

Foundations of Accounting & Finance

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Lecture – 27

Allocation and Apportionment of Cost

Introduction

In the previous session, we discussed various cost components including prime cost, works cost, cost of production, cost of goods sold and cost of sales. We studied the constituents of both the cost of sale and production, as well as the elements leading to prime cost. Additionally, we explored topics such as direct materials and direct expenditures.

Now, let us consider an example. Suppose we focus on factory overhead. This encompasses expenses such as rent, salaries for factory supervisors, operating recreational facilities for employees, and providing healthcare services. Each of these costs must be absorbed by the final product.

In a scenario where a company produces a single product, all costs are allocated to that product, simplifying the calculation of its total cost. However, in the case of a company manufacturing three products—A, B, and C—cost allocation becomes more intricate.

Apportionment of overheads

The challenge lies in determining how to divide these costs among the three products—A, B, and C. This process is known as the allocation and apportionment of overheads and it poses a significant challenge.

The basis for dividing these costs must be carefully considered. Some suggest using the number of units produced as a basis, which is feasible. However, why not consider the value per unit or the overall value of each product? For instance, for rent, instead of simply considering the number of units, why not allocate it based on the space occupied by each product?

Similarly, for expenses such as recreational facilities or healthcare services, it becomes more complex. Allocating these costs based on the number of employees might be suitable for recreational facilities, but for healthcare services, a different metric would be required.

In essence, there needs to be a basis behind the apportionment of overheads, whether it is based on production units, value, space occupied, or other relevant factors. Each cost element requires careful consideration to ensure fair and accurate apportionment of cost.

Challenges in this system

Let us consider a specific example to help understand the allocation clear. For instance, let us examine the allocation of staff welfare costs pertaining to recreational facility. If we allocate these costs based on the space occupied by each product, a production manager might object. They could argue that although their product occupies significant space, it is highly automated, requiring minimal labour and therefore, minimal use of recreational facilities. In contrast, another product with more employees may heavily utilize these facilities.

Even if we refine the allocation based on the number of employees, challenges persist. For instance, a manager might argue that their younger workforce requires lesser healthcare or welfare compared to an older workforce in another product line.

Each production manager views their product as a profit centre and aims to minimize cost to maximize profits. If costs are allocated in a manner perceived as unfair, conflict can arise. This tension can escalate into a continuous tension on the shop floor.

Further, additional overhead costs such as transportation for employee pickups, security staff, administrative expenses, and marketing efforts present further challenges. Equal distribution may not accurately reflect the differing needs of each product line. Managers may argue against equal distribution, citing varying levels of effort required for managing different products.

For example, a manager of a product deemed as a necessity may question why administrative costs are divided equally when their product requires minimal marketing efforts compared to others. Similarly, if the sales promotion team incurs costs on a world tour, dividing these costs equally among products may be contested, especially if a product is performing well without the need for extensive promotion.

In summary, the apportionment of overhead costs are challenging. Each decision regarding cost allocation can have significant implications for product profitability and interdepartmental relations.

What is the solution?

The solution to the challenges posed by traditional methods of overhead allocation lies in adopting a more scientific approach known as activity-based costing (ABC). Unlike traditional methods, which often rely on arbitrary measures or simplistic allocations, ABC allocates overhead costs based on the specific activities that drive those costs.

In ABC, overhead costs are allocated to products or services based on the activities required to produce them. This method provides a more accurate reflection of how resources are actually consumed by different products or services. By identifying and analysing the various activities within an organization, ABC allows for a more precise allocation of costs, leading to better decision-making and cost management.

Let us revisit our traditional approach to overhead allocation first and then get into how ABC can provide a more refined and accurate method. We will explore numerical examples to illustrate the differences between traditional methods and ABC, demonstrating the benefits of adopting a more scientific approach to overhead allocation.

