

# CURRENT SCIENCE

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EDITORIAL

## Imitating the Bayh-Dole Act: Incremental Innovation

In simpler times academic institutions had two major objectives, teaching and research. Universities were intended to disseminate knowledge and also produce new knowledge. Academia was supposedly a refuge for intellectuals, who often worked and worried about arcane subjects. The rise of the research institutions promoted a pronounced divide between research and teaching, resulting in a rapid decline in the academic ambience of the traditional university. In more recent times there is a third strand that has entered academic campuses, with mounting talk of industry interactions. In the West, the enmeshed troika of university–government–industry has been referred to as the ‘triple helix’; a term that must be familiar to some readers as a description of G. N. Ramachandran’s model for the structure of the protein collagen, in which three strands are intertwined. Collagen is a robust protein, forming the matrix of connective tissue in animals, and the term ‘triple helix’ conjures up an image of deeply enmeshed, three-way interactions between academia, government and industry. Are these linkages really robust and healthy? This is a question that has been widely discussed in the West, particularly in the United States. Exactly thirty years ago, the Bayh-Dole Act was passed in the US; a piece of legislation that dramatically altered the way in which universities approached the task of reaping the fruits of the commercial success of innovations and inventions, that had their origins in university research. In reviewing the Bayh-Dole Act, a quarter century after its passage, Donald Kennedy, then editor-in-chief of *Science*, noted in an editorial: ‘... the US government renounced intellectual property claims on research supported by federal funds in universities or other nongovernment institutions. The argument in its favor went this way: Because few patents were being issued on government-funded work, scientists and their institutions needed an incentive to patent their discoveries and then license the new technology for development into useful products’ (*Science*, 2005, **307**, 1371). The experience in the United States has been mixed. The ‘corporatization’ of the university has not been an unmixed blessing. The role of the professor–entrepreneur, the emergence of a strong feeling that universities must obtain returns on research (if not on investment), the presence of proximal industry parks where graduate students may obtain, in Kennedy’s words, ‘offshore employment in mentor’s startups’ and the creation of

venture funds in universities have all been widely discussed. At the quarter century mark Kennedy’s assessment of the impact of the Bayh-Dole Act is cautious: ‘Inconsistency and ambivalence prevail. We want technology transfer, but we resent those who take federally supported work add some value, and receive a return on investment. The same National Institutes of Health (NIH) that urges nonprofit publishers to give that value away properly declines to make drug manufacturers to sell drugs cheaply if they were derived from NIH research. Some scientists resent control over material transfer; others insist that they are essential. Critics decry the “corporatization” of the university, yet academic/corporate collaborations flourish.’ Kennedy concludes his assessment noting that the Bayh-Dole Act ‘has neither a sunset nor a reauthorization requirement, but after a quarter-century it may be time to measure the innovation it has created and to balance that against the costs to universities, their faculties, and public trust in science’. The changing face of US universities in the last two decades has worried many analysts and Kennedy asks rhetorically: ‘Has the developing thicket of patents and licenses created what Eisenberg and Heller called a “knowledge anti-commons”, stifling communication among scientists?’. In any discussion of the role of universities in catalysing technological revolutions the famous examples of Genentech and the University of California San Francisco and Stanford and Google are oft cited. An interesting recent survey provides ‘The Universities Patent Scorecard<sup>TM</sup>’. The trademark on the title is most appropriate ([www.patentboard.com](http://www.patentboard.com)). A listing of ‘2009 University Leaders in Innovation’ has the Massachusetts Institute of Technology (MIT) at the top, followed by the University of California, Stanford and the California Institute of Technology (Caltech). The scorecard ranks the top 124 institutions using patents granted in the US as an index. Relatively few non-US institutions appear, although the numbers are growing. Interestingly, universities account only ‘for 2% of all US utility patent issuances in the past year’.

