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## **Innovation, entrepreneurship and development**

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**Abstract:** This paper tries to delve behind the often used word 'innovation' and attempts to understand the connection between innovation, entrepreneurship and growth. The macro index of measuring innovation of countries by the European Commission is presented. However, these indicators, have to be treated with some caution in the interpretation of 'innovativeness' of countries. The paper analyses one of the most important, and most quoted innovation statistic, that of investment in research and development (R&D). When the indicators of the 'productivity' of research are taken into account by creating a composite index for example, the rankings of countries are very different from that of the commission.

**Keywords:** innovation; entrepreneurship and growth; productivity indicators of R&D.

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**Biographical notes:** Soumodip Sarkar is an Associate Professor in the Department of Business, University of Evora, Portugal. He received his PhD in Economics from Northeastern University, Boston in 1995. He previously worked with the Harvard Institute for International Development (HIID) and later CID, Kennedy School, Harvard University and is also currently the Director for the Centre of Business Studies, (CEFAG-UE) University of Evora, Portugal. His research interests are international business, innovation and entrepreneurship. He has published papers in several scientific journals. He is a Project Leader in many Portuguese and European projects and is a current consultant to USAID and Nathan Associates.

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### **1 What is innovation?**

If there is a place for a word that captures the imagination of academia, politicians, media and businesses, one strong contender must be the word innovation. Coupled with entrepreneurship, it holds the promise of unlocking the gates to enhancing firm productivity and promoting economic growth.

In the most simplistic terms, innovation is having a new idea, or sometimes applying other people's ideas in new and novel ways. There is also historical innovation, when an old idea is given new life. In a certain sense at many points in our lives, we are all innovative. The challenge is when innovation of either process or product at the firm level, is connected to launching new products or product differentiation or organisational

innovation that improves firm efficiency. At a macro level, innovation is intimately connected to economic growth and welfare.

Although innovation may be intimately linked with technology adoption, it doesn't have to be. If the market accepts it, and a firm is successful in translating a new idea into a product that sells, then that is also being innovative. In the world of fashion, an outrageous costume (that nobody will ever wear) is considered innovative. Indeed the fashion world is driven by the constant drive to be innovative, which has often to do with the shock appeal.

So what is innovation? Succinctly, innovation is the exploitation of new ideas which finds market acceptance, incorporating new technologies, processes, design and best practice. The innovation process generally involves the following phases:

- having a new idea or rethinking an old one
- recognising opportunities that exist or can be promoted
- choosing the best alternatives
- application of the idea and the process.

According to Schumpeter (1939), technological change is one of the major determinants of industrial change and consists of the introduction of new products (product innovation), production processes (process innovation) and management methods (organisational innovation), and this trilogy distinguishes between invention, innovation and diffusion.

Although it is not very easy to measure the degree of innovativeness of a nation, there are many reliable indicators. One comprehensive study is that of the estudo annual da OCDE, which comes up with the EIS (European Innovation Scoreboard) ranking of OECD countries which covers the 25 EU Member States, Bulgaria, Romania and Turkey, the associate countries Iceland, Norway and Switzerland, as well as the USA and Japan. The indicators of the EIS summarise the main drivers and outputs of innovation. These indicators are divided into four groups:

- human resources for innovation (five indicators)
- indicators relating and related to knowledge creation (four indicators)
- indicators relating to transmission and application of knowledge (four indicators)
- finally, a fourth set of indicators relating to innovation finance, output and market (seven indicators).

However these indicators have to be treated with some caution in the interpretation of 'innovativeness' of countries. Take for instance one of the most important and most quoted innovation statistic, that of investment in Research and Development (R&D). It is not an end in itself.

What is the end goal of Research and Development? What are the indicators of the 'productivity' of research? There are different indicators of this end result, and a simple simulation of this 'productivity' of research highlights the need for care in using R&D statistics in particular, and innovation measures in general.

