Advanced Cost Assignment

Support Department Costs, Common Costs, and revenues

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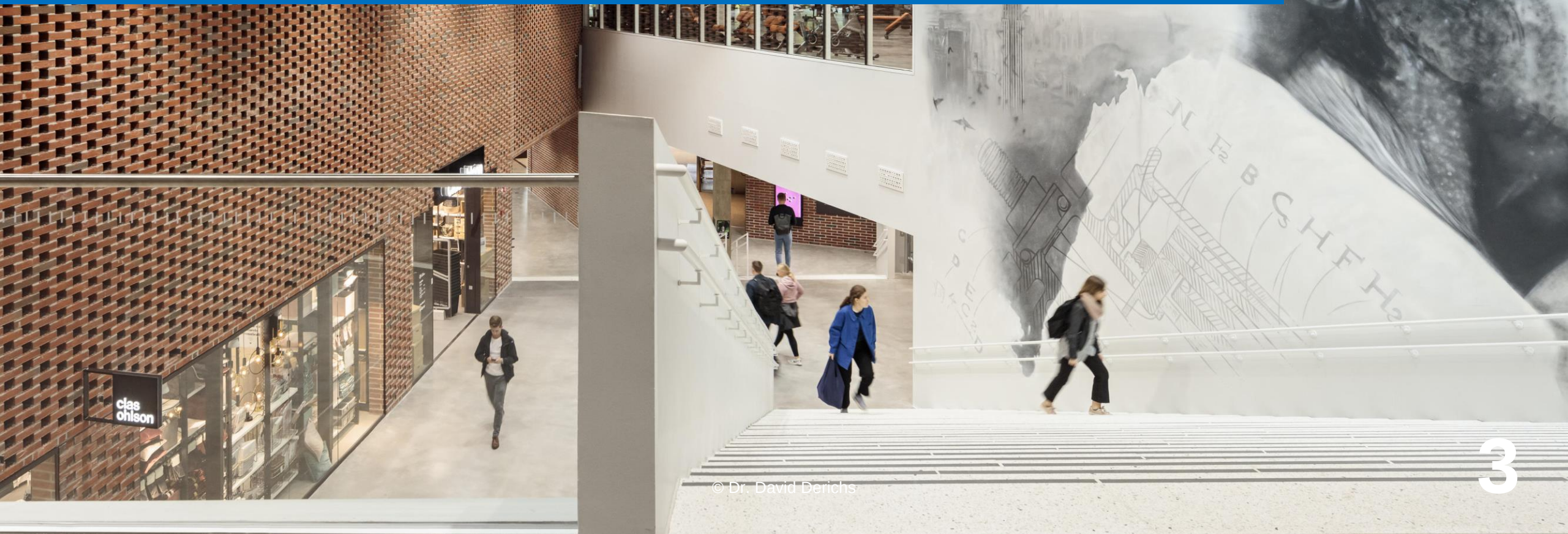
School of Business

Glossary

NRV Net Realizable value

Allocation of support department costs, common costs, and revenues



Agenda:
Learning Objectives for this session

16.1 Distinguish the single-rate method from the dual-rate method

16.2 Understand how the choice between allocation based on budgeted and actual rates and between budgeted and actual usage can affect the incentives of division managers

16.3 Allocate multiple support-department costs using the direct method, the step-down method, and the reciprocal method

16.4 Allocate common costs using the stand-alone method and the incremental method

16.5 Explain the importance of explicit agreement between contracting parties when the reimbursement amount is based on costs incurred

16.6 Understand how bundling of products causes revenue allocation issues and the methods managers use to allocate revenues

Allocation of support department costs, common costs, and revenues

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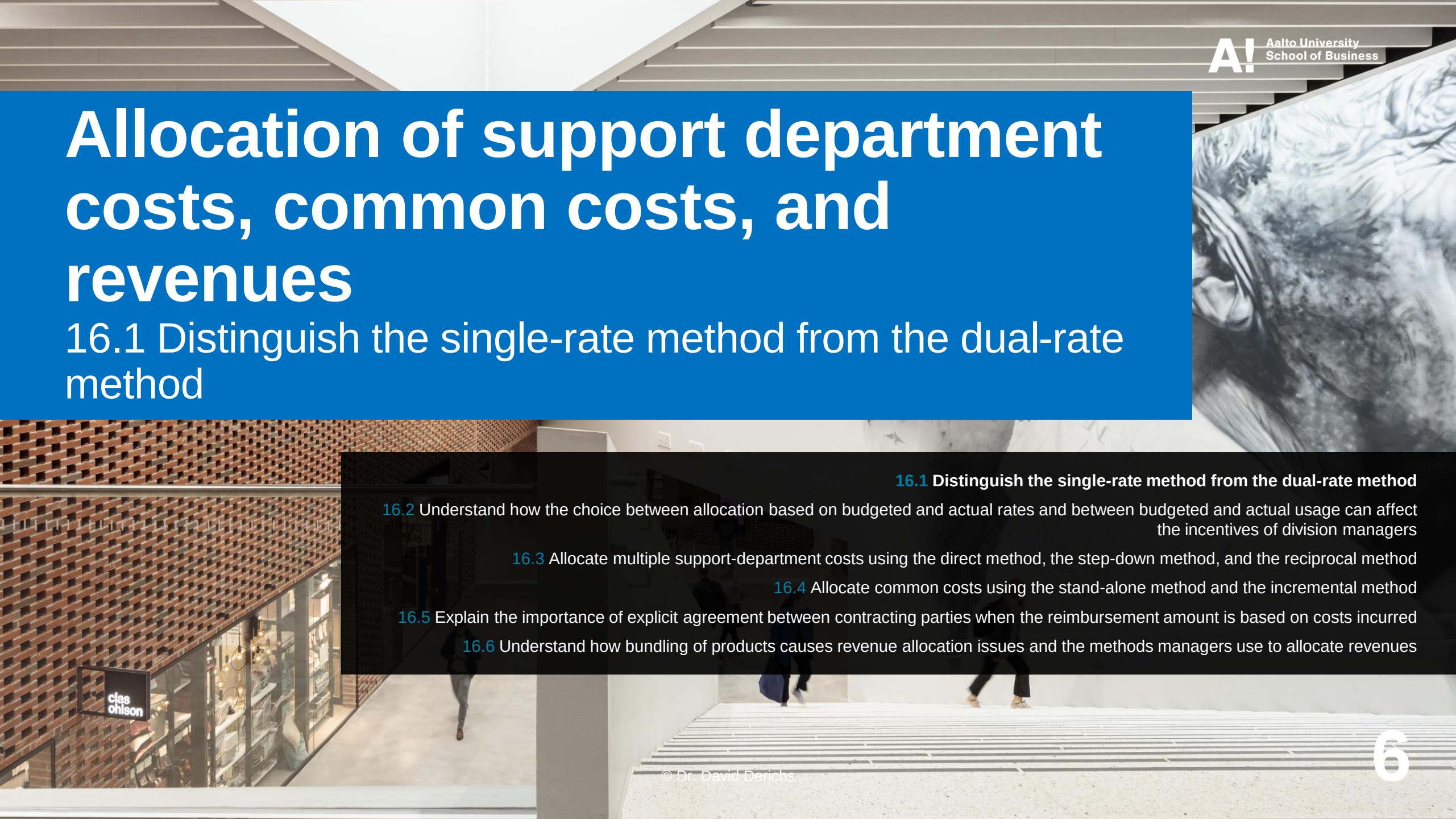

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Allocation of support department costs, common costs, and revenues

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Allocating Support Department Costs Using Single-Rate and Dual-Rate Methods

- **How a company allocates its overhead** and internal support costs—costs related to marketing, advertising, and other internal services—among its various production departments or projects **can have a big impact on how profitable those departments or projects are**.
- **Operating (production) department**—directly adds value to a product or service.
- **Support (service) department**—provides the services that assist other internal departments (operating departments and other support departments) in the company.

