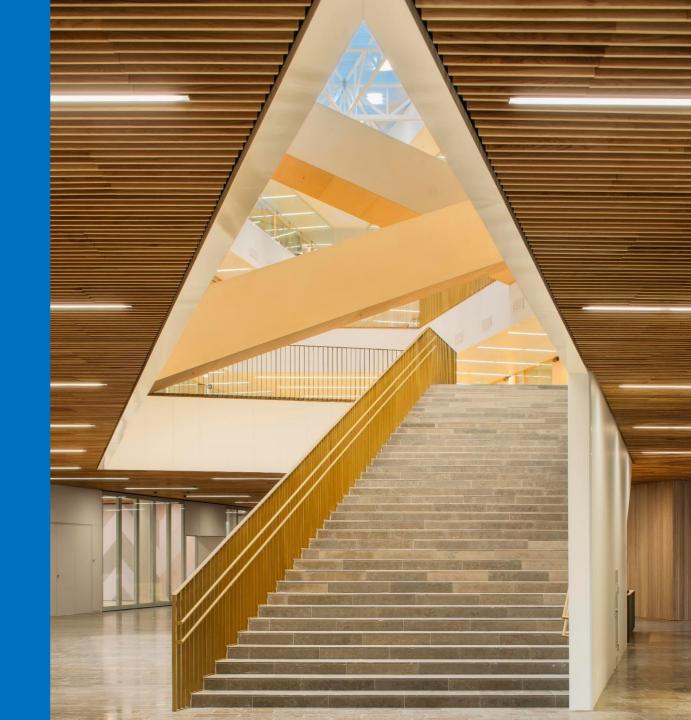
ABC

Session 9

David Derichs, PhD







Glossary

ABC Activity Based Costing

ABM Activity Based Management

Managerial Accounting I © Dr. David Derichs





Agenda: Learning Objectives for this session

- 5.1 Explain how broad averaging undercosts and overcosts products or services
- **5.2** Present three guidelines for refining a costing system
- 5.3 Distinguish between simple and activity-based costing systems
- **5.4** Describe a four-part cost hierarchy
- 5.5 Cost products or services using activity-based costing
- 5.6 Evaluate the benefits and costs of implementing activity-based costing systems
- 5.7 Explain how managers use activity-based costing systems in activity-based management



Activity Based Costing (ABC) and Activity Based Management (ABM)

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5.1 Explain how broad averaging undercosts and overcosts products or services



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Background

- Recall that plant overhead is applied to production in a rational systematic manner, using some type of averaging.
- There are a variety of methods to accomplish this goal.
- These methods often involve trade-offs between simplicity and realism.

Simple Methods

Can be inaccurate





Plantwide and Department Overhead Calculations

Plantwide Overhead Rate (Budgeted Manufacturing Overhead Rate):

Department Overhead Rate

Similar concept except overhead cost pools and selected base are obtained by department rather than plantwide.

Total Estimated Overhead ** / Total Estimated Allocation Base ***

- ** Obtain total of all overhead costs to be allocated.
- *** Determine the best "base" direct labor hours, machine hours, etc.

This rate is used to allocate overhead costs to all products



Example of Plantwide and Department Overhead Calculations

Let's say we have two departments: A and B with overhead costs of €300,000 and €450,000, respectively.

Let's also assume that the best allocation base (the most likely cost driver) in Department A is **Direct Labor Hours** and in Department B is **Machine Hours**.

The calculation of overhead allocation rates would be as follows:

	Dept A	Dept B	Plantwide
Overhead	€300,000	€450,000	€750,000
Direct Labor Hrs	8,000	7,000	15,000
Machine Hours	750	1,200	1,950
Allocation Rate-DLH	€37.50	n/a	€50.00
Allocation Rate-MH	n/a	€375.00	€384.62





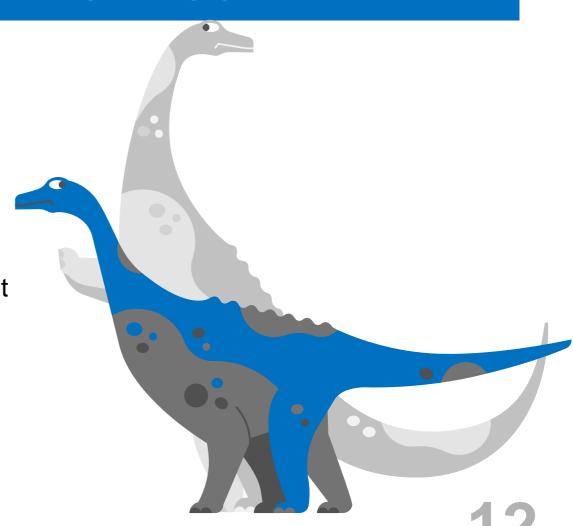
Broad Averaging

- Historically, firms produced a limited variety of goods and at the same time, their indirect costs were relatively small.
- Allocating overhead costs was simple: Use broad averages to allocate costs uniformly regardless of how they are actually incurred.
 - Generally known as "Peanut-butter costing" (perhaps because it is spread evenly?)
- The end-result:
 - Products using fewer resources are overcosted, and products using more resources are undercosted.



