

Title

Imitation – is it a misconceived target for innovation policy?

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In economics, imitation is considered to be an activity with a severe negative connotation. In the worst case, imitation is considered as a form of industrial espionage. Even if no sloppy hats and cloak coats are evoked, mainstream economics tells us, that because of the public good nature of new technological knowledge, imitation happens automatically by rational agents and simultaneously the incentives to invest in costly R&D disappear.

Without doubt, there is some truth in considering new technological knowledge at least as a “latent public good”. However, to derive from this that all incentives to be engaged in innovation may disappear instantaneously has to be considered as overshooting far from any kind of realistic analysis. The history of innovation is full of stories of innovations that are hardly viable and full of technological and organizational flaws when they were firstly generated. Without severe improvements of the original blueprints by so-called imitators, these new technologies would never have found their ways through markets in order to unfold the beneficial effects on income growth.

Besides the latent public good properties of new technological knowledge, innovation processes are additionally characterized by strong uncertainty. Contrariwise to risk, in a situation of true uncertainty an optimization rationale is self-forbidden. Innovation is always experimental and targeting an open future; to phrase it differently, failure is always an important component of innovation processes. From this follows that also the idea of optimal incentives to invest in R&D is missing the real nature of innovation processes.

Innovation and technology policy in mainstream economics is designed around the two ideas of (i) new technological knowledge to be a pure public good, and (ii) severe distortions of optimal incentives to invest in R&D due to this. Taking seriously the epistemological caveat of true uncertainty and the empirical observation of latent public good features of new technological knowledge therefore must have severe consequences for designing innovation policy instruments. Acknowledging for true uncertainty does not allow evaluating innovation activities against the benchmark of optimal innovation incentives. The

future-orientation of innovation suggests dismissing any deterministic view inherent in an optimization-based approach, but much more modestly stick to an evolutionary description of innovation.

Even if in an evolutionary interpretation a well-described target of innovation policy is not available anymore, innovation policy can reflect the experimental nature of innovation and try to avoid situations which restrict future developments. Such situations are characterized as evolutionary inefficient and avoiding these evolutionary inefficiencies turned out to be a much more modest but at the same time realistic goal for innovation policy. Furthermore, taking seriously the latent public good features of new knowledge sheds light on cumulativeness of innovation, firm and technology specificities, and the tacit as well as local character of new knowledge, convicts the focus on incentives to innovate as much too simplifying. In most industries today, innovation processes are not undertaken by single firms but in innovation networks comprising heterogeneous firms with different competences in joint learning activities. Acknowledging innovation activities in innovation networks makes it already almost impossible to distinguish between innovation and imitation. The consideration of knowledge as a latent public good therefore opens up the possibilities of collective innovation, where heterogeneous actors, sometimes even from different industries, mutually develop, test and improve new knowledge and its application in different domains.

These considerations lead to a different interpretation of so far unloved imitation processes. In many circumstances the difficulties of innovations to become successful and to spur economic growth and development can stem from imitation processes not working adequately. The understanding of innovation as an evolutionary process highlights the meaning of evolutionary inefficiencies for economic development and therefore as a target for policy interventions. This, however, includes the possibility that policy shifts attention from innovation to imitation.

1. Theoretical discussion: imitation and innovation

Schumpeter ideas on innovation and economic development are best summarized in his book, The Theory of Economic Development (Schumpeter, 1934). His classical definition of development includes:

“(1) The introduction of a new good – that is one with which consumers are not yet familiar – or of a new quality of a good. (2) The introduction of a new method of production, that one not yet tested by the branch of manufacturing concerned/.../(3) The opening of new market/.../(4) The conquest of a new source of supply of raw materials or half-manufactured goods/.../(5) The carrying out of new organization of any industry/.../” (Schumpeter, 1934, p. 66).

This seminal taxonomy is still valid and forms the bases of our present-day definitions of both innovation and economic development. It also underlines the importance of radical, innovation for economic development. Yet, most economic development in catching up processes starts up with imitative innovation, that is innovation that is new to the countries and the firms that adopt the new product, process technology or organization, but is not new to the world, and is often already known by consumers, even in more backward countries.