The ratio of the number of patents to investment in R&D can be thought of as one indicator of how ‘useful’ is research. Using OECD data of patent registrations both in the European Patent office (EPO) and the United States Patent and Trademark Office (USPTO), we tried to measure the ‘productivity’ of research expenditure, both public and private, as measured by the number of patents (both EPO and USPTO registrations) per million habitants, per percentage of R&D expenditure in GDP. Table 1 summarises the data for a selected sample of countries.

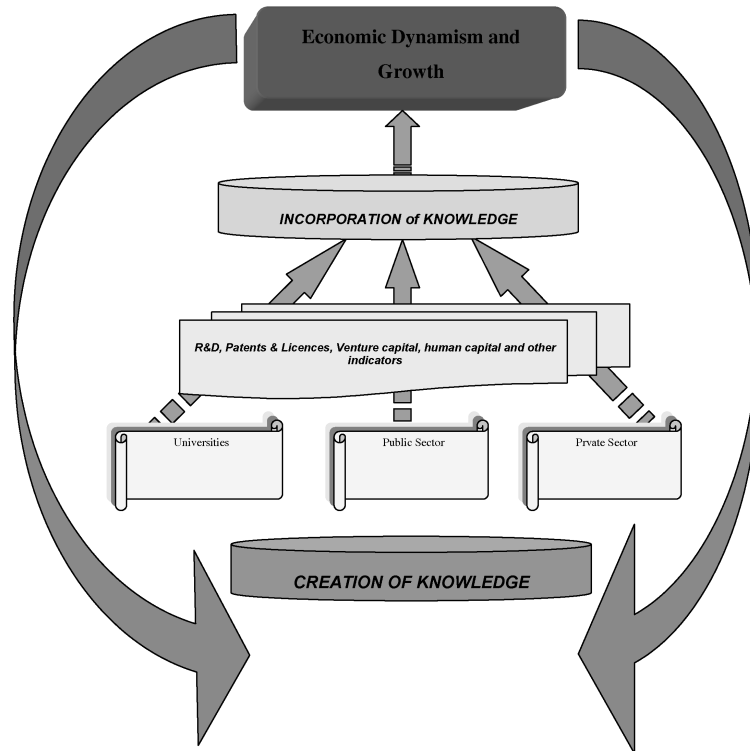
**Table 1** How ‘productive’ investment is in R&D

	<i>EU pat</i>	<i>USPTO</i>	<i>Public</i>	<i>Pvt</i>	<i>EU/pub</i>	<i>EU/pvt</i>	<i>EU/total</i>	<i>USPTO/ pub</i>	<i>USPTO/ pvt</i>	<i>USPTO/ total</i>
DE	301.0	137.2	0.8	1.7	385.8	174.0	119.9	175.9	79.3	54.7
DK	214.8	83.8	0.8	1.8	279.0	122.8	85.2	108.8	47.9	33.3
ES	25.5	8.0	0.5	0.6	54.2	45.5	24.7	17.0	14.3	7.8
EU15	158.5	71.3	0.7	1.3	229.7	121.9	79.6	103.4	54.9	35.8
FI	310.9	158.6	1.0	2.5	304.8	125.9	89.1	155.5	64.2	45.4
FR	147.2	68.1	0.8	1.4	177.4	107.5	66.9	82.0	49.7	30.9
JP	166.7	273.9	0.8	2.3	208.3	71.8	53.4	342.4	118.1	87.8
NO	131.3	55.1	0.7	1.0	185.0	136.8	78.6	77.6	57.4	33.0
PT	4.3	1.3	0.6	0.3	7.0	13.3	4.6	2.1	4.0	1.4
UK	128.7	64.5	0.7	0.9	198.0	139.9	82.0	99.2	70.1	41.1
USA	154.5	301.4	0.8	0.4	203.3	417.6	136.7	396.6	814.6	266.7

*Source:* Author’s calculations based on patent data in European Innovation Scoreboard (2004), OECD.