Over and Undercosting—Defined

- OVERCOSTING occurs when the cost measurement system reports a cost for a product that is above the cost of the resources the product consumes.
- UNDERCOSTING occurs when the cost measurement system reports a cost for a product that is below the cost of the resources the product consumes.





Product Cost Cross-Subsidization (1 of 3)

- If a company undercosts one of its products, it will overcost at least one of its other products.
- The overcosted product absorbs too much cost, making it seem less profitable than it really is.
- The undercosted product is left with too little cost, making it seem more profitable than it really is.



Product Cost Cross-Subsidization (2 of 3)

Consider the Following:

- If you were using cost to determine price, what effect would this have?
- If you were looking at product profitability to determine marketing focus, what would be the result?
- Managers use product costs everyday to make decisions. If the cost is wrong, so will be the
 decisions made based on the cost.



Example of Plantwide and Department Overhead Calculations

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Product Cost Cross-Subsidization (3 of 3)

How much overhead should be allocated to Job 457?

- Let's look again at our example:
- **Dept A** has €300,000 Overhead and uses DLH (8,000).
- **Dept B** has €450,000 Overhead and uses MH (1,200).
- Job 457 incurs 1,000 DLH in Dept A and 1,000 DLH in Dept B; 50 M H in Dept A and 75 MH in Dept B.



Activity Based Costing (ABC) and Activity Based Management (ABM) 5.2 Present three guidelines for refining a costing system

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5.1 Explain how broad averaging undercosts and overcosts products or services

Reasons for Refining a Costing System

Three principal reasons have accelerated the demand for refinements to the costing system:

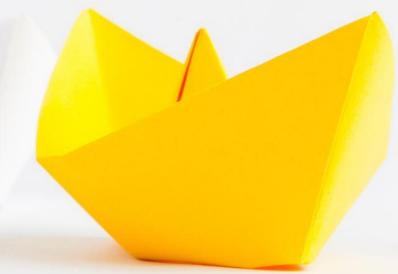
- 1. Increase in product diversity
- 2. Increase in indirect costs with different cost drivers
- 3. Competition in product markets

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Guidelines for Refining a Costing System

There are three main guidelines for refining a costing system:

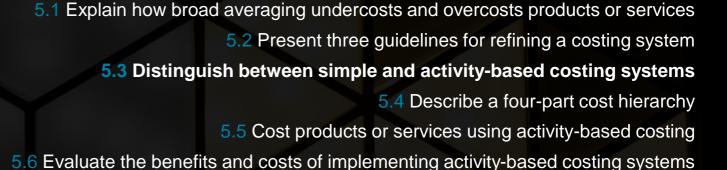
- 1. Direct-cost tracing
- 2. Indirect-cost pools
- 3. Cost-allocation bases





Activity Based Costing (ABC) and Activity Based Management (ABM)

5.3 Distinguish between simple and activity-based costing systems



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5.7 Explain how managers use activity-based costing systems in activity-based management



Types of costing systems

Direct costing systems

- Only assign direct costs to cost objects.
- Report contributions to indirect costs.
- No system in place to measure and assign indirect costs.

Traditional costing systems

Use unsophisticated methods to allocate indirect costs to cost objects.

ABC systems

Use sophisticated methods to allocate indirect costs to cost objects.



