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(Conference Draft)

“Universities as Engines of Development”

Shubha Ghosh, PhD, JD*

2021 Law and Development Conference

Hamburg, Germany
November 2021

* Shubha Ghosh, PhD, JD, Crandall Melvin Professor of Law, Syracuse University College of Law; email: sghosh01@law.syr.edu

I. Introduction

“Economic development” evokes images of industrial prowess. Dams, hydroelectric projects, turbines, skyscrapers, smokestacks, cleantech fill real and imagined landscapes before being translated into growth rates, input-output tables, and labor-intensive technological change. Removed from such visions are the bucolic settings of the university, spires towering above aquascapes, Edwardian gabled buildings rising above a welcoming set of stairs, statues of founders and intellectuals long dead. Yet, as this Article sets forth, universities also serve as engines of economic development. Promotion of education and the push of research, faculty, students, and staff may be the harbingers of progress, perhaps surpassing the band of industrialists who are often given primary billing.

Senators Birch Bayh and Robert Dole certainly held universities in such regard, as indicated by their eponymous legislation. The Bayh-Dole Act of 1980 sought to unleash United States universities, tapping into the energies of its researchers and pushing the fruits of their research into the marketplace.¹ Several decades later South Africa emulated this legislation into an expanded form, going beyond patents to include all types of university intellectual property.² India also deliberated its own versions of the Bayh-Dole Act, with no formal enactment, but with some tacit administrative implementation.³ This Article explores these legislative developments as evidence of how universities fuel economic development.

Some readers may wince at juxtaposing universities with economics and development. Maybe social development, psychological development, or cultural development is the more appropriate term. But, of course, universities’ role as shapers of persons and cultures is not denied in this Article. The aim is to draw the connection between the university and the development of economies, a connection that will expose policies underlying legislative reform and enlighten theories of economic development.

¹ Shubha Ghosh, “Bayh-Dole beyond Patents,” in Jacob Rooksby, ed., *Research Handbook on Intellectual Property and Technology Transfer* (2020).

² See Risa L. Lieberwitz, *Confronting the Privatization and Commercialization of Academic Research: An Analysis of Social Implications at the Local, National, and Global Levels*, 12 *Indiana J Global Legal Studies* 109 (2005); A. Brand & Oh Dean, *Intellectual Property Rights Flowing From Universities: An Analysis of the Impact of the Current South African Legal Framework on International Research Collaboration*, 3 *TSAR* 475 (2018).

³ See Lieberwitz, *supra* note 2; Joelle Dountio O, *The Indian Protection and Utilization of Public Funded Intellectual Property Bill, 2008: Does It Secure Access to Medicines?*, 21 *Journal of Intellectual Property Rights* 140 (2016); Prateek Kumar & Roopali Gupta, *The Roadmap for Enhancing University—Industry Research Collaboration in India*, 63(2) *Indian Journal of Public Administration* 196 (2017).

Professors Cooter and Shaeffer’s work on law and economic development is the starting point for understanding universities as engines of development.⁴ These two scholars demonstrate how law can solve the double trust problem, an obstacle for the creation of markets and economic development. Certain legal rules by addressing the double trust problem can facilitate the creation of markets which in turn spur economic development. Conceptually, Cooter and Shaeffer set forth a linkage from law to trust to markets to economic development. Of course, these linkages are not so linear and clear cut, and the authors are aware of criticisms. For the purposes of this Article, I examine the linkages among law, trust, and market, making the heroic assumption that markets lead to economic development. I have more thoroughly discussed the market-economic development linkage in previous work.⁵

I adopt this tack to address a particular strain of argument often supporting the Bayh-Dole Act. That argument advocates for the creation of strong intellectual property rights within universities in order to facilitate commercialization of inventions and creative works by universities and their faculty, students, and staff. These property rights are often justified as resolving a particular double trust problem as arising from uncertain property rights within universities. My central point is that this type of argument ignores how universities themselves solve a double trust problem that impedes economic development. Proponents of the Bayh-Dole Act by creating property rights within the university ignore critical functions and goals of universities. Property rights within universities can subvert these goals. The policy challenge is to recognize these goals of the university as an institution and reconcile them with how intellectual property rights can promote economic development. A strong claim is that this reconciliation may be impossible and undesirable in practice and in theory.