Source: Datar/Rajan (2021)

Managers face two questions when allocating the costs of a support department to operating departments or divisions:

1. **Should fixed costs of support departments be allocated to operating divisions**?

2. If fixed costs are allocated, **should variable and fixed costs of the support department be allocated in the same way**?

Source: Datar/Rajan (2021)

Two Methods to Allocate Support Department Costs: Single-Rate and Dual-Rate

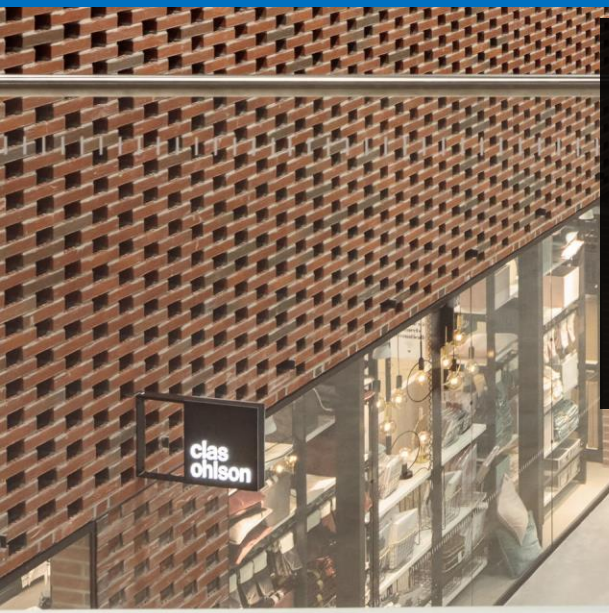
Depending on the answer to our first question (from the prior slide), there are two approaches to allocating support-department costs:

- The **single-rate method** does not distinguish between fixed and variable costs. It allocates costs in each cost pool using the same rate per unit of a single allocation base.
  - A support department would be an example of a cost-pool.
- The **dual-rate method** partitions the cost of each support department into two pools, a variable-cost pool and a fixed-cost pool.
  - It allocates each pool using a different cost-allocation base.

Source: Datar/Rajan (2021)

Allocation of support department costs, common costs, and revenues

16.2 Understand how the choice between allocation based on budgeted and actual rates and between budgeted and actual usage can affect the incentives of division managers



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Allocation Bases

- Under either method, **allocation of support costs can be based on one of the three following scenarios**:
  1. **Budgeted overhead rate and budgeted hours**
  2. **Budgeted overhead rate and actual hours**
  3. **Actual overhead rate and actual hours**
- When using either method, managers can allocate support-department costs to operating divisions based on either a budgeted rate or the eventual actual cost rate. We can also allocate based on demand (usage) or supply (practical capacity).
- The latter approach (using actual rates) is neither preferred nor widely used; we will illustrate using budgeted rates.

Source: Datar/Rajan (2021)

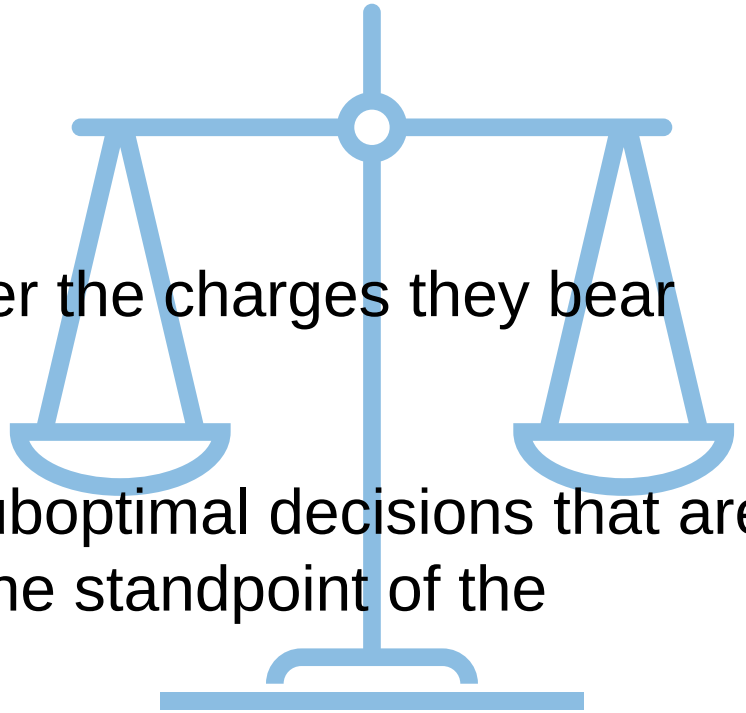
Advantages and Disadvantages: Single-Rate Method

Advantages

- Less costly to implement
- Offers user departments some operational control over the charges they bear

Disadvantages

- May lead operating department managers to make suboptimal decisions that are in their own best interest but may be inefficient from the standpoint of the organization as a whole



Source: Datar/Rajan (2021)

Advantages and Disadvantages: Dual-Rate Method [1/2]

Advantages

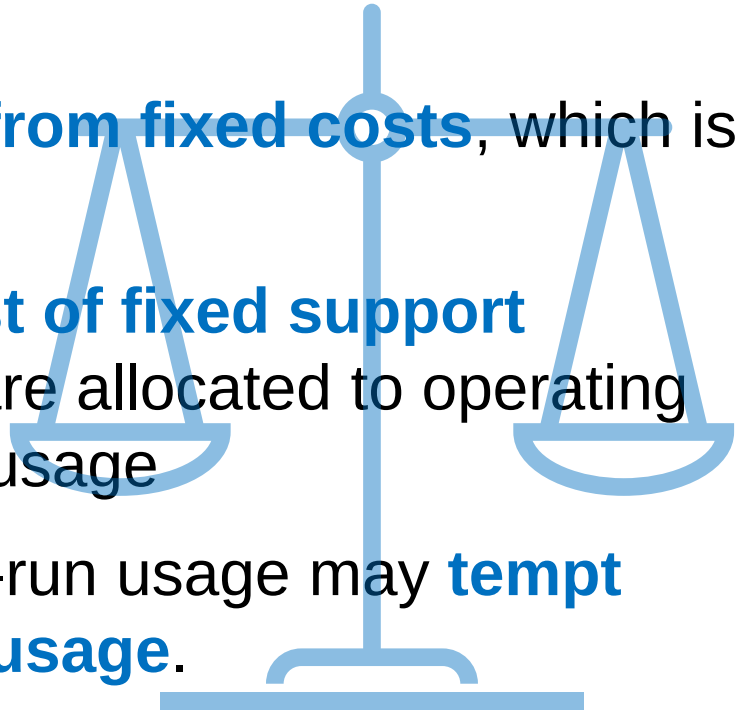
1. **Guides department managers** to make decisions that **benefit both the organization** as a whole and each **department**
2. Allocating fixed costs based on budgeted usage **helps user departments with both short-run and long-run planning** because user departments know the costs allocated to them in advance

Source: Datar/Rajan (2021)

Advantages and Disadvantages: Dual-Rate Method [2/2]

Disadvantages

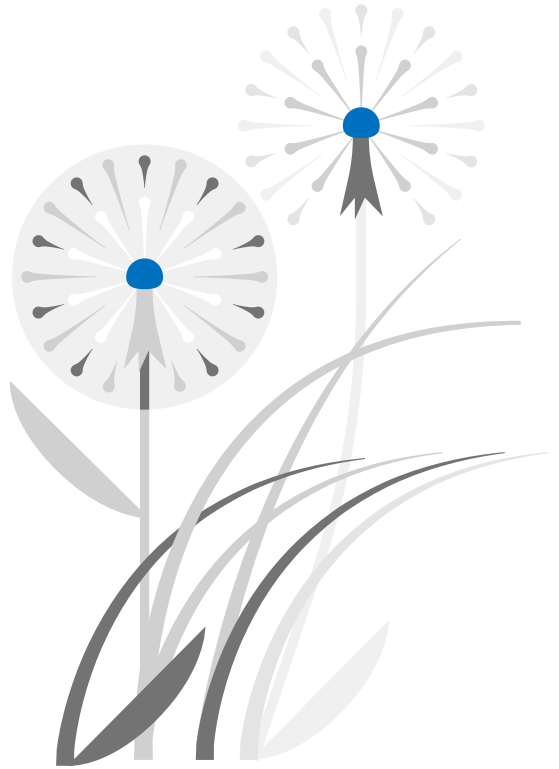
1. Requires managers to **distinguish variable costs from fixed costs**, which is often a challenging task
2. Does **not indicate to operating managers the cost of fixed support department resources used** because fixed costs are allocated to operating departments based on budgeted rather than actual usage
3. Allocating fixed costs on the basis of budgeted long-run usage may **tempt some managers to underestimate their planned usage**.