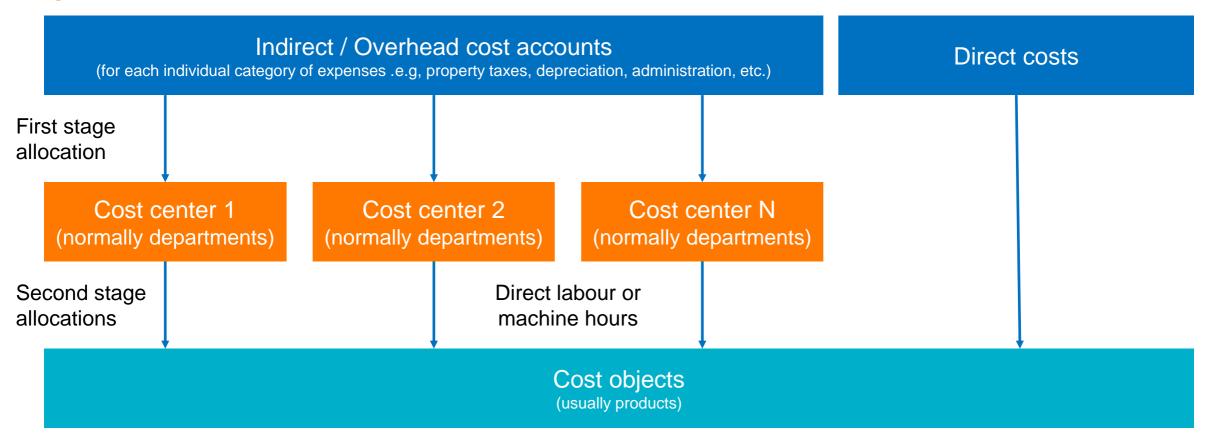
A Comparison of Traditional and ABC Systems

- Both systems use the two-stage allocation process.
- In the first stage, traditional systems tend to allocate costs to departments whereas ABC systems allocate costs to activities
- In the second stage, traditional systems rely on a small number of volume-based cost drivers (typically direct labour or machine hours) whereas ABC systems use many second stage cost drivers.
- ABC systems seek to use only cause-and-effect cost drivers whereas traditional systems
 often rely on arbitrary allocation bases.
- ABC systems tend to establish separate cost driver rates for support departments whereas
 traditional systems merge support and production centre costs.



Two stage allocation: a traditional system

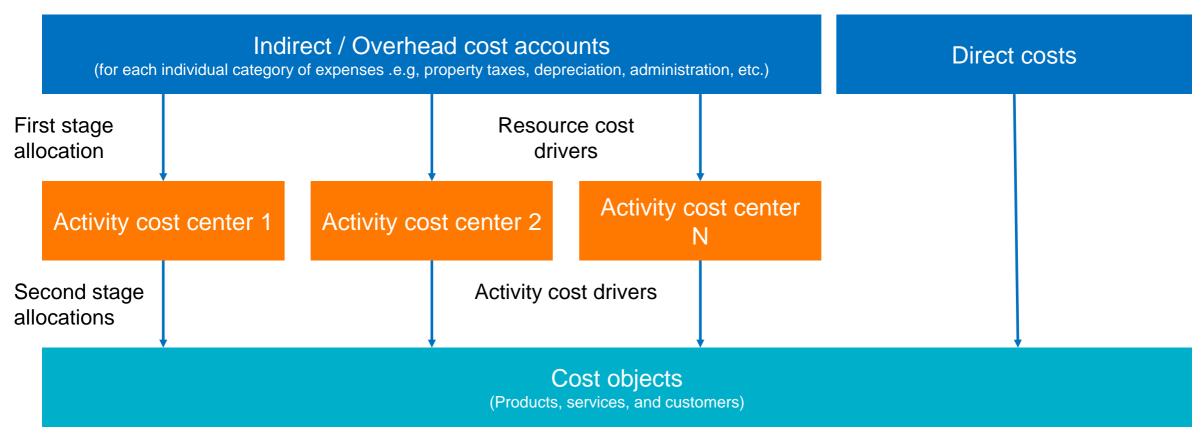
RECALL





Two stage allocation: a ABC system

RECALL





- 2. What action should an organization take when the ABC analysis identifies loss-making activities?
- 3. What are the factors that might prevent the restaurant industry from using ABC?





Volume-Based and Non-Volume-Based Cost Drivers

- Traditional systems use only volume-based cost drivers.
- Assumption that overheads are directly related to units produced.
- This can lead to the reporting of distorted product costs.
- Whereas, non-volume-based cost drivers consider activities other than units produced, e.g. number of setups.

5.3 Distinguish between simple and activity-based costing systems

An Example: Simple Costing System

Overview of Plastim's Simple Costing System

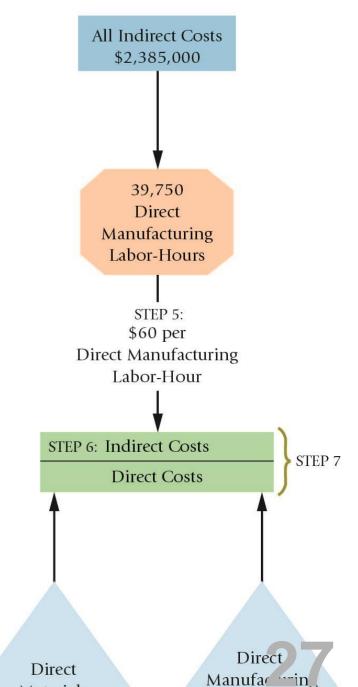
STEP 4: INDIRECT– COST POOL

STEP 3: COST-ALLOCATION BASE

> STEP 1: COST OBJECT: S3 AND C5 LENSES

> > STEP 2: DIRECT COSTS

> > > Materials



Labor

Source: Datar/Rajan (2021) Managerial Accounting I

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An Example: Simple Costing System

