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A Review of *The Genesis of Innovation: Systemic Linkages between Knowledge and the Market*, Edited by Blandine Laperche, Dimitri Uzunidis, Nick von Tunzelmann, Cheltenham UK, Edward Elgar, 2008, 285 pp.

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Though almost one-century old, the Schumpeterian statement that innovation is the true driver of welfare-enhancing economic development captures the essence of today's knowledge economy. In his acceptation innovation refers to new combinations conducive to new products, new production processes, new markets, new organizational forms, and the discovery of new resources. Currently the fierce global race challenges nation-states and transnational corporations (TNC) to engage in the management of innovation in order to secure competitive advantages, hence their recurrent initiatives in science and technology (S&T)/innovation policies, and regional development. In a best-case scenario this endeavour produces innovative milieux underpinned by vibrant interactions among major players (companies, research organizations, local communities, regional and central governments, etc.), and integrates them into other networks spawning knowledge externalities.

The Genesis of Innovation: Systemic Linkages between Knowledge and the Market is an attempt to build a systemic comprehensive framework of innovation. To this effect it assumes a multidisciplinary scope, and draws upon major developments in fields as diverse as economics, sociology, linguistics, philosophy, ethics, and psychology.

The book embarks upon a critique or outright revision of certain developments in the economics of innovation or in writings that serve as seminal undercurrents for this field. For instance, it revisits and/or upgrades extant concepts, classifications, and theories. Accompanying case studies primarily target Western Europe's innovative space, occasionally benchmarked against the American experience.

Most contributions embrace the assumptions of the new economy of growth and as such advocate state intervention the economy in conjunction with other public/private bodies if aimed at reinforcing regional and/or national competitiveness via the build-up of a knowledge reservoir. This move is legitimated by the issue of knowledge non-appropriability under market conditions. Occasionally such pleas may seem excessive (s. chapter 8). Some other times more nuanced stances occur: public involvement is deemed appropriate in specific innovation-gearred environments where there is no co-operation tradition among companies (s. chapter 10).

The Genesis of Innovation revolves around three major concepts: knowledge, power, communication (and ensuing networking). At first sight book parts seem to probe into these notions by turns: Part I ostensibly addresses the knowledge dimension, part II explores the 'hard power' dimension, and its two-way linkages to civilian technologies, part III provides a theoretical and empirical assessment of innovative milieux, with an emphasis on communication and networking as the prime tools for boosting their performance. In fact, the concepts in question feed into each other as becomes apparent also in the following adages: "Knowledge is power" [1], "Power is knowledge" (a major tenet of postmodern thought), "Discourse is the power which is to be seized" [2].

The first part, *Core linkages in the genesis of innovation: the knowledge dimension*, addresses the creation of the new as well as the attendant attempts at protecting and disseminating it. The first chapter purports to fill a gap in J.A. Schumpeter's theory of 'creative destruction' and accumulation by probing into the micro processes that are conducive to innovations. Communication is central to such processes hence the need to incorporate it into a new theory explaining 'the origin of the new'. However this contribution does not lead to a full-fledged theory of communicative innovation, rather it beautifully distills useful concepts for building one, and maps out relationships between these theories and concepts, and innovation economics research (for example, R. Nelson and S. Winter's 'routines', B. Noteboom's 'scripts', U. Witt's 'leadership', I. Nonaka and N. Konno's 'ba space', etc.). In a first stage S. Kesting's *tour de force* covers theories and concepts from K. Boulding, J. Habermas, G. Myrdal, and J.K. Galbraith. K. Boulding's theory of communicative economic action is particularly illuminating: individual images of the new (i.e. 'new combinations') progressively converge into public images via integrative power (emotional bonds among community members) and conflict

resolution (reconciliation of images belonging to individuals, groups or subcultures): "According to Boulding the new is not only created, but also propagated and implemented in processes of communication which change public imagination. These processes are not free of conflict. The explanatory advantage of such an image- and communication-based theory of innovation is not only that it includes changing preferences and interdependence of individuals, but also that it allows for welfare-enhancing effects through social learning." (p. 16)