Source: Datar/Rajan (2021)

Budgeted Versus Actual Costs and the Choice of Allocation Base (1 of 4)

- The **allocation methods** previously outlined f**ollow**
  - **specific procedures in terms of the support department costs that are considered** as well as
  - **the manner in which costs are assigned to the operating departments**.



Source: Datar/Rajan (2021)

Budgeted Versus Actual Costs and the Choice of Allocation Base (2 of 4)

Budgeted versus actual rates—Use of **actual rates** imposes a **high level of uncertainty** on user departments. **Budgeted rates** tend to **motivate the manager of the support** (or supplier) department to improve efficiency and to decide appropriately (if allowed) whether to use the internal resource or an external vendor.

Variable Budgeted versus actual usage—**Actual usage** is best here because the **variable costs are directly and causally linked to usage**. Also, allocating variable costs on the basis of budgeted usage would provide the user departments with no incentive to control their consumption of support services.

Source: Datar/Rajan (2021)

Budgeted Versus Actual Costs and the Choice of Allocation Base (3 of 4)

Fixed-cost allocation based on budgeted rates and budgeted usage—When **budgeted usage is the allocation base**, **user departments receive a present lump-sum fixed-cost charge**. Rates can be set based on budgeted usage or on practical capacity.

Fixed-cost allocation based on budgeted rates and actual usage—If **actual usage is equal to budgeted usage but less than practical capacity, 100% of the departments costs are allocated even though the department had idle capacity**.

Budgeted Versus Actual Costs and the Choice of Allocation Base (4 of 4)

Allocating budgeted fixed costs based on actual usage—When budgeted fixed costs are allocated based on actual usage, user departments will not know their fixed-cost allocations until the end of the budget period. Therefore, this method shares the flaw as the methods that rely on the use of actual costs rates rather than budgeted cost rates.

In summary, strong economic and motivational reasons justify the precise forms of the single-rate and dual-rate methods considered in the previous section and, in particular, to support the use of the dual-rate allocation procedure.

Source: Datar/Rajan (2021)

Exercise Time – E1

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Allocation of support department costs, common costs, and revenues

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Allocating Costs of Multiple Support Departments (1 of 2)

Now, we examine the **special cost-allocation problems** that arise **when two or more of the support departments** whose costs are being allocated **provide reciprocal support** to each other as well as to operating departments. The allocation is done in three steps:

1. **Trace or allocate each cost** to various support and operating departments.
2. **Allocate plant administration costs** to other support departments and operating departments.
3. **Allocate the support department costs** to the operating departments.

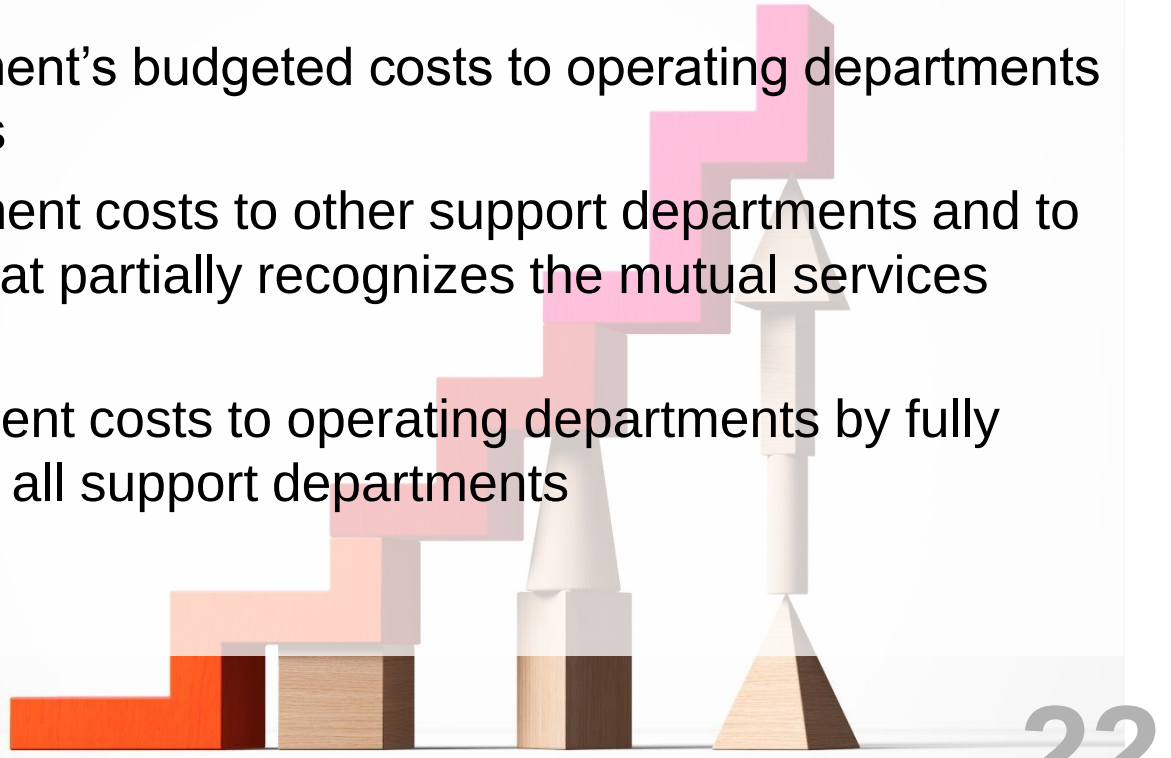
Allocating Costs of Multiple Support Departments (2 of 2)

Three methods can be used for the allocations:

A. **Direct Method**—allocates each support department's budgeted costs to operating departments only; no allocations to other support departments

B. **Step-Down Method**—allocates support-department costs to other support departments and to operating departments in a sequential manner that partially recognizes the mutual services provided among all support departments

C. **Reciprocal Method**—allocates support-department costs to operating departments by fully recognizing the mutual services provided among all support departments



