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## REVIEW

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### The Knowledge Economy

Joel Mokyr, *The Gifts of Athena: Historical Origins of the Knowledge Economy*, Princeton University Press, Princeton and Oxford, 2002

Review by *Don Lamberton*

When Thomas Hodgskin in 1827 lamented that ‘the influence of knowledge was not noticed by economists till very lately’ (Hodgskin, 1827:3), he was not being entirely fair to, for example, Adam Smith and Dugald Stewart. Broadly speaking, however, questions about technology, that is, useful knowledge, were neglected in the classical period. In modern times there has been a flood of writing about the Information Revolution and, more recently, the Knowledge Economy but those efforts have, for the most part, focused on the acquiring of information machines, especially the telephone and the computer, rather than on the production, distribution and use of knowledge. It seems reasonable to say that a central role in economic analysis for knowledge has yet to be created.

The latest *World Development Report 2005* drives home several points: reform is a process; more and better-directed government is needed; institutions must evolve; and ‘rent-seeking’ must be reduced (World Bank, 2004). The approach is to deliver the basics. But surely knowledge falls in this category.

The preamble to a book review does not permit detailed discussion but this major issue has to be put in perspective in order to do justice to Joel Mokyr’s superb book. Consider what Luigi Pasinetti said in his 1993 R. C. Mills Memorial Lecture (p. 3):

The reaction of economic theorists was most extraordinary. Instead of opening their eyes to reality and acknowledging, at last, the relevance of technical progress, they locked themselves into a theoretical castle. ... Theorists withdrew all attention from dynamic problems ... and concentrated all attention on the typically static problems of the optimum allocation of existing resources.

He viewed this as ‘the most astonishing retreat from responsibility’.

Many difficulties have been encountered by theorists when they endeavoured to embrace a wider view of the information or knowledge economy. Economic theory did not cope well with what the actors knew and believed. Endogenous growth thinking ran into logical difficulties when competitive assumptions were relaxed. The major contributions can be traced in the writings of Fritz Machlup,

Kenneth Arrow, Joseph Stiglitz, Richard Lipsey and the OECD, to mention just a few.

Some of these difficulties are rather daunting. We are warned in the Preface to the *New Economy Handbook* (Jones, 2003) that the contributions making up its 1,095 pages are by economists ‘and fall, broadly defined, within the neoclassical paradigm’ (p.xxxvii). While the contributors seem to agree we have been living in ‘a truly extraordinary time’ (p. xi), they seem largely intent on pulling the problems back within the old theoretical framework in a further ‘retreat from responsibility’.

Even Charles Jones’ (2004) with his exciting title, *Growth and Ideas*, raises problems from his opening pages. Ideas are presented as instructions or recipes and they are treated as nonrivalrous. These thoughts can be questioned once we think of knowledge as capital, which, as Schumpeter (1953:61) taught us, ‘is neither homogeneous nor an amorphous heap. Its various parts complement each other in a way we readily understand as soon as we hear of buildings, equipment, raw materials and consumer’s goods’. And anyone who has grappled with the problems of accounting for and measuring knowledge must hesitate when presented with equations using an index of the knowledge in use and propositions about the *total amount* of knowledge and managed changes in knowledge.

Another NBER paper by Hausmann and Rodrik (2002) is a good reminder that the processes of knowledge creation and use seem to show discernible and disconcerting patterns. Knowledge is not just oil that lubricates an economic system. As the literature spawned by the tacit *vs* codified knowledge research has sought to show, ‘transfer’ efforts can lead to delays, mistakes, mismatches, and, of course, costs, as well as problems for researchers — some recent work includes: on the conceptual front, Boizot and Canals, (2004) and Lambertson (forthcoming); and on the measurement front, Grigorovici, Schement and Taylor (2004).

Against this background, Joel Mokyr’s superb book helps with these problems and argues that knowledge is the true base of civilization. For him, ‘The growth of human knowledge is one of the deepest and most elusive elements in history’ (p. 1). He can draw upon economics, history including the history of technology and science, and political economy. He is a former editor of the *Journal of Economic History*. *The Gifts of Athena* builds on his earlier *The Lever of Riches*.

Mokyr avoids entanglement in the webs of traditional theory. Central to his analysis is his concept of useful knowledge — which he acknowledges as going back to Simon Kuznets - pointing out that ‘Even ‘New Growth Theory’ which explicitly tries to incorporate technology as a variable driven by human and physical capital, does not try to model the concept of useful knowledge and its change over time explicitly’ (p. 4).

How then can a theory of useful knowledge be developed? Mokyr goes beyond the tacit *vs* codified dichotomy and distinguishes knowledge ‘what’ or propositional knowledge, i.e., beliefs about natural phenomena and regularities, which can be used to create prescriptive knowledge or techniques ... a dichotomy

of *episteme* and *techné*, the former being the support for the techniques executed in economic production.

The dynamic complementarities with all their interactions between propositional and prescriptive knowledge depict the rich history of innovation and growth of the dominant economies. These changes are traced through the Industrial Revolution (Ch. 3) and the Factory System (Ch. 4). In what I personally found most exciting, Mokyr brings his analytical approach to bear in Chapter 5: Knowledge, Health and the Household. Information and living processes have had profound effects on life expectancy. Evolving consumption patterns present very interesting challenges to neoclassical thinking, with some writers now arguing for a consumer-driven version of innovation and development. Some qualifications need to be added: business has always been willing to discriminate as finely as it was profitable to do so.

Chapters 6 and 7 turn to the political economy of knowledge: to innovation, institutions and the resistance to innovation. A broad perspective is set out:

Yet throughout history technological progress has run into an even more powerful foe: the purposeful self-interested resistance to new technology. Outright resistance is a widely observed historical phenomenon. Precisely because such resistance must work outside the market and normal economic process, artificial distinctions between the 'economic sphere' and the 'political sphere' for this class of problems are doomed. The political battles over technology have profound implications for economic history. One is that technological progress in a society is by and large a temporary and vulnerable process, with many powerful enemies with a vested interest in the status quo or an aversion to change continuously threatening it. The net result is that changes in technology, the mainspring of economic progress, have actually been rare relative to what we now know human creativity is capable of, and that stasis or change at very slow rates has been the rule rather than the exception. (pp. 220-221)

Mokyr sees 'one of the main rediscoveries of the new growth theory and recent thinking about economic development is the importance of institutions and politics' (p. 282). Poverty traps, multiple equilibria, and inappropriate institutions can go together, 'One type of such institution is the one that protects a technological status quo from would-be innovators' (p. 283).

Salvation lies in the generation of new propositional knowledge, 'the fuel that keeps the engine of growth running' (p. 283). The continuing expansion of useful knowledge is not guaranteed and so 'the political economy of technological progress must occupy its rightful place at center stage' (p. 283).

Clearly, Mokyr shows that historical perspective is essential. The challenge to economics is to fuse together the evolutionary economics thinking with the contributions of information economics that have been prominent in economic theory in recent decades. Most probably this will involve abandonment of a

unitary and all-purpose concept of knowledge and calls for efforts to move beyond what seem at first simple dichotomies like tacit/codified and propositional/prescriptive knowledge. Knowledge is too diverse, elusive and important and we have yet to achieve a taxonomy based on its significant characteristics. *The Gifts of Athena* provides motivation and directions for that effort by seeking reasoned argument and empirically grounded findings rather than relying upon ideology.

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