

Chapter 10

R&D Competition, Cooperation, and Microeconomic Policies

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ABSTRACT

This chapter aims to contribute to the better understanding of R&D by scholars and practitioners. It includes a first section where the concept of innovation is defined and its public good nature and cumulative dimension are analysed. Next, the incentives that firms have to undertake R&D to attain a competitive edge upon rivals are considered. This entails the consideration of both ex ante and ex post incentives to undertake R&D. Since innovation is costly and derives important external effects, cooperation in R&D activities is prominent in several industries where firms enter into research joint ventures, or form research networks. The effect of cooperation is that, under some circumstances, the industry performance is better as compared to full competition. The final section addresses the complementarities and conflicts among the different microeconomic policies (trade, industrial and competition policy) faced by governments when considering the support of R&D activities.

INTRODUCTION

[...] Where is the wisdom we have lost in knowledge? Where is the knowledge we have lost in information? -T.S. Elliot

In the world today, information is increasingly available to all people. The latest developments in computing, information, and telecommunication technologies have sped up the production and dissemination of information. But information

has to be converted into knowledge before being used to produce innovation. Since innovation is one of the drivers of growth and development, we will want to refer in this chapter to how economic actors use information to gain in efficiency and achieve a better performance that potentially leads to more prosperous economies. Aware of this fact, governments include Research & Development (R&D) related issues as targets. For example, research, development, and innovation are key policy components of the European Union (EU)

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strategy for economic growth, as presented in “Europe 2020”. The EU acknowledges that by fostering market take-up innovative goods and services, smart growth and job creation, which will be important in addressing societal challenges. Increased labour productivity, industrial competitiveness and the development of green and efficient resources are, thus, the final goals.

As shall be made clear below, most MENA countries are lagged with respect to the developed economies in terms of innovation capabilities. Our contribution is to give a broad overview useful both for academicians and practitioners in those countries regarding: the specific nature of innovation, how firms use innovation to acquire a sustainable advantage in the market by either competing or collaborating and, finally, how governments elsewhere have developed instruments and implemented policies that enhance innovation and ultimately economic growth. In doing so, we survey the mainstream economic literature that addresses these questions.

Just to provide a glimpse of the relevance of innovation in modern economies, some data are provided on three important features that characterize innovation. First, regarding the participation of innovation in Gross Domestic Product (GDP), note that the Gross Expenditure on R&D (GERD) as a percentage of GDP is in 2012 above 2.00 in all the mainstream economies, and this ratio is mainly increasing in the period 2002-12 (see Table 1a below for data of a sample of countries in the period 2002-12). A further relevant aspect of innovation is the public support governments provide in funding R&D activity. Table 2 shows the percentage of GERD financed by governments in a sample of countries. Note that about one third of the expenditure is financed by the governments in developed economies. This ratio is higher in most of the developing economies.

Finally, innovation is recently being undertaken by way of alliances. The number of alliances worldwide seems to be increasing, according to the CATI (Cooperative Agreements and Tech-

nology Indicators) database, in 2006 about 900 new worldwide business technology alliances were formed. Approximately two-thirds of which involved at least one U.S.-owned company regardless of location. Close to 60% of the worldwide total focused on biotechnology, and 23% focused on information technology. Other areas include materials research and engineering, aerospace, automotive and chemicals. See Table 3 below for more detailed information since 1980.

As is well known, data for the MENA region are usually not available. Thus, Table 1b displays that, when available, these countries exhibit GERD as a percentage of GDP that are very low, except for Israel and Tunisia. It is also informative to report that, in the listing of number of patents granted by the USPTO in 2008, Israel is the first MENA country to appear in the 12th position with 1,166 patents and the next is Saudi Arabia in the 36th position with 30 patents. These data are an indication that MENA countries still have much ground to cover. This chapter will include a first section where the concept of innovation is defined and the basic features that make innovation so difficult to deal with are described. Thus, its public good nature, the appropriability problem of knowledge and the view of innovation as a cumulative process are included.

Next, the incentives that firms must undertake R&D to attain a competitive edge upon rivals are considered. This entails the consideration of the ex ante and ex post incentives to undertake R&D. Therefore, once the innovator obtains a new patentable development, it has an incentive to sell the rights of use to other firms. This leads us to comment licensing contracts as mechanisms to spread knowledge and devote attention to their basic features.

Finally and since innovation is costly and has important external effects, cooperation in R&D activities is prominent in several industries. Cooperation allows firms not only to share costs but also to internalize the aforementioned externalities. The effect of cooperation is that, under some

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