The second and third contributions relate mainly to the issue of knowledge appropriation. In "The division of scientific labour and the sharing of knowledge", M.P. Bès explores the thorny issue of intellectual property rights (IPR) over the knowledge developed in French joint laboratories, i.e. partnerships between public research organizations (PRO) and businesses. A longitudinal study of engineering sciences contracts between the French CNRS (Centre National pour la Recherche Scientifique) and local companies shows that such projects are associated with emerging networks: both partners and contents are on the move, whilst the knowledge being developed has certain peculiarities: it is 'local, competing, appropriable, specific and non-substitutable' (p. 44). The mixed teams' special expertise is the outcome of cumulative learning, and consists mostly of tacit, collective know-how. Knowledge publication and commercialization spark fierce debates between partners: industrialists seek to lock-in research outputs whereas public labs (CNRS) supply services outside the frame of ongoing projects. The next chapter "Proprietary vs. open-access dimensions of knowledge" deepens the prior topic via a survey of a French PRO, the CEA (Commissariat à l'Énergie Atomique): inter- and intra-organizational tensions over IPR occur, especially in relation to patenting. M. Isabelle also puts forth a classification of research activities in keeping with the knowledge economy: D. Stokes's taxonomy is expanded via the proprietary vs. open-access knowledge dimension.

Incorporating this facet into the survey yields intriguing results: CEA researchers are inclined to engage in more use-inspired proprietary research to comply with the 'new social contract for science', i.e. gearing research to economic and societal needs in keeping with the revised Lisbon agenda ("a partnership for growth and jobs"), and to capture funding through competition-based contracts.

The fourth contribution "Towards an integrated patent system and innovation prospects in Europe" moves the issue of knowledge appropriation and dissemination into the institutional arena. Major developments in IPR

harmonization in Europe (going back to the end of the 19th c.) are traced down and neatly associated with globalization stages. A. Ilardi and B. Laperche highlight the reasons why this process has not been felicitously concluded. Obstacles include technical barriers and political ones as member states are reluctant to relinquish this national source of competitiveness. Their protectionist stance is at odds with the pre-crisis wave of liberalization and ever deeper European integration. The authors contend that the 'one patent' dream can come true only if decisive political action is taken. Further, the integrated patent system should be correlated with innovation policies that have been downgraded in the economic agenda.

The second part, *Military-based innovation networks*, implies that cross-fertilisation occurs between 'hard power' and 'soft power' realms in terms of technology transfer (*spin-offs* and *spin-ins*) or joint formulation of technologies (dual technologies and the 'new security agenda'). This crisscrossing underscores the complexity of innovation endeavours in a highly uncertain world economy.

Chapter 5 "The relationship between military and commercial technologies: an empirical and analytical perspective" by C. Serfati sets out to dispel conventional wisdom as encapsulated in the saying 'war is necessary for technological progress' (p. 115). After World War II *spin-offs* (technological flows from the military to the civilian domain) have yielded spectacular results, however their achievement rate has been overstated. In a later stage, *spin-ins* have gone to the foreground: businesses have provided insights into how to improve military technologies. Next, with the advent of the 'security economy' following the 9/11 attacks, the United States and the European Union have buttressed up their military technological capabilities, which has led to significant advances in the fields of biotechnologies, and space research respectively with spillover effects in the civilian realm. This endeavour has been underpinned by a novel combination between military and civilian technologies. In order to fully grasp the subtle interplay between military and commercial technologies, a multilayered analysis is called for integrating five criteria: history, geopolitics, technical change, entrepreneurship, and contingency.

The sixth contribution "Theory and practice in knowledge transfer: the emergence of 'interface structures'" by E. Castro-Martínez, I. Fernández-de-Lucio, and J. Molas-Gallart introduces a new concept. Interface structures are organizations that are not part of innovation systems *per se*, nevertheless they induce rapprochement between players acting freely in these milieux, with a potential

increase in their performance. These entities act as catalysts because, just like in a chemical reaction, they allow for the interaction and transformation of substances while preserving their outsider role. Two case studies document the emergence of such structures in the context of policy changes in Spain and the UK respectively. Interestingly enough the two organizations resort to similar strategies even if they bring together parties belonging to different quarters: universities and businesses in Spain following a major reshuffling of S&T policy aimed at increasing research competitiveness through partnerships; military and civil sectors in the UK in the wake of a policy stimulating two-way transfers of technologies and competencies between the military and private sectors. Both interface structures were highly successful, and duly developed regional networks to fulfill their mission. Thus their role extends beyond the narrow scope of a technology broker covering a set number of fields, and is meant to bring together individual researchers or groups for mutually beneficial partnerships.

