

# ITU-D Regional Development Forum for the Asia Pacific Region NGN and Broadband, Opportunities and Challenges

## Convergence Opportunities for Technology Leapfrogging

Yogyakarta, (Indonesia), 27-29 July 2009

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## Agenda

- **Convergence**
  - Convergence related questions
  - Dimensions and profiles
  - Key factors: Economies of scale
- Market and Business trends per category
- Technology and Business Leapfrogging

## Convergence related questions

- Does convergence refer only to Fixed and Mobile?
- Does convergence matter only to developed countries?
- Is convergence more expensive?
- What benefits may be addressed by convergence?
- How convergence may help developing countries?
- Others.....?

## Convergence dimensions

### Convergence is taking place at several domains

- ➔ **At Network domain**
  - One network for all service types: NGN, IMS
- ➔ **At Service domain**
  - Fixed, Nomadic, Mobile, Interactive and Broadcasting, Content, etc.
- ➔ **At radio Access domain**
  - DECT, WiMax, 3G, LTE, etc.
- ➔ **At Operational and Business domain**
  - OSS, Billing, etc, for all customer classes
- ➔ **At Terminal domain**
  - 2G, 3G, PDA, iPhone, etc.

# Convergence profiles

Convergence Domain	Level of convergence			
	Separated Implementation	Low level convergence	Medium level convergence	Full convergence
Network	●			
Services	●			
Access	●			
Operations	●			
Terminals	●			

Present Mode of Operation

Initial status: Separated networks, services and operations

# Convergence profiles

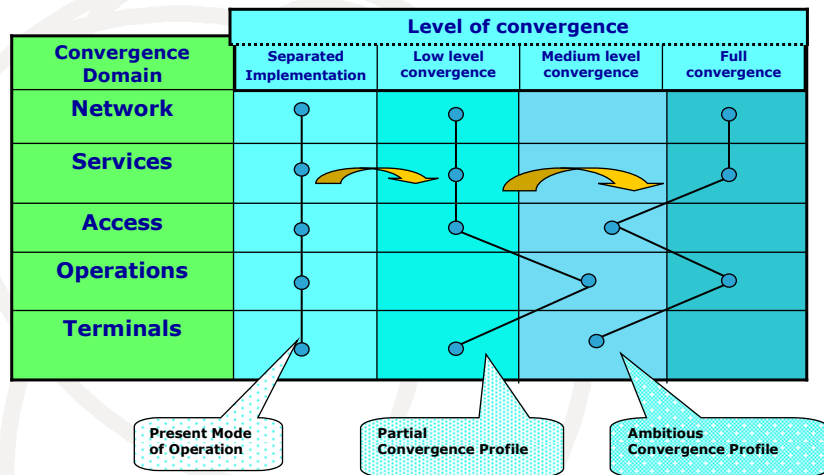
Convergence Domain	Level of convergence			
	Separated Implementation	Low level convergence	Medium level convergence	Full convergence
Network	●	●		
Services	●	●		
Access	●	●		
Operations	●		●	
Terminals	●	●		

Present Mode of Operation

Partial Convergence Profile

Example of convergence today by representative operators

## Convergence profiles



Future profile driven by: Initial status, Market development, Economy of scale and Operator Strategy

## Key Factors: Economies of scale

Economies of scale are an inherent characteristic to the telecom technologies that impact on solutions, efficiency and cost reduction

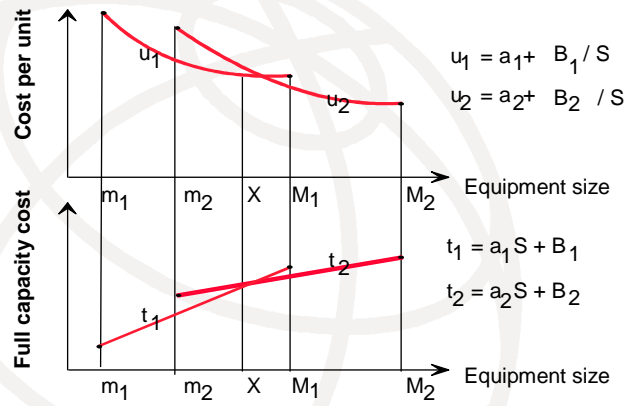
The five dimensions of the economy of scale:

