

# Briefing Notes in Economics

*'Helping to de-mystify economics since 1992'*

Issue No. 56, March 2003

<http://www.richmond.ac.uk/bne>

ISSN 0968-7017

## **From Schumpeter to the Economics of Innovation** ✧

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Schumpeter's insights have been used along both neoclassical and evolutionary lines to explain how the process of economic development contributes to innovation-based competition. This paper explores several aspects of these issues and concludes that the policy message – more active government – is the same irrespective of whichever of the neoclassical or the evolutionary interpretations of Schumpeter's work is taken. **JEL: O31, O38, B31.**

*"The fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers' goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates"*  
- **Joseph A. Schumpeter**, 1942, p. 83

### **1. Introduction**

In these days innovation is generally seen as the heartbeat of advanced economies. Globalization, technological developments and changes in market demand have led to more competitive pressure for companies. Firms cannot suffice anymore by competing solely on price. In order to keep ahead of competitors from all over the world, firms spend a lot of time and money on research and development (R&D). Thus, they hope to develop and

introduce innovations; that is new products, services and production processes. Consequently, competitiveness has become almost synonymous with innovativeness. Not only companies, but also governments recognize the importance of innovation. In it European context both national and regional policy makers search for policies to strengthen innovative performance. What used to be industrial and regional policy has been largely reformulated to innovation policy now.

In the academic world there has been a long tradition in studying innovation. Economists like Marx, List, Veblen and particularly Joseph A. Schumpeter (1883-1950) pointed to the importance of innovation in the economy. Schumpeter (1934; 1942) saw the entrepreneur developing ‘new combinations’ as the engine that keeps the capitalist system running. Innovations bring about a process of ‘creative destruction’ through which the old economic structure is destroyed and a new one is created. For Schumpeter, innovations are not exogenously given (like ‘*mana from heaven*’), but come from within the economic system itself. Innovations are the outcome of competition between firms searching for *monopoly profits* that result from innovating. Attracted by these profits firms continuously look for new ways to make their rivals’ positions obsolete. According to Schumpeter, it is this innovation-based rivalry rather than neoclassical price competition that is the important feature of capitalism.

Schumpeter’s view on innovation has inspired many economists and the research that they do. However, the rich prose in which Schumpeter wrote has not helped an unambiguous interpretation of his ideas. This may explain why there are several different schools of thought all claiming to build on the Schumpeterian tradition. The mainstream approach, neoclassical economics, has focused particularly on the innovation market and its imperfect nature. In contrast, the evolutionary school of economics has stressed the dynamic and systemic character of innovation. Their work resulted in the literature on innovation systems. Broadly speaking these two ‘theories’ have come to embody what is currently

known about the economics of innovation.

In this paper we shall deal with both the neoclassical and the evolutionary perspectives on innovation. These views are presented in sections 2 and 3, respectively. In section 4 we discuss the insights both theories offer for innovation policy. Section 5 concludes. If anything, this review attempts to show that like the process of innovation itself, its analysis is also a complex, but fascinating all the same, field of study.

## 2. The market for innovation

Traditionally, the economics of innovation has been studied from a neoclassical perspective. In particular the notion of market imperfections in the innovation market has received much attention. Theoretically, a firm should be highly motivated to invest in R&D as innovations contribute to its goal of maximizing profits. Neoclassical theory, however, argues that the innovation market prevents firms from innovating as much as would be socially optimal. The private incentives to invest in R&D are far too low compared with the social incentives. Usually, the characteristics of R&D-results, and the nature of the innovation process, are regarded as the main causes why the market for innovation does not work properly.

The first source of market failure is that the outcome of R&D can be interpreted as a piece of new knowledge. Unlike private goods, knowledge has characteristics of a public good: it has a non-rival and partially excludable character. Non-rivalry means that an *economic* actor can use knowledge without reducing its value for someone else. Partial

excludability refers to the idea that the knowledge producer can only appropriate a fraction of its total economic value (the appropriability problem). In other words, R&D-activities generate positive externalities (or spillovers) to other market parties. These knowledge spillovers and their effects decrease the incentives for firms to invest in R&D in three ways.

First, as the research accomplished by one firm may, at least partly, leak out to others, the individual private returns will be lowered (Katz, 1986). The innovator cannot ask a payment from other firms who, due to spillovers, ‘free ride’ on its R&D. Second, when the spillovers of R&D-efforts flow to competitors, the innovating firm may inadvertently strengthen their competitive position at the cost of itself. Third, even if the innovator is able to sell its R&D-results to other firms (through, say, licensing) or to consumers, the surplus of the innovations cannot be appropriated completely. The fact is that companies are not able to apply perfect price discrimination in the market, because quality improvements due to R&D are not well translated in the prices at which the innovations are sold.