Why is a piece of US legislation that is thirty years old of any interest to readers of this journal? I have turned to this topic because of the introduction of a Bill in the Parliament, ‘The Protection and Utilisation of Public Funded Intellectual Property Bill, 2008’, which may soon come up for consideration. In the run-up to the drafting of the Bill, the intentions of government were clear. The Bill

was intended to be India's version of the Bayh-Dole Act and its purpose was to spur the process of innovation and protection of intellectual property rights (IPRs) in universities and research institutions. Since almost all research in Indian academic institutions is publicly funded, the move to divest 'government' of a share in the IPR generated will afford legal sanction to current practices in many institutions. It will also resolve the differences in the approaches of different departments of government, that support scientific research in academic institutions. Bills are difficult documents to draft. Lawyers (and bureaucrats) revel in the ambiguous phrase, creating fertile ground for future litigation and debate. Since this is a piece of legislation that concerns the practice of scientific research and the institutions where future innovation must be nurtured, there is a need to carefully examine the implications of every section of the Bill. This is not a piece of legislation that needs to be hurried through the parliamentary process. Even a cursory (and I must confess uninformed) reading suggests that the Indian scientific community must ensure that clarifications are obtained and modifications made wherever necessary. The 'Statement of Objects and Reasons' is unambiguous and clearly worded: 'The proposed legislation will enhance awareness about intellectual property issues, especially in universities, academic and research institutions. It will also increase the responsibility of universities, academic and research institutions to encourage students, faculty and scientists to innovate. Such innovations can be utilized for raising financial resources of these establishments through royalties or income. The income from intellectual property will promote self-reliance and will minimize dependence of universities, academic and research institutions and other recipient organizations for Government funding'.

I am certainly apprehensive (and I suspect many ordinary people are) whenever a document drafted by lawyers crosses my desk. The language is forbidding and often ambiguous, leading to the feeling that multiple interpretations are possible. This must benefit lawyers as every contentious issue must then be resolved by litigation, with judicial interpretations sometimes varying at different levels. My attention was drawn to point 17 of the Act which says: 'Nothing in this Act shall apply to any intellectual property generated out of scholarship, fellowship and grant given by the Government, primarily, for education purposes'. Research in our institutions is carried out almost exclusively by Ph D students (the ubiquitous JRFs and SRFs) most of whom are usually supported by publicly funded scholarships. These fellowships are intended to serve an educational purpose, principally training students for research. It is these students who also man the frontlines in the laboratories. Any intellectual property that is generated is highly likely to bear the imprint of this workforce. Would the new Act then place all such work outside its purview? There are other sections that bear careful scrutiny and in places it is not clear if the

intention is to facilitate innovation for the public good or to add further hurdles to the process of disseminating and utilizing research carried out in public institutions. Many institutions already have in place programs that facilitate entrepreneurship and have internal IP management cells. The new Act might only appear to be incrementally innovative. Some government departments engaged in funding science seem to accept the fact that IPRs rest with the institution where the research is carried out. Curiously, all funding arms of government do not seem to subscribe to this approach.

Will legislation improve the climate for innovation and original research in our institutions? Is financial incentive the key driver of creativity? In thinking about the new IPR Act, I was drawn to a recent study enticingly titled: 'The Decline of University Patenting and the End of the Bayh-Dole Effect' (Leydesdorff, L. and Meyer, M., *Scientometrics*, 2010, in press). The authors note that while the Bayh-Dole Act did have a dramatic impact on patenting by US universities between 1981 and the late 1990s, the effect of legislation 'has withered away, with a relative decline of university patenting since 2000'. They draw attention to an earlier study which suggests 'that Australian universities emulate... the Bayh-Dole success without legislation'. These authors make the interesting suggestion 'that institutional incentives for university patenting have disappeared with the new regime of university ranking. Patents and spin-offs are not counted in university rankings'. Patents cost money to file and maintain, in a global arena. Licensing fees and royalty income must substantially exceed patent expenditure; a condition not often achieved in Indian organizations as yet. The new legislation will undoubtedly bring in its wake new problems that will need to be addressed, especially if the size of patent portfolios becomes an index of apparent institutional achievement. I must confess that I found the new Act hard to read, undoubtedly a reflection of my innocence of the niceties of law. I could not help recalling the unforgettable episode in *Oliver Twist*, almost at the end of Dickens' long novel, when the truth of Oliver's origins is revealed. In discovering the fate of trinkets bequeathed to Oliver by his long dead mother the good Mr Brownlow establishes that Mrs Bumble had sold them to a pawnbroker. He addresses her husband, Mr Bumble as the 'more guilty of the two, in the eyes of the law; for the law supposes that your wife acts under your direction'. Mr Bumble's response has achieved immortality. '“If the law supposes that”, said Mr Bumble squeezing his hat emphatically in both hands, “the law is a ass – a idiot. If that's the eye of the law, the law is a bachelor; and the worst I wish the law is, that his eye may be opened by experience – by experience.”' (Charles Dickens, *Oliver Twist*, 1837–1839, Penguin Popular Classics, 1994, p. 491). There is no doubt that new laws will also be tempered by experience.

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