Source: Datar/Rajan (2021)
Managerial Accounting II

A. Direct Method

- **Allocates support costs only to operating departments**

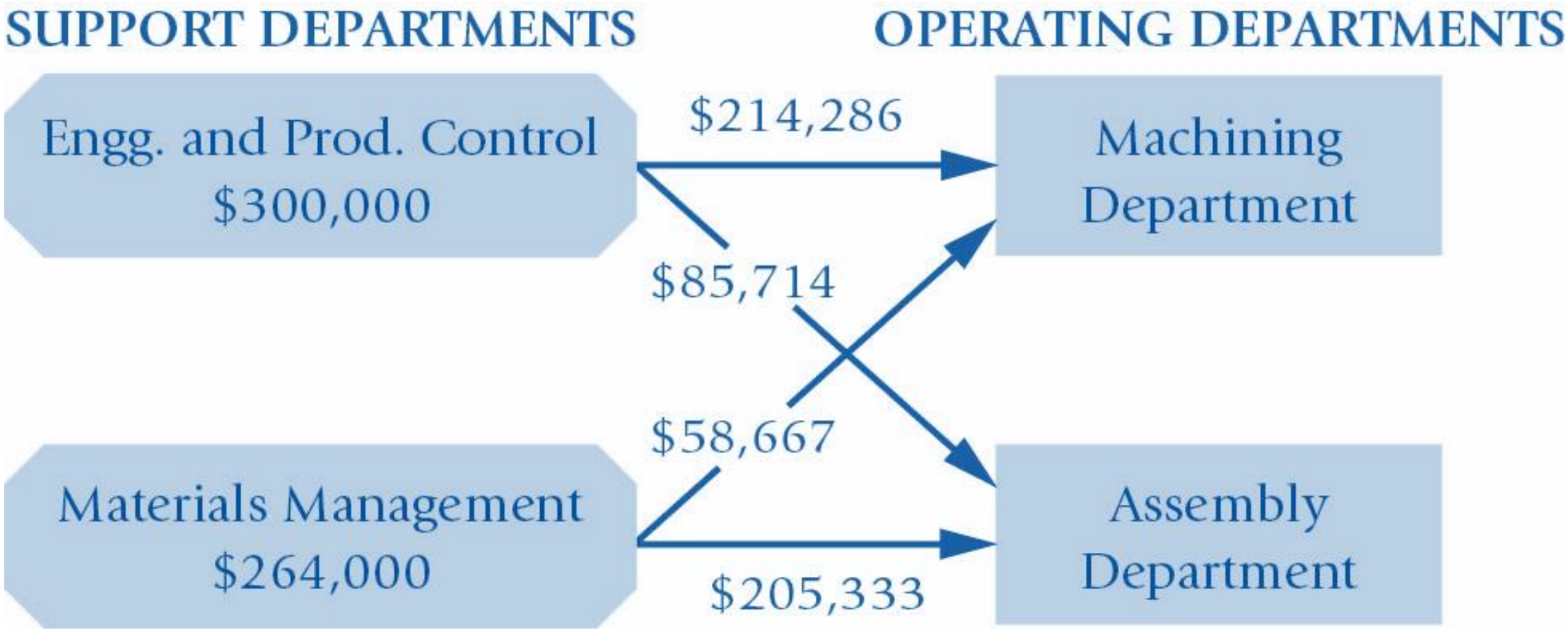
- Direct method does not allocate support-department costs to other support departments.

Data Used in Cost Allocation Example

	A	B	C	D	E	F	G
1		SUPPORT DEPARTMENTS			OPERATING DEPARTMENTS		
2		Engineering and Production Control	Materials Management		Machining	Assembly	Total
3	Budgeted overhead costs						
4	before any interdepartment cost allocations	$300,000	$264,000		$329,000	$227,000	$1,120,000
5	Support work furnished:						
6	By Engineering and Production Control						
7	Budgeted engineering salaries	—	$ 36,000		$ 60,000	$ 24,000	$ 120,000
8	Percentage	—	30%		50%	20%	100%
9	By Materials Management						
10	Budgeted material-handling labor-hours	400	—		800	2,800	4,000
11	Percentage	10%	—		20%	70%	100%

Source: Datar/Rajan (2021)

A. Direct Allocation Method Illustrated



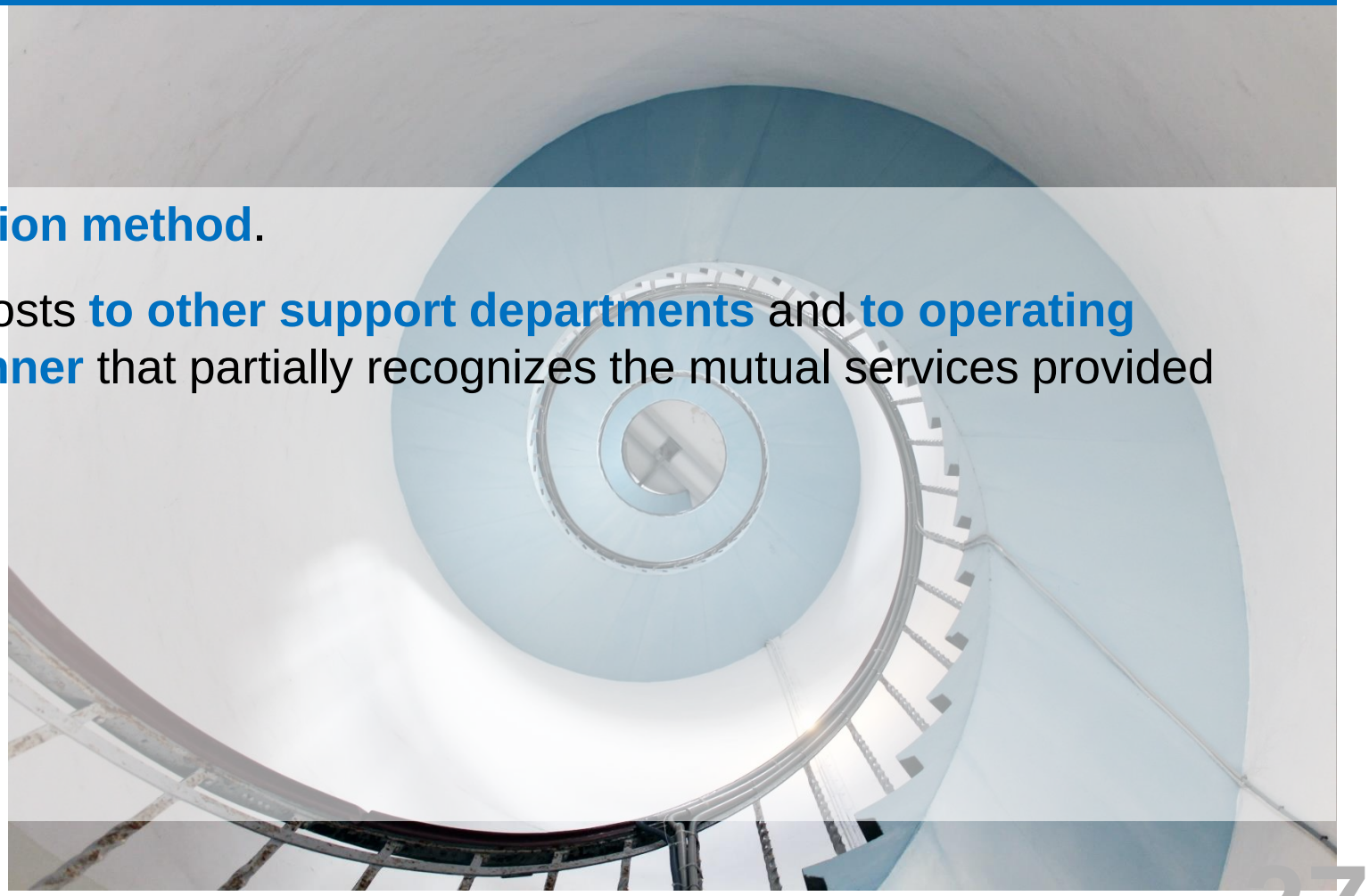
Source: Datar/Rajan (2021)

A. Direct Allocation Method Example

	A	B	C	D	E	F	G
1		SUPPORT DEPARTMENTS			OPERATING DEPARTMENTS		
2		Engineering and Production Control	Materials Management		Machining	Assembly	Total
3	Budgeted overhead costs						
4	before any interdepartment cost allocations	$300,000	$264,000		$329,000	$227,000	$1,120,000
5	Allocation of Engg. And Prod. Control (5/7, 2/7)[a]	(300,000)			214,286	85,714	
6	Allocation of Materials Management (2/9, 7/9)[b]		(264,000)		58,667	205,333	
7							
8	Total budgeted overhead of operating departments	$ 0	$ 0		$601,953	$518,047	$1,120,000
9							
10	[a] Base is ($60,000 + $24,000), or $84,000; $60,000 ÷ $84,000 = 5/7; $24,000 ÷ $84,000 = 2/7.						
11	[b] Base is (800 + 2,800), or 3,600 hours; 800 ÷ 3,600 = 2/9; 2,800 ÷ 3,600 = 7/9.						

