



Tapping the riches of science

Universities and the promise of economic growth

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Tapping the riches of science seeks neither to boost nor detract, but rather to examine, critically and empirically, the actual role of universities in scientific innovation. The authors, Roger L. Geiger and Creso M. Sá, are academics in the area of education at Pennsylvania State University and the University of Toronto, respectively, and, at least in the case of Geiger, focused on higher education.

The book begins with the history of innovation in American universities, going back to the fields of chemistry, mineralogy, and geology in the 1840s and followed decades later by agriculture, engineering, and manufacturing. The growth of federal funding in the biological sciences shortly after the conclusion of World War II rapidly translated to dramatic growth in the extramural programs of the NIH and thus in the flow of dollars for biomedical research into universities. Demand to commercialize these new research findings led to the Bayh-Dole Act in 1980, giving universities the unrestricted right to patent their discoveries, despite being funded by federal sources. This new era of innovation in universities was thus on its way. The authors conclude the first chapter by noting that biotech patents have come to dominate university technology transfer offices (TTOs) at the expense of a larger mission.

Chapter 2 discusses the two paths to innovation in universities. The first path is shown by the example of Stanley Cohen and Herbert Boyer, who developed a technique to join together (recombine) DNA segments from two or more different DNA molecules. Their patents emerged directly from basic research, represented patenting of a new research technique, and were very

strong and could not be “invented around”; their commercial value could be exploited by licensing fees, royalties, and launching new companies. The second path relates to “innovation which runs through laboratories of established corporations.” Here there has been more friction because of differences in the way each party operates. The authors expand on the specifics and, given the importance to both universities and industry, the approaches used by both to facilitate cooperation and partnership. Surely, this is a path that must be enhanced in the future.

Chapter 3 focuses on how states “promote technology-based economic development” and how this relates to universities. While the authors note that essentially every state has adopted an approach to this over the last decade, examples in four states — California, New York, Georgia, and Arizona — are described in some detail.

Chapter 4 presents a particularly interesting analysis of the technology transfer operations of the university. Despite the enlarging scope and funding of these TTOs, evidence is provided that their “relative productivity has apparently declined.”

The next chapter delves into the age-old and immensely important issue of how universities and their faculties deal with the critical need for interdisciplinary thinking and the development of cross-cutting new disciplines in the setting of the fundamental structure of departments and schools within the university, again with numerous recent examples. The final chapter summarizes the status of technology transfer in universities and provides the authors’ perspectives on some of the factors relevant to future progress.

There are outstanding examples of efforts made by universities — as well as by government, industry, and others — to enhance technology transfer operations within the university environment. In addition, the authors cite many examples of universities with multidisciplinary programs, new buildings, expanded industry relationships, or new clusters for hiring faculty. Most of the examples, however, seemed to have been developed over the past decade; relevant examples going back to the 1980s or earlier are not mentioned. Were the examples cited the best from which we could learn?

Some attempt to assess, in a critical manner, the outcomes of many of the specific examples cited would also have been particularly helpful. Here, too, an analysis of longer-term efforts would have been useful. This may be great material for the next book.

An approach that may deserve more emphasis in the future is the monetization of intellectual property assets. In Chapter 6, the authors mention the sale of future drug royalties for \$700 million by Northwestern University. Emory University has had similar success with another drug; perhaps there are others. Clearly, this is an approach that should be seriously considered whenever possible.

In conclusion, this is a well-written book by authors highly knowledgeable in the field. It is strongly recommended for anyone in a leadership role in a university, but particularly for those involved with research, research policy, research administration, and technology transfer. It might also be useful for individuals from other disciplines who have difficulty understanding the motives and actions of university TTOs.