	Α	В	С	D	Е	F	G
1		60,000			15,000		
2		Simple Lenses (S3)			Complex Lenses (C5)		
3		Total	per Unit		Total	per Unit	Total
4		(1)	$(2) = (1) \div 60,000$		(3)	$(4) = (3) \div 15,000$	(5) = (1) + (3)
5	Direct materials	\$1,125,000	\$18.75		\$ 675,000	\$45.00	\$1,800,000
6	Direct manufacturing labor	600,000	10.00		195,000	13.00	795,000
7	Total direct costs (Step 2)	1,725,000	28.75		870,000	58.00	2,595,000
8	Indirect costs allocated (Step 6)	1,800,000	30.00		585,000	39.00	2,385,000
9	Total costs (Step 7)	\$3,525,000	<u>\$58.75</u>		\$1,455,000	\$97.00	\$4,980,000
10							



The Five-Step Decision-Making Process—Plastim

- Identify the problems and uncertainties (possible loss of a large S3 customer).
- 2. Obtain information (analyze and evaluate the design, manufacturing, and distribution operations for the S3 lens).
- 3. Make predictions about the future (obtain a better cost estimate for the S3).
- Make decisions by choosing among alternatives (should they bid and if yes, at what price?).
- 5. Implement the decision, evaluate performance, and learn.



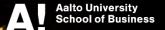
Brief Intro to: Time-Driven ABC → More during the MSc course

- Not all businesses are suited to ABC.
- Costly design, implementation and operation of ABC have hindered adoption.
- Time-driven ABC developed to overcome such problems.
- Requires an estimation of:
 - cost per time unit of supplying resource capacity;
 - the unit times of consumption of resource capacity by products.



Example of TDABC

Activity	% of time spent	Assigned cost (£)	Cost driver quantity	Cost driver rate (£)	
Process customer orders	70	392,000	49,000	8 per order	
Handle customer enquiries	10	56,000	1,400	40 per enquiry	
Perform credit checks	20	112,000 560,000	2,500	44.80 per credit check	
Time-driven ABC reporting					
			Total time		Total cos
	Cost driver	Unit time	used	Cost driver	assigned
Activity	quantity	(minutes)	(minutes)	rate (£)	(£)
Process customer orders	49,000	8	392,000	6.40	313,600
Handle customer enquiries	1,400	44	61,600	35.20	49,280
Perform credit checks	2,500	50	125,000	40.00	100,000
Total used			578,600		462,880
Total supplied			700,000		560,000
Unused capacity			121,400		97,120



Activity Based Costing (ABC) and Activity Based Management (ABM) 5.4 Describe a four-part cost hierarchy

5.2 Present three guidelines for refining a costing system
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5.5 Cost products or services using activity-based costing

5.1 Explain how broad averaging undercosts and overcosts products or services

5.7 Explain how managers use activity-based costing systems in activity-based management

5.6 Evaluate the benefits and costs of implementing activity-based costing systems



Cost Hierarchies (1 of 4)

A **cost hierarchy** categorizes various activity cost pools on the basis of the different types of cost drivers, cost-allocation bases, or different degrees of difficulty in determining cause-and-effect relationships.

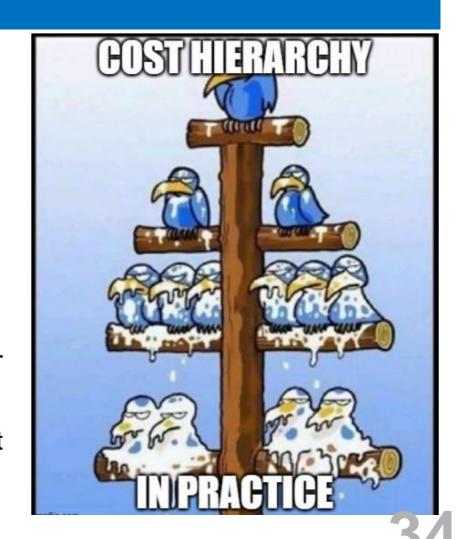
ABC systems commonly use a cost hierarchy with four levels to identify cost-allocation bases that are cost drivers of the activity cost pools.



