



# Telecommunications Cost Concepts & Cost Accounting

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# Introduction

- Cost should be standard for judging reasonable levels of prices for regulated markets (oligopolies and monopolies)
- Minimum prices should be one that allows operators to cover their costs and make a reasonable profit
- Maximum prices for basic services should be based also on cost, for socio-economic reasons
- It is often argued that costs are the best base for interconnection charges





# Cost concepts are often used in reform of network industries:

- Account separation to determine the costs of providing each service (does the service recover its costs or loses money?)
- Cross-subsidisation: selling one service below cost and making up the loss from another one (predatory pricing)
- Rate rebalancing: Bringing prices for different telecommunications services in line with costs of providing these services:
  - Unbalanced prices are not sustainable in competitive environment
  - Inefficient as they encourage uneconomic entry by high-cost operators
  - Lower-than-cost prices discourage economic entry, even by low cost operators
- Lock-in of customers:
  - Use of agreements to 'lock in' subscribers to long term service contracts (24 months)
  - Anti competitive when done by a dominant operator prior to the introduction of competition





# Economic Perspective

- ■ Stimulate network investments
- ■ Stimulate service expansion
- ■ Lowest prices at given service quality
- ■ Potential Trade-Off:
  - ■ Low prices might mean low revenues and little incentive to expand network
  - ■ High prices might mean higher revenues or just inefficient operation
  - ■ Hence the need to understand Telco operations better in particular their cost structures

