



ENERGY MARKET REFORMS, R&D & INNOVATION, AND CHALLENGES: TURKISH EXPERIENCE

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INTRODUCTION

- An overview of innovation and R&D, the impact of energy market reforms on innovation and R&D expenditures
- Turkey's experience in promotion of innovation and R&D expenditures
- Challenges for regulatory authorities
- Conclusion

WHAT IS R&D AND INNOVATION

R&D is defined as “**creative work undertaken on a systematic basis in order to increase the stock of knowledge**, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications” (Frascati Manual, 2002)

- Three types of R&D; **Basic research, Applied research , Experimental development**

Innovation is defined as “**the implementation of a new or significantly improved product** (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations” (Oslo Manual, 2005).

Innovation is **a new or significantly improved** product, process or method to the firm, and **it must be implemented.**

- Four main types of innovation that are related with **product, process, marketing and organizational.**

INNOVATION- R&D INVESTMENTS

Innovation and R&D expenditures are different from other investments.

- Innovation and R&D
 - **Have characteristics of public goods** - lead to free-rider problem and create market failure.
 - **Include costly processes**, require high initial investments, and scale economies are essential to reduce their costs.
 - **Technological, market and trade uncertainties** which increase risks for firms and adversely affect innovative activities and R&D.

These differences hinder allocation of enough sources for innovation and R&D. Therefore, government intervention is required to allocate enough resources to innovation and R&D in competitive markets.

INNOVATION SYSTEM-A NOTE

Innovation should always be **considered as a system** (regional or national etc.) that is affected by many policies (development policy, energy policy, education policy, fiscal policy, etc.)

Experiences of successful countries show strong networks and feedbacks among stakeholders. (Shale Gas in USA, Taiwan Solar Industry, German Wind Industry)

Problems that hinder innovative activities :

- **Cost and marketing problems** : High initial costs and lack of early stage funding, uncertain demand etc.
- **Collaboration and knowledge problems** : Lack of skilled & trained personnel, Lack of technological knowledge
- **Institutional and legislative problems** : Weak technological infrastructure, Regulations and taxation

INNOVATION AND R&D IN THE POWER SECTOR

- Characteristics of the electricity sector :
 - Huge capital investments and large sunk costs,
 - Interdependencies among actors are higher than other sectors,
 - Actors have to comply with standards and technical requirements to assure functioning of the system effectively and safely.
- It is more resistant to change, and incumbents in electricity sector prefer **incremental innovations** that comply with the infrastructure and do not compromise the functioning of the system.

MARKET REFORMS - INNOVATION AND R&D

It is expected that firms will make innovations to **offer competitive prices and high quality services to consumers** (Process, marketing and organizational innovation)

However, energy market reforms have **altered the motivation**, firms engage in less-risky and less-costly innovations or R&D activities that will result in a product or a service in short term.

Some studies stress that **energy R&D expenditures have decreased considerably in real terms** in major economies since the beginning 1990s, and they attribute this decline mainly to restructuring.

MARKET REFORMS - INNOVATION AND R&D (2)