Cost Hierarchies (2 of 4)

There are four levels of the cost hierarchy:

- Output unit-level costs (related to the individual units of a product or service)
- 2. Batch-level costs (related to a group of units)
- 3. Product (or service)-sustaining costs (related to support a particular product or service without regard to the number of units or batches)
- 4. Facility-sustaining costs (related to costs of activities that cannot be traced to individual products or services)





Cost Hierarchies (3 of 4)

1. Unit-level activities

- Performed each time a unit of the product or service is produced.
- Resources are consumed in proportion to the number of units produced or sold.
- Examples Direct materials and labour, energy costs and expenses consumed in proportion to machine processing time.

2. Batch-related activities

- Performed each time a batch of goods is produced.
- Costs vary with the number of batches made.
- Examples include set-ups, purchase ordering and first-item inspection activities.



Cost Hierarchies (4 of 4)

3. Product/service sustaining activities

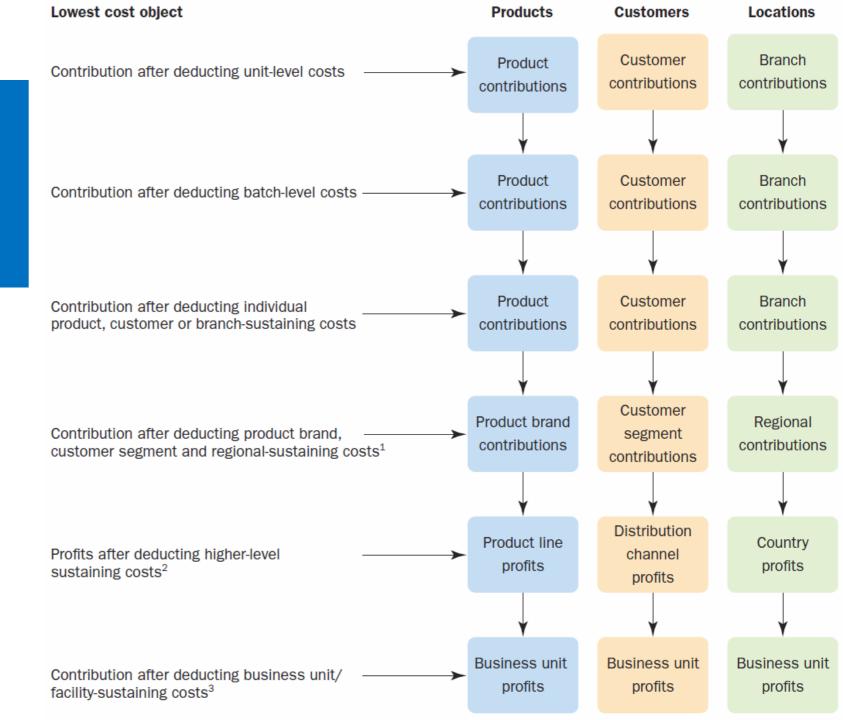
- Performed to enable the production of individual products or services.
- Examples include activities related to maintaining an accurate bill of materials, preparing engineering change notices.

4. Facility-sustaining (or business-sustaining) activities

- Performed to support the organization as a whole.
- Examples include plant management, property costs and salaries of general administrative staff.
- Common to all products and services not allocated to products/services.

5.4 Describe a four-part cost hierarchy

Illustration of a cost hierarchy







Activity Based Costing (ABC) and Activity Based Management (ABM) 5.5 Cost products or services using activity-based costing

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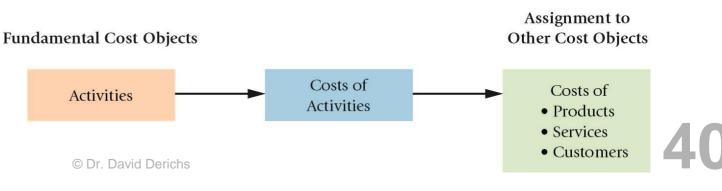
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Activity-Based Costing (ABC)

Refines a costing system by identifying individual activities as the fundamental source of indirect costs.

An **activity** is an event, task, or unit of work with a specified purpose—for example, designing products, setting up machines, operating machines, or distributing products. These are often referred to as **cost drivers**.





4 Steps of designing an ABC system 1/3

- 1. identifying the major activities that take place in an organization;
- 2. assigning costs to activity cost centres;
- 3. selecting appropriate costs drivers
- 4. assigning the cost of activities to products according to the product's demand for activities.





4 Steps of designing an ABC system 2/3

1. Identifying activities

- The activities chosen should be at a reasonable level of aggregation based on cost/benefit criteria.
- Choice of activities influenced by the total cost of the activity centre and the ability of a single cost driver to provide a satisfactory determinant of the cost of the activity.