Chapter 7 "Dual technological knowledge and the firm's trade-off between civilian and military activities" starts from F. Malerba's conceptualisation of sectoral innovation systems as the outgrowth of three interrelated dimensions: institutional environment, connectedness, and cognitive base. Next M. Callois chooses the defence industry in order to econometrically test the link between the first and third dimensions. The investigation covers the first 100 defence companies ranked by income between 1999-2005 as well as their patent applications. A company's defence orientation is established by computing the ratio of its defence income to total income. Patents are envisioned as a proxy for the companies' knowledge production function. Findings suggest that defence-related firms tend to patent less than their civilian counterparts. Further, defence-gearred firms exhibit a higher cognitive specialization whilst dual or civilian firms tend to develop a broader knowledge base. Hence the demanding nature of military institutions impacts upon the cognitive base and structure of the defence industry.

The third part, *From knowledge to market: systemic links at the market level*, begins with theoretical explorations of two critical concepts for the emergence of innovation, i.e. innovative milieux and entrepreneurship, and closes with illustrations from Australian and American clustering experiences.

According to the eighth contribution by D. Uzunidis, an innovative milieu is underlain by proximity and interplay between public and private protagonists. It induces regional economic growth through transaction costs savings and

networking among participants, with the latter facilitating knowledge exchange and trust. He advocates a broader sociology-grounded approach: companies are embedded in social structures whose influence may advance or hamper innovation. The establishment's intervention via innovation policies can potentially turn a regional economy into an innovative milieu. This stimulates TNC to set up research and development (R&D) locations in the area, and further refine its specialization. The involvement of all relevant stakeholders in knowledge management is a prerequisite for a local economy's success. For businesses appropriating resources from such milieux is far easier than creating them from scratch, hence the importance of location choice and the urge for policymakers to fashion out innovation-friendly environments!

Chapter 9 "The entrepreneur's 'resource potential', innovation and networks" by S. Boutillier, B. Laperche, and D. Uzundis purports to demystify the Schumpeterian conceptualization of the entrepreneur as a heroic figure or a *deus ex machina* that is conducive both to economic development via innovation and to the collapse of capitalism through his own imminent demise. The authors account for the 'hero's ephemeral status by resorting to an 'organic square of entrepreneurship' somewhat reminiscent of M. Porter's 'national diamond'. Entrepreneurial excellence is not a matter of individual merit or special gifts but it occurs at the intersection of four major classes of factors: public policies (in the guise of support for new companies), economic and social organization (legal, financial, and technological *statu quo*), market conditions, the entrepreneur's 'resource potential' (defined as a conjunction between knowledge, finance, and connections). This formalization also implies that the present-day entrepreneur is highly networked: he has turned into a social agent operating in a multilayered environment (social, economic and political) alongside other important players: nation-states and TNC.

The last two contributions illustrate the concepts of innovative milieux. In the former case, "Cooperative networks and clustering of high-technology SMEs: the case of Brisbane Technology Park" by K. Mohannak and R. Keast, intra-STP networking occurs but is rather limited, with companies mostly tapping into their own external networks. In the latter case, "Clumps or clusters: a case study of biotechnology and life sciences in the Seattle area" by P. Sommers, vibrant interactions between major players are quite frequent, and are underpinned by a significant institutional effort to improve the industry environment. That is why this group of companies are worthy of the cluster denomination as opposed to

purely spatial agglomerations of firms operating in the same or related industries that are referred to as 'clumps'.

To recap, the creation, appropriation and diffusion of knowledge is a delicate issue that needs to be approached with the utmost care. From the vantage point of nation-states research outputs can be wielded as a powerful weapon and/or be capitalized upon for economic development. From the angle of transnational corporations they can serve as offensive or defensive tools vis-à-vis the competition. As far as local communities are concerned their welfare depends upon the existence of competitive knowledge-based clusters or networks in their area. In Western Europe innovation-friendly milieux are still scarce despite attempts at devising appropriate innovation policies and partial emulation of the American experience. Hopefully breakthroughs in the economics of innovation coupled with political determination will spell out solutions for addressing the faltering competitiveness of crisis-stricken European economies.

Endnotes

[1] Sir Francis Bacon, *Meditationes Sacrae, De Haeresibus* (1597), *Religious Meditations, Of Heresies* (transl.)

[2] Michel Foucault, *Inaugural Lecture at the Collège de France*, given 2 December 1970, <http://www.scribd.com/doc/19746310/michel-foucault-the-order-of-discourse>

Unless otherwise indicated quotations come from *The Genesis of Innovation: Systemic Linkages between Knowledge and the Market*

Dana Gârdu is Assistant Professor at the Bucharest Academy of Economic Studies, Department of International Business and Economics
(Dana.Gardu@rei.ase.ro)