Regional Seminar on the economic and financial aspects of telecommunications Study Group 3 Regional Group for Latin America and the Caribbean (SG3RG-LAC)

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Interconnection: cost modeling and calculation

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1. Introduction.

Market description: offer vs demand

DEMAND	• **High growth** not only of **fixed but also mobile services**….. • **Packet services** • **Customer segmentation** (heavy internet users vs soft internet users) and fixed-mobile substitution effect.
OFFER	• **Alternative technologies** like cable, fiber , ULL or mobile • Focused on **most highly populated areas** and **better economic conditions** • **Geographical regions characterized by infrastructure competence has more price competition** • **Governments in Europe are convinced to extend broadband services to urban and rural areas –> Complementation by private initiatives** • **Alternatively, areas with no network competence have competence based on services.** • **Mobile broadband offer is increasing quickly.** • **Network neutrality could change some business models (service providers, content providers, network operators, end users)**

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2. Main trends and challenges

Fixed Penetration (%)

24,7	Argentina
21,6	Brasil
14,7	Colombia
20,2	Chile
19,9	Guyana
10,9	Perú
16,2	Surinam
8,5	Bolivia
14,4	Ecuador
6,3	Paraguay
28,6	Uruguay
24,4	Venezuela

Mobile Penetration (%)

Argentina	141,8
Brasil	104,1
Colombia	93,8
Chile	116
Guyana	73,6
Perú	100,1
Surinam	169,6
Bolivia	72,3
Ecuador	102,2
Paraguay	91,6
Uruguay	131,7
Venezuela	96,2

Fixed Internet Penetration (%)

9,6	Argentina
7,2	Brasil
5,7	Colombia
10,5	Chile
1,6	Guyana
3,1	Perú
3,0	Surinam
1,0	Bolivia
1,4	Ecuador
0,6	Paraguay
11,4	Uruguay
5,4	Venezuela

Mobile Internet Penetration (%)

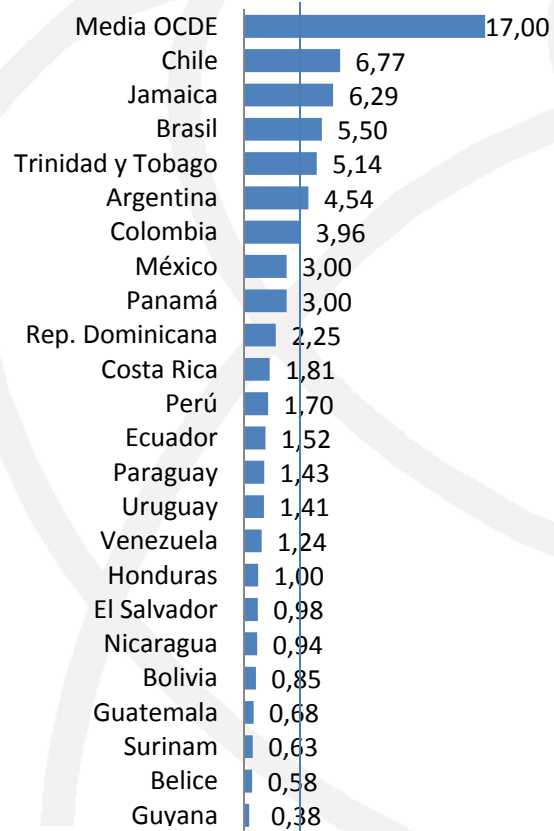|	
Argentina	12,8
Brasil	10,6
Colombia	5,6
Chile	7,1
Guyana	0,0
Perú	7,2
Surinam	0,0
Bolivia	1,4
Ecuador	8,7
Paraguay	4,1
Uruguay	5,7
Venezuela	20,8
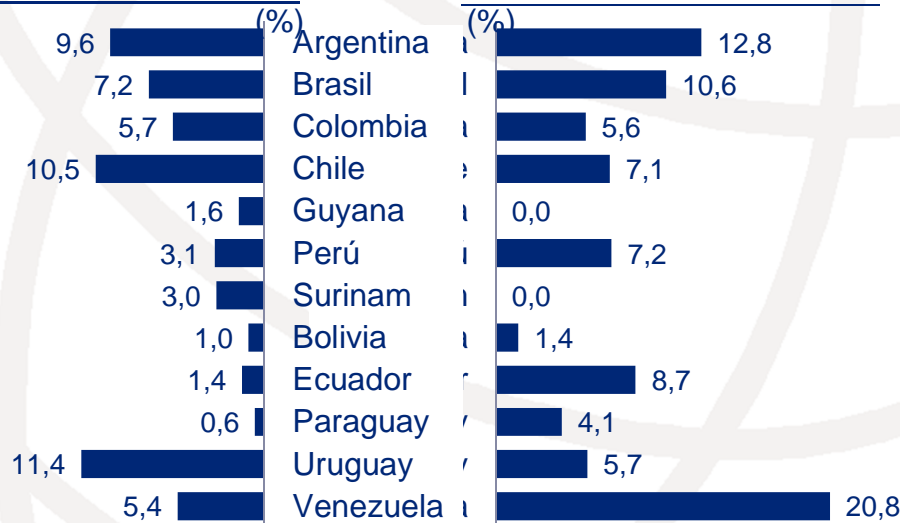
REALITY SAYS...

- Low penetration of fixed telephony
- Mobile penetration of 100% (universal)
- Different sociodemographic and economic conditions
- Capital intensive sector with sunk costs and significant O&M
- Destructive innovation due to technological change
- There is a gap between the mobile penetration rate and the mobile broadband penetration (growth opportunity)
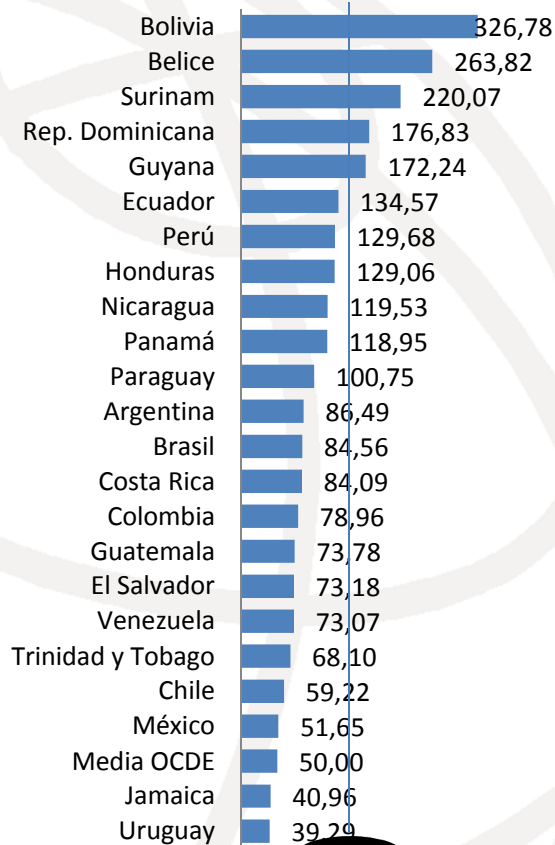
2. Main trends and challenges

