Technological Innovation in the Development of Peripheral Regions: the case of the telecommunications in the development of the region of “Alto Trás-os-Montes”

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Context

- The information and communication technologies (ICT) convergence is one of the main economic growth determinants.

- The **important role of the knowledge and information** has a significant impact on developing countries as they seek to become competitive players in a global market.

- Many authors argue that **telecommunications sector is the “nervous system”** of an emerging global information economy…
Context (2)
Peripheral Regions characteristics

• The geographic isolation of the peripheral regions is historically a brake for:
  ▪ the economic development,
  ▪ cultural change and,
  ▪ in general, for the access to services.

• While countries make significant progress in providing access in urban areas, **access in peripheral areas continues to be sparse**.

• This **scarcity of peripheral service** is partly attributable to the unique characteristics these areas present to a telecommunications provider:
  ▪ large geographical distances,
  ▪ low population densities,
  ▪ low levels of economic development, and
  ▪ low levels of skills.

• Then, Telecommunications Operators will be willing **to invest in core-regions** because of the number of inhabitants and therefore the ability to recover cost and make profit...
There is now growing empirical evidence that the increasing trend for deregulation in the telecommunication sector and privatization of telecommunications providers encourage the development of advanced telecommunication services based on actual demand, not on social objectives underlying a universal service requirement.

This means that metropolitan areas and large cities are better served than sparsely populated areas and small towns.

Each locality may be connected with internet using telephone or television cables, but only the largest cities are connected with glass fiber grids that allow for high speed communication of complex information around the globe.

Thus, the ubiquity assumption seems not true for advanced ICT infrastructure; remote areas tend to remain disconnected from them on the local level (the “last mile”).
Context (4)

• To fully exploit the technological capacity of the new ICTs, requires the adoption and development of regional human resources and of the institutional structures which support REGIONAL INNOVATION and organized learning.

• Clearly, a major challenge in developing the Information Society in peripheral regions is to stimulate demand for the new ICT infrastructures (demand side).

• The relationships between regional government and industry and other major actors such as the universities and the economic development authorities all significantly shape regional innovation.

• For many regions, telecommunication policy is not normally regarded as a regional policy issue. More and more regions becoming aware of the need to elaborate strategies for adapting the regional economic base to the challenges of the Information Society.
Question

- In this context, we define the following preliminary research question:

"Which is the role of telecommunication infrastructures in the development of peripheral regions?"
Preliminary Framework

- Peripheral Regions Characterization
- Literature Review
- Broadband Technology Characterization
- Cost Models Development
- Testing / Validation Cost Models
- Benchmarking
- Policy Implications
Methods (1)

- Focus on Peripheral Regions:
  - Trás-os-Montes: Portugal
  - Castilla y Léon: Spain
  - And benchmarking with central regions...

- “Alto Trás-os-Montes” region is a peripheral zone, located in the northeast of Portugal with 431,540 inhabitants and an area of 11,122 km² (corresponds 12.07% of the surface of Portugal).

- “Castilla y León” is an interior region, situated in the northwest of the Iberian Peninsula with 2,480,369 inhabitants. This peripheral region is limited for nine Autonomous Communities and Portugal. It occupies a surface of 94,223 km² (corresponds 18.7% of the surface of Spain), configuring itself as the region most extensive of Spain and third of the Europe. It is constituted by nine provinces: Avila, Burgos, León, Palencia, Salamanca, Segovia, Soria, Valladolid and Zamora.
Methods (2)

Indicators:
1. Demographic indicators;
2. Economic indicators
3. Social indicators;
4. Technological indicators

• Wholesale
  - ADSL accesses
  - Wholesale traffic
  - Internet
  - Average weighted change:
    • Call origination
    • Call termination
  - Wholesale leased lines
  - Number of leased lines
  - Capacity (equivalent to 64 kbps)
  - Digital

• Fixed Telephone Service
  - Total lines
  - Main lines in service
  - Main lines per 100 inhabitants
  - ISDN equivalent main lines
  - ISDN penetration rate
  - Total traffic, of which:
    - Retail
      • Fixed-fixed
      • Fixed-mobile
      • Other
      • International
        - Outgoing
        - Incoming
  - Total originated traffic in the fixed network
  - Originated traffic per access per day
  - Average weighted price change (price basket)
Methods (2.1)


<table>
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<tr>
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<tbody>
<tr>
<td>Portugal</td>
<td>0,3%</td>
<td>5,2%</td>
</tr>
<tr>
<td>Norte</td>
<td>1,8%</td>
<td>5,9%</td>
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<tr>
<td>Alto Trás-os-Montes</td>
<td>-15,8%</td>
<td>-6,5%</td>
</tr>
</tbody>
</table>
Methods (2.2)

- Population density, in 2001 (hab./km²)
Methods (2.3)

- Students variation in Secondary School between 1998 and 2003 (public / private schools)

<table>
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<tr>
<th>Region</th>
<th>Public Variation</th>
<th>Private Variation</th>
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<tbody>
<tr>
<td>Continente</td>
<td>-14%</td>
<td>12%</td>
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<tr>
<td>Região Norte</td>
<td>-10%</td>
<td>20%</td>
</tr>
<tr>
<td>Alto Trás-os-Montes</td>
<td>-16%</td>
<td>-27%</td>
</tr>
</tbody>
</table>

Variação de alunos matriculados no Ens. Secundário entre 1998 e 2003
Methods (2.4)

• Students variation in high education between 1998 and 2003

Variação de alunos matriculados no Ens. Superior entre 1998 e 2003

<table>
<thead>
<tr>
<th>Continente</th>
<th>Público</th>
<th>Privado</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>21%</td>
<td>-10%</td>
</tr>
<tr>
<td>Região Norte</td>
<td>19%</td>
<td>-0,5%</td>
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<tr>
<td>Alto Trás-os-Montes</td>
<td>47%</td>
<td>31%</td>
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</table>
Methods (3)

- Broadband infrastructures in peripheral regions can be supported for multiple technologies:
  - Main technological options for fixed access to broadband:
    - Fiber; cable; xDSL, …
  - Main technological options for wireless access to broadband:
    - UMTS, WLL, WiFi, Satellite, DVB-T, …

- The choice is determined for various factors:
  - Clients dispersion;
  - Infrastructure availability;
  - Services to support;
  - And, operation costs of the network infrastructure.

- Critical factors with direct impact in BB development:
  - Prices; Infrastructures; Contents.

- Critical factors with indirect impact:
  - IT skills; Firms modernization; Public Administration modernization.
Methods (4)

• Methodology:
  1. Quantitative, (Sources: Portugal Telecom, UMIC, OCT, ITU, OECD, and surveys…)
  2. Qualitative, (Sources: case studies, and documental content analysis)

• The main problem in collecting data:
  ▪ no available data on regional level;
  ▪ the available information is to national level.

• Two case studies in progress:
  ▪ Trás-os-Montes: Portugal
  ▪ Castilla y Léon: Spain
Thank You

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