Conventional System - Calculating overhead rates

In the conventional system, allocating overheads typically involves three basic steps:

1. **Assignment to Production and Service Centres:** Initially, all overhead costs are assigned to either production centres or service centres. Production centres are where actual goods or services are produced, while service centres provide support functions.
2. **Reassignment from Service Centres to Production Centres:** The costs incurred by service centres are then reassigned to the production centres that utilize their services. This ensures that the costs of support functions are allocated to the appropriate areas of production.
3. **Calculation of Final Production Centre Costs:** Finally, the total costs for each production centre are calculated, incorporating both direct production costs and allocated overhead costs.

This process involves both primary distributions, where costs are initially allocated between production and service departments, and secondary distribution, where service centre costs are further allocated within the production department.

Let us explore an example to illustrate these steps and clarify the concept further. We will walk through the process of assigning and reallocating overhead costs to demonstrate how this conventional system operates in practice.

Example

Let us illustrate this process with an example from a production-intensive company.

In this company, we have a timekeeping office on the shop floor. This office tracks when employees enter and leave the premises by punching their cards. It is important to note that this office serves not only production employees but also those in administrative roles and other service departments, such as sourcing and canteen staff.

To allocate the total cost of the timekeeping office, we will first distribute it based on the number of employees in each department. For example, if production department A has 10 employees, production department B has 20 employees, and administrative department C has some employees, we will allocate the cost based on number of employees in each department. However, it is essential to recognize that departments such as canteen and administration are not profit centres—they do not generate revenue.

Next, we will reallocate the total costs of the administrative department and the canteen to the production departments. This ensures that the costs are appropriately assigned based on usage. For instance, since the canteen is used by staff from various departments, including production and administration, we will allocate its costs accordingly.

Once we have completed this second-level allocation, we will then allocate the total administrative costs to production departments A and B. This process of successive allocations ensures that overhead costs are distributed accurately based on the services utilized by each department.

When conducting these allocations, we typically start with the service centre that provides the most services. In this case, we might begin with the canteen, followed by administration and then the timekeeping office. However, the order of allocation can vary depending on the organization's specific circumstances.

By following this methodical approach to overhead allocation, we can ensure that costs are distributed fairly and accurately, reflecting the services utilized by each department within the company. Now, let's work through an example to understand this in detail:

Illustration-1 of conventional system

ABC Ltd has three production departments and four service departments. Per Primary distribution the expenses were:

Production Dept	Rs.	Rs.
A	15000	
B	13000	
C	12000	
		40000
Service departments		
Stores	2000	
Time keeping & accounts	1500	
Power	800	
canteen	500	
		4800
Total		44800

The following information is also available:

	Dept A	B	C
HP of machines	300	300	200
No of workers	20	15	15
Value of stores requisitioned	2500	1500	1000

Apportion the costs of the service departments to the production departments

In the conventional system, overhead costs are historically allocated based on various factors such as the horsepower (HP) of machines, the number of workers, and the value of stores requisitioned. While this method has been widely accepted, it is not without any limitations.

For instance, let us consider the allocation of costs for the stores department. Suppose the total cost of operating the stores department is \$2000. The value of stores requisitioned by each department is as follows: \$2500 for department A, \$1500 for department B, and \$1000 for department C. Based on these values one might allocate costs proportionally: \$1250 to department A, \$750 to department B, and \$500 to department C. This seems fair based on the value of goods requested.

However, one could argue that the cost incurred by the stores department should not be solely based on the value of goods requisitioned. Instead, it could be based on the number of requests made to the stores. For example, Department A may make only one request for \$2500 worth of goods, resulting in minimal paperwork. In contrast, Department C may make ten requests for \$100 worth of goods each, leading to more paperwork and administrative costs.

This example highlights the inherent complexities and potential disparities in the conventional allocation system. While these allocation methods are not arbitrary and are based on some basic logic, they may not always accurately reflect the true usage of resources by different departments.

As we delve further into understanding the conventional system, we will recognize its typical problems and limitations. However, it is essential to grasp how this system works before exploring the more refined activity-based costing system, which addresses many of these challenges.

Solution to the illustration

To solve the problem of apportioning the costs of the service departments to the production departments, we can use a typical secondary distribution method. Let's break down the process step by step using an Excel sheet.

1. Identify the service departments: In this case, we have four service departments—Stores, Timekeeping and Accounts, Power, and Canteen.
2. Allocate costs to production departments: We will allocate the costs of the service departments to the three production departments—A, B, and C.

To start, let's focus on the service departments. We will list each service department along with its associated costs and determine the basis for allocation. Then, we will calculate the total costs for each production department.

Let us proceed with the calculation:

1) Stores departments

For the stores department, we will directly perform the secondary distribution, skipping the primary distribution step. We will allocate the total cost of stores requisitioned among the three production departments—A, B, and C—based on the specified ratio of 5:3:2.

Given that the total value of stores requisitioned is \$2000, we will allocate this amount among the production departments using the ratio:

- Production Department A: $(5/10) * \$2000 = \1000
- Production Department B: $(3/10) * \$2000 = \600
- Production Department C: $(2/10) * \$2000 = \400

This straightforward allocation ensures that each production department receives a fair share of the stores department costs based on the specified ratio. Now, let us proceed with similar allocations for the other service departments.

2) Time keeping and accounts department

For the timekeeping and accounts department, we will similarly perform the secondary distribution based on the number of employees in each production department. Given that the total cost for timekeeping and accounts is \$1500, we will allocate this amount among the three production departments using the ratio of 4:3:3, which corresponds to the number of workers in each department.

- Production Department A: $(4/10) * \$1500 = \600
- Production Department B: $(3/10) * \$1500 = \450
- Production Department C: $(3/10) * \$1500 = \450

This allocation ensures that the costs of the timekeeping and accounts department are distributed among the production departments in proportion to their respective numbers of workers.

3) Power department

For the power department, the cost of power is \$800, and we will allocate this cost based on the horsepower (HP) of the machines in each production department. The ratio of HP of machines is 3:3:2 for departments A, B, and C, respectively.

- Production Department A: $(3/8) * \$800 = \300
- Production Department B: $(3/8) * \$800 = \300
- Production Department C: $(2/8) * \$800 = \200

This straightforward allocation ensures that the cost of power is distributed among the production departments based on the horsepower of their machines.

4) Canteen department

For the canteen department, the cost is \$500, and we will allocate this cost based solely on the number of workers in each production department. Using the same logic as before, we will distribute the canteen costs among the production departments.

- Production Department A: $(4/10) * \$500 = \200
- Production Department B: $(3/10) * \$500 = \150
- Production Department C: $(3/10) * \$500 = \150

This allocation ensures that the cost of the canteen department is distributed among the production departments based on the number of workers in each department.

Total cost

Now, combining all the allocated costs for the service departments with the respective production department costs (See Figure 1):

- Production Department A: \$2,100 (allocated service department costs) + \$15,000 (original production department cost) = \$17,100
- Production Department B: \$1,500 (allocated service department costs) + \$13,000 (original production department cost) = \$14,500
- Production Department C: \$1,200 (allocated service department costs) + \$12,000 (original production department cost) = \$13,200

This approach demonstrates a straightforward secondary allocation method based on predetermined criteria, effectively distributing costs among production departments. We have solely focused on secondary distribution in this example, leaving primary distribution for upcoming illustrations.

Figure 1: Secondary departmental distribution summary

Secondary Distribution					
Costs	Basis	Total	Production Departments		
<i>Produciton dept</i>			A	B	C
as per summary		40000	15000	13000	12000
Service dept					
Stores	value of stores requisitioned (5:3:2)	2000	1000	600	400
Time keeping & ac	No. of workers (4:3:3)	1500	600	450	450
Power	HP of machines (3:3:2)	800	300	300	200
Canteen	No. of workers (4:3:3)	500	200	150	150
		44800	17100	14500	13200