Table 1 illustrates how different the structure of expenditure is when comparing not just European countries to the USA, but between the countries themselves. Investment in R&D in the private sector in Europe is much lower than in the USA, a clear indicator of the European State as a source of innovation as compared to the USA, where the private sector leads in innovation. Then, using the productivity figure of R&D, a clearer picture emerges as to the usefulness of investment in innovation. Southern European states like Portugal and Spain are remarkably weak in translating investment in research into patent production. In this productivity measure, the USA is way ahead of the field. (Leave aside for the moment that many patent applications are speculative in nature). A similar exercise could be done with other indicators of the productivity of innovation expenditure, for instance ‘spin offs’, the number of scientific publications, and the number of citations, all using the same indicator that I used just for fun.

Below we present a simple version of a virtuous circle for a knowledge based economic dynamic model, where innovation is the key driver. As illustrated in Figure 1, the three pillars of knowledge creation, universities, the public and the private sector create the knowledge base for the wider economy which in turns creates the economic dynamism that comes from an innovative society.

**Figure 1** A simplified version of the dynamic process in the virtuous circle of innovation

## 2 Entrepreneurship, innovation and growth: the special issue

Innovation is no longer confined to the developed economies. Many innovative enterprises both in the industrial as well as the service sector are fast emerging from developing economies like India, China, Russia, Brazil, Philippines etc. Developing countries have not normally been associated with the dynamic use and development of technologies, but are now becoming increasingly successful in both technological parity and endogenous technology creation (Mani and Romijn, 2003).<sup>1</sup> Take the case of a developing country like Brazil, no more than 9% of whose manufactured exports are high technology products, which has now established a successful civil aircraft manufacturing industry. The rapidly rising software export from India is another example. Outsourcing of services to countries like India is no longer about cost reduction, but about sourcing innovation. Innovation leaders like Microsoft are now establishing R&D centres in countries like China and India from where some of its most important products are emerging. This special issue identifies some cases of technological dynamism with special emphasis on developing countries.

This special issue presents a rich and wide array of ten cases of high quality research into innovation, entrepreneurship and development. The issue is rich in both the theoretical and empirical validations of models and hypotheses, as well as rich in the areas it covers, from entrepreneurial characteristics, to the financial aspects of innovation.

Laying both a theoretic framework and an empirical application, the first paper, *Innovation and market structures-An integrated approach*, Sarkar presents a model in four quadrants that describes market archetypes based on competitive pressure and innovation of products and services. The integrated model, innovative in its framework as well as its potential, enables the academic and the practitioner alike to understand the 'where', the 'why' and the 'how' of firms in markets. The model further tries to bridge the gap between industrial organisation market structures and strategic management. The global competitiveness of developing country goods and services, and implications in terms of innovation strategies are also suggested by the model. The model is then put to a diagnostic test for a universe of over a thousand firms to see the distribution of firms in the four market archetypes.

In many developing economies, the formal inter-firm network that typically involves financial institutions, distributors and manufacturers and the diversified business groups is a ubiquitous institution. Groupwise diversification is sometimes viewed as a novel form of organisational innovation. Abegaz in *The diversified business group as an innovative organisational model for large State-enterprise reform in China and Vietnam*, studies the business groups created out of State enterprises. After reviewing the theory and cross-country experience, his paper concludes that selective economic grouping can be an efficient transitional organisation. For other developing countries looking to this form of organisational innovation, the author cautions that success in incubating national champions is predicated on a high technocratic capability for restraining abuse of market power, nurturing competitive market institutions, properly sequencing large-scale privatisation, and crafting WTO-compatible industrial and technology policies. In another Asian country study, Subrahmanya, in his paper *Technological innovations in Indian engineering industry: industry and firm level case studies* probes the nature and dimensions of technological innovations carried out by small engineering enterprises in the state of Karnataka, India, at both the industry and firm level. His study reveals that small enterprises undertook innovations due to both internal and external factors and importantly, the technical education background of the entrepreneurs seemed to motivate them towards technological innovations. Most of the enterprises were engaged in 'incremental innovations' with self-efforts and achieved quality improvement, improved product designs and increased output. But the firm level case study sheds light on 'radical innovations' achieved by a small enterprise with self-efforts, which developed new products periodically, entered the export market and grew in size over time.