It is thus important to understand the different processes through which imitative innovation takes place. This paper is about the several mechanisms of imitative innovation, and brings forward a set of general propositions about imitative innovation. The paper puts forward several propositions on imitation.

General proposition 1: Technological and organizational imitation is universal in economic development and it has been theoretically underestimated.

General proposition 2: Organizational and technological imitation is part of the diffusion process. Technology and organization often change through diffusion as they adapt to new environments (Niosi, 1999).

General proposition 3: Imitation most often involves a certain degree of innovation, technological or organizational. There is a high degree of continuity linking imitation and incremental innovation.

Proposition 1: Imitation is not confined to backward countries contrary to an often-repeated belief according to which imitation is confined to emerging and catching up countries (see Luo et al, 2011). Most imitation occurs among industrial countries.

Proposition 2: Typologies of innovation strategies (i.e. Kay, 1978) confine the imitation strategy as one particular case, yet most companies in both industrial and developing countries are imitators, not radical innovators. Imitative innovation deserves more attention.

Proposition 3: Intellectual property rights have an impact on imitation strategies; patents and other legal barriers to copying do slow down the rhythm of imitation but they do not prevent it, because imitation occurs through several different channels (Bessen and Maskin, 2009).

Proposition 4: Imitative innovation may occur at the level entire architectures of products, but also of modules and components, (Henderson & Clark, 1990) new applications for known drugs (i.e. biologics), product size reduction, and process and product simplification (Wells Jr., 1983).

Proposition 5: Imitation may start with licensing in, but is far more frequent than these cases. It occurs through the generation of new ideas about how to improve existing products in order to adapt them to a different market (Kim, 1997; Ozawa, 1974).

Proposition 6: Reverse engineering is a common imitative practice (Anchordoguy, 2001) but far from the only one. Licensing in, consulting with experts, machinery acquisition, and hiring experts, technicians and managers from more advanced competitors are also common.

In sum, with a few exceptions (Nelson and Winter, 1982; Levitt, 1996; Huang et al, 2010; Ulhøi, 2012) imitative strategies have been too often overlooked. They deserve a more thorough analysis both at the micro and macro levels, in the debates about catching up, learning and economic development.

Proposition 7: Innovation policies are not classified between those aimed at radical innovation, incremental improvement of existing ones, modular innovation or other. In both industrial and industrializing countries, innovation policies serve as well architectural and radical innovation, incremental innovation and imitation.

Yet, South East Asian countries are often aware of the need to imitate existing products, process and organizations in order to catch up. The example of imitation of biosimilar drugs in several emerging countries will serve to illustrate and develop these hypotheses.

2. Imitative company and policy strategies in biopharmaceuticals

A new niche – biopharmaceuticals – is now growing in the pharmaceutical industry. Since 1980, new drugs are increasingly developed using modern biotechnology. Some 80% of all new biotechnology drugs have been developed in the United States. As they lose patent protection, American, Canadian, European (based mainly in Germany and Switzerland), Israeli and emerging-country companies (mostly from Argentina, China, India, and Korea) are developing their own versions of the new drugs. This imitation involves substantive levels of innovation. Germany is the largest exporter of these biological follow-on (as they are called in the United States) or biosimilars (as they are known in Europe), followed by Israel and Canada, but emerging countries are not far behind with their domestic versions of these new drugs (Niosi et al, 2012). Yet, the policy incentives required for accelerated innovative imitation may be slightly different compared to those implemented for any kind of innovation.

This section will analyze the different mechanisms through which imitative innovation occurs in the global biopharmaceutical industry. It will also pinpoint the different innovation policies implemented in several European, Latin American and South East Asian countries in order to catch up in this knowledge-intensive industry.

3. Conclusion and policy implications

Imitative innovation has always been held central role in development and catching up strategies. The paper concludes that there are important policy implications. Both emerging and industrial countries may benefit if they recognize the importance of imitative improvement and they align their innovation policies taking this important element into consideration. Some key innovation policy inefficiencies will be avoided if the universal fact of imitation was taken into consideration in the design of these incentives.

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