Source: Datar/Rajan (2021)

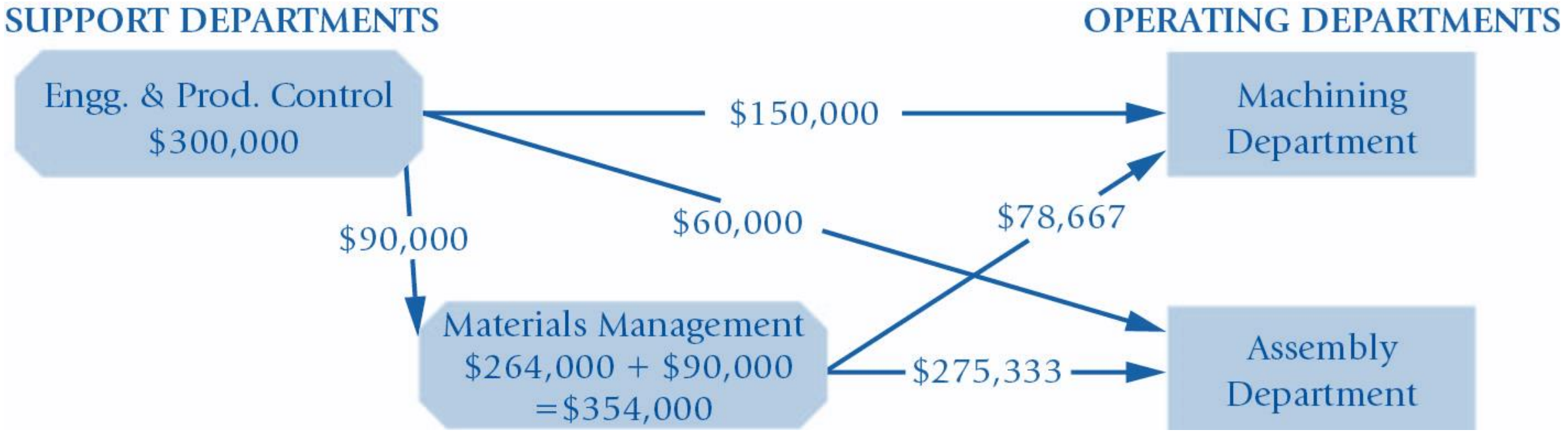
B. Step-Down Method



- Also called the **sequential allocation method**.
- **Allocates support-department** costs **to other support departments** and **to operating departments** in a **sequential manner** that partially recognizes the mutual services provided among all support departments.

Source: Datar/Rajan (2021)

B. Step-Down Allocation Method Illustrated



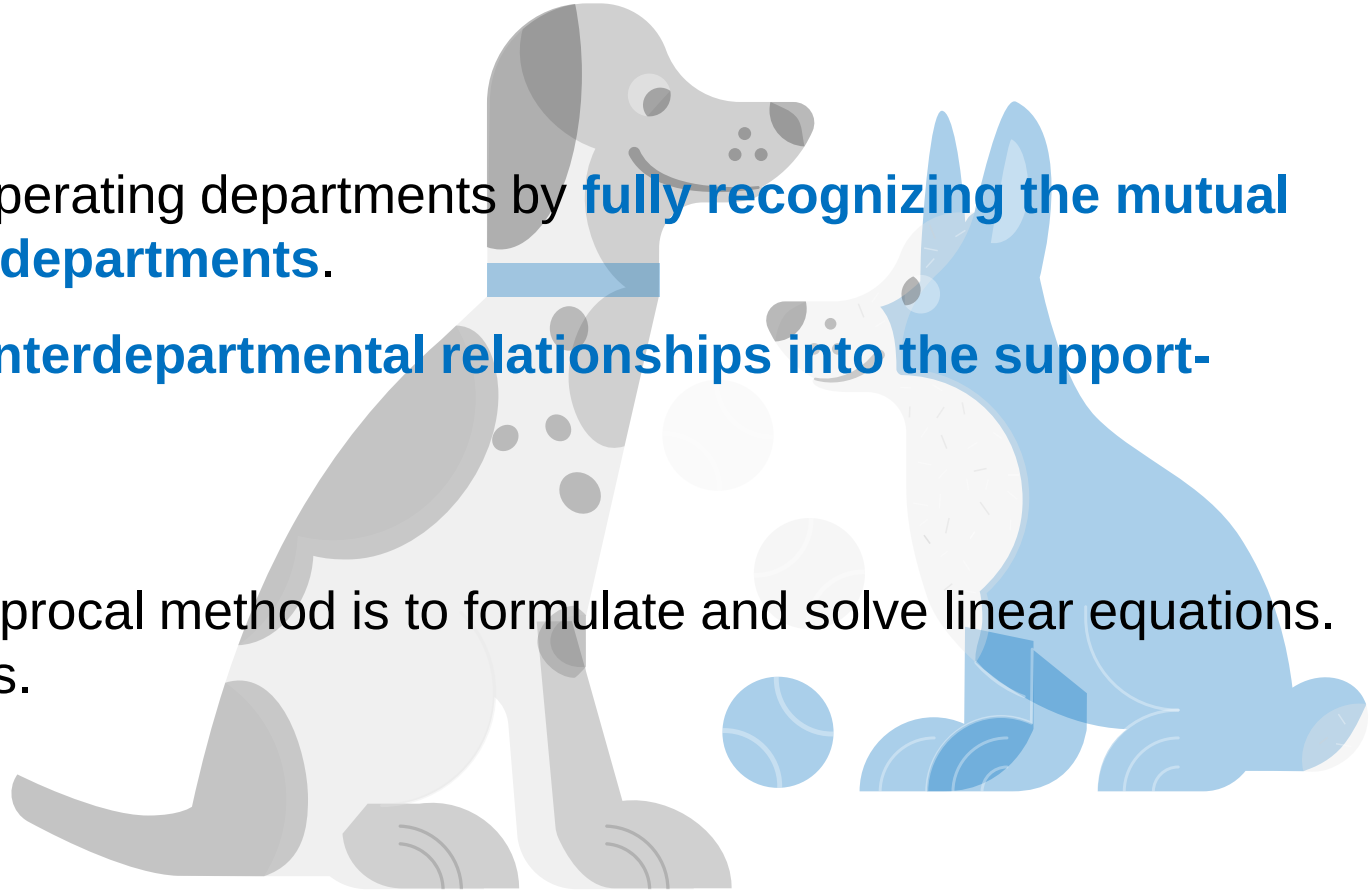
Source: Datar/Rajan (2021)

B. Step-Down Allocation Method Example

	A	B	C	D	E	F	G
1		SUPPORT DEPARTMENTS			OPERATING DEPARTMENTS		
2		Engineering and Production Control	Materials Management		Machining	Assembly	Total
3	Budgeted overhead costs before any						
4	interdepartment cost allocations	$300,000	$264,000		$329,000	$227,000	$1,120,000
5	Allocation of Engg. and Prod. Control (3/10, 5/10, 2/10) [a]	(300,000)	90,000		150,000	60,000	
6			354,000				
7	Allocation of Materials Management (2/9, 7/9) [b]		(354,000)		78,667	275,333	
8							
9	Total budgeted overhead of operating departments	$ 0	$ 0		$557,667	$562,333	$1,120,000
10							
11	[a] Base is ($36,000 + $60,000 + $24,000), or $120,000 ; $36,000 ÷ $120,000 = 3/10; $60,000 ÷ $120,000 = 5/10; $24,000 ÷ $120,000 = 2/10.						
12	[b] Base is (800 + 2,800), or 3,600 hours; 800 ÷ 3,600 = 2/9; 2,800 ÷ 3,600 = 7/9.						

Source: Datar/Rajan (2021)

C. Reciprocal Method



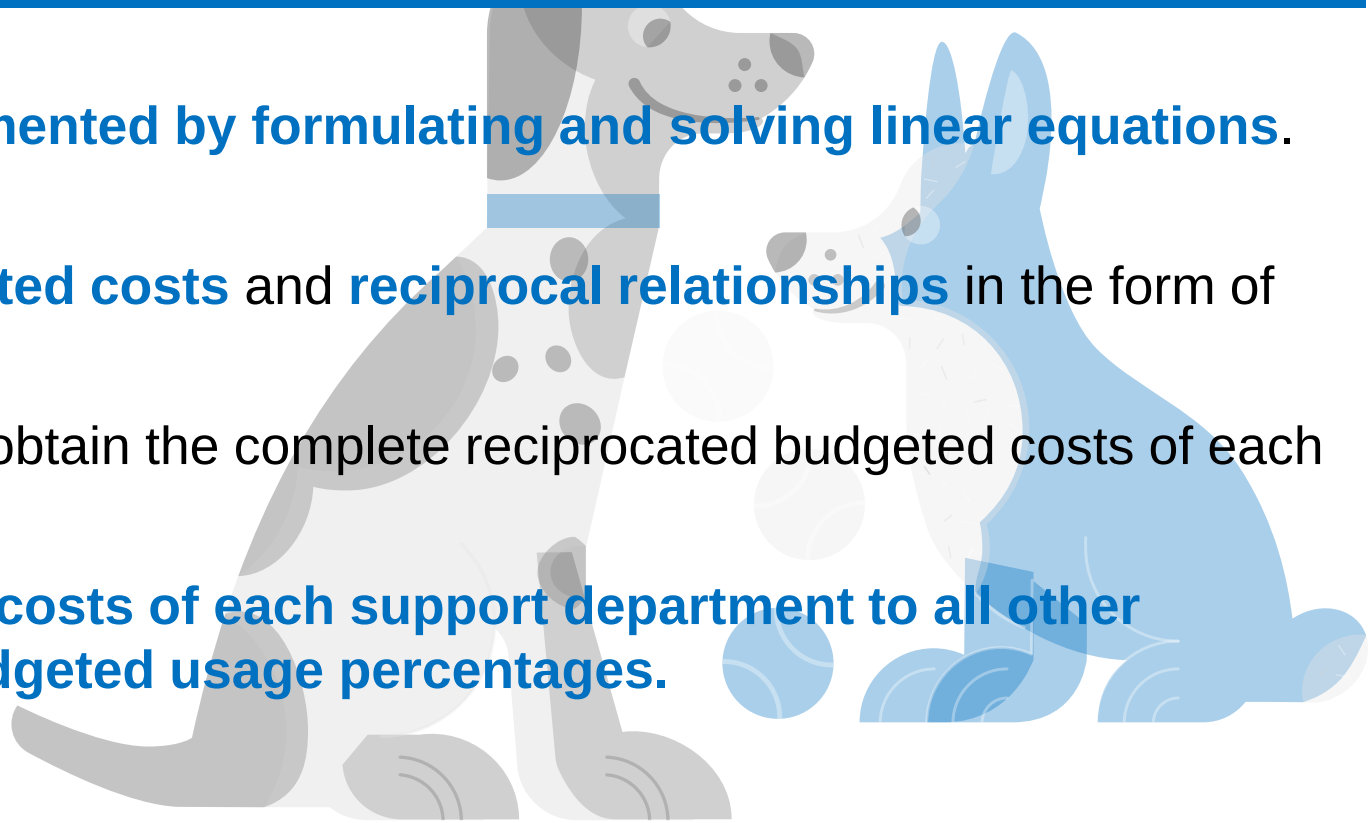
- Allocates support-department costs to operating departments by **fully recognizing the mutual services provided among all support departments**.
- Reciprocal method **fully incorporates interdepartmental relationships into the support-department cost allocation**.
- It is also known as **the matrix method**.
- An alternative way to implement the reciprocal method is to formulate and solve linear equations. This implementation requires three steps.

C. Reciprocal Allocation Method (Repeated Iterations) Example

	A	B	C	D	E	F	G
1		Engineering and Production Control	Materials Management		Machining Department	Assembly Department	Total
2							
3	Budgeted overhead costs before any						
4	interdepartment cost allocations	$300,000	$264,000		$329,000	$227,000	$1,120,000
5	1st Allocation of Engg. and Prod. Control (3/10,5/10,2/10)[a]	(300,000)	90,000		150,000	60,000	
6			354,000				
7	1st Allocation of Materials Management (1/10,2/10,7/10)[b]	35,400	(354,000)		70,800	247,800	
8	2nd Allocation of Engg. and Prod. Control (3/10,5/10,2/10)[a]	(35,400)	10,620		17,700	7,080	
9	2nd Allocation of Materials Management (1/10,2/10,7/10)[b]	1,062	(10,620)		2,124	7,434	
10	3rd Allocation of Engg. and Prod. Control (3/10,5/10,2/10)[a]	(1,062)	319		531	212	
11	3rd Allocation of Materials Management (1/10,2/10,7/10)[b]	32	(319)		63	224	
12	4th Allocation of Engg. and Prod. Control (3/10,5/10,2/10)[a]	(32)	10		16	6	
13	4th Allocation of Materials Management (1/10,2/10,7/10)[b]	1	(10)		2	7	
14	5th Allocation of Engg. and Prod. Control (3/10,5/10,2/10)[a]	(1)	0		1	0	
15							
16	Total budgeted overhead of operating departments	$ 0	$ 0		$570,237	$549,763	$1,120,000
17							
18	Total support department amounts allocated and reallocated (the numbers in parentheses in the first two columns):						
19	Engineering and Production Control: $300,000 + $35,400 + $1,062 + $32 + $1 = $336,495						
20	Materials Management: $354,000 + $10,620 + $319 + $10 = $364,949						
21							
22	[a]Base is $36,000 + $60,000 + $24,000 = $120,000; $36,000 ÷ $120,000 = 3/10; $60,000 ÷ $120,000 = 5/10; $24,000 ÷ $120,000 = 2/10						
23	[b]Base is 400 + 800 + 2,800 = 4,000 labor-hours; 400 ÷ 4,000 = 1/10; 800 ÷ 4,000 = 2/10; 2,800 ÷ 4,000 = 7/10						

Source: Datar/Rajan (2021)