Average speed offered (Mbps)

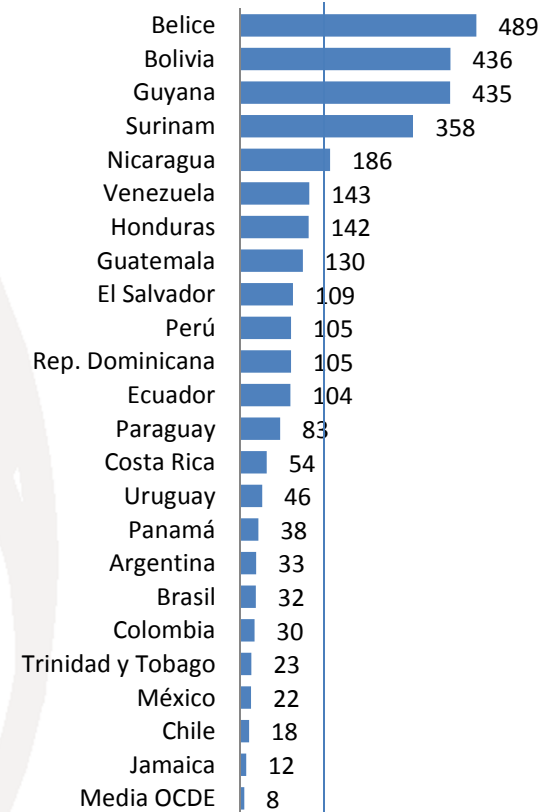|	
Media OCDE	17,00
Chile	6,77
Jamaica	6,29
Brasil	5,50
Trinidad y Tobago	5,14
Argentina	4,54
Colombia	3,96
México	3,00
Panamá	3,00
Rep. Dominicana	2,25
Costa Rica	1,81
Perú	1,70
Ecuador	1,52
Paraguay	1,43
Uruguay	1,41
Venezuela	1,24
Honduras	1,00
El Salvador	0,98
Nicaragua	0,94
Bolivia	0,85
Guatemala	0,68
Surinam	0,63
Belice	0,58
Guyana	0,38
Latin-America Average	**2.32**

Broadband prices - Average plans (USD PPP/month)

Bolivia	326,78
Belice	263,82
Surinam	220,07
Rep. Dominicana	176,83
Guyana	172,24
Ecuador	134,57
Perú	129,68
Honduras	129,06
Nicaragua	119,53
Panamá	118,95
Paraguay	100,75
Argentina	86,49
Brasil	84,56
Costa Rica	84,09
Colombia	78,96
Guatemala	73,78
El Salvador	73,18
Venezuela	73,07
Trinidad y Tobago	68,10
Chile	59,22
México	51,65
Media OCDE	50,00
Jamaica	40,96
Uruguay	39,29
11	

Average price per Mbps (USD PPP/Mbps)

Belice	489
Bolivia	436
Guyana	435
Surinam	358
Nicaragua	186
Venezuela	143
Honduras	142
Guatemala	130
El Salvador	109
Perú	105
Rep. Dominicana	105
Ecuador	104
Paraguay	83
Costa Rica	54
Uruguay	46
Panamá	38
Argentina	33
Brasil	32
Colombia	30
Trinidad y Tobago	23
México	22
Chile	18
Jamaica	12
Media OCDE	8
13	

2. Main trends and challenges

Main trends

- Growing **popularity of smartphones** with an **significant impact on the traffic**

- **Mobile broadband substitution** for several clients and geographical areas.

- **Economical crisis impacts on demand evolution** and decision taken about network rollout or sharing networks

- **Impact of network neutrality** on strategy of different operators (value chain)

- **Price strategy must be changed**

- **Spectrum regulation**

- **Digital Agenda** (rural broadband, universal broadband, etc,,,,)

Challenges

- **Definition of spectrum policy** implying more efficient spectrum use as well as a higher telecom services penetration. (refarming, digital dividend,…)

- **Definition of regulatory policy** that incentive investments and shareholders return (risk remuneration depending on the risk assumed)

- **Access network transformation** substituting traditional networks for broadband networks.

- **Geographical segmentation consideration** in the market analysis, network deployment and SMP operators.

- New **commercial and pricing policies,** based on capacity and different kinds of user devices

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Problem 1: Low Broadband Penetration

→ **Dimension 1: Universal Access**
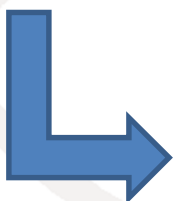
BUT ALSO…

→ **Dimension 2: Universal Service**

**Problem 2:** High Broadband Prices

→ **Affordable prices**

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Some ideas to be considered:

• In reality, **competition is focusing on some areas** in every country !!

• Geographic markets should not be considered exceptions in fixed telecommunications

• **narrowband access** markets as well as **broadband access markets** are likely to show very often the features of geographic markets.