2. Assigning costs to activity cost centres

- Costs assigned to activity cost pools will include direct and indirect costs.
- Resource cost drivers used to assign indirect costs.
- Reliability of cost information will be reduced if arbitrary allocations are used to assign a significant proportion of costs to activities.



4 Steps of designing an ABC system 3/3

3. Selecting appropriate cost drivers for assigning the cost of activities to cost objects

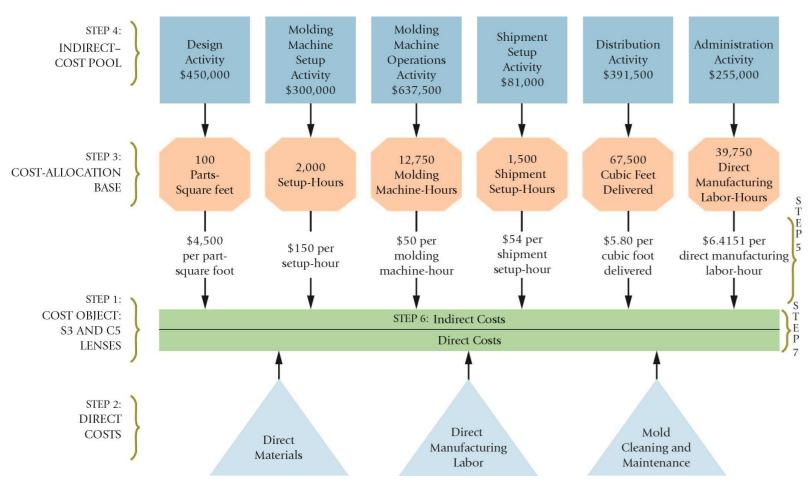
- Drivers at this stage called activity drivers. They should:
 - provide a good explanation of costs of each activity pool;
 - be easily measurable;
 - the data should be easy to obtain and identifiable with the product.
- Activity cost drivers consist of transaction and duration drivers.

4. Assigning the cost of activities to products

The cost driver must be measurable so that it can be identified with individual products.



Plastim and ABC Illustrated



Source: Datar/Rajan (2021) Managerial Accounting I



Plastim: ABC Rate Calculation

	Α	В	С	D	E	F		G	Н	
1			(Step 4)	(Step 3)		(Step 5)		tep 5)		
		Cost Hierarchy	Total Budgeted Indirect	Budgeted Quantity of		Budgeted Indirect			Cause-and-Effect Relationship Between Allocation Base and	
2	Activity	Category	Costs	Cost-Allocation Base		Cost Rate			Activity Cost	
3	(1)	(2)	(3)		(4)	$(5) = (3) \div (4)$		$(3) \div (4)$	(6)	
4	Design	Product- sustaining	\$450,000	100	parts-square feet	\$ 4	1,500	per part-square foot	Design Department indirect costs increase with more complex molds (more parts, larger surface area).	
5	Molding machine setup	Batch-level	\$300,000	2,000	setup-hours	\$	150	per setup-hour	Indirect setup costs increase with setup-hours.	
6	Machine operations	Output unit- level	\$637,500	12,750	molding machine- hours	\$	50	per molding machine-hour	Indirect costs of operating molding machines increases with molding machine-hours.	
7	Shipment setup	Batch-level	\$ 81,000	1,500	shipment setup-hours	\$	54	per shipment setup-hour	Shipping costs incurred to prepare batches for shipment increase with the number of shipment setup-hours.	
8	Distribution	Output-unit- level	\$391,500	67,500	cubic feet delivered	\$	5.80	per cubic foot delivered	Distribution costs increase with the cubic feet of packages delivered.	
9	Administration	Facility sustaining	\$255,000		direct manuf. labor-hours _{© [}			per direct manuf. labor- hour	The demand for administrative resources increases with direct manufacturing labor-hours.	

