Notes:

Material costs = \$34 (\$2 material design saving from \$36) x 1.03 (3% supplier material cost increase from Year One events) = \$35.02.

Direct labor costs = \$14.85 x .9 (reflects 10% agreed upon productivity commitment from Year One level) = \$13.36. \$13.36 x 1.02 (2% increase in supplier labor costs in Year One) = \$13.63

\$9 per unit profit includes supplier share of material design saving (\$1.00) plus the original \$8 per unit profit

Year Three Agreement and Events

	Dollars	Economics	Productivity Commitment and Changes
Material Costs	\$36.77		
Direct Labor Costs	\$12.76		10% annual improvement
Burden (Direct Labor x 175%)	\$22.33		
Total	\$71.86		
Scrap (\$71.86 x 2.5%)	<u>\$1.80</u>		50% annual reduction
Manufacturing Cost	\$73.66		
SG&A (Mfg. Cost x 10%)	<u>\$7.37</u>		
Total Cost	\$81.03		
Profit Per Unit	<u>\$9.00</u>		
Selling Price	\$90.03		

Year Three Notes:

Material = $\$35.02 \times 1.05$ (5% material cost increase from Year Two events) = \$36.77

Direct labor costs = $\$13.63 \times .9$ (reflects 10% agreed upon productivity commitment from Year Two level) = \$12.27. $\$12.27 \times 1.04$ (4% increase in supplier labor costs in Year One) = \$12.76

Volume Risk Sharing Calculation

	Year One Expected	Year One Actual
Volume (units)	80,000-120,000	75,000
Volume outside the 20% band (units)	0	5,000
Expected profit (Volume x \$8 per unit)	\$800,000 (100,000 units x \$8)	\$600,000 (75,000 units x \$8)
Profit shortfall	\$0	\$200,000 (\$800,000 - \$600,000)
Profit shortfall outside the 20% band	\$0	\$40,000 (80,000 - 75,000) x \$8
50/50 sharing remitted to supplier	\$0	\$20,000 (\$40,000/2)

Thank you!