- By **Size** of the systems
- By **Technology** capabilities
- By **Traffic efficiency** with the occupancy
- By customers **Density**
- By **Volume** of purchasing

Benefits per dimension

- Cost reduction per unit (i.e.: 10% to 30%)
- New technologies with higher productivity (i.e.: x10)
- Better utilization for a given GoS when larger systems (i.e.: +20%)
- Quadratic decrease with coverage radio increase
- Discount per volume in log scale (i.e.: up to 40%)

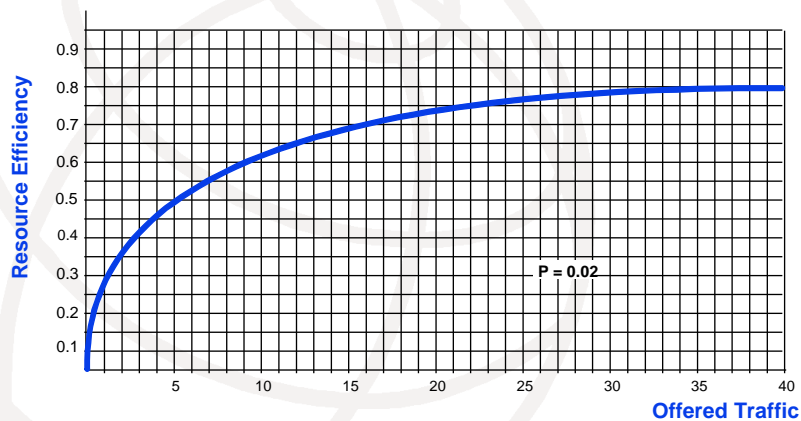
## Economy of scale per system size



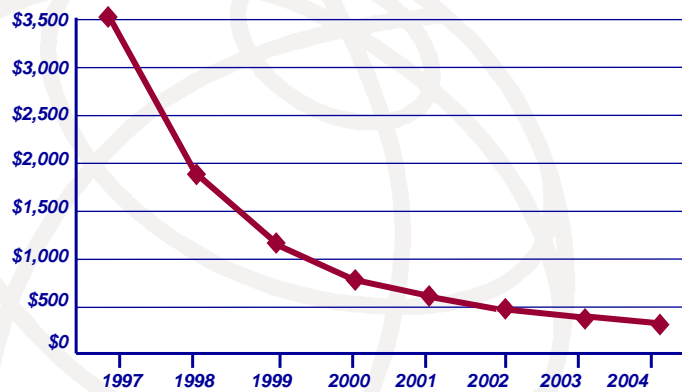
Cost reduction as function of size and occupancy

## Economy of scale per traffic efficiency

Impact on efficiency increase for a given quality with traffic and group size (non-linear effect)



## Cost reduction per technology evolution. Example for Ethernet ports



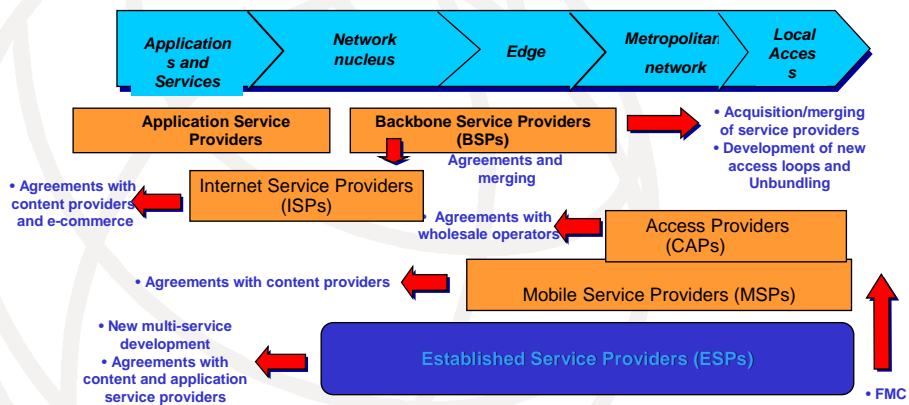
Source: Dell'Oro Group

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## Business domains and trends

Example of Value Added chain and operators movements to gain economy of scale and market