The second reason why firms are discouraged to invest in R&D has to do with the features of the innovation process (Dasgupta, 1996). One impediment is that innovating involves scale- and scope-effects. Since the same piece of new knowledge does not need to be produced more than once, its production can be seen as a fixed cost-component for the innovator. Generally speaking, these fixed costs are so high that firms can only cover them by producing at a large scale.

Besides, these scale-effects there are scope-effects with respect to R&D.

One firm making use of possibilities of synergy can conduct the R&D-activities of two firms, each operating on a different technological area, more efficiently. Thus, the scale- and scope-effects of innovation require a sufficiently large scale and efficiency of operation. If firms do not meet these requirements, the practice of innovating can be too expensive for them. Furthermore, the innovation market is surrounded by uncertainty. Innovating is often a process of ‘trial and error’ or, in Schumpeter’s words:

‘like shooting at a target that is not only indistinct but moving’ (Schumpeter, 1942, p. 88).

It is difficult to predict whether R&D-efforts really generate the new technology at which they are aimed at. Apart from this *technological* uncertainty innovating firms face *market* uncertainty, that is the difficulty in seeing ahead of time whether there is a profitable market for the innovations developed, or not. So, the uncertainty in the innovation process can keep firms from conducting the amount of research that society would like.

Although in theory the gap between private and social incentives can be identified fairly simply, its empirical measurement is more difficult. From a review of empirical studies Nadiri (1993) concludes that the average private benefits of R&D amount to between 20 and 30 percent, while the benefits for society as a whole are around 56 percent. This confirms the

impression that the market for innovation indeed fails. Often such empirical material is used to justify corrective government intervention. From this viewpoint, innovation policy can move the market towards the neoclassical ideal of general equilibrium. As we will see, governments often apply patents and R&D-subsidies in trying to correct the failures within the innovation market. For example, recently innovative clustering has been applied as an additional instrument of innovation policy. This so-called cluster policy is related to another perspective on innovation. This is the evolutionary theory mentioned earlier. It is to this approach that we turn our attention now.

### 3. The innovation system

The neoclassical approach towards innovation has been criticized by several scholars including Nelson and Winter (1982) and Lundvall (1992). Building on Schumpeter's evolutionary perspective they argue that applying a systems-oriented and dynamic approach can better capture innovation. Their views have led to the development of evolutionary economics with its emphasis on variety, selection, interaction and learning among *economic* actors within any innovation system. Evolutionary economists claim that innovation is not a linear process in the market but rather a cumulative, interactive and learning process with complex feed back mechanisms. As firms are almost never able to innovate in isolation, they need various other organizations for a successful development and diffusion of innovations. Examples of such organizations are firms (suppliers, customers, competitors) as well as

universities, research institutes, private consultants, investment banks, government agencies and so forth. Together, these market and non-market institutions constitute what has been called a 'system of innovation' (Lundvall, 1992).

A system of innovation refers to those institutions in a national or regional setting that jointly support the development and diffusion of new knowledge and innovation. In this view, the interplay of innovative activities of firms and the functioning of institutions are seen as crucial for the rate and direction of innovation in a society.

The systemic approach of innovation has recently received considerable attention from policy makers and researchers. As well having mostly a national level focus, innovation systems are also increasingly being studied on a regional level. Such regional innovation systems, Silicon Valley being a prominent example, have been conceptualized as 'innovative milieu', 'learning regions' and 'innovative clusters'. Fuelled by the work of Porter (1990) in particular, 'clusters' have become a popular concept. Common to all these notions, however, is the emphasis on the role that institutionally embedded networks play in the innovation process (Edquist, 1997). The clusters that make up an innovation system are seen as a way to reduce the risks involved in innovative activities. Firms participating in innovative networks can increase the connectivity of the system, thus helping both themselves and other actors. In addition, clusters act as bridging institutions that may establish links between otherwise disconnected actors in the system, particularly between universities and private firms. Finally,

by networking firms broaden their technology base and enhance their ‘absorptive capacity’ for new developments.

This technology diversification has two advantages: it is less likely that companies will be surprised when new technologies arise and it is easier for them to benefit from unexpected results of R&D-activities (serendipity). In these ways, evolutionary economists argue, innovative clusters may contribute to a stronger innovation system.