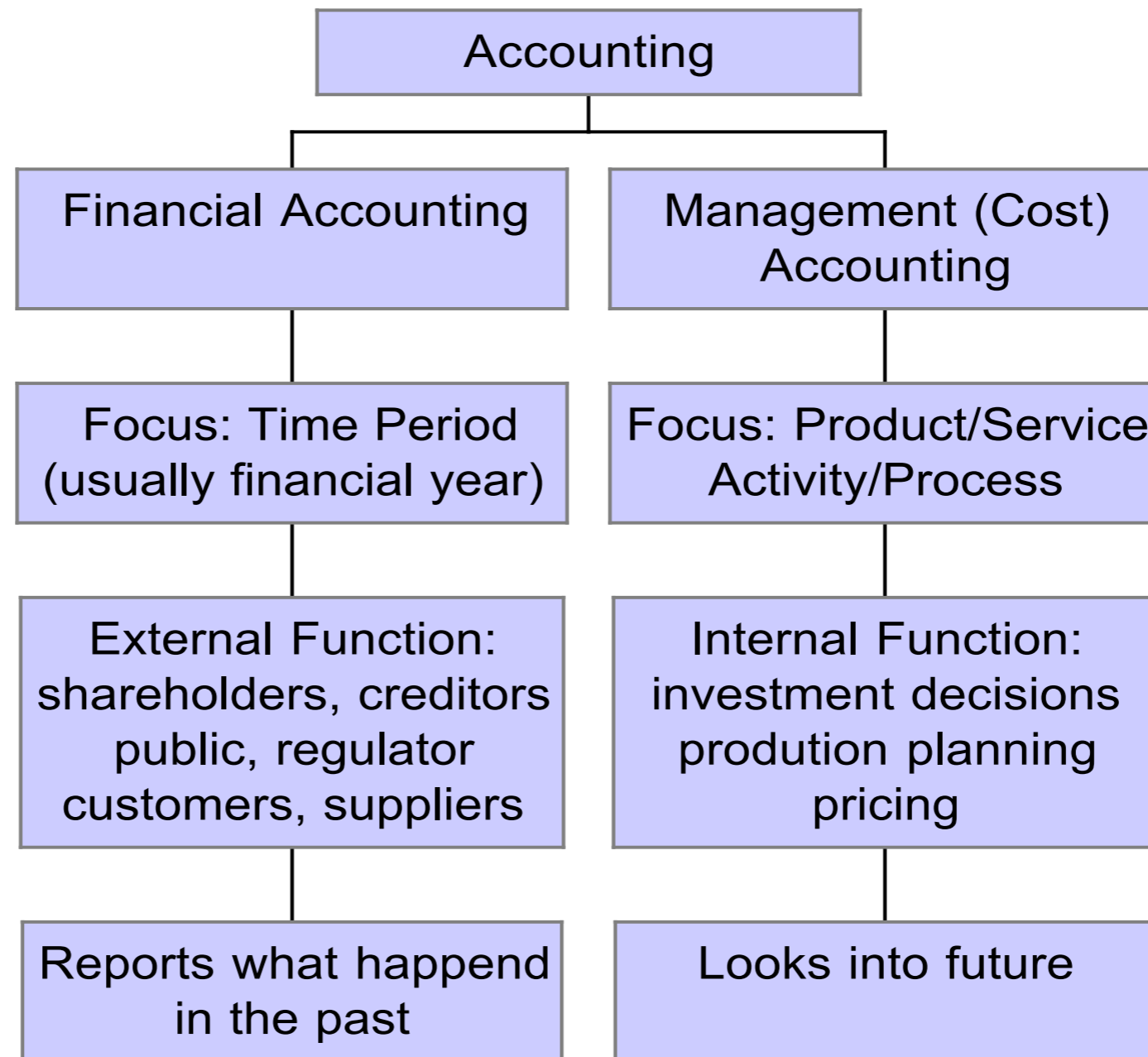




# Economic Perspective



# Accounting





# Management (Cost) Accounting

- Cost accounting is purpose driven: no right or wrong-just useful or not...
- Investment decisions concerning a new service:
  - How much does it cost to render it?
  - At what price should it be offered?
  - What are technological alternatives?
- To remain competitive one needs to analyse various activities required for the delivery of a service in terms of its costs
- Example: Analysing maintenance costs of PSTN network might point to fixed-wireless solutions since customer call outs which are labour intensive are no longer required







# Management (Cost) Accounting - as a regulatory tool

- Prescription and monitoring of cost accounting procedures
- Interference with internal management
- Justifiable for monopolies and oligopolies that are state owned and / or serve public interest





# Cost Terms





# Variable / Fixed Costs

- Variable costs vary with output produced or services rendered (vary with the cost object)
- Fixed costs do not vary with the output quantity
- Example MTC outlet in Klein Windhoek:
  - Fixed costs = rent, salaries
  - Variable costs = electricity, paper contracts
- Example Skype call to the US using modem dial-up:
  - Fixed costs: monthly internet subscription
  - Variable costs: MB rate + any Skype fees for PSTN termination
- What is fixed to one is variable for another: decision and time horizon dependent





# Direct / Indirect Costs

- Direct Costs: can be specifically and exclusively identified with cost object - can be directly assigned to a service e.g.
- Indirect Costs: cannot be specifically and exclusively identified with cost object but there is causal relationship - needs to be allocated
- Example: directory enquiry - office in HQ, 20 telephonists
  - indirect costs = HQ
  - direct costs = salary of the telephonists





# Example

	direct	indirect
variable	?	?
fixed	?	?





# Marginal Cost

- Change in total cost that arises when the quantity produced changes by one unit
- May change with volume, at each level of production, the marginal cost is the cost of the next unit produced
- Difficult to estimate due to a number of practical issues (e.g. the inability of telecommunications plant to be divided into very small parts, or scaled to provide an exact fit with the actual requirements of the network)





# Incremental Cost

- Cost caused by additional units of output
- Total cost assuming the increment is produced, minus total cost assuming the increment is not produced
- Incremental cost can conceptually range all the way from total cost of a service (entire output as the increment) to marginal cost (one unit as the increment)
- The size of the increment used in any specific cost analysis will be a matter of judgment
- The most common practice is to use the entire service or element as the increment, in which case the service or element specific fixed costs of the service or element would be included in the increment





# Common Cost

- ■ Cost of something that is shared among differed activities, services, or products
  - ■ Cost of maintenance of a local exchange is common to all services that make use of the local exchange
  - ■ Depreciation of base station
  - ■ Cow feed for beef and leather production (variable common cost)
- ■ The costs of producing several products within a single firm may be less than the sum of the analogous costs that would be incurred if each of the products were produced separately
- ■ Usually difference between the marginal cost of the last unit of production and the average cost per unit is the common cost per unit







# Joint Cost

- Specific type of common cost
- Offering a certain services might require that another service is offered at the same time
  - Capacity created to meet demand peak-time automatically creates the same capacity for off-peak periods





# Mark Up

- A percentage or a fixed monetary amount that is used to take into account joint and common costs, for example, to supplement certain costing methodologies.
- Cost concepts that do not fully allocate (or distribute) all indirect costs generally require mark-ups. These cost concepts include incremental costing methodologies, including LRIC (and TSLRIC/LRAIC and TELRIC as discussed in detail in the cost methods section below).
- The mark-up may be uniform or non-uniform.