The analysis is presented as follows. Section Two elaborates on the double trust explanation for law in supporting economic development. Bayh-Dole advocates would view the legislation as itself resolving double trust problems arising in universities. Contrary to these advocates, universities themselves resolve the double trust problem, and the Bayh-Dole Act solution of strong intellectual property rights will be inconsistent with how universities resolve the double trust problem. Section Three turns to the extensive literature on Bayh-Dole legislation in the United States and counterparts in South Africa and India. This literature reveals experience consistent with my analysis in Section Two. Section Four proposes possible policy responses as a basis for further discussion and research.

⁴ Robert Cooter and Hans Berndt Schaefer, *Solomon’s Knot: How Law Can End the Poverty of Nations* (2012).

⁵ Shubha Ghosh, *Intellectual Property and Economic Development: A Guide for Scholarly and Policy Research*, in Ben Depoorter & Peter S. Menell, *Research Handbook on the Economics of Intellectual Property Law* (2019).

II. Universities and the Double Trust Problem

Professors Cooter and Shaeffer explain how law can promote economic development. Their arguments drew on an institutional tradition of law and economics, enriched by the field of information economics and the dramatic changes in political economy after the fall of the Berlin Wall. According to these two scholars, law is important for institutions, and institutions are important for market-led growth and economic development. As for the second point, market institutions, rather than centralized state planning are critical for economic progress. This point is underscored by the collapse of the Soviet Union and the adoption of liberalization policies in India, countries in Latin America and Africa, and the restructuring of the Communist Party in China. The problem however is that markets do not arise spontaneously without legal infrastructure. Economic development depends on the appropriate design of law.

Information economics can guide the design of law to promote functioning and effective markets. Professors Cooter and Shaeffer demonstrate that markets fail because of the double trust problem. If buyers and sellers do not trust each other, exchange is unlikely to occur. Lack of trust stems from differences in information. Buyers cannot be assured of the quality of products they are promised by sellers, who in turn may be uncertain or doubtful of the method of payments promised by buyers. These information problems are often summarized in the concepts of adverse selection, the inability to identify the type of person one is trading with (honest or devious), and moral hazard, the inability to identify acts by persons (adulterating a product, passing counterfeit currency, lack of assets to satisfy debts). But information problems can extend beyond these two categories to include lack of knowledge of the rules of the game, inability to verify certain facts about transactions, and differences in cognitive abilities in processing quantitative or qualitative data. Economies attempting to establish markets, whether countries moving from rural to industrial settings or developed countries trying to establish markets on digital platforms, need to address the double trust problem.

As Professors Cooter and Shaeffer elaborate, law can address the double trust problem. By creating rules on money, legal institutions provide the basis for an accepted currency. Contract law can create enforceable rights for buyers and sellers to ensure either side has recourse if the respective promises are not met. Tort law can address injuries to person and property that arise from intentional or miscalculated conduct. Competition law can forestall dominance in the marketplace. Property law can establish rights of ownership and exclusion

that promote management of assets and ensure stability in transactions. How to institute and coordinate these various legal regimes becomes the challenge for economic development.

Arguments for and against the Bayh-Dole Act fit within the theoretical framework of the double trust problem. By creating property rights for university developed research, the Bayh-Dole Act creates stable rights that allow constituencies within universities to cultivate and commercialize their inventions. Or, at least as I set forth below, the conventional wisdom goes. What this argument ignores is how the institution of universities itself solves a double trust problem, a solution that is perturbed and possibly undermined by the Bayh-Dole Act. This Article explores this set of arguments with the aim of suggesting how Bayh-Dole type legislation may properly be implemented in countries that seek to do so.