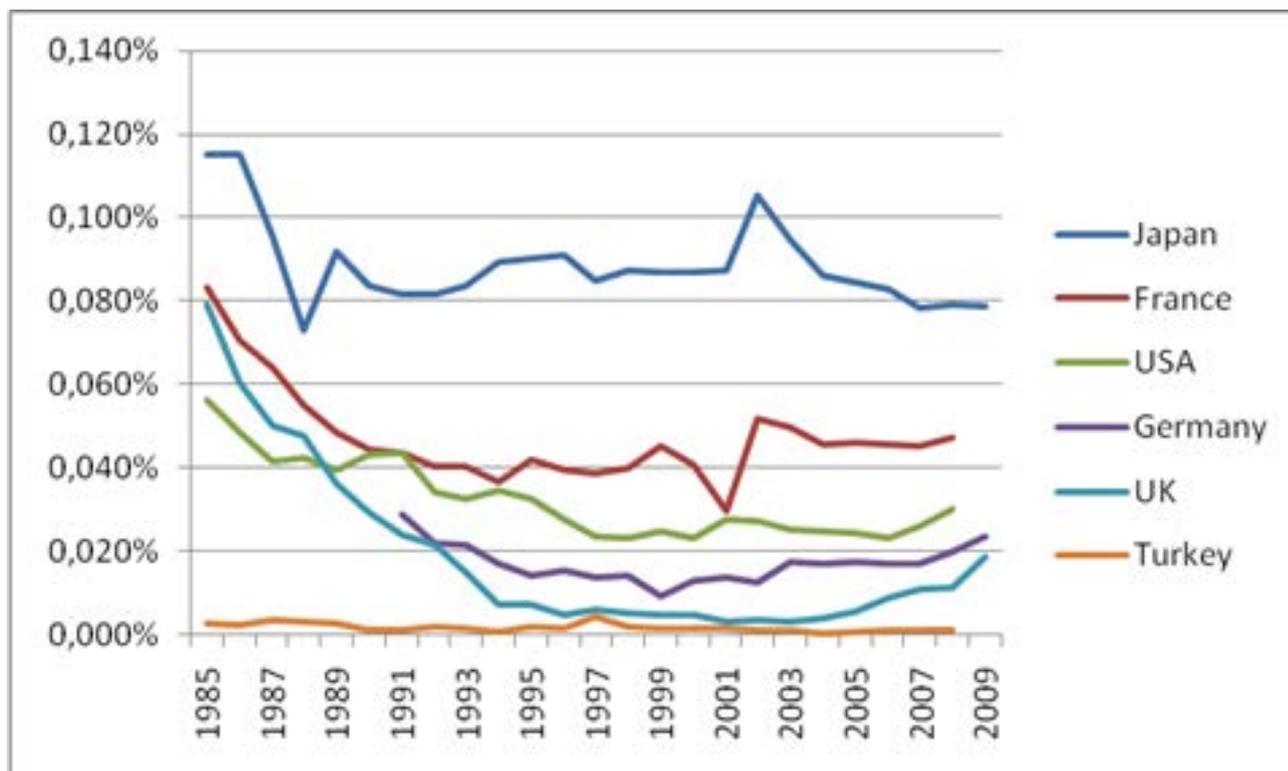
On the other hand, some authors point that R&D expenditures in regulated markets **were mainly determined by political and social concerns which led to a waste of resources for useless activities**, and the decline in R&D expenditures may not hamper technological innovation.

Some studies attribute the decline in R&D expenditures to the transition process, and it is claimed that uncertainties regarding liberalization and deregulation process adversely affect both public and private sector investment decisions which include R&D expenditures.

SUPPORT MECHANISMS FOR INNOVATION AND R&D

- Direct support mechanisms
 - Tenders,
 - Grants,
 - Loans,
 - Training, research programs
 - Tax-exemptions,
 - Public procurement,
 - Promotion of clusters and collaboration among companies,
- Indirect support mechanisms (FiTs etc.)

ENERGY R&D IN TURKEY



Energy R&D Budgets as a share of GDP (Source : IEA)

SURVEY RESULTS 2011 – DISTRIBUTION COMPANIES

6 companies were interviewed, none of them had R&D expenditures. However, they engaged in innovative activities.

Product / Process Innovations :

- Online customer services
- Use of new technologies in distribution network

Marketing Innovations :

- New subscription and payment methods

Organizational Innovations:

- Improvement of IT systems and technical infrastructure
- Use of new management methods
- Acquisition of international quality management system certificates,

Why ?

They are focusing on the organizational problems.

They do not want to make unnecessary expenditures

They may initiate or participate in R&D projects.

NEW INCENTIVE SCHEME BY EMRA

In May 2014, EMRA initiated a new incentive scheme for R&D expenditures and innovative activities of distribution companies.

The purpose is to enhance infrastructure quality, develop new technologies for network operation, facilitate innovation, increase efficiency and service quality, and reduce costs and losses.

EMRA allocated %1 of operating costs of distribution companies as R&D budgets.(A total of ₺98 million or \$37 million until 2016)

NEW INCENTIVE SCHEME BY EMRA

Projects should be submitted to EMRA twice a year, a commission of five experts assess and approve projects.

Projects partially funded by International Organizations (such as EU) or government agencies (such as TUBITAK) do not need approval.

- In July 2014, 11 of 39 projects were approved.
- In January 2015, 12 of 44 projects were approved.

CHALLENGES !

- Is it necessary to provide incentives for innovation and R&D expenditures in competitive markets with recent technological progress?
- How should the incentives be structured? Are international cooperation or national support mechanisms useful? How can duplicate efforts be prevented?
- Which activities should be supported? What are the priorities? What about joint projects?
- How long should these activities be supported by incentive schemes?



THANKS FOR LISTENING