## Business Planning case

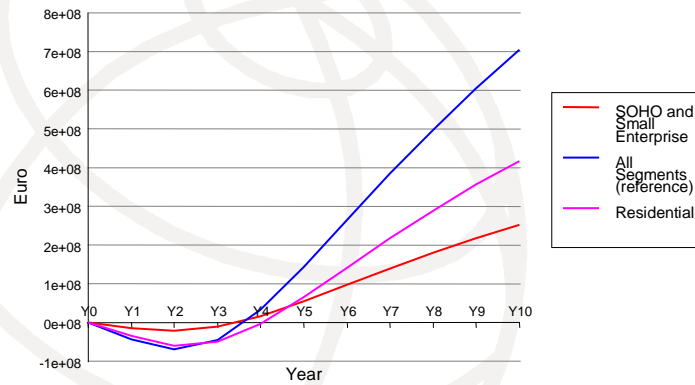
Evaluations to be based on robust techno-economical tools due to high number of alternatives and complexity

Case study performed for medium size country with mixes of customer classes and services domains:

- Multiservice IP Network with integrated operation available
- Three service categories: Voice, Data/Internet, Video distribution
- Modeling demands, multiservice traffic flows, dimensioning, network resources, CAPEX, OPEX and financial results for different levels of competition
- Evaluate differential future Cash-flows, NPV, IRR, etc. for a 10 years period

## Business Planning case

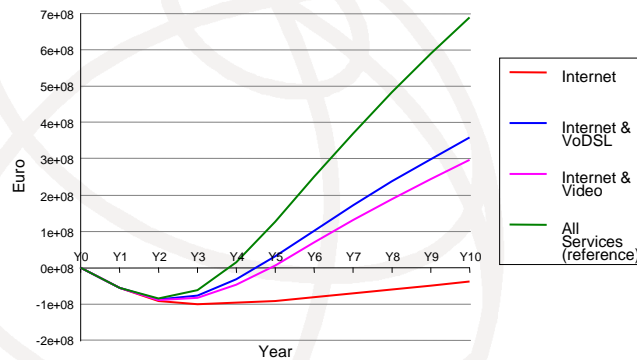
Effects of the mix of customers on Reference Scenario: Low competition level Network NPV



- SME and SOHO with quicker recovery but less NPV and company value at medium term
- "All customer segments" case with much better behavior

## Business Planning case

Effects of the mix of services on Reference Scenario: Low competition level Network NPV

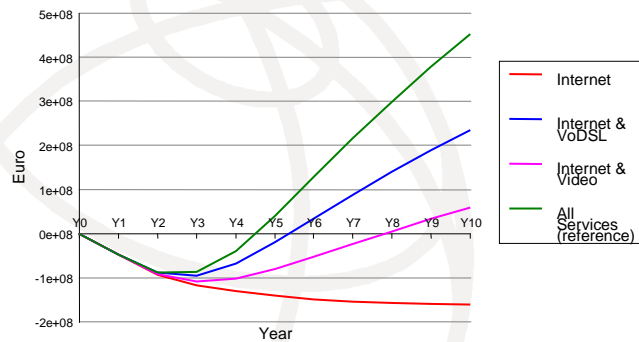


- Major impact of service classes on NPV and company survivability
  - Single service classes without future
  - High benefit of "all services" case



## Business Planning case

Effects of the mix of services on typical scenario: Medium competition level Network NPV

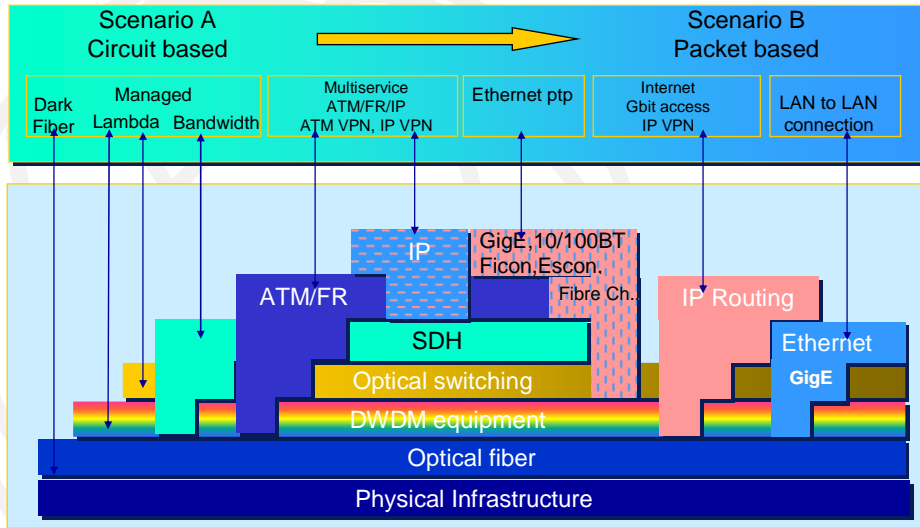


- Increase of competition level amplifies the previous effects on feasibility: big differences between service mixes
- Data only or single service classes without feasibility at medium term
  - Very robust behavior for the "all services" case

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# Technological alternatives at core

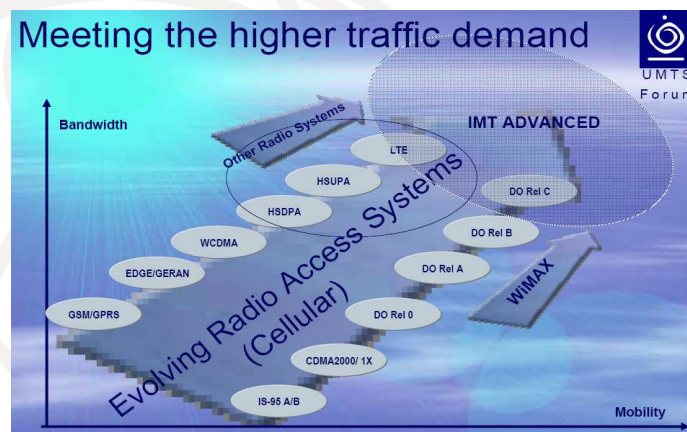


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# Network Architecture towards NGN Trends in WLL technologies for Bandwidth and Mobility



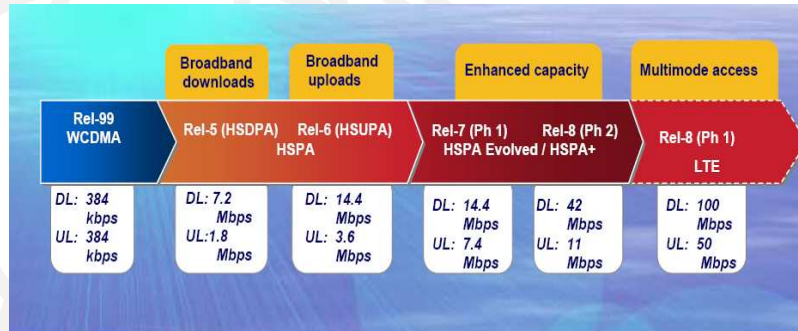
Convergence of different radio systems towards the integration of solutions and services at the IMT advanced

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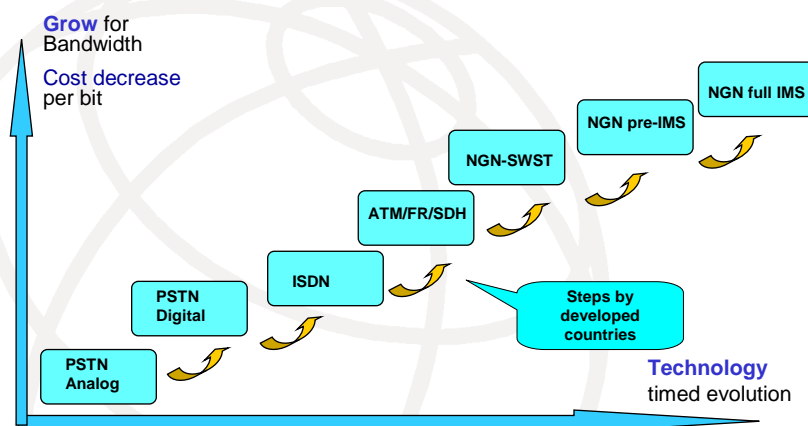
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## Network Architecture towards NGN Trends in UMTS solutions for higher capacity and performance

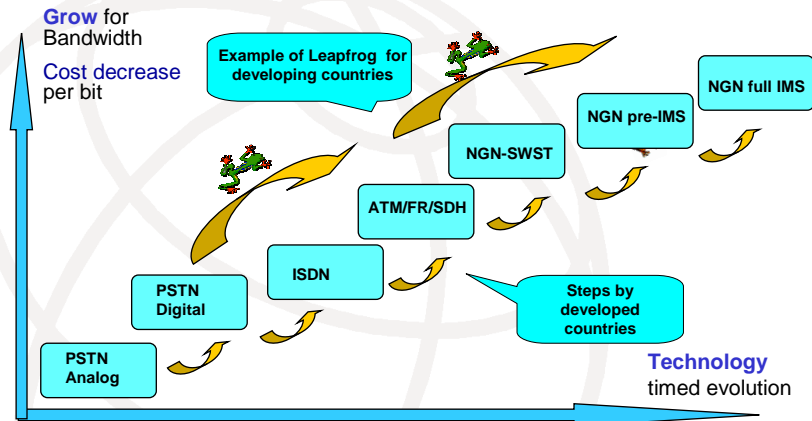


Evolution of the 3G and 3,5G versions towards 4G with increasing speeds and decreasing latency time

## Network Architecture towards NGN Fixed network steps/leapfrogging

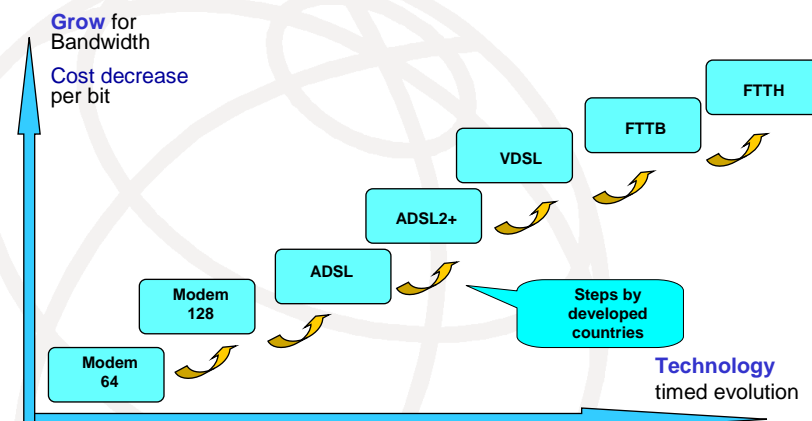


## Network Architecture towards NGN Fixed network steps/leapfrogging



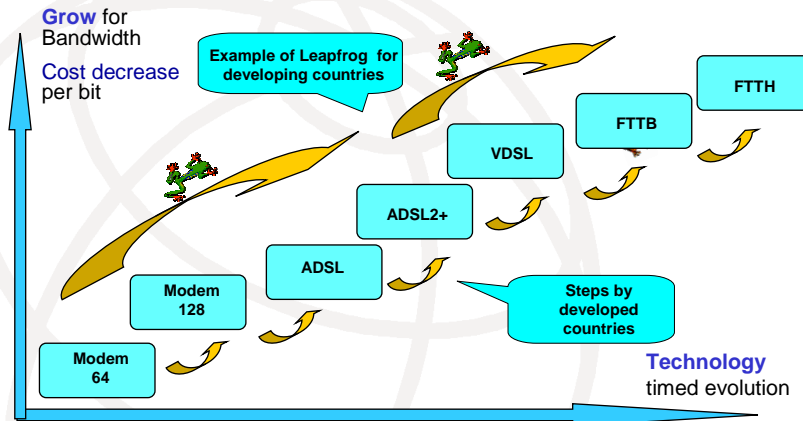
Migration strategy is strongly dependent on **country opportunity**, infrastructure and service maturity

## Network Architecture towards NGN Fixed Access network steps/leapfrogging



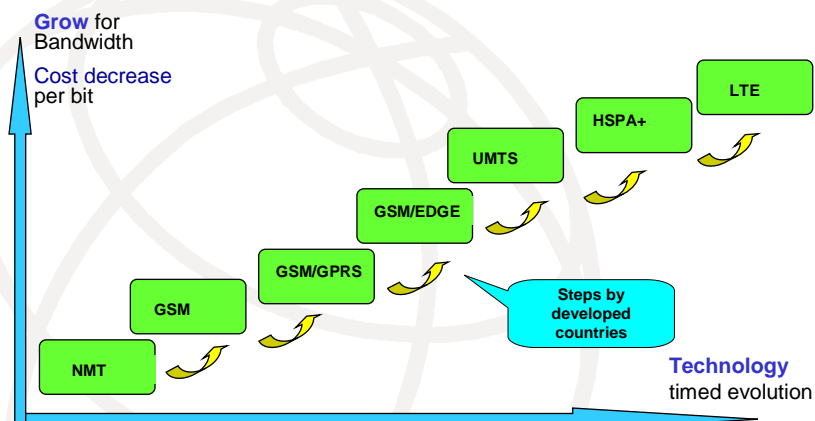
Historical migration steps for internet access operators with early development and services deployment

## Network Architecture towards NGN Fixed Access network steps/leapfrogging



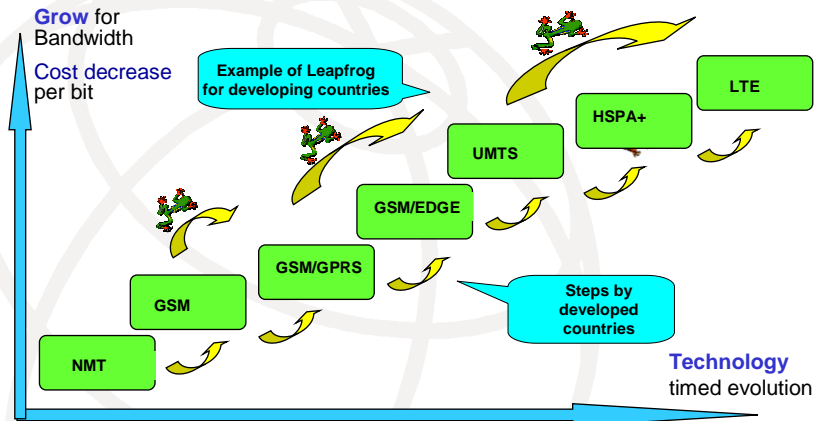
Migration strategy is strongly dependent on **country opportunity**, infrastructure and service maturity

## Network Architecture towards NGN Mobile network steps/leapfrogging



Historical migration steps for mobile operators with early development and services deployment

# Network Architecture towards NGN Mobile network steps/leapfrogging

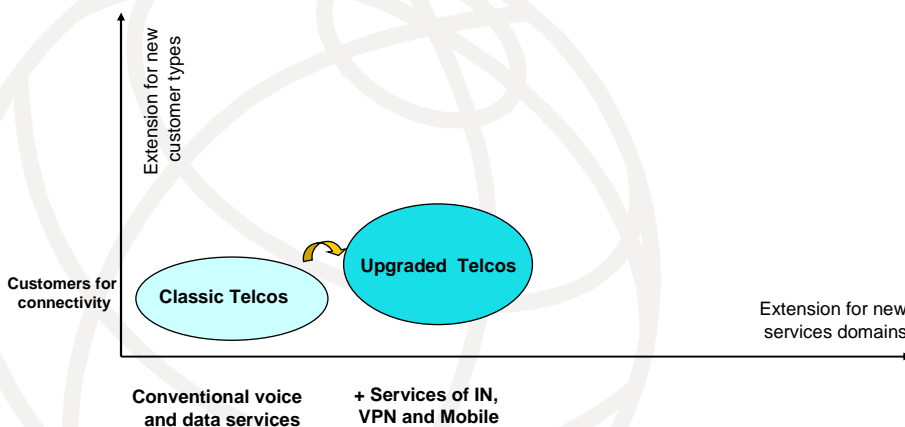


Migration strategy is strongly dependent on **country opportunity, infrastructure and service maturity**

# Business Migration Leaps



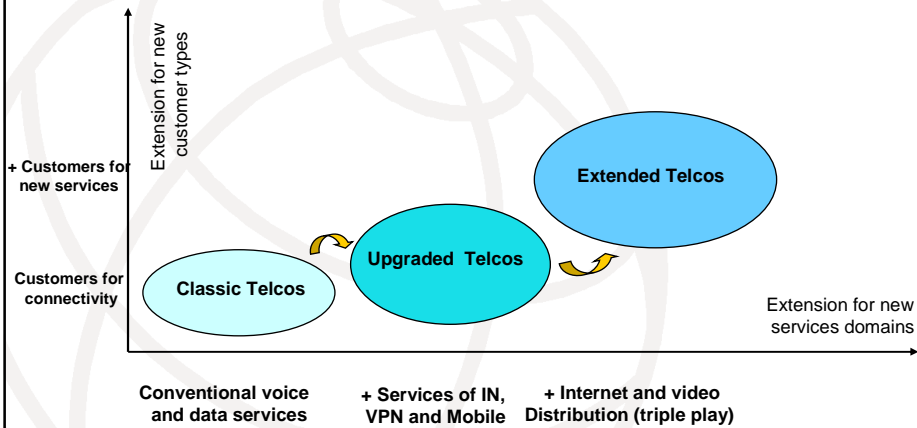
"staircase" for leading growing alternatives



# Business Migration Leaps



"staircase" for leading growing alternatives



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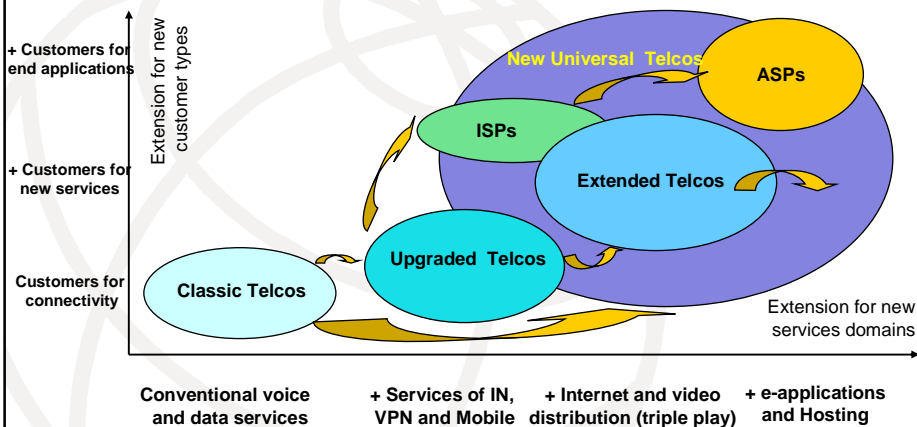
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# Business Migration Leaps



"staircase" for New Universal Telcos



Specific migration and timeframe to be optimized for the country context and regulatory conditions

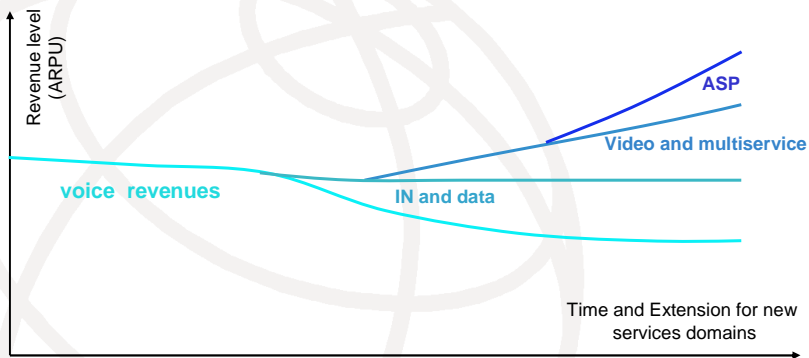
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## Business Migration Leaps

### Evolution of revenues with service domains



Conventional voice and data services    + Services of IN, VPN and Mobile    + Internet and video distribution (triple play)    + e-applications and Hosting

Convergence strategy is fundamental to grow in a competitive environment

## Recommendations

- Take benefit of experiences, benchmarking and proper modeling of key techno-economical factors
- Focus on consolidated migration steps and technologies with multiple services domains
- Take benefit of all economies of scale

**!! Which convergence will happen ?  
Combination Driven by Market, Economy of scale  
and Competition !!**