In this section, the role of universities and the Bayh-Dole Act in addressing the double trust problem is explained in three stages:

1. The role of markets in economic development
2. Bayh-Dole Act and the double trust problem of innovation
3. Universities as solving a double trust problem and the conflict with Bayh-Dole

Each of these points are the subject of scrutiny in the rest of this section.

A. Markets and Economic Development: The Problem of Embeddedness

Policies in favor of market institutions as necessary for economic development have become a given after the collapse of the Soviet Union and the adoption of liberal economic policies in several previously self-described socialist countries. China’s movement toward market institutions reinforce the new accepted wisdom. Recent market declines and economic collapses have disturbed the faith in markets only slightly with government interventions seemingly needed only as stop-gap measures.

Whether markets are in fact or in theory necessary for economic development has been the subject of my previous research. The principal conclusion, relevant for this Article, is that markets function when embedded with other social institutions.⁶ This insight is consistent with the conclusions of Professors Cooter and Shaeffer, who focus primarily on legal institutions as needed to address information failures that inhibit the formation of markets. However, other institutions, such as the family, technological infrastructure, networks of communication, and

⁶ See Ghosh, *supra* note 5.

systems of distribution also are needed for functioning markets as engines for development. The task of development policy is to align these complex and varied set of institutions, whose relevance depends upon history and cultural context.

Universities are institutions within which markets are embedded. As transmitters of knowledge, universities help in forming human capital. Even if students somehow manage to teach themselves, which is often the goal of pedagogy, universities can serve a sorting functioning by screening for talent and by granting signals of capability. Economist Fritz Machlup was a pioneer in shaping our understanding the economics of knowledge production and the role of universities in developing and promoting knowledge through research and through teaching.⁷ His studies from the 1950’s are consistent with the history of universities which often complemented monastic institutions in preserving canonical knowledge and in training priests and took a secular turn with the rise of science and decline of metaphysics.⁸

While some may argue that universities really promote cultural development rather than markets, the success of markets rests on cultural foundations, not only the work-ethic (isolated by Weber within the Protestant tradition, but without doubt having more varied roots) but also the power of language needed for communication and persuasion. I caution against the view that universities serve solely to promote markets and development. Culture is not a handmaiden for commerce. The point is that markets, crafted often purely in terms of self-interest, appropriation, and accumulation, fail without a deeper culture foundation that cultivates cooperation, civic virtue, and democracy.⁹ To understand universities purely in instrumental terms is to overlook the connections between the pursuit of profit and a sense of connection to society.

Equally to be avoided is a patrician view of markets that rests capitalism solely on an educated elite. I am not suggesting an aristocracy of virtue with the amassing of wealth leading to philanthropic endeavors as a coda to a life of ruthless materialist accumulation. Democratic culture fosters markets by expanding the field of talent and by promoting the entry of new ideas in the arts, the sciences, and industry. Culture is not a handmaiden to commerce, and universities do not merely refine the affectations of the bourgeoisie.¹⁰ Shaping thoughtful,

⁷ Fritz Machlup, *The Production and Distribution of Knowledge in the United States* (1962).

⁸ See John Henry Newman, *The Idea of a University* (1982 ed); Laurence R. Veysey, *The Emergence of the American University* (1965); Jarrett B. Warshaw, *University as Knowledge-Based Enterprise: Organizational Design and Technology Transfer*, in Jacob Rooksby, ed., *Research Handbook on Intellectual Property and Technology Transfer* (2020).

⁹ See Deirdre N. McCloskey, *The Bourgeois Virtues: Ethics for An Age of Commerce* (2007).

¹⁰ See Thomas P. Hughes, *American Genesis: A Century of Invention and Technological Enthusiasm, 1870-1970* (1989).

engaged citizenry who can also contribute to the world of commerce defines concisely how universities are embedded in the world of markets.¹¹

Markets are also embedded in universities. Within the United States, universities are corporate entities, mostly not-for profit, but with for profit forms also dotting the landscape.¹² They form contracts. They can be sued for tort liability. Market competition norms also govern universities as claims of antitrust and employment law violations frequently disrupt their superficially bucolic ambience. But once again the embeddedness of markets in university life does not break down the walls from the agora. Universities are also havens from the marketplace often made possible by job security for faculty and staff, financial security arising from endowments and stable revenue streams, and the privileges from being engaged in research, teaching, and learning. These havens are made possible by structures of management and organization, rooted in law and in commercial transactions.

