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Role of Research Infrastructures for a Competitive Knowledge Economy

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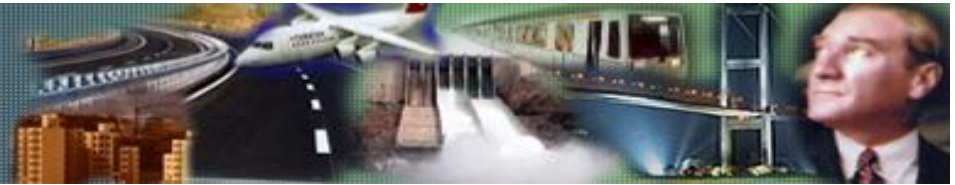
*State Planning Organization,
Turkey*

8 March 2010



Definition: What are research infrastructures?

- **Advanced research centers**
- **Observatories**
- **Data banks**
- **Radiation sources**
- **Communication networks**



Fundamental Benefits of Research Infrastructures

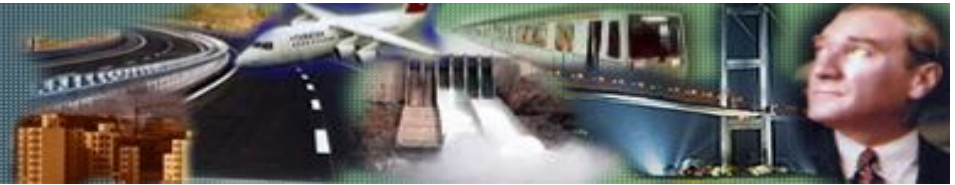
High-profile Research Infrastructures

- **Endow you with unique competitive edge** by enabling producing new knowledge at the science & technology frontier, which is accessible for only a few
- **Let you catch up your competitors** by helping to absorb and assimilate knowledge existing elsewhere
- **Act as an integrating medium** for several different actors, which leads to **birth of** more ideas, more cooperative research and new products/services



Research Infrastructures as a policy tool - examples

- **Reconstruction of Industry Composition**
 - Higher ratio of high-technology sectors within the composition
 - Reformation of traditional industries (textiles, steel production, etc.)
 - Creation of new industries (depending on biotechnology, new energy technologies, etc.)
 - Attraction of research intensive FDI
- **Technology Transfer**
- **Formation of TRA and Integration into ERA**
- **Attaining focus & critical mass in R&D activities**



Research Infrastructures as a policy tool - examples

- **University – Industry Cooperation**
- **Cluster Formation**
- **Acquaring Core Competencies and Capabilities**
- **Raising and Retention of Star Researchers**
- **Effective allocation of resources for R&D**



Why State Intervention is needed?

There can be substantial amount of *market failure* (private investments alone remain below the socially optimal level) associated with Research Infrastructures because:

- **Public Good nature of research outcomes prevents the full privilege of firms on their investments**
- **Great size of initial investment and operational costs (cost of building, machinery, know-how & human resources) precludes any single firm to attempt even it desires so**
- **Risky nature of R&D investments represents additional important obstacle**



Investments for R&D Infrastructures in Turkey

In 2010 from central state budget:

Overall State Supports for R&D : 670 million Euros

Supports for Research Infrastructures: 190 million Euros

- 101 million for universities
- 43 million for TUBITAK research centers
- 46 million for remaining public institutions & technoparks



Types of R&D Infrastructures in Turkey

1- Thematical Research Centers:

- In well-established universities and public research institutions
- Very competitive selection process depending on panel reviews
- Few centers on each topic (but not single: for competition & diversity)
- Aim to be a center of expertise in a certain area on national and international scale
- Size between 5-30 million Euros

2- Central Research Facilities:

- Founded in **all** developing universities
- Based on common and priority research infrastructure needs of the all departments of the university
- Take into account the needs of the close region in design
- Form the base for subsequent thematic research centers
- Size between 2-6 million Euros



Examples of Research Infrastructures in Turkey

- National Biotechnology Institute, Ankara Univ. 30 M E
- National Nanotechnology Institute, Bilkent Univ. 20 M E
- Sabanci Univ. Nanotechnology Center 20 M E
- Istanbul Technical Univ. Aviation Res. Center 25 M E
- Turkish Accelerator Centers (2 of them) each 25 M E
- MEMS Research Center, Middle East Tech. Univ. 12 M E
- National High Performance Computing Center 25 M E
- TUBİTAK ULAKBİM GRID Infrastructure 15 M E
- TUBİTAK Reseach Centers growing by 40-50 M E/ year



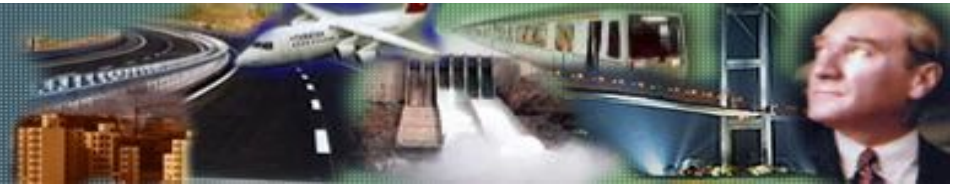
Next Step for Research Infrastructures in Turkey

- Development of a National Roadmap:
 - 1- Detailed inventory of what we have now
 - 2- What are the existing ones to improve
 - 3- What are the new ones to enter into
 - 4- How to integrate with EU system



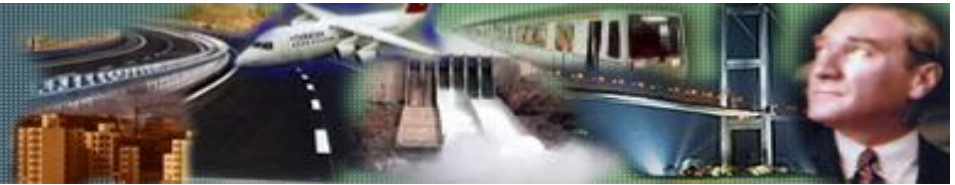
Important Issues for Operation of Research Infrastructures

- R&D strategy of each center: core areas, roadmaps, strategic alliances
- Allocation rules, prices and procedures:
 - Openness is taken granted with legislation
 - Web-based scheduling
- Reflective business plan that maintains
 - Sustainability: generate enough income for operational costs
 - Reach for the industry: aggressive marketing



Important Issues for Operation of Research Infrastructures

- Technology transfer mechanism
- Consultation medium
- Facilities to facilitate the the use of center by outsiders
 - Accomodation for researchers from other universities
 - Rentable project offices for companies



Monitoring of Research Infrastructures

Monitoring of **Scientific Achievements** of each center:

- SCI publications – at the frontier
- Integration into EU Research Programs
- Amount of Research activities enabled
- Utilization rates
- Star researchers raised or brought back



Monitoring of Research Infrastructures

Monitoring of **Economic Achievements** of each center:

- Patents and licences
- Contract research activities
- Services provided for business (Analysis, certification, standarts)
- Spin-offs created
- Star researchers raised or brought back
- Regional/provincial problems addressed & improved



Evaluation of Research Infrastructures

Assessing for the **performance of all centers:**

- Comparison of centers with each other
- Experience sharing between different centers
- Interplay between research infrastructures and other R&D support mechanisms and combined impacts
- Relative performance with respect to other EU peers



CONCLUSION

- Investment **decision is a hard one** but the **potential is enormous**
- Turkey has made this decision
- Drastic improvements in knowledge base and research capacity seem to be in close reach
- But the critical issue is that the private sector should engage at the same scale of effort in innovations
- Then these research infrastructures would be the real driving force of development



Thank you for listening...