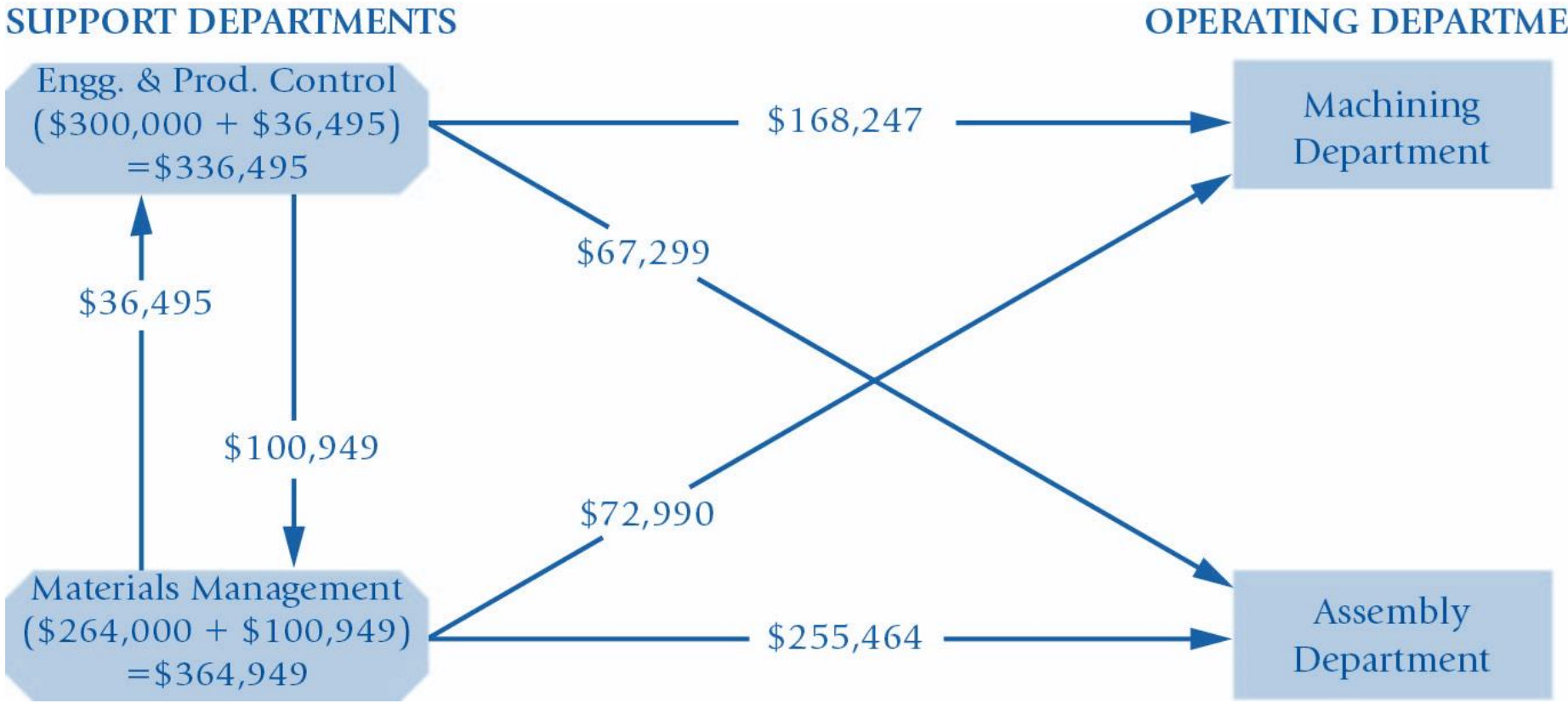
C. Reciprocal Allocation Method (Linear Equations)



The reciprocal method can also be **implemented by formulating and solving linear equations**. This process requires three steps:

1. **Express support department budgeted costs** and **reciprocal relationships** in the form of linear equations.
2. **Solve the set of linear equations** to obtain the complete reciprocated budgeted costs of each support department.
3. **Allocate the complete reciprocated costs of each support department to all other departments on the basis of the budgeted usage percentages.**

C. Reciprocal Allocation Method (Linear Equations) Illustrated



Source: Datar/Rajan (2021)

C. Reciprocal Allocation Method (Linear Equations) Example

	A	B	C	D	E	F	G
1		SUPPORT DEPARTMENTS			OPERATING DEPARTMENTS		
2		Engineering and Production Control	Materials Management		Machining	Assembly	Total
3	Budgeted overhead costs before any						
4	interdepartment cost allocations	$300,000	$264,000		$329,000	$227,000	$1,120,000
5	Allocation of Engg. & Prod. Control (3/10, 5/10, 2/10)[a]	(336,495)	100,949		168,247	67,299	
6	Allocation of Materials Management (1/10, 2/10, 7/10)[b]	36,495	(364,949)		72,990	255,464	
7							
8	Total budgeted overhead of operating departments	$ 0	$ 0		$570,237	$549,763	$1,120,000
9							
10	[a]Base is ($36,000 + $60,000 + $24,000), or $120,000 ; $36,000 ÷ $120,000 = 3/10; $60,000 ÷ $120,000 = 5/10; $24,000 ÷ $120,000 = 2/10.						
11	[b]Base is (400 + 800 + 2,800), or 4,000 hours; 400 ÷ 4,000 = 1/10; 800 ÷ 4,000 = 2/10; 2,800 ÷ 4,000 = 7/10.						

Source: Datar/Rajan (2021)

Overview of Methods

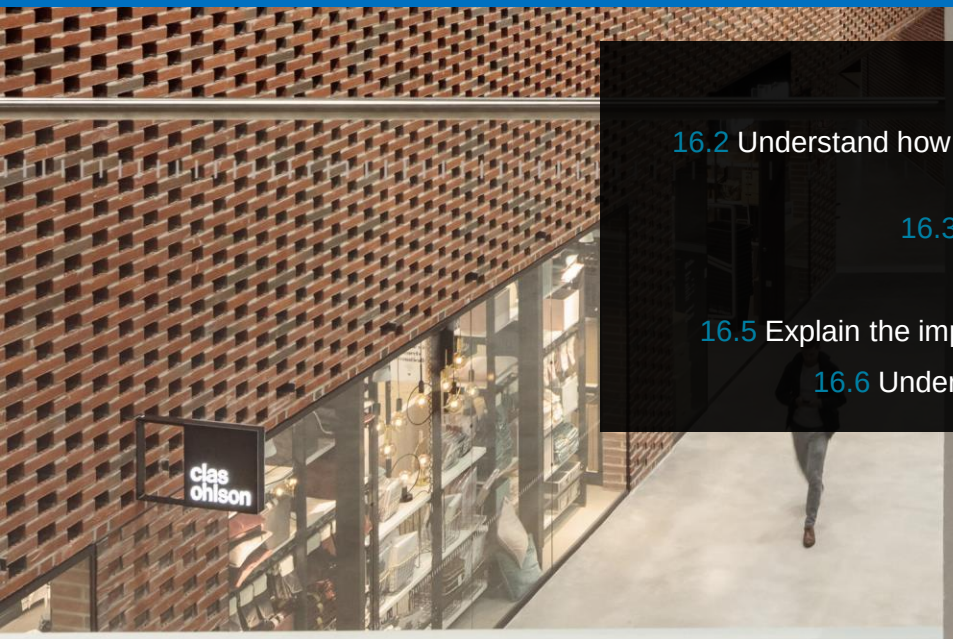
- **Differences** among the three methods' allocations **increase as the magnitude of the reciprocal allocations increases** and **as the differences across operating departments' usage of each support department's services increase**.
- **Reciprocal is conceptually the most precise** because it **considers the mutual services provided** among all support departments.
- **Direct and step-down** are **simple** to compute and understand.
- Direct method is widely used, but as computing power to perform repeated iterations increases, **more companies find the reciprocal method easier** to implement.

Source: Datar/Rajan (2021)

Mini Case – later!

Allocation of support department costs, common costs, and revenues

16.4 Allocate common costs using the stand-alone method and the incremental method



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Allocating Common Costs

- **Common cost**—the **cost of operating a facility, activity, or cost object when that facility, activity, or cost object is shared by two or more** users
- Common costs arise because **each user incurs a lower cost by sharing a facility or activity** than operating the facility or performing the activity independently.
- The cost accounting challenge is how to allocate common costs to each user in a reasonable way.
  - We use two different methods to allocate common costs:
    1. **Stand-Alone Method**
    2. **Incremental Method**

Source: Datar/Rajan (2021)

1. Methods of Allocating Common Costs: Stand-Alone Method

Stand-alone cost-allocation method determines the **weights for cost allocation by considering each user of the common cost facility or activity as a separate entity**.

Individual costs are added together, and **allocation percentages are calculated** from the whole and applied to the common cost.