# Other Cost Terms

- ❑ Actual / Planned Costs: Not all costs can be foreseen - difference is being analysed to improve efficiency
- ❑ Long Run: A period over which all factors of production, including capital, are variable. In practice, a period of 10 to 15 years is sometimes selected by regulators for the purpose of LRIC analysis
- ❑ Relevant / irrelevant costs: depending on whether they vary with decision (Decision to go on a journey with own car or public transport: road tax and car insurance are irrelevant, while depreciation and petrol are relevant costs)
- ❑ Opportunity Costs: Cost of losing revenue by not using resources effectively ie not really costs... (CEO shopping for cell phone - time too precious to worry about price differences between Marua Mall and Wernhill)
- ❑ Sunk Costs: costs that are not recoverable and will not lead to revenues in the future, written-off
- ❑ Allocated Cost: A joint or common cost that has been distributed to services (distributed cost)
- ❑ Average Cost: A specified cost divided by the quantity of output





# Costing Concepts






# Overview

- Based on the principle of cost causality
- Forward-looking costs are preferred because they better reflect the workings of competitive markets. In such markets, from the moment an investment is made, the asset's value to the operator depends more on what use can be made of it than what it costs
- Historic costs may reflect certain operational or technological inefficiencies of the incumbent operator
  - Using historic costs, for example, to calculate interconnection costs, leads to concerns that incumbent operators are passing on their inefficiencies to the interconnecting operators
  - Services in question could likely be provided at a lower cost using current technology or efficient labour and/or management practices





# Fully Distributed Cost (FDC/FAC)

- Allocates all costs (direct and indirect)
- The challenge (and inherent weakness) is how to allocate joint and common costs to the specific classes of services
  - For instance, if network access lines in an exchange are used 70% for local calls, 20% for national long distance calls and 10% for international calls, an FDC study may allocate the joint costs of these lines based on the same percentages
- FDC/FAC methods do not require a mark-up to recover a portion of joint and common costs





# Embedded Direct Analysis

- Developed by AT&T in the 70s
- EDA is just like FDC, but without the allocation of corporate overheads
  - Only assigned cost elements to services that could be directly associated
  - Excluded eg common local exchange costs that did not vary directly with usage (i.e., access costs) and common management and overhead costs (i.e., common costs)
- Same accounting and management information of the company's actual costs (i.e., "embedded" in the accounts)





# Forward looking concepts

- Estimate the costs of rebuilding specific elements of the network using current technology
- Modelling approach assumes operating and capital costs will be incurred efficiently
- One of the weaknesses of this method, and of all forward-looking studies, is that the results are estimations that may or may not occur in practice.







# Long Run Incremental Cost (LRIC)

- The incremental costs that arise in the long run with a specific increment in volume of production.
- LRIC is generally calculated by estimating costs using current technology and best available performance standards.
- In the presence of joint or common costs, the sum of the LRIC for all of the operator's services will be less than the total costs of the operator.
- Hence, the operator will not be able to recoup all of its costs.
- Regulators will generally allow a mark-up to be added to LRIC or LRIC-type costs for the firm to help recover all of its costs.