In the evolutionary view, the market for innovation represents only a limited part of the context for innovation and diffusion. Non-market institutions and modes of interaction are also important elements in the system. In addition to this systems-oriented perspective the focus of evolutionary economics is on variety and selection. Variety refers to the processes determining the range of innovations introduced in the system, while selection includes the processes changing the relative importance of competing alternatives. Policy aimed at innovation must therefore take into account the issues of variety and selection in the innovation system (Metcalf, 1994). In general, policy measures should encourage the generation of variety through innovation and ensure that the feedback mechanisms from selection do not hinder this process. Then, the central purpose of policy becomes that of stimulating innovative capabilities and learning processes in the economy in order to generate variety. Thus, governments can help in identifying and removing mismatches (or system imperfections) within the innovation system. As well as market failures to which neoclassical economists refer,

the lack of interaction between companies, institutions and other *economic* actors may justify the introduction of public policy measures. Additionally, institutional mismatches between knowledge institutes and the needs of the market (institutional failures) may call for public policy action as well.

#### 4. Innovation policy

Inspired by both neoclassical and evolutionary theory, nearly all governments in advanced countries pursue some form of innovation policy. In order to enhance a particular area’s level of innovativeness, policy makers apply a combination of measures such as promotion of patents, R&D-subsidies and cluster policies. The patent system and public R&D-support are often rationalized with the help of neoclassical arguments, whereas the evolutionary perspective is mostly used to justify innovative cluster policy.

Patents give firms property rights over the R&D-results (or new knowledge) they have generated, at least over some years. As knowledge spillovers diminish, patents provide firms with an incentive to innovate. Moreover, patents facilitate the appropriability of the profits earned through innovation, as competitors are unable to imitate the innovator anymore.

Apart from these merits the patent system also has some drawbacks. First, firms may be able to innovate by ‘inventing around the patent’, thus not ensuring the innovator’s appropriability of new knowledge and the resulting profits. Second, the patent system may lead to duplication of R&D-efforts, which is socially undesirable. From this perspective, innovating is just a ‘patent

race', in which not one firm, but all firms in the market participate in order to become the first to file a patent application ('the prize') for a certain innovation (Dasgupta, 1996). In practice, the effectiveness of patents is disappointing. From a sample among 650 firms Levin et al. (1987) found that firms consider patents as the most ineffective method to protect innovations.

Apart from patents governments provide R&D-subsidies (including financial facilities like grants, tax incentives and loan schemes). Firms are not likely to invest in R&D with high spillovers (for example in 'basic research') despite the fact that conducting such R&D is socially very desirable. Subsidies, however, enhance the private incentives to carry out R&D and lower entry barriers because investing in R&D becomes relatively cheaper. At the same time, as highlighted by Katz (1986), subsidizing R&D has several problems associated with it. To start with, it is difficult to determine the appropriate rate and direction of the R&D-subsidy. Further, in order to obtain subsidies, firms may deceive the government through fabricating information. Finally, subsidies coming from public funds will lead to distortions in the market and possibly to excessive R&D-efforts from the society's point of view. Nevertheless, empirical research on the effectiveness of subsidizing R&D confirms that such a policy may raise the total level of R&D firms engage in (Guinet and Kamata, 1996).

Innovative cluster policy has recently entered the domain of innovation policy. By developing and supporting cooperative clusters public authorities correct several market and system

imperfections at once. Cluster participants share their knowledge, exploit scale and scope economies and reduce uncertainty all at once. Furthermore, cluster policy reduces interaction failure and institutional failure in the innovation system by bringing parties together that otherwise would not know each other. In reality, cluster policies differ and range from the mere creation of a business climate favourable for cluster development to the matching of suppliers, customers and knowledge institutes providing each other with complementary knowledge. In-depth studies of such policies suggest that governments can play an important part in improving the working of clusters (see, for example, the work of Edquist, 1997).

## 5. Conclusion

In today's increasingly competitive business environment innovation is considered as a survival strategy for both firms and nations. Companies invest heavily in R&D and governments actively pursue innovation policies. Schumpeter stressed the importance of innovation for the economy several decades ago. These ideas have found new meaning within neoclassical and evolutionary perspectives. Although these approaches highlight different aspects of innovation, they both end up calling for governmental support. What types of policy governments can pursue to achieve best results is less clear. The recent turn to cluster policy seems to be a promising avenue. Let us hope that further research will shed more light on the economics of innovation. This is all the more important as the following partial quote suggests:

‘... this process of Creative Destruction is the essential fact about capitalism. It is what capitalism consists of and what every capitalist concern has got to live with ...’ (Schumpeter, 1942, p. 83).

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## Book Review:

*Ha-Joon Chang. (2002). Kicking Away the Ladder: Development Strategy in Historical Perspective. Anthem Press: London. PP 187. ISBN 1-84-331027-9*

“The laws of economics, it is often forgotten, are like the laws of engineering. There’s only one set of laws and they work everywhere.”