5.5 Cost products or services using activity-based costing

Plastim: ABC Product Costs

Source: Datar/Rajan (2021) Managerial Accounting I

	A	В	С	D	E	Į F	G	
1			0,000			5,000		
2		Control of the Contro	Lenses (S3)			Lenses (C5)		
3		Total	per Unit		Total	per Unit	Total	
4	Cost Description	(1)	$(2) = (1) \div 60,000$		(3)	$(4) = (3) \div 15,000$	(5) = (1) + (3)	
5	Direct costs							
6	Direct materials	\$1,125,000	\$18.75		\$ 675,000	\$ 45.00	\$1,800,000	
7	Direct manufacturing labor	600,000	10.00		195,000	13.00	795,000	
8	Direct mold cleaning and maintenance costs	120,000	2.00		150,000	10.00	270,000	
9	Total direct costs (Step 2)	1,845,000	30.75		1,020,000	68.00	2,865,000	
10	Indirect Costs of Activities							
11	Design							
12	S3, 30 parts-sq.ft. × \$4,500	135,000	2.25				150,000	
13	C5, 70 parts-sq.ft. × \$4,500				315,000	21.00	} 450,000	
14	Setup of molding machines							
15	S3, 500 setup-hours × \$150	75,000	1.25				} 300,000	
16	C5, 1,500 setup-hours × \$150				225,000	15.00		
17	Machine operations							
18	S3, 9,000 molding machine-hours × \$50	450,000	7.50				} 637,500	
19	C5, 3,750 molding machine-hours × \$50				187,500	12.50	J 637,500	
20	Shipment setup							
21	S3, 750 shipment setup hours × \$54	40,500	0.67				} 81,000	
22	C5, 750 shipment setup hours × \$54				40,500	2.70) 01,000	
23	Distribution							
24	S3, 45,000 cubic feet delivered × \$5.80	261,000	4.35				} 391,500	
25	C5, 22,500 cubic feet delivered × \$5.80				130,500	8.70	J 391,300	
26	Administration							
27	S3, 30,000 dir. manuf. labor-hours × \$6.4151	192,453	3.21				} 255,000	
28	C5, 9,750 dir. manuf. labor-hours × \$6.4151				62,547	4.17		
29	Total indirect costs allocated (Step 6)	1,153,953	19.23		961,047	64.07	2/15,000	
30	Total Costs (Step 7) © Dr. David Derichs	\$2,998,953	\$49.98		\$1,981,047	\$132.07	\$4,980,000	
31	• • •							





Activity Based Costing (ABC) and Activity Based Management (ABM)

5.6 Evaluate the benefits and costs of implementing activity-based costing systems

5.1 Explain how broad averaging undercosts and overcosts products or services5.2 Present three guidelines for refining a costing system

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Plastim: Simple and ABC Compared

Indirect-cost pools Single indirect-cost pool allocated using direct manufacturing labor-hours Machine operations (molding machine-hours) Shipment setup (shipment setup-hours) Distribution (cubic feet delivered) Administration (direct manufacturing labor-hours) Total indirect costs Total costs assigned to simple (S3) lens Cost per unit of simple (S3) lens Total costs assigned to complex (C5) lens Cost per unit of complex		Simple Costing System Using a Single Indirect-Cost Pool (1)	ABC System (2)	Difference (3) = (2) - (1)
Direct manufacturing labor Total direct costs Indirect-cost pools Indirect costs \$2,595,000 \$2,865,000 \$270,1 \$6 5 5 Single indirect-cost pool allocated using direct manufacturing labor-hours Machine operations (molding machine-hours) Shipment setup (setup-hours) Shipment setup (shipment setup-hours) Total indirect costs \$2,385,000 \$2,385,000 \$2,115,000 \$270, Total costs assigned to simple (S3) lens \$3,525,000 \$2,998,953 \$526, Cost per unit of simple (S3) lens \$58.75 \$49.98 \$68 Total costs assigned to complex (C5) lens \$1,455,000 \$1,981,047 \$526, Cost per unit of complex \$526,000 \$1,981,047 \$526, Cost per unit of complex \$526,000 \$1,981,047 \$526, Total costs assigned to complex (C5) lens \$1,455,000 \$1,981,047 \$526, Cost per unit of complex \$58.75 \$49.98 \$68 Total costs assigned to complex (C5) lens \$1,455,000 \$1,981,047 \$526, Cost per unit of complex \$58.75 \$49.98 \$68 Total costs assigned to complex (C5) lens \$1,455,000 \$1,981,047 \$526, Cost per unit of complex \$58.75 \$60 \$1,981,047 \$526, Cost per unit of complex \$1,455,000 \$1,981,047 \$1,000	Direct-cost categories	2	3	1
labor Direct mold cleaning and maintenance labor Total direct costs Indirect-cost pools Indirect-cost pools Indirect-cost pools Indirect-cost pools Indirect-cost pools Indirect-cost pool allocated using direct manufacturing labor-hours Molding machine setup (setup-hours) Machine operations (molding machine-hours) Shipment setup (shipment setup-hours) Distribution (cubic feet delivered) Administration (direct manufacturing labor-hours) Total indirect costs Indirect cost cost cost cost cost cost cost co		Direct materials	Direct materials	
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Indirect-cost pools Single indirect-cost pool allocated using direct manufacturing labor-hours Machine operations (molding machine-hours) Shipment setup (shipment setup-hours) Distribution (cubic feet delivered) Administration (direct manufacturing labor-hours) Total indirect costs \$2,385,000 \$2,115,000 \$2,115,000 \$270, Total costs assigned to simple (S3) lens Cost per unit of simple (S3) lens \$58.75 \$49.98 \$3,525,000 \$1,981,047 \$526, Cost per unit of complex	Total direct costs	\$2,595,000	\$2,865,000	\$270,000
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¹ Cost drivers for the various indirect-cost pools are shown in parentheses.	¹ Cost drivers for the various i	ndirect-cost pools are shown in paren	theses.	