# LRIC Modelling Approaches

- ■ Top-Down Incremental Cost Approach: analyses the actual costs of a company, which may be adjusted to reflect forward looking valuations and an alternative level of efficiency
- ■ Bottom-Up Incremental Cost Approach:
  - ■ Scorched Country
  - ■ Scorched Nodes





# Total Element Long-Run Incremental Cost (TELRIC)

- TELRIC includes the incremental cost resulting from adding or subtracting a specific network element in the long run, plus an allocated portion of part of the joint and common costs
- Hence, mark-ups may be necessary to recoup a portion of the “residual” joint and common costs not already included in TELRIC. provides access services and local calling services
- The FCC developed TELRIC to implement the 1996 Telecommunications Act





# Total-Service Long-Run Incremental Cost (TSLRIC)

- TSLRIC measures the difference in cost between producing a service and not producing it.
- TSLRIC is LRIC in which the increment is the total service.
- Hence, mark-ups are required to recoup a portion of joint and common costs, which are not included in TSLRIC
- Long Run Average Incremental Cost (LRAIC) is a TSLRIC type adopted by the EU
- Since May 2009 called Pure LRIC





# Stand-alone cost (SAC)

- Stand-alone cost (SAC) is the cost that a stand-alone firm (producing no other services) would incur to produce a particular service
- For a single-service firm, TSLRIC and SAC are equal. For a multiple service firm, SAC will generally be greater than TSLRIC, because SAC incorporates shared fixed costs and common fixed costs





# EU Recommendation

7 May 2009

- Objectives of regulation:
  - Technological neutrality
  - Preventing distortions and promoting competition
  - Deliver maximum benefit for consumers (choice, price and quality of service)
- Termination rates should be brought down to the cost of an efficient operator - Cost Model:
  - Bottom-up LRIC, only taking into account cost that are caused by the provision of wholesale call termination (the increment)
  - Mobile and fixed core network based on NGN
  - Mobile access network based on a combination of 2G and 3G
  - Asymmetric termination rate for max 4 years: if incremental unit costs higher





# LRIC Modelling





- Bottom up -scorched earth
- Bottom up Scorched nodes
- Top down







# **South Africa**

## CHART OF ACCOUNTS AND COST ALLOCATION MANUAL (COA/CAM)





# Objectives

- Set out a structured accounting and regulatory reporting framework for operators to ensure that operators provide regular information allowing ICASA to meet its regulatory objectives:
  - ensuring that Operators do not exploit their market power to earn excess monopoly profits
  - ensuring that Operators do not engage in predatory pricing
  - ensuring that Operators do not engage in anti-competitive cross subsidisation
  - ensuring that Operators do not price on a discriminatory basis
  - ensuring that charges are cost orientated and sufficiently unbundled
  - protecting consumers by monitoring and approving tariffs and pricing regimes
  - monitoring the financial performance and situation of Operators





# Structure of the COA/CAM

- The COA/CAM comprises three volumes:
  - Volume 1 – Regulatory Accounting Guidelines
  - Volume 2 – Detailed Requirements for Mobile Cellular Telecommunication Service Licensees
  - Volume 3 – Detailed Requirements for Public Switched Telecommunication Service Licensees.






# Chart of Accounts (COA)

- The Chart of Accounts (COA) defines the minimum level of account detail that Operators must maintain
- COA is based on the usual asset, liability, equity, revenue and expense structure typical of any chart of accounts.
- It has a multilevel structure that allows for ease of account identification and account grouping and permits the classification of financial information in a manner that is suited to telecommunications organisations.
- Balance Sheet: Non-current assets, Current assets, Capital and reserves, Non-current liabilities, Current liabilities
- Income Statement: Revenue, Direct Costs, Operating Expenses, Non-operating items (Income from investments, Finance charges, Taxation, Extraordinary items, Dividends)