Regarding NGA (Next Generation Access), **geography does matter:**

• **state and age of existing network infrastructure,**

• length of local loop,

• population density and structure of the housing market,

• Others (distribution of number if users,…)
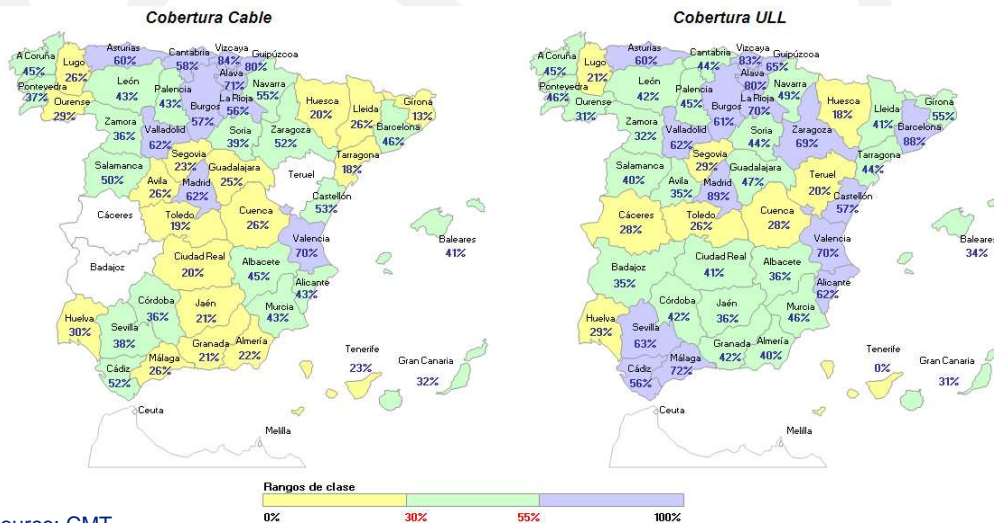
In Spain, broadband market shows very heterogeneous competitive conditions, existing higher competition in areas where several types of infrastructures provide several broadband services: socio-demographic and economic conditions in different regions.

Cobertura Cable

Cobertura ULL

Rangos de clase

0%   30%   55%   100%

Source: CMT

4.NGN regulation.
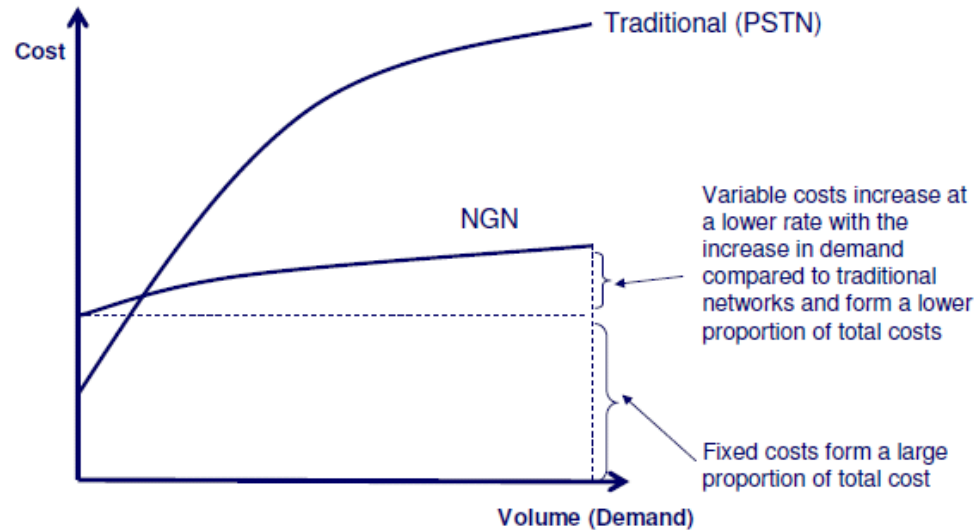
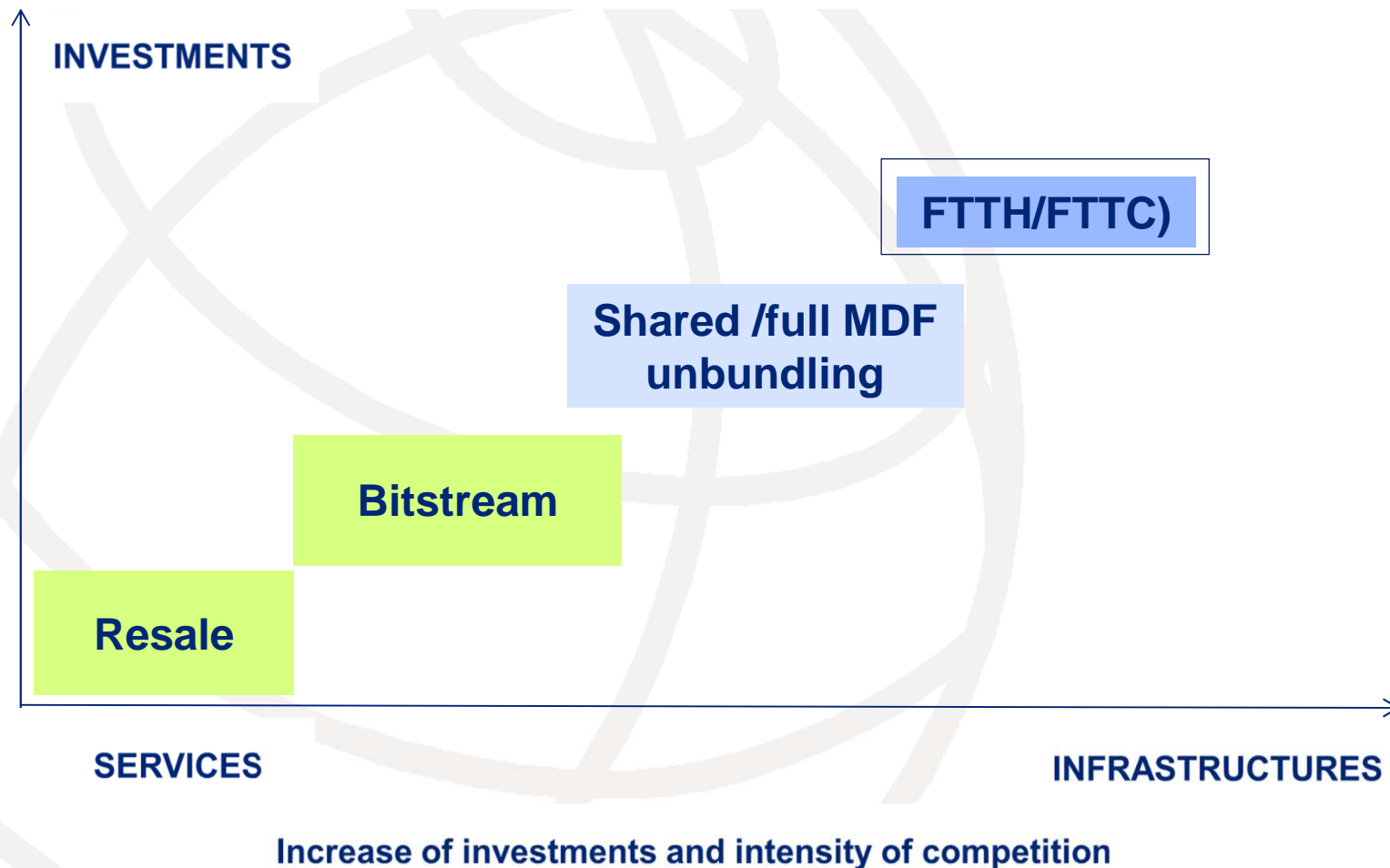- **NGN costs should be lower** and less dependent on traffic volumes.