Cimple Coeting

Source: Datar/Rajan (2021) Managerial Accounting I



ABC Versus Simple Costing (1 of 2)

- ABC is generally perceived to produce superior costing figures due to the use of multiple drivers across multiple levels.
- ABC is only as good as the drivers selected and their actual relationship to costs. Poorly chosen drivers will produce inaccurate costs, even with ABC.
- Using ABC does not guarantee more accurate costs!
- ABC is an alternate way to allocate costs. It is generally considered to be more accurate and more costly to implement.



ABC Versus Simple Costing (2 of 2)

- A company should consider refining its cost system when evidence begins to suggest that the existing system is flawed.
- A number of critical decisions, such as pricing, whether or not one product should be "pushed" over another, whether or not a product should be dropped, etc. will be made using cost information.
- Therefore, best efforts should be used to arrive at a cost that is fair and reasonable for each product.
- · This is an imprecise science, and differences of opinion are likely to occur.

Resource Consumption Models and Unused Capacity (1 of 2)

 ABC systems measure the cost of using resources and not the cost of supplying resources:

Cost of resources = Cost of resources + supplied used

Cost of unused capacity

- Periodic financial statements measure the cost of resources supplied.
- ABC systems measure the cost of resources used.
- The difference between the cost of resources supplied and the cost of resources used represents the cost of unused capacity.

Resource Consumption Models and Unused Capacity (2 of 2)

- Unused capacity arises with committed resources because they must be acquired in discrete amounts in advance of usage.
- With flexible resources supply can be continually adjusted to match exactly the usage of resources.
- Managers make decisions that will result in a change of activity usage (e.g. discontinuation decisions reduce cost of resources used and increase the cost of unused capacity).
- Cash flow consequences will only arise if action is taken to remove unused capacity by reducing spending on the supply of resources.
- The periodic reporting of unused capacity signals the need for a change in the spending on the supply of resources.



Signals That Suggest That ABC Implementation May Be Helpful

- 1. Significant amounts of indirect costs are allocated using only one or two cost pools.
- 2. All or most indirect costs are identified as output unit-level costs.
- 3. Products make diverse demands on resources because of volume, process steps, batch size, or complexity.
- 4. Products that a company is well-suited to make show small profits whereas products that a company is less suited to make show large profits.
- 5. Operations staff has substantial disagreement with the reported costs of manufacturing and marketing products or services.



Activity Based Costing (ABC) and Activity Based Management (ABM)

5.7 Explain how managers use activity-based costing systems in activity-based management

5.2 Present three guidelines for refining a costing system

5.3 Distinguish between simple and activity-based costing systems

5.4 Describe a four-part cost hierarchy

5.5 Cost products or services using activity-based costing

5.6 Evaluate the benefits and costs of implementing activity-based costing systems

5.7 Explain how managers use activity-based costing systems in activity-based management

5.1 Explain how broad averaging undercosts and overcosts products or services



Behavioral Issue to Consider When Implementing ABC

- Gain the support of top management and create a sense of urgency.
- Create a guiding coalition of managers throughout the value chain for the ABC effort.
- Educate and train employees in ABC as a basis for employee empowerment.
- Seek small short-run success as proof that the ABC implementation is yielding results.
- Recognize that ABC is not perfect (better costs but complex system).





Activity-Based Management

- A method of management decision-making that uses AB
 C information to improve customer satisfaction and
 profitability.
- We define ABM broadly to include decisions about pricing and product mix, cost reduction, process improvement and product and process design.



ABC and Service/Merchandising Firms

ABC implementation is widespread in a variety of applications outside manufacturing:

- Health Care
- Banking
- Telecommunications
- Retailing
- Transportation



- 1. In some countries revenues may be received in a lump sum and are not assignable to individual diagnosis related groups. What role can ABC play in such organizations?
- 2. Do you think many business organizations utilize ABC techniques? Why or why not?





Terms to Learn

Activity	Product cost cross-subsidization
Activity-Based Costing (ABC)	Product overcosting
Activity-Based Management (ABM)	Product undercosting
Batch-level costs	Product-sustaining costs
Cost hierarchy	Refined costing system
Facility-sustaining costs	Service-sustaining costs
Output unit-level costs	

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