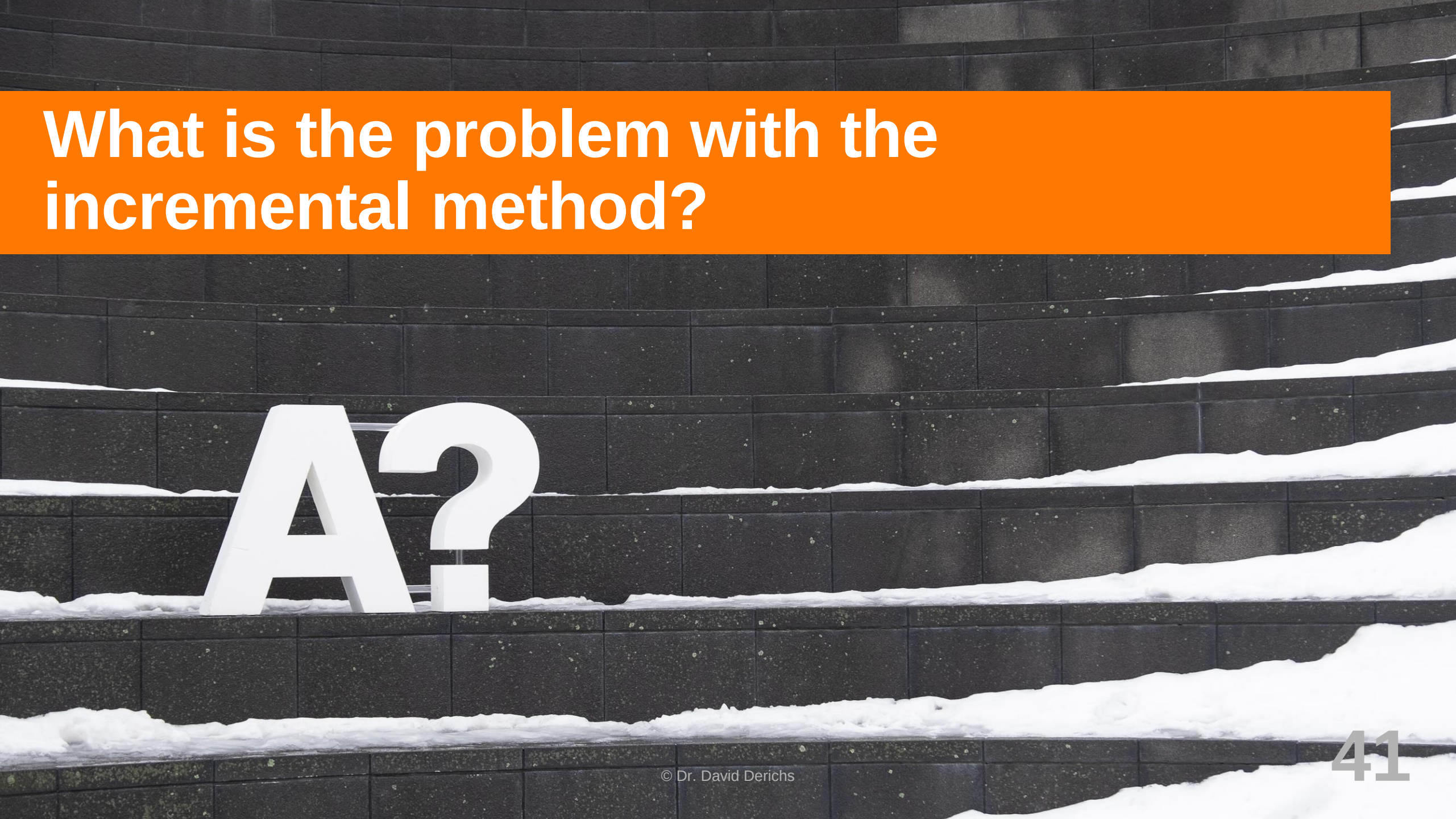
Source: Datar/Rajan (2021)

2. Methods of Allocating Common Costs: Incremental Cost-Allocation Method

- **Incremental cost-allocation** method **ranks the individual users of a cost object in the order of users most responsible for the common cost** and then uses this ranking to allocate the cost among the users.
  - The **first-ranked user is the primary user** and is **allocated costs up to the costs as a stand-alone user** (typically gets the highest allocation of the common costs).
  - The **second-ranked user** is the **first incremental user and is allocated the additional cost that arises from two users** rather than one.
  - **Subsequent users are handled in the same manner** as the second-ranked user.

Source: Datar/Rajan (2021)

What is the problem with the incremental method?



Solution to the problem is the Shapely Method

- We combine the results of the incremental method derived with different primary and secondary user

  (Primary amount department 1 + Secondary amount department 1) / 2

  (Primary amount department 2 + Secondary amount department 2) / 2

- Lets take an example!

Exercise Time – E2

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Allocation of support department costs, common costs, and revenues

16.5 Explain the importance of explicit agreement between contracting parties when the reimbursement amount is based on costs incurred

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16.2 Understand how the choice between allocation based on budgeted and actual rates and between budgeted and actual usage can affect the incentives of division managers

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16.4 Allocate common costs using the stand-alone method and the incremental method

16.5 Explain the importance of explicit agreement between contracting parties when the reimbursement amount is based on costs incurred

16.6 Understand how bundling of products causes revenue allocation issues and the methods managers use to allocate revenues

Cost Allocations and Contract Disputes

The U.S. government reimburses most contractors in one of two main ways:

1. The contractor is paid a set price without analysis of actual contract cost data.
2. The contractor is paid after an analysis of actual contract cost data. In some cases, the contract will state that the reimbursement amount is based on actual allowable costs plus a fixed fee (cost-plus contract).

The standards are designed to achieve ***uniformity*** and ***consistency*** in the measurement, assignment, and allocation of costs to government contracts within the United States.

The standards represent the complex interplay of political considerations and accounting principles. Terms such as ***fairness*** and ***equity***, as well as cause and effect and benefits received, are relevant to and a part of government contracts.

NOT EXAM RELEVANT

Source: Datar/Rajan (2021)

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Allocation of support department costs, common costs, and revenues

16.6 Understand how bundling of products causes revenue allocation issues and the methods managers use to allocate revenues

16.1 Distinguish the single-rate method from the dual-rate method

16.2 Understand how the choice between allocation based on budgeted and actual rates and between budgeted and actual usage can affect the incentives of division managers

16.3 Allocate multiple support-department costs using the direct method, the step-down method, and the reciprocal method

16.4 Allocate common costs using the stand-alone method and the incremental method

16.5 Explain the importance of explicit agreement between contracting parties when the reimbursement amount is based on costs incurred

16.6 Understand how bundling of products causes revenue allocation issues and the methods managers use to allocate revenues

Bundled Products and Revenue Allocation Methods

- **Revenue allocation** occurs when **revenues are related to a particular REVENUE OBJECT but cannot be traced to it in an economically feasible (cost-effective) way**.
  - **Revenue object**—anything for which a separate measurement of revenue is desired
- **Bundled product**—a package of two or more products or services that is **sold for a single price**, but whose individual components may be sold as separate items at their own "stand-alone" prices
- Allocation issues can arise when revenues from multiple products are bundled together and sold at a single price → Same methods as common cost allocations

Source: Datar/Rajan (2021)

Two Methods to Allocate Revenue to Bundled Products: Stand-Alone Method

Stand-alone (separate) revenue allocation method uses **product-specific information on the products in the bundle as weights for allocating the bundled revenues to the individual products**. Three types of weights may be used:

1. Selling prices
2. Unit costs
3. Physical units

Source: Datar/Rajan (2021)
Managerial Accounting II

Two Methods to Allocate Revenue to Bundled Products: Incremental Revenue-Allocation Method

Incremental revenue-allocation method ranks individual products in a bundle according to criteria determined by management and then uses this ranking to allocate bundled revenues to individual products (similar to the incremental cost-allocation method we discussed earlier).

- **The first-ranked product is the primary product.**
- **The second-ranked product is the first incremental product.**
- **The third-ranked product is the second incremental product, and so on.**

Source: Datar/Rajan (2021)

Terms to Learn

Allowable cost	Operating department
Artificial costs	Production department
Bundled product	Reciprocal method
Common cost	Revenue allocation
Complete reciprocated costs	Revenue object
Matrix method	Service department
Direct method	Single-rate method
Dual-rate method	Sequential allocation method
Incremental cost-allocation method	Stand-alone cost-allocation method
Incremental revenue-allocation method	Stand-alone revenue-allocation
	Step-down method
	Support department

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Supplementary materials

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