- NGN features create fundamental problems if we wish to cost an **individual service for "cost-based wholesale price" remedies**
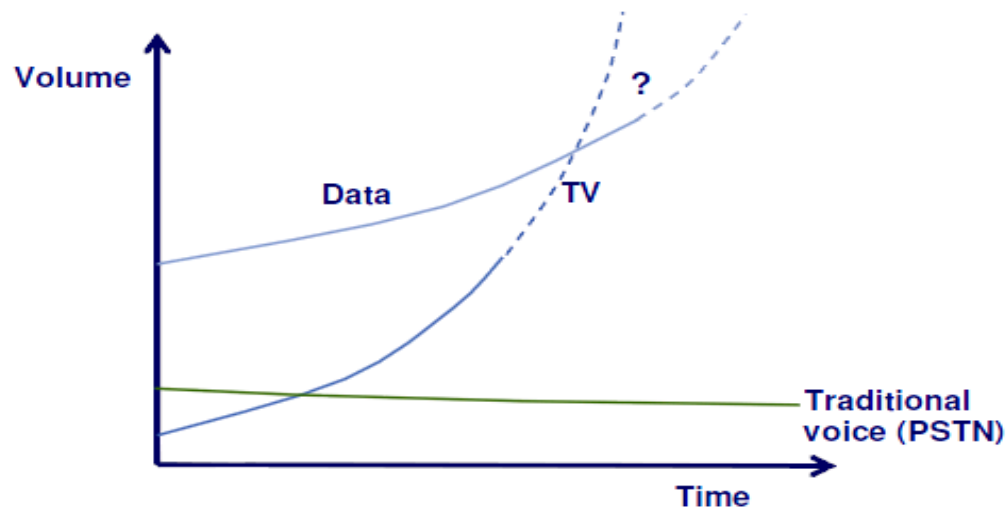
- **Data services dominate voice traffic volumes contributing to an increase of data revenues in the operators accountings.**

- The **main barriers of FTTC /FTTB and FTTH** are civil engineering cost (horizontal barrier), in-house wiring (vertical barrier), co-location at the street cabinet, and backhaul between the Street Cabinet and the operators' networks.

INVESTMENTS

FTTH/FTTC)

Shared /full MDF unbundling

Bitstream

Resale

SERVICES

INFRASTRUCTURES

Increase of investments and intensity of competition

4.NGN regulation.

Due to the high investment in Fiber, **only where alternative operators have sufficient market share** and access to infrastructure (ducts from the municipalities) it is possible to achieve a reasonable payback
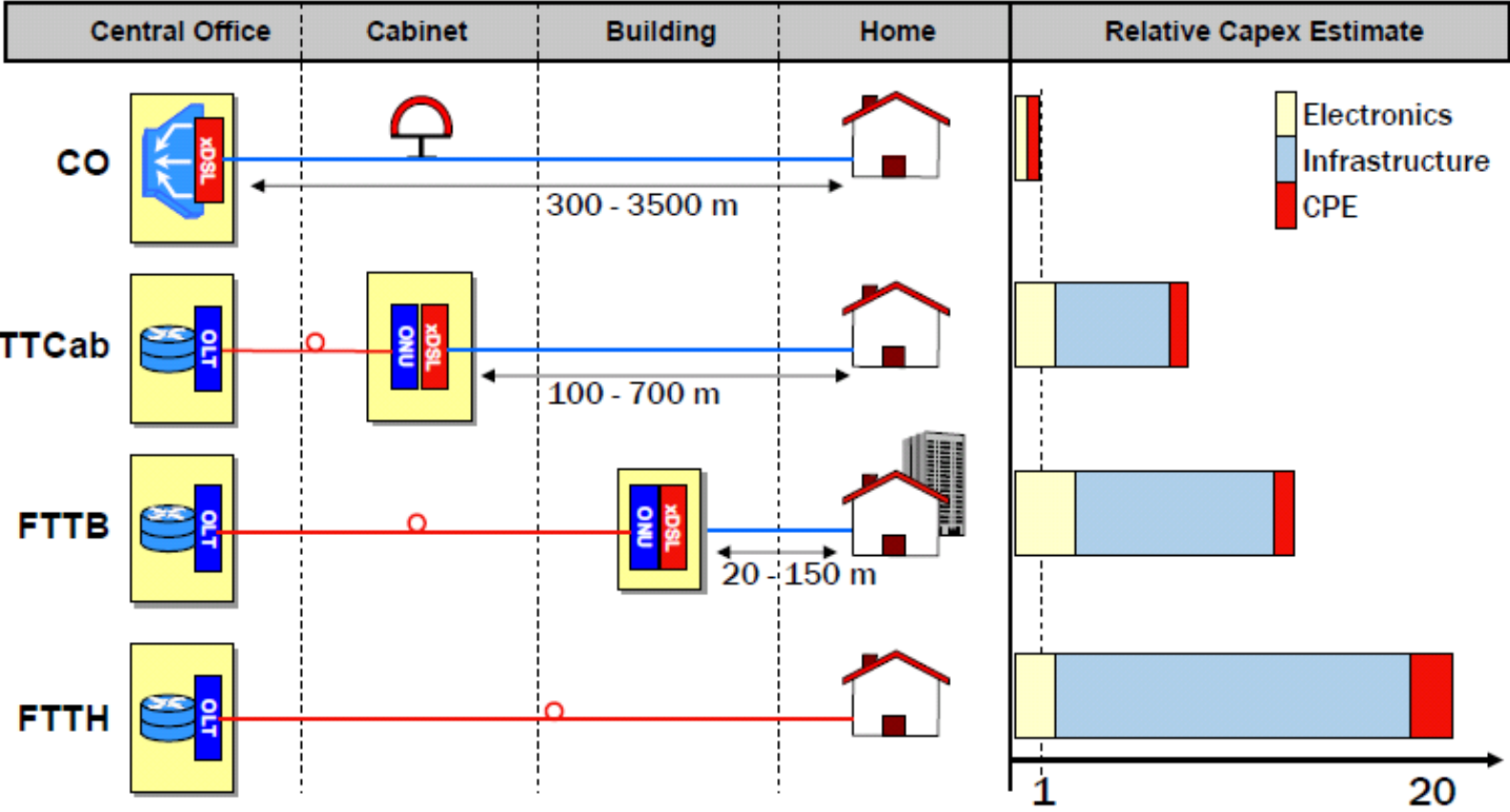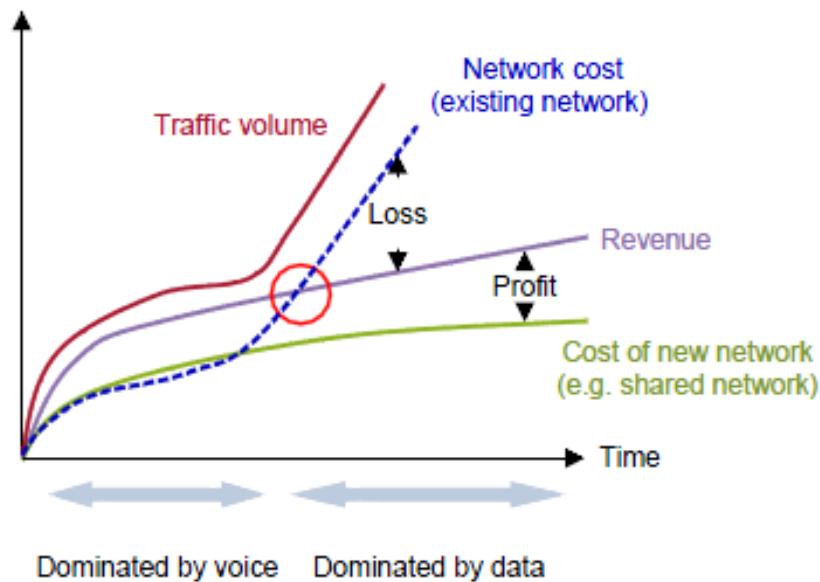
4.NGN regulation.

The main driver **to share networks is reducing network costs** that represents **one-third of total expenditure**.
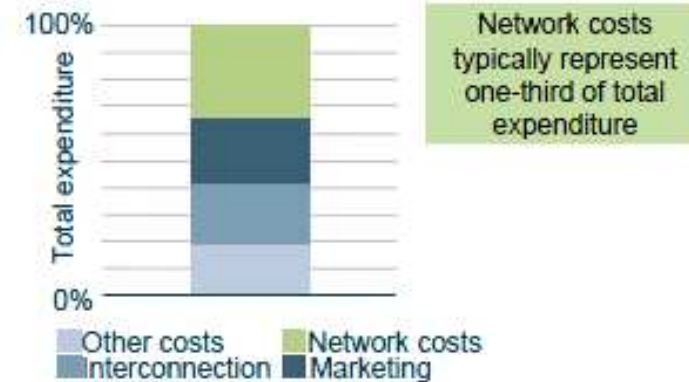
- **Capex**: 37% buildings and materials, 31% power, 15% BTS or Node B, 6% backhaul, 11% other

- **Opex**: 20% electricity, 20% hw and sw, 15% land rent, 14% backhaul, 31% other

- Another driver could be to **extent coverage into rural areas**,

Comparison of the network economics of legacy and LTE networks

Typical expenditure by an European MNO

Source: Analysis Mason

Source: Analysis Mason

4.NGN regulation.

NGN are facing different assessments to traditional remedies or regulatory strategies, taking into account the relationship between services and networks.

ACCESS NETWORK	• Already shared **access costs cannot be sensibly/easily split into services** • **"Customer dependent costs" are mixed with traffic dependent costs** and co- exist in the access network or even at customer premises • **Copper local loop is no longer a clear demarcation:** – Even in traditional networks, the definitions have been a problem with some "arbitrary" allocations of nodes from access to core • **Traditional definitions** (often in directives or law) **cannot be easily applied** • NGN access seems to be the **enduring bottleneck**
CORE NETWORK	• **Services share the same network** – in the past each had their own dedicated network (and costs). A large amount of costs are fixed/common to many services • In the past **shared systems' cost could be split based on technical and economic factors** that were generally agreed on and based on good cost driver logic • **NGN services are delivered by application severs** - more separate from the networks • **Service providers should be able to configure the network** (say QoS – speed, priority) to suit the service

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5.Cost modeling: bottom up - LRIC

Bottom up models - LRIC	To down models

Assets, working capital and operational costs

• A functioning network incurs operational costs. Both capital and operational costs must be recovered. In addition to the fixed assets, some working capital is required – net assets less net liabilities. This requires an additional investment that should be allowed for.

Annualisation methodologies

• Annualisation charges are calculated on capital investment as the sum of the cost of capital, and depreciation. The effective annual cost of the investment is required to define the revenue needed to provide for the replacement of the investment (asset) and to allow a fair return on the investment (profit).
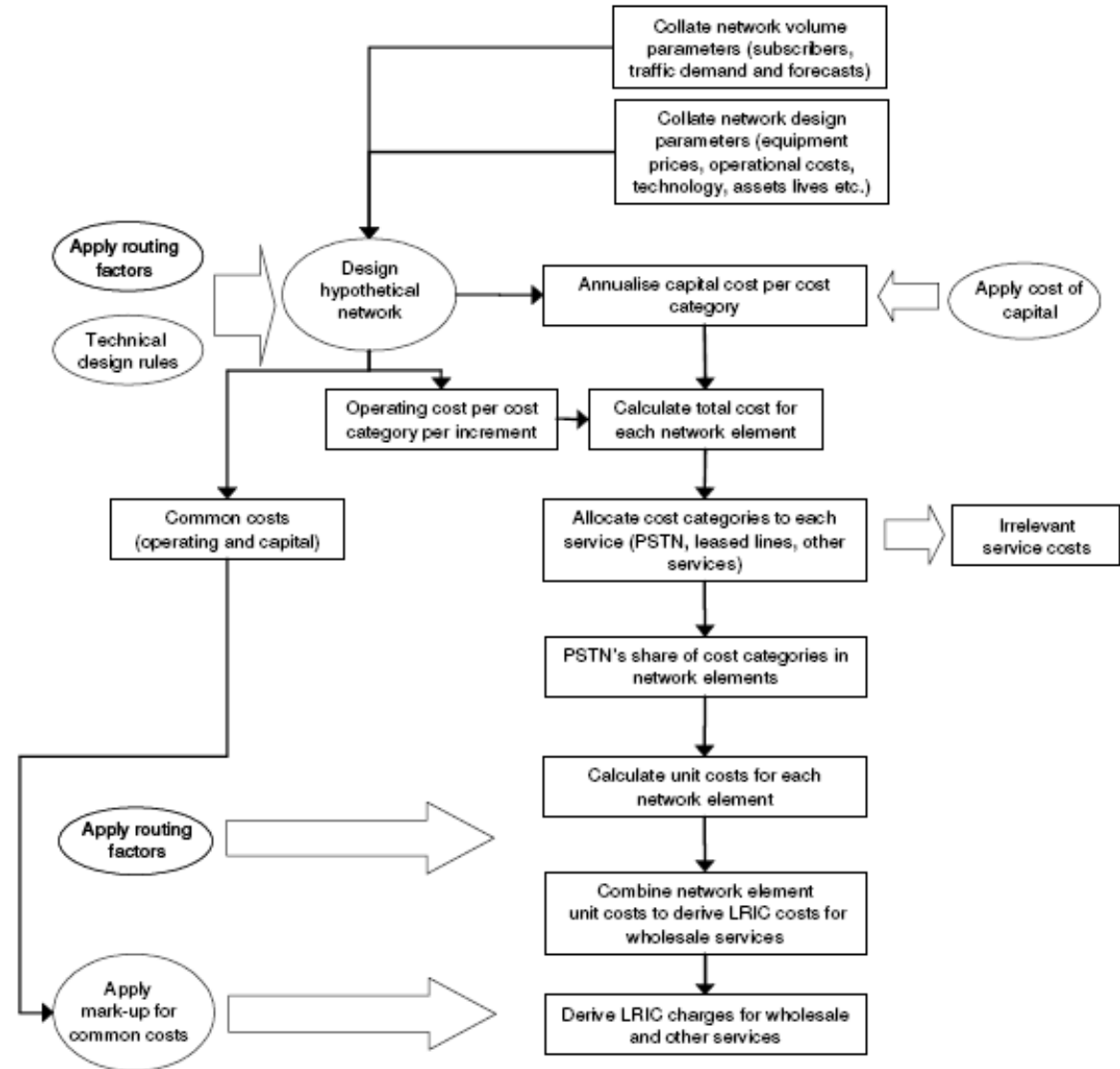
Cost of capital (WACC)

• It provides a fair return on the asset investment. If it is correctly defined, it allows sufficient return to account for the risks of the associated telecoms market
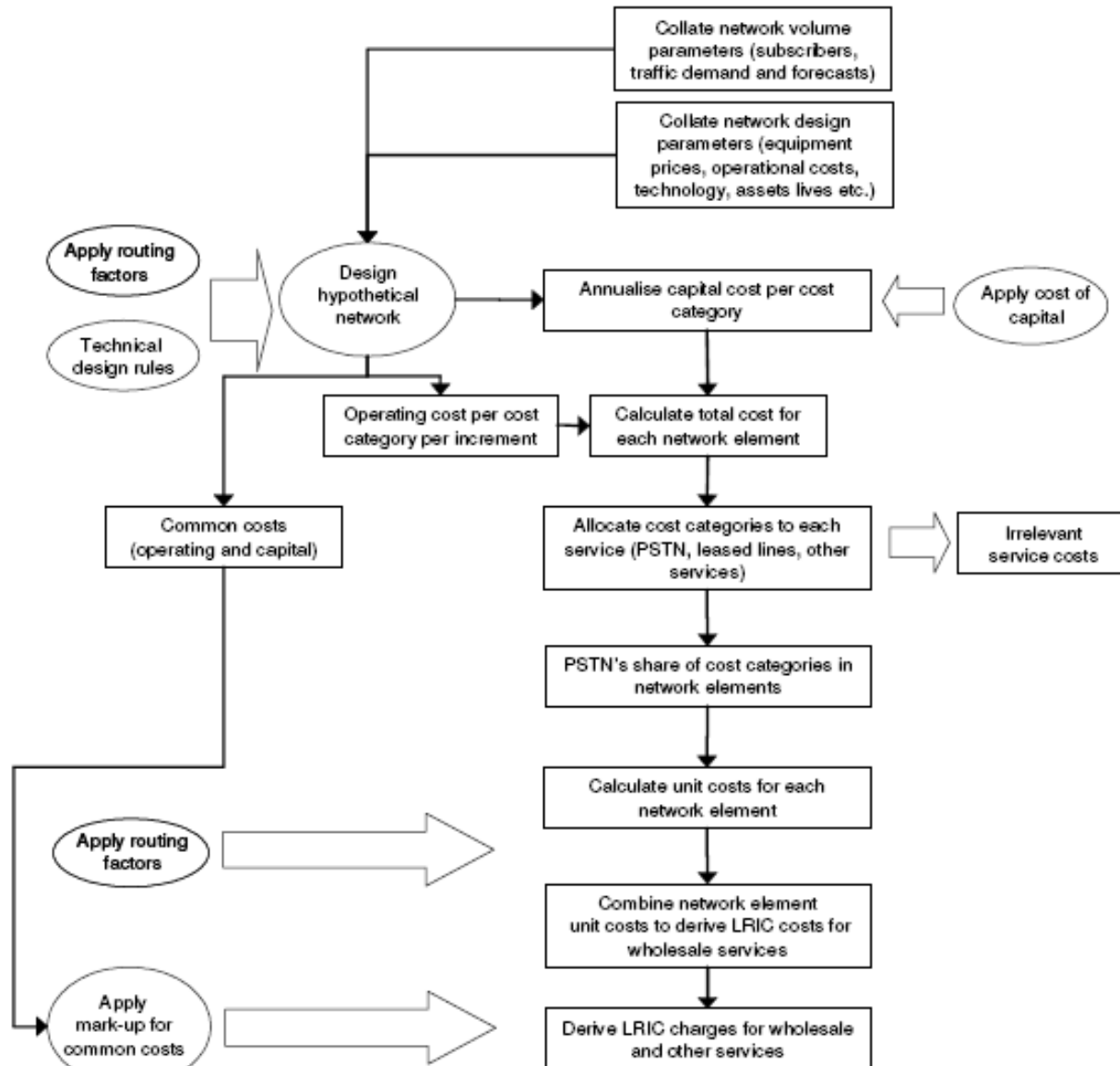
Routing factors:

• Specify, for each type of service, the average use made of each type of network element

Others

5.Cost modeling: bottom up - LRIC

- The main parts of the model are:
  - Estimating demand and determining input unit costs
  - Building an hypothetical network
  - Calculating network elements
  - Determining the cost of network elements
  - Costing services

- The Bottom-Up model shall be used as part of a process to validate and reconcile results obtained from the Top-Down model to achieve fairly determined LRIC estimates for key wholesale services

- The Bottom-Up models may be updated periodically and used to compare with updated versions of the Top-Down models.

5.Cost modeling: Top down
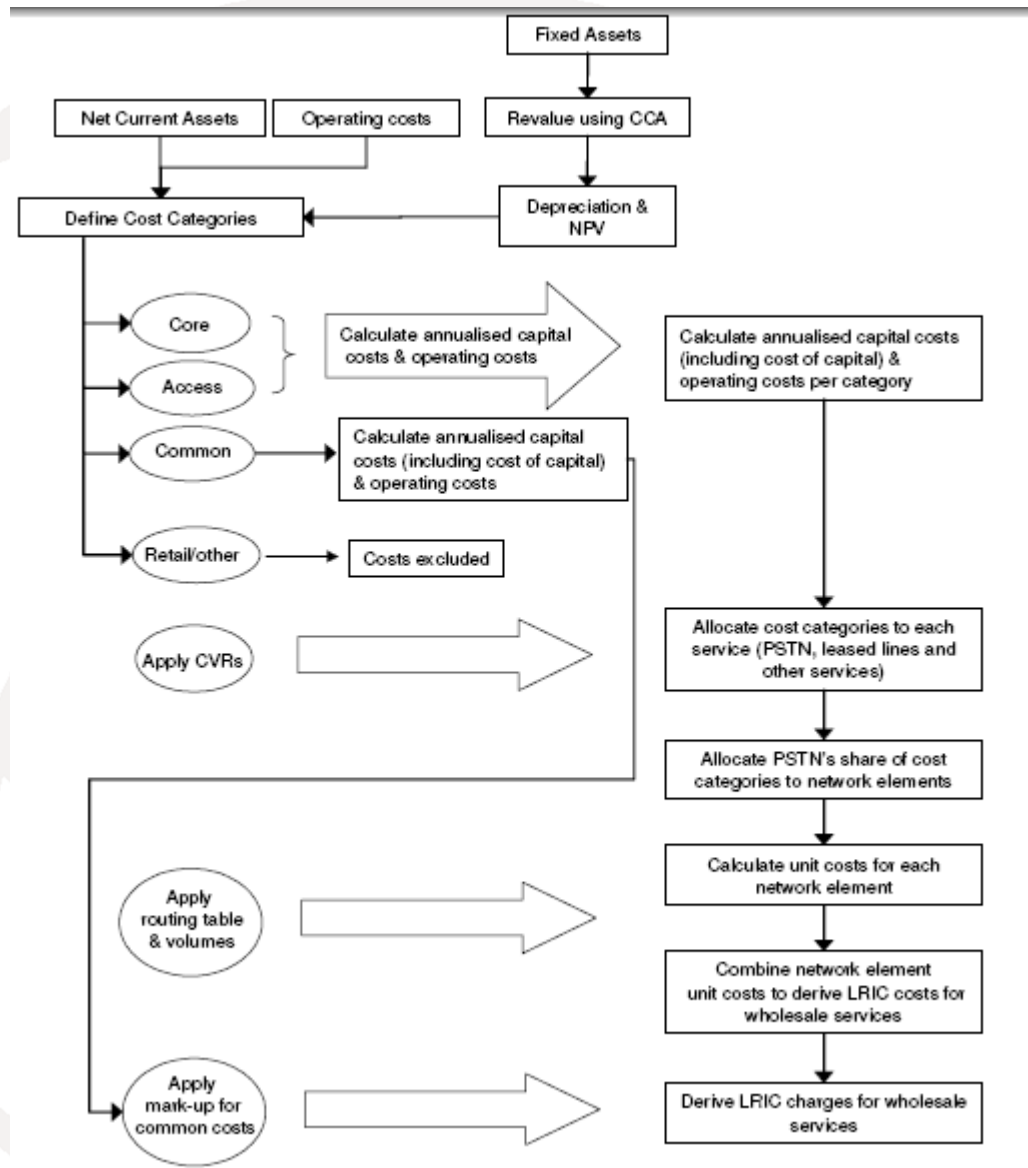
- Since **LRIC is a forward-looking concept, current cost accounting (CCA**) principles have to be used to estimate the appropriate Gross value of assets (an annualisation method has to be defined) . This involves re-valuing assets on the basis of the replacement cost of the modern equivalent asset (MEA).

- Under top down models and using FDC (Full Distributed costs) you have a first draft to calculate asset revaluation by using historical cost accounting

- **Cost-volume relationships** (CVRs) show the way in which costs change in relation to a change in the volumes of the service provided.

- **Average cost of capital** (WACC) is a key element of this model
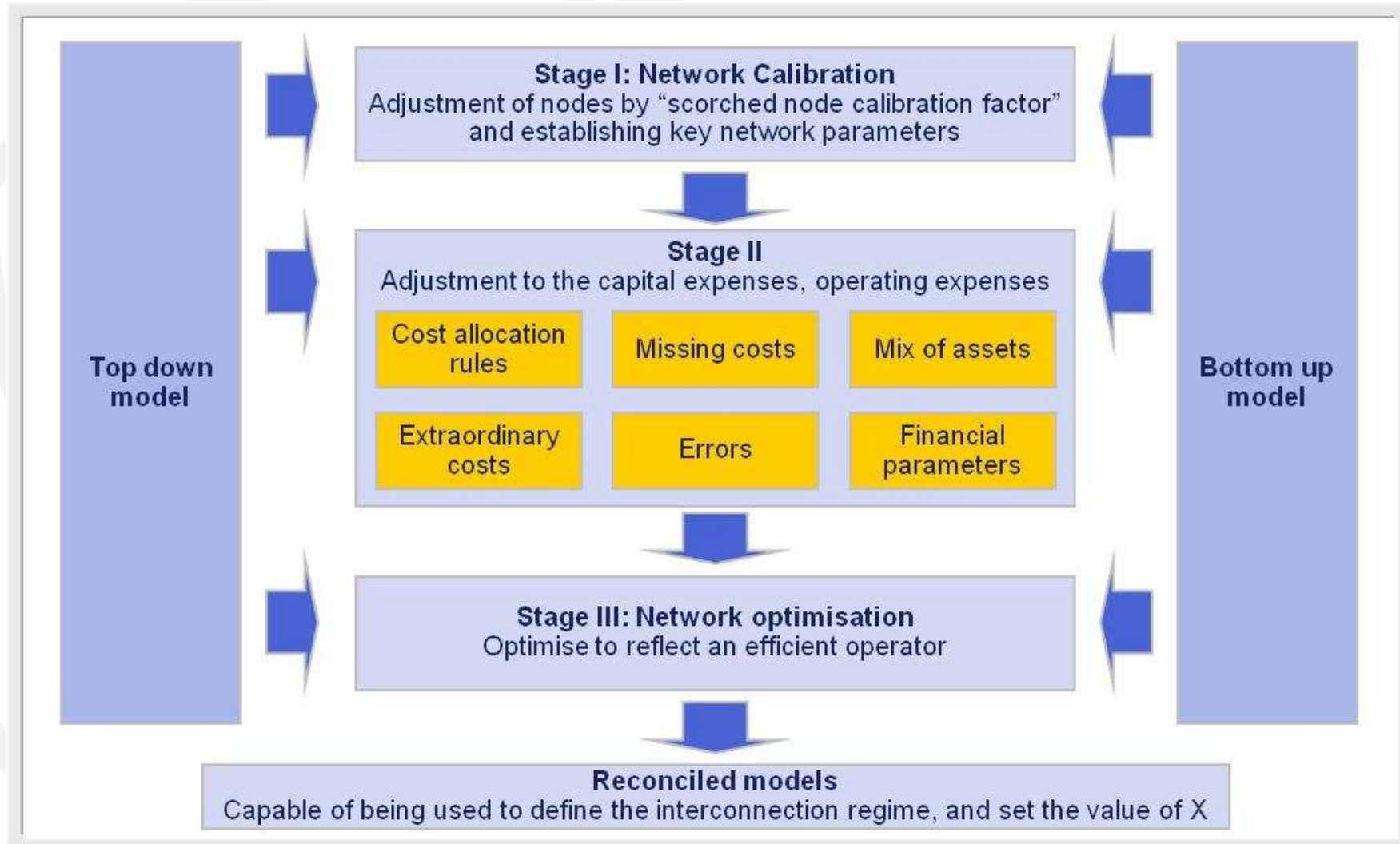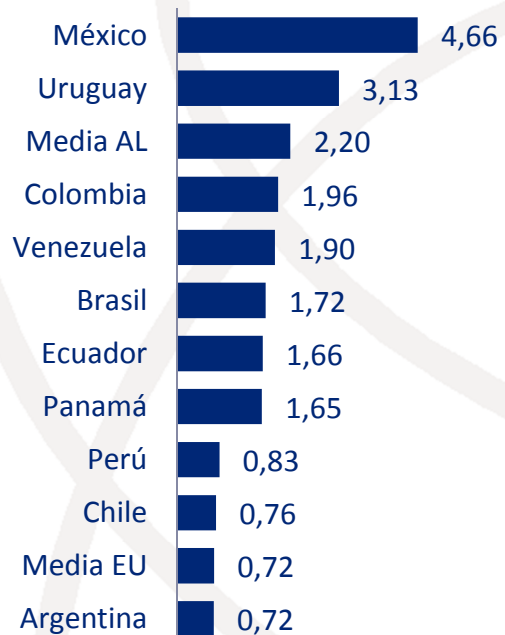
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3. What are the major problems in the Region

4. NGN regulation

5. Pricing: cost modeling

6. Benchmark

7. Summary and conclusions

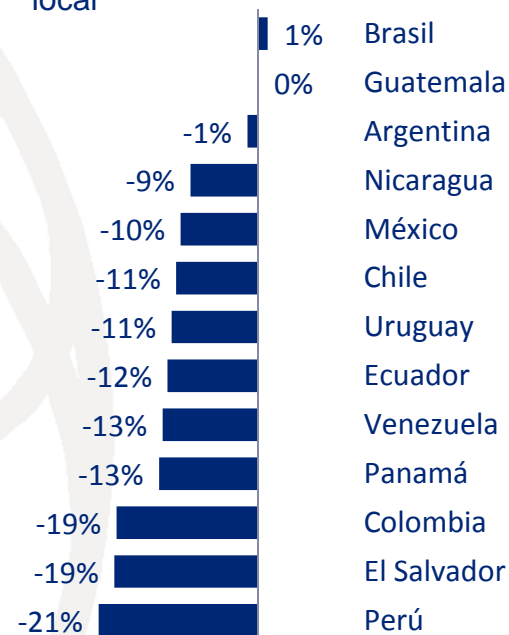## Tarifas de terminación local en redes fijas
Centavos de dólar por minuto

País	Valor
México	4,66
Uruguay	3,13
Media AL	2,20
Colombia	1,96
Venezuela	1,90
Brasil	1,72
Ecuador	1,66
Panamá	1,65
Perú	0,83
Chile	0,76
Media EU	0,72
Argentina	0,72

Tarifas de terminación en redes móviles
Centavos de dólar por minuto

País	Valor
Uruguay	10,86
Venezuela	10,83
Nicaragua	8,00
El Salvador	7,00
México	6,88
Argentina	6,77
Perú	6,62
Ecuador	6,39
Panamá	6,00
Colombia	5,09
Costa Rica	3,45
Guatemala	1,50

Evolución de las tarifas de terminación en redes móviles
TACC 2006 - 1S2011 en moneda local

Valor	País
1%	Brasil
0%	Guatemala
-1%	Argentina
-9%	Nicaragua
-10%	México
-11%	Chile
-11%	Uruguay
-12%	Ecuador
-13%	Venezuela
-13%	Panamá
-19%	Colombia
-19%	El Salvador
-21%	Perú

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7. Summary and conclusions.

1. **No homogeneous competence conditions**. Depending on the geography and economic conditions , **competence based on infrastructures** or on **services** is applied.

2. **Different access alternatives**, like LLU or mobile broadband, must be taken into account in order to analyze markets and define ex-ante obligations.

3. **Next Generation Networks (NGN) investments** open the discussion of the remuneration of the risk assumed by operators to deploy the network. Traditional weighted average cost of capital (wacc) vs **real options**

4. **Calculating NGN pricing** face some difficulties compared with traditional networks and services: LRIC models - bottom up vs top down

5. **A new investment cycle** bring us new models to be considered: **real options**

6. **Taken into consideration geographical areas** is crucial, from a regulatory point of view, in order to provide proportionate obligations.