In an interesting study, Othman, Ghazali and Cheng investigate whether becoming an entrepreneur is characterised by the entrepreneur's personality characteristics. Their paper *Demographics and personal characteristics of urban Malaysian entrepreneurs: an ethnic comparison*, explores the differences between two ethnic groups, Malay and Chinese, with regard to entrepreneur personality, family background and company background. Four demographic variables, three business characteristics variables and six personality variables were found to be significantly different across ethnic groups. An interesting result was that Malays derive satisfaction from working hard and seeing the job well done as compared to the Chinese, and that Chinese enjoy having power over people as compared to the Malays. Clearly the paper has many implications and begs further research into a field that is at the frontiers of business, economics and sociology. In a slightly different focus on entrepreneurial characteristics, Carswell and Gunaratne in their paper *Exploring the role of entrepreneurial characteristics in determining the economic growth potential of an innovation*, use an

innovative diagnosis of entrepreneurial characteristics. Analyses of the survey shows that many of these entrepreneurs had characteristics more suited to inventing rather than developing the business. Their research posits that a key for developing start-up ventures to be able to internationalise is a successful transition from entrepreneurial marketing to a traditional systematic broad based marketing strategy. Also on entrepreneurial characteristics in their paper *Relationship between entrepreneurial learning, entrepreneurial competencies and venture success: empirical study on SMEs*, Priyanto and Sandjojo use the responses of small and medium enterprise managers in West Java to test the hypothesis that entrepreneurial learning of the manager had a positive impact on firm growth through enhanced managerial competence. The authors' research points to entrepreneurial learning as having both a direct effect on entrepreneurial competencies and an indirect effect on venture growth.

Focusing on the financial aspects, Neves describes in detail a number of adjustments that are required for the proper valuation of the entrepreneurial firms and quantifies the magnitude of some of the issues and their effects on the firm's earnings power and value. In his paper *The value of financial freedom and ownership on opportunities of entrepreneurial harvest*, he makes a very strong case that the financial freedom of the entrepreneur and the inexistence of agency problems between managers and owners, which reduce the short times bias of managers, are sources of value not reflected in the financial statements. The evidence is presented using the case study methodology in 12 opportunities of entrepreneurial harvest.

Mazzarol and Reboud in *Customers as predictors of rent returns to innovation in small firms – an exploratory study*, examine the risk-return profile of future investment in innovation by SME with respect to anticipated 'rent' or financial returns. The analyses of their survey of highly innovative SMEs, examines management perceptions of the key strategic influences on rent returns, suggests that a firm's assessment of the rent returns from their innovation may be influenced by the value it is likely to deliver to the customer, the customer's expected use of the innovation to generate new sales and the ease of integrating the new innovation into existing technologies. Also in finance, *Community banks in Australia- an innovative approach to social and economic wealth creation?* The authors Byrne, Jobling Walker and Johnson, study community banks, introduced to Australia predicated on an innovative and entrepreneurial ownership, structural and operational framework. In their paper the authors explain the banking framework discussing distinguishing features of the framework that they submit are germane to developing a grounded theory appropriate to modelling, explaining and researching this framework and practice, and enabling its adaptation elsewhere.

The issue concludes with Degregori in *Frontier technologies for emerging economies: the entrepreneur as science and technology champion*, which has as its thesis that technology transfer has been and remains the driving force for economic development. The paper argues for the strong need for entrepreneurs as 'technology' champions to facilitate the use of frontier technologies in bioengineering, in agriculture and pharmaceuticals and emerging areas such as nano-technology.

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**Note**

<sup>1</sup>See for instance Mani and Romijn (2003), for examples of innovation dynamism in developing countries.