Advocates of the Bayh-Dole Act point to the potential within the university for commercializing marketable inventions. The mantra “from the lab to the marketplace” appeals to the markets hidden inside university walls. By recognizing intellectual property rights within universities, the mantra continues, these hidden markets will be unleashed. In the next subsection, I elaborate on this standard argument, show how it fits into the double trust problem identified by Professors Cooter and Schaeffer, and conclude that this justification ignores the deeper problem of embeddedness, to which I turn in subsection II.C.

B. Bayh-Dole and Information Problems in Innovation

Prior to the passage of the Bayh-Dole Act in 1980, recipients of United States government funded research could not patent inventions derived from their research because of restrictions from the funding agency.¹³ These restrictions were justified on the grounds of avoiding double taxation of the public.¹⁴ Taxpayers funded the government grants. Allowing patents on the invention would impose another tax, based on the exclusivity created by patent rights, when consumers would purchase patented inventions—whether pharmaceuticals, pesticides, hardware—in the marketplace. Some universities circumvented these restrictions by creating private foundations separate from the university which would hold the patents.¹⁵ In

¹¹ See Warshaw, *supra* note 8.

¹² See Machlup, *supra* note 7.

¹³ See Grisca Metlay, *Reconsidering Renormalization: Stability and Change in 20th Century Views on University Patents*, 36(4) *Social Studies of Science* 565 (2006).

¹⁴ *Id.*; David C. Mowery & Arvids A. Ziedonis, *Numbers, Quality, and Entry: How Has the Bayh-Dole Act Affected U.S. University Patenting and Licensing?*, 1 *Innovation Policy and the Economy* 187 (2000).

¹⁵ See Metlay, *supra* note 13.

addition, university employed inventors would often exit the university, enter the private sector, and secure patent rights.

The impetus for the Bayh-Dole Act was the recognition that many potentially profitable inventions were stuck inside universities and were not being commercialized. Senators Birch Bayh and Bob Dale hailed from the states of Indiana and Kansas respectively, two states known for their prestigious research universities. In the late seventies, a time of decline in United States productivity and global competitiveness, the senators recognized the ability of university research to enhance national productivity.¹⁶ Patents were seen as the answer. As Wendy Schacht of the Congressional Research Service wrote in 2006: “In an academic setting, the possession of title to inventions is expected to provide motivation for the university to license the technology to the private sector for commercialization in anticipation of royalty payments.”¹⁷ Commercializing university research was identified as a new revenue stream for universities as well as opening new national markets for innovation.

The Bayh-Dole Act implemented as amendments to the Patent Act required universities receiving federal government funding supporting scientific research to create Technology Transfer Offices (TTO). These offices would be reporting centers for potentially patentable research arising from government funding. Once identifying potentially patentable research, TTO’s would follow procedures to see if the university and the funding agency would pursue patenting. If they decided not to, the university researcher who invented the work would be free to do so. If the university and agency did pursue the patent successfully, there would be requirements for licensing the patented invention.

As Schacht reminds us, “patent ownership is seen as a way to encourage the additional, and often substantial investment necessary for new goods and services, particularly in the case of small business.”¹⁸ In the context of university patenting, universities do not have the physical capacity or the legal ability under their charter “necessary to take the results of research and generate marketable products.” One important goal of the Bayh-Dole Act was to promote “cooperative efforts between academia and the business community.” As Wendy Schacht concludes:

¹⁶ Id.

¹⁷ Wendy Schacht, *The Bayh-Dole Act: Selected Issues in Patent Policy and the Commercialization of Technology*, Congressional Research Service, 2012.

¹⁸ Id.

By providing universities with intellectual property ownership with which to pursue and structure collaborative ventures, the legislation encourages the two sectors to work together to generate new goods, processes, