CAREC
Central Asia Regional Economic Cooperation Program

8th Railway Working Group Meeting

22–24 May 2024 • Baku, Azerbaijan

8-е заседание Рабочей группы по железнодорожному транспорту

22–24 мая 2024 года • Баку, Азербайджан

Modern accounting standards in railway organizations

Udo Sauerbrey
Railistics GmbH

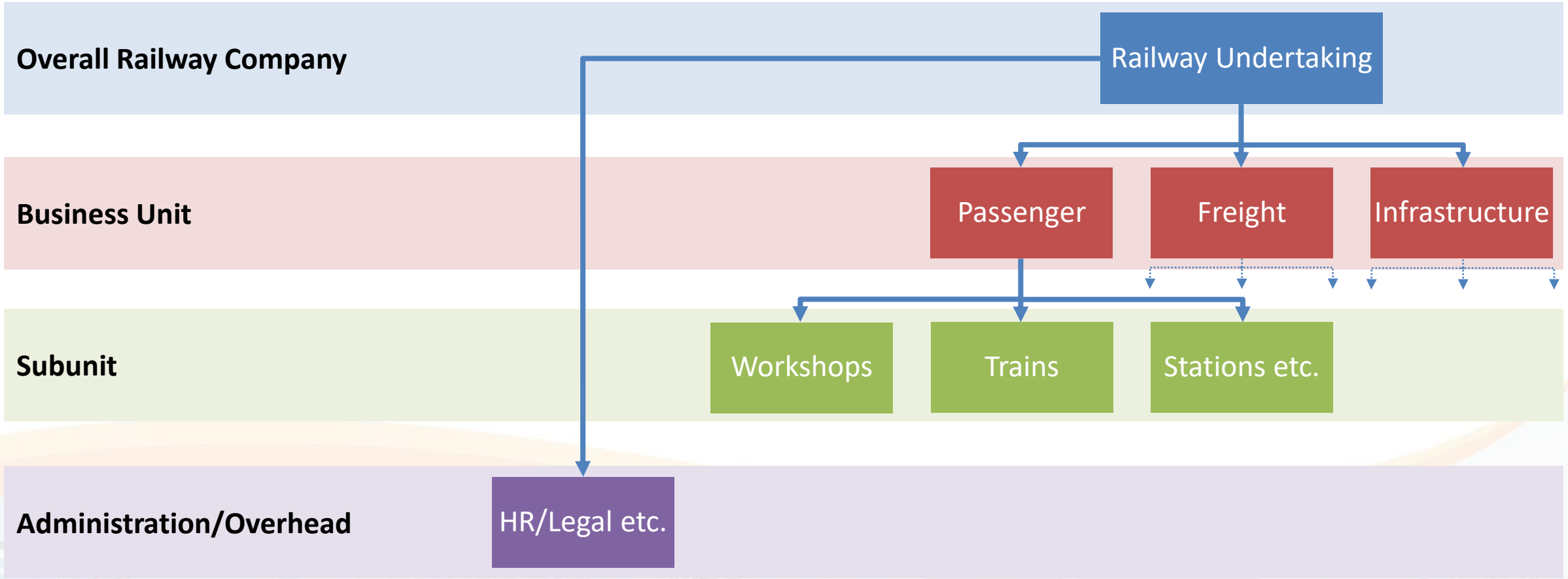
Introduction

- **Objective:** Explore how modern accounting can transform financial and operational strategies within railways.

- **Context:** Brief overview of traditional vs. modern accounting practices in the railway industry.

The Goal of Modern Accounting

Knowing about the financial situation (Costs and Revenues) of:



The Goal of Modern Accounting

Knowing about the financial situation (Costs and Revenues) of:

Overall Railway Company

Business Unit

Subunit

Administration/Overhead

→ Reporting mostly defined by national tax and accounting rules

- Annual Report
- Financial statement
- Balance Sheet
- Profit and Loss statement

The Goal of Modern Accounting

Knowing about the financial situation (Costs and Revenues) of:

Overall Railway Company

Business Unit

Subunit

Administration/Overhead

→ Allocating costs and revenues on second level

- Freight, passenger and infrastructure
- Definition of assets and staff
- Revenues
- Allocation of overhead and services

The Goal of Modern Accounting

Knowing about the financial situation (Costs and Revenues) of:

Overall Railway Company

Business Unit

Subunit

Administration/Overhead

→ Allocating costs and revenues on lower level

- Locomotive department
- Wagon department
- Maintenance workshops
- Infrastructure regions (track, electrification, signalling etc.)
- Mechanized maintenance machines
- Other services such as terminals, yards, port railways

The Goal of Modern Accounting

Knowing about the financial situation (Costs and Revenues) of:

Overall Railway Company

Business Unit

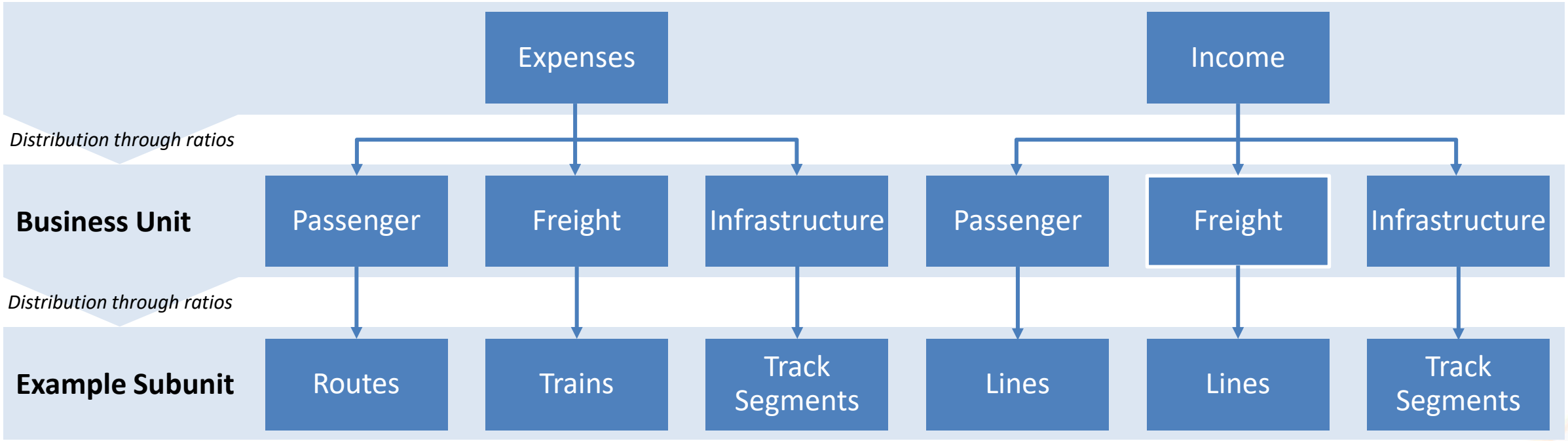
Subunit

Administration/Overhead

→ Allocating costs and revenues

- Management
- HR, legal department, other headquarter functions
- Security
- Health, sports, social functions etc.

Status Quo (Example)

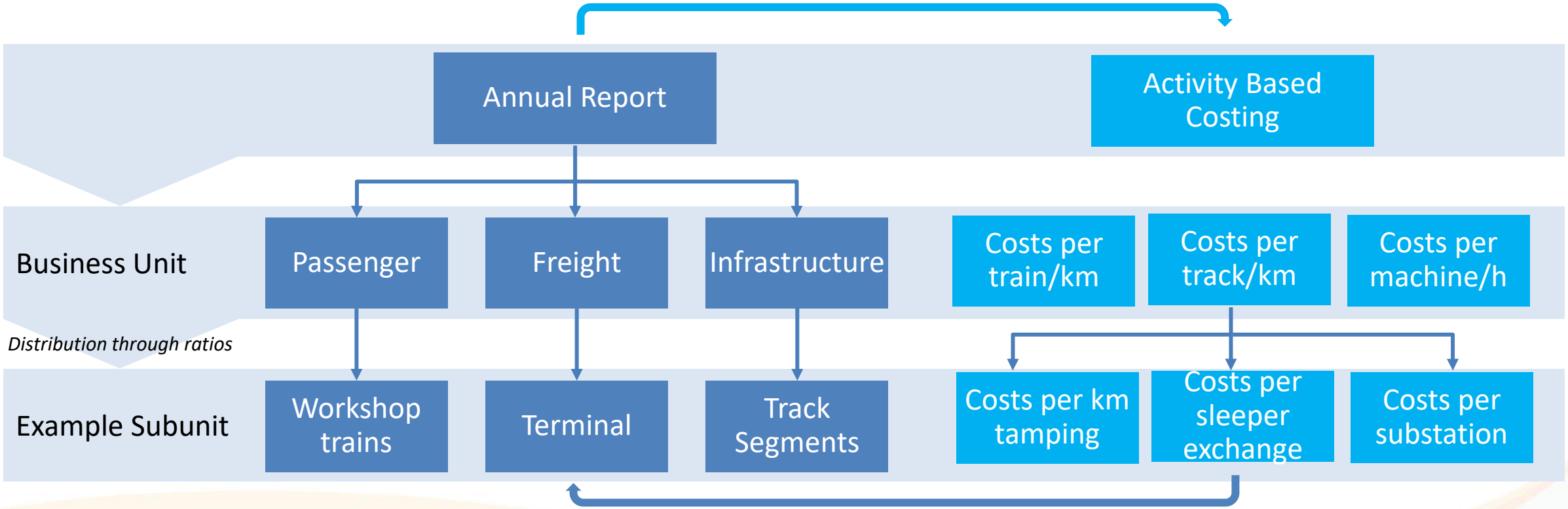


→ **Costs are distributed to subgroups only through ratios, lacking precision in allocation.**

The Goal of Modern Accounting

- Accounting should provide information to cover the **financial situation** of all above mentioned structures.
- Accounting needs to provide cost information based on **recordings** rather than allocation
- "**Activity Based Costing**" should show costs for specific services to allow price calculation

The Goal of Modern Accounting



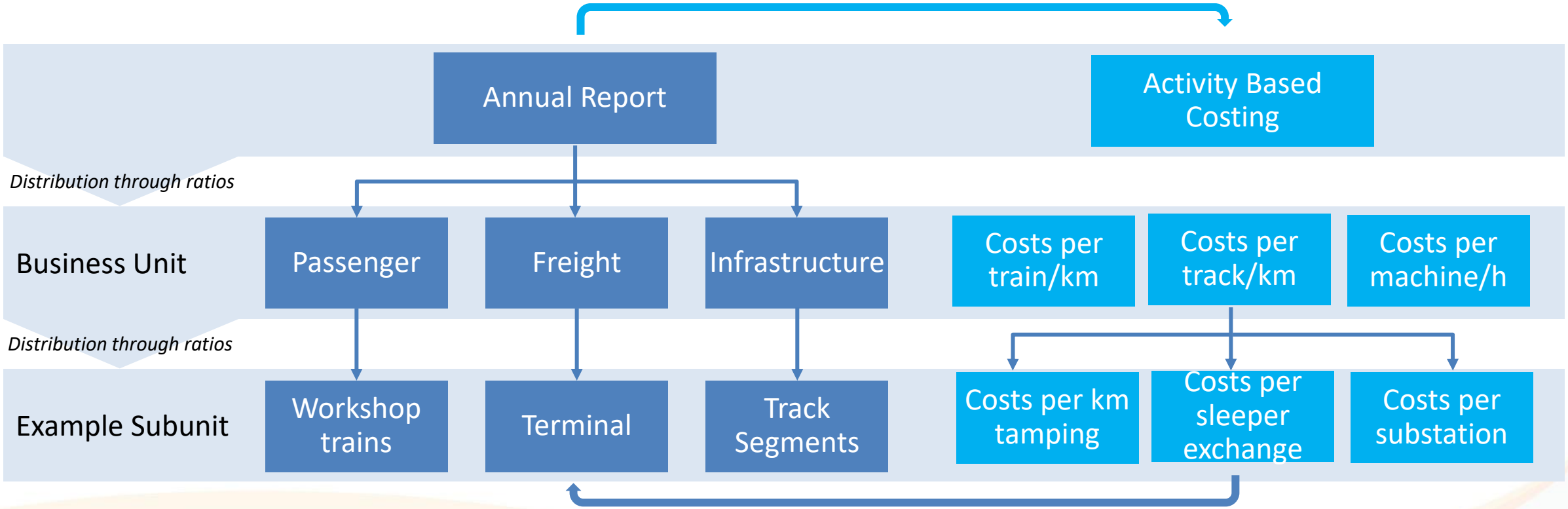
→ **Basic cost monitoring and recording leads to:**

→ **Company and internal Reporting**

→ **Activity Based Costing and KPI**

→ **Costs and Price Calculation of services**

The Goal of Modern Accounting



→ **Target is to understand Financials Top Down and Bottom Up:**

- → **Overall result and viability**
- → **Costs of Activities**
- → **Costs of assets, and sub-units**

The Goal of Modern Accounting

Example: How to calculate costs of a train run

→ Key factor: Costs of the assets (per day or per trip or per km)

Workshop costs
- Staff costs
- Material/parts
- Building/machines

Maintenance of loco
- Regular maintenance
- Overhaul
- Repair

Procurement of loco
- Depreciation
- Financing costs

Operations costs
- Driver
- Energy costs (Diesel/Electricity)
- Running maintenance

Administrative costs
- Dispatching of locos & staff
- Headquarter costs

The Goal of Modern Accounting

Target: How to calculate costs of a train run

Knowing the full asset cost is the key!

Example: Locomotive

Purchase price: 5.000.000 $

Costs p.a.:	
Depreciation (25 y):	200.000 $
Financing (5%):	250.000 $
Overhaul (700k after 10 y):	70.000 $
	520.000 $
Maintenance (4%):	200.000 $
Annual costs:	720.000 $
Per month:	60.000 $
Per day:	**2.000 $**

For assets **TIME** is the deciding factor!

Costs per km:

250 km per day:	8 $ / km
500 km per day:	4 $ / km
1000 km per day:	2 $ / km

Performance depends on:

- Slot quality / avg. speed (Infrastructure)
- Maintenance time / availability of locomotive (Workshops)
- Loading / unloading facilities (turnaround-time) (Terminals)

The Goal of Modern Accounting

Target: How to calculate costs of a train run

Knowing the full asset cost is the key!

Example: Wagon

Purchase price: 70.000 $

Costs p.a.:	
Depreciation (25 y):	2.800 $
Financing (5%):	3.500 $
Overhaul (7k after 10 y):	700 $
	7.000 $
Maintenance (1%):	700 $
Annual costs:	7.700 $
Per month:	640 $
Per day:	**21 $**

For assets **TIME** is the deciding factor!

Costs per wagon/km:

250 km per day:	8 ct / km
500 km per day:	4 ct / km
1000 km per day:	2 ct / km

Costs per train/km:
25 wagons per train:

250 km per day:	2 $/ km
500 km per day:	1 $ / km
1000 km per day:	0,5 $/ km

Performance depends on:

- Slot quality / avg. speed (Infrastructure)
- Maintenance time / availability of wagon (Workshops)
- Loading / unloading facilities (turnaround-time) (Terminals)

The Goal of Modern Accounting

Target: How to calculate costs of a train run

Driver costs

Salary / active hours driving / train speed (Quality of staff planning)

Energy costs

Type of locomotive / train + driver quality factor (Quality of driver training)

Rolling Stock Maintenance costs

Spare parts, Material + Availability factor (Number of days in workshop)

The Goal of Modern Accounting

Target: How to calculate costs of a train run

Locomotive costs	Wagon costs	Driver costs	Energy costs
Costs of locomotive per km	**Costs of wagons per km**	**Costs of driver per km**	**Costs of energy per km**:
250 km per day: 8 $/km 500 km per day: 4 $/km 1000 km per day: 2 $/km	250 km per day: 2 $/km 500 km per day: 1 $/km 1000 km per day: 0,5 $/km	Avg. per km: 3 $/km	Diesel per km: 3 $/km Electric per km: 1 $/km

Total costs

MAX: 16 $
MIN: 6,5 $

→ Based on those figures, sales and marketing can calculate costs plus margin = price

→ Differentiated by train type, commodity etc. this provides enough information

→ For passenger trains, the PSO negotiation can be based on the same parameters

The Goal of Modern Accounting

Target: How to calculate costs of a train run

- Costs are calculated very differently per subject (time, km, consumption)
- Costs need to be adjusted according to the specific conditions
- The more precise the accounting can provide the basic parameters, the better the costs can be calculated and predicted

- Accounting starts with “Counting” and Recording such as:
  - Fillings of a Diesel locomotive
  - Cleaning activities in trains and stations
  - Maintenance of wagons and coaches
  - … and many hundreds of elements more

The Goal of Modern Accounting

ABC is considered the most beneficial result of accounting for railways

- An Italian Research Paper identified 52 Activities that can be calculated in railways
- These are for example:
  - ticket sales,
  - track inspection,
  - railway operations,
  - supervision of rolling stock,
  - timetable management,
  - cleaning activities,
  - mechanical maintenance,
  - warehouse management,
  - grass cutting,
  - infrastructure inspection ….

(1) checking lines and infrastructure, which consists of periodically checking the condition of the railway network (tracks, points, lighting systems, line areas, stations, etc.);
(2) propping up the tracks, which consists of making the tracks level using special machinery;
(3) removing and cutting grass, which consists of removing the grass at the sides of the tracks using suitable machinery;
(4) supervision of the railway;
(5) checking work done by external suppliers, which consists of checking and inspecting work carried out by external suppliers on the railway network;
(6) clearing snow and ice, which consists of removing snow and ice from the tracks and stations;
(7) cleaning buildings;
(8) [illegible] material;
(9) [illegible]
(10) managing coach service maintenance personnel;
(11) maintenance and checking of the railway infrastructures;
(12) [illegible] environmental protection;
(13) building maintenance;
(14) planning [illegible]
(15) [illegible]
(16) special project management;
(17) railway electrical maintenance;
(18) railway mechanical maintenance;
(19) railway carriage maintenance;
(20) carpentry;
(21) cleaning trains and stations;
(22) railway warehouse management;
(23) maintenance of electric signal systems (ESSs), such as level crossings and tunnel telephones;
(24) ACS safety systems maintenance;
(25) maintenance of overhead cables;
(26) electrical maintenance of coach service;
(27) mechanical maintenance of coach service;
(28) carriage maintenance of coach service;
(29) cleaning of coaches and depot;
(30) tyre maintenance;
(31) management of coach service warehouse;
(32) minor maintenance;
(33) railway operations, which consists of managing shifts of staff that travel, assigning rolling stock to the journeys, defining the composition of the trains, and applying railway regulations;
(34) ticket sales;
(35) railway traffic support;
(36) opening/closing level crossings;
(37) goods transport management;
(38) [illegible]
(39) [illegible]
(40) coach service operations;
(41) [illegible]
(42) inspecting rail and coach staff;
(43) supervision of rail and coach services;
(44) sales of rental services;
(45) administrative management of rental services;
(46) management of rental shifts;
(47) driving rented coaches;
(48) co-ordinating operations on the railway network;
(49) co-ordinating circulation and traffic;
(50) driving service vehicles;
(51) transferring maintenance material; and
(52) testing rolling stock.

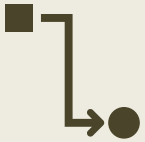
→All activities need specific insight into the basic cost elements and their characteristics

The Goal of Modern Accounting

Beside ABC the provision of KPI is one crucial goal for accounting

Supporting decision making based on the projected financial implication

Cost Benefit Analysis



Impact of investments

Forecast of operations costs

Monitoring cost development

The Goal of Modern Accounting

Cost Benefit Analysis based on well-structured financial information

Example: Rehabilitation of a single line

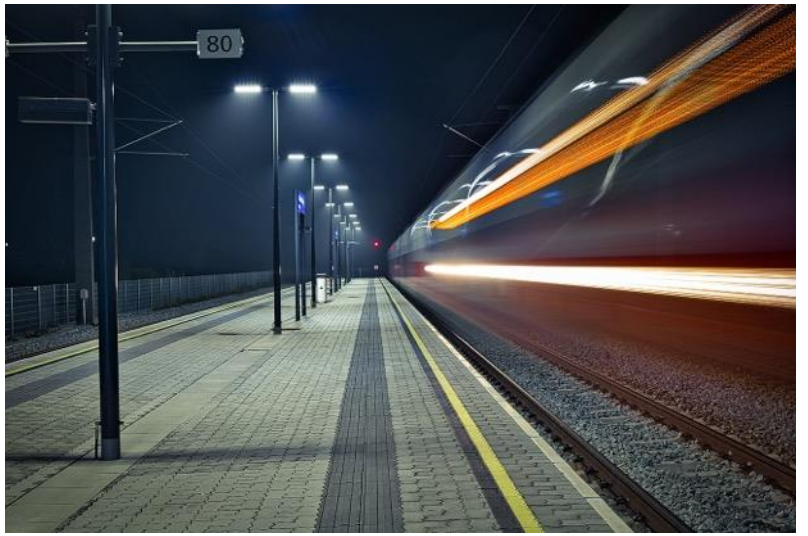
1. Defining revenues and costs from operating this line
2. Calculating construction costs for different types of construction (line closure time)
3. Comparing the difference in construction costs with operating profits
4. Decision about type of constructions

The Goal of Modern Accounting

Forecast of operations costs

Example: Calculation of Public Service Obligations

1. Calculating fix costs for trains for different scenarios
2. Calculating operations costs for different scenarios
3. Differentiating cost calculations according to asset utilization
4. Calculating revenues for scenarios
5. Offering scenarios to government including calculated losses



The Goal of Modern Accounting

Impact of investments

Example: Upgrade of mainline for higher maximum speed

1. Define target transit times for services (competition with bus, car, airplane)
2. Simulate train services with higher speed on the network and differences with today speed
3. Identify reasons for low speed and measures to increase speed (new signals, alignment, track quality etc.)
4. Calculate costs for measures
5. Model expected revenues and opex for fast trains
6. Compare investment with expected profit

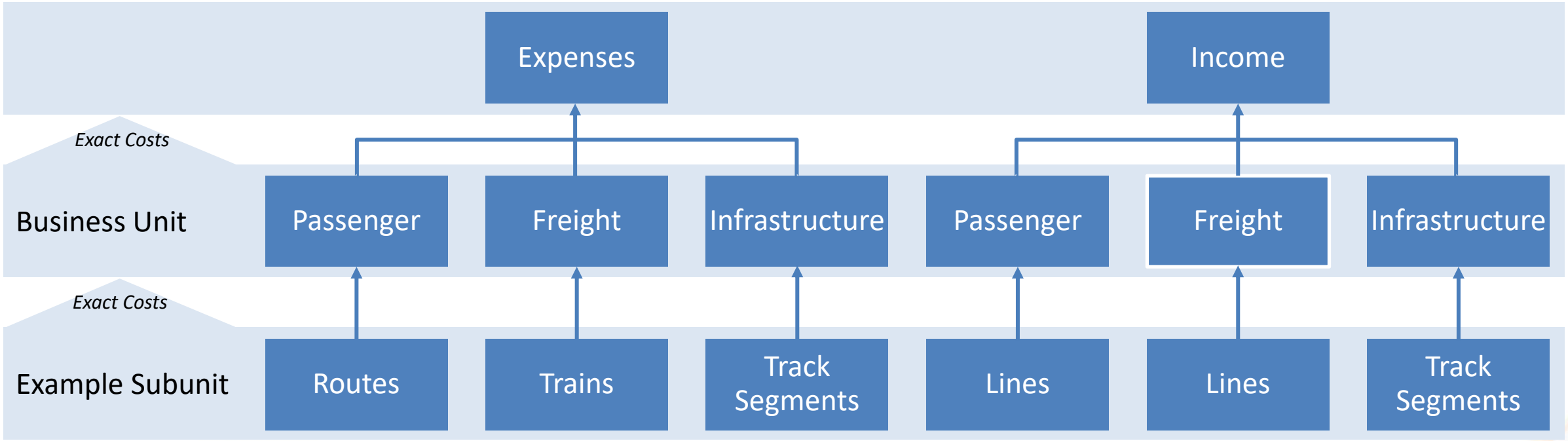
The Goal of Modern Accounting

Monitoring of cost development

Example: Cost for line maintenance

1. Calculate today expenditures for line maintenance (material, machine opex, staff costs, administration)
2. Calculate activities for line maintenance (inspection, tamping, rail surface treatment, regulating, ballast cleaning, sleeper exchange, joints etc.)
3. Keeping track for such elements over time
4. Give feedback to department about development to improve cost situation

The Goal of Modern Accounting



→ All costs and revenues are precisely assigned to assets. While a fully comprehensive view is challenging, large improvements are achievable.

The Purpose of Modern Accounting

External Reporting	Internal Reporting
• Compliance with regulations • Financial disclosures • Stakeholder communication • Revenue and expense reporting • Asset and liability management	• Department-specific metrics • Cost tracking • Budget control • Performance analysis • Process optimization

Benefits of Modern Accounting

Enhanced financial clarity	Operational efficiency	Strategic decision support	Regulatory compliance

operational KPI

For example:

- Cost of 1 km of track
- Cost of operating an intermodal train
- Cost of a seat per journey
- Cost of transporting a container

Implementation

Challenges

- Resource allocation
- Technological upgrade needs
- Training and adaptation
- Integration with existing systems

Solutions

- Implementation in phases
- Invest in software (such as ERP)
- Targeted training programs

Precise financial tracking

Q&A