*Lawrence Summers – one time, World Bank economist and currently President of Harvard University.*

The above statement typifies rather well the overriding confidence with which Neo-Liberals of the industrialised world have, for the last 20 years, advocated their policies for the developing world. The pleas that the

developing world faces specific and different problems requiring new and different approaches have been dismissed as, at best, providing justifications for clinging on to discredited Keynesian policies, or at worst a cover for the inward looking nationalist policies of Friedrich List. Development Economics, which had emerged in the post war years as a new branch of economics studying the economics *of* the developing world, was told that its role was in applying rediscovered economic liberalism *in* the developing world.

Yet if the laws of economics are indeed like the laws of engineering, surely their effectiveness should not be limited to working *everywhere* - surely they should also work *at any time*? If the policies of today's Neo-Liberals are the solution to the problems of today's developing world, then surely the policies of the original economic Liberals must have been the solution to the problems of developing countries in the 19th and early 20th centuries. The assumption made by the Neo-Liberal orthodoxy is that they were. This is exactly what Ha-Joon Chang sets out to disprove.

The first half of the book is devoted to discussing the government/state policies pursued by Britain, the USA, Germany, France, Sweden, Belgium, Netherlands, Switzerland and Japan to achieve economic development. As Chang himself points out, he is not the first to show that these countries utilised protectionism to try and nurture infant industry, or that the glorious period of free trade in the mid to late 19th century was promoted by Britain only after achieving an industrial lead by using protectionism and was circumscribed by the protectionism of

its closest rivals. Indeed he draws heavily on the work of Paul Bairoch's 'Myths and Paradoxes' as well as others. Chang certainly adds to that inheritance by condensing and systematising the implications of their work, and by making direct reference to theories/concepts of Development Economics such as Import Substitution Strategy. He thereby adds his own list of 'historical myths and facts' about the actual policies of developing countries at that time.

However, what is new about Chang's work is ultimately what is new about the prescriptions of Neo-Liberalism at the turn of the millennium. More recently these have extended beyond the purely economic and have included political prescriptions. This was clearly demonstrated during the opening phase of the currency crisis in Argentina.

At the United Nations-sponsored International Conference on Financing for Development, held March 18–22 2001 in Monterrey, Mexico, President Bush made it clear that in addition to the normal prescriptions of free trade and free movement of capital, political reform was also necessary in Argentina: "The country itself is going to have to make some tough calls, starting with reforming the relationship between the [provinces] and their budgets and the central government." Similar calls for tying aid to 'good government' were made at the Johannesburg Earth Summit in September 2002.

Chang devotes the second half of his book to examining the 'myths and facts' concerning 'good governance' in the first industrialising countries. This is the most original and challenging half of the book. He tackles issues ranging

from democracy, the bureaucracy and the judiciary, property rights (including intellectual property rights), corporate governance, financial institutions, and social and labour institutions. Again he points to the increasing insistence of Neo-Liberal orthodoxy that these be present today, and their relative absence during the first industrialisations.

What of Chang's conclusions? Chang suggests that the policy being pursued by western industrialised countries is essentially, as the title suggests, one of kicking away the ladder to development by denying that the ladder ever existed. It would be easy for Neo-Liberal orthodoxy to dismiss this as a plea for a return to the 'bad old days' of ISS through an adulation of protectionism as a means to development in the presently industrialised countries. Yet this would be to duck the intellectual challenge.

Chang has challenged adherents of the Neo-Liberal orthodoxy to show that their laws of economics, like the laws of engineering, are relevant to the past as well as the present. As Chang points out, at the very least adherents of Neo-Liberalism should explain what has changed in the world to make the practice of those who first industrialised no longer valid for the developing world.

I am sceptical as to whether Chang will elicit a response outside of the most conscientious of Neo-Liberal intellectuals. Neo-Liberalism, like classical political economy, is after all an entirely deductive approach to economics. It builds abstract economic models that not only leave aside some variables for later incorporation into the model, but also more importantly

considers data as the stuff for manipulation by models, rather than as intrinsic to the process of model building. History, with its minefield of equally plausible but conflicting interpretations, is not its chosen terrain.

However there is a challenge to Neo-Liberal orthodoxy that is palpable and is very much a product of the present. This is the accusation, voiced by many NGOs and governments in the developing world, that the US and the EU are engaged in double standards. Nurturing infant industry if not protecting decaying industry, coupled with unfair trade practices such as subsidies and export dumping, seem to be acceptable in certain conditions if not in others. They are asking whether, if the same laws of engineering apply in both, there must not be a different physical world in the north and south.

I take comfort that ultimately this will force a joining of these two terrains of debate - the past and the present. After all, there is the adage that however much we ignore our history, it always catches up with us.

*Richard Palsler*

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