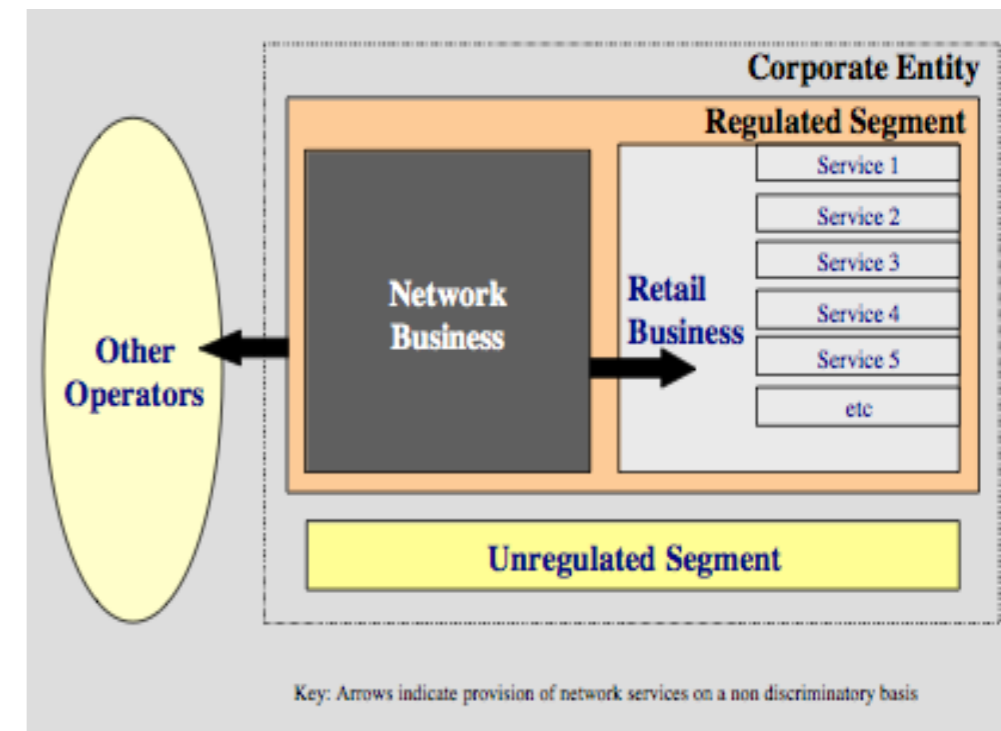
# Cost Accounting Manual(CAM)

- (a) LEVEL OF DISAGGREGATION
- (b) REPORTING REQUIREMENTS
- (c) ACCOUNTING SEPARATION PRINCIPLES
- (d) ATTRIBUTION METHODOLOGY
- (e) LONG RUN INCREMENTAL COST POLICIES



# a) Level of disaggregation

- Accounting separation involves splitting Corporate Entity into:
  - Regulated and Unregulated Segments,
  - Separate Businesses into network and retail businesses
  - Groups of services.
- The level of disaggregation is driven by the Authority's need to exercise specific regulatory responsibilities
- All Operators are required to prepare income statements, statements of capital employed and supporting schedules and notes for the **Regulated and Unregulated Segments, Businesses and services.**





# b) Reporting Requirements

- Annual & Audited Regulatory Financial Statements
  - Current cost statements:
    - Income statements by segment
    - Statements of capital employed by segment
    - Statement of network component costs
    - Statement of network service costs
  - Statement of costs on long run incremental cost basis (LRIC) with and without mark up. This mark-up relates to the recovery of fixed common and joint costs
  - Income and capital employed statement need to be reconciliation with annual statutory financial statements





# c) Accounting Separation Principles

- Fully Allocated Cost basis, whereby all the revenues, costs, assets and liabilities are allocated to segments according to the following principles:
  - Causality: Costs must be attributed to cost pools on the basis of how those cost pools cause the revenues to be earned
  - Objectivity: The attribution must be objective and not intended to benefit either the Operator or any other Operator, Business or service.
  - There must be consistency of treatment from year to year.
  - Transparency: The attribution methods used must be transparent. Revenues, costs attributed must be traceable back to their source in the Operators' accounting records.
  - Sampling: Where sampling is used to derive the attribution it must be based either on generally accepted statistical techniques or other methods that should result in the reasonable attribution of revenues, costs, assets and liabilities.



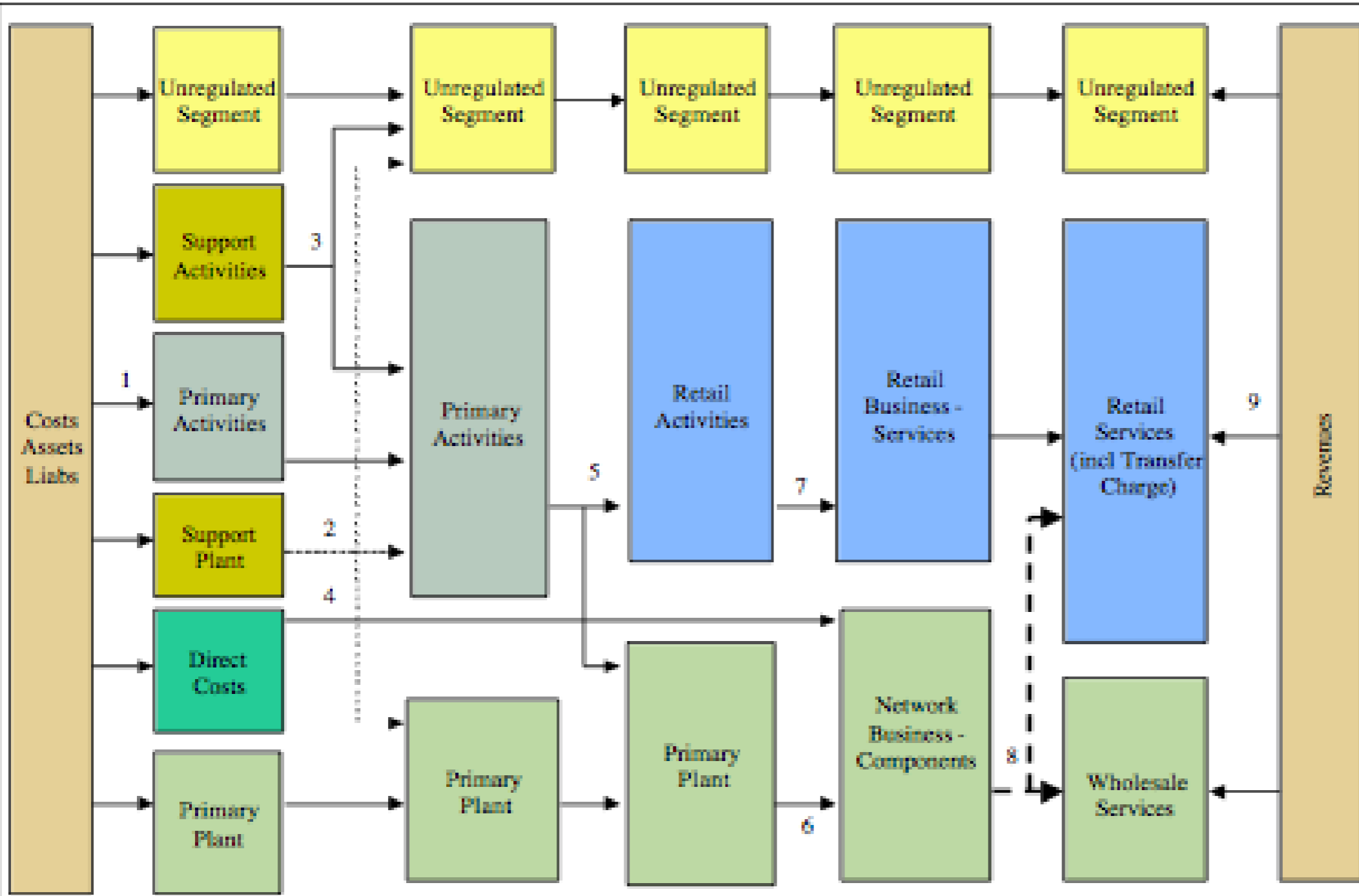




## d) Attribution Methodology

- Causality. Each item of revenue, cost and capital employed recorded in the Operator's financial records should be attributed to the activities and components which make up the separate segments
- The objective of the accounting separation process is to prepare income statements, up to profit before interest and taxation, and statements of capital employed for relevant segments (interest charges; corporate tax charges; and extraordinary items are not to be reported)
- Retail Business and Network Business are disaggregated
- Beginning with directly attributable costs and progressively attributing indirect costs on the basis of cost driver relationships
  - Directly attributable costs are those costs that can be directly and unambiguously related unattributable costs.
  - Indirectly attributable costs are those costs that can be related to cost pools on a causal, non-arbitrary basis.
  - Unattributable costs - no direct or independent causal method of apportionment





**Key:** See allocations described under 'Attribution Steps'





# Exercise

- Discuss ICASA COA/CAM and its regulatory function, did it work?
- Why did it or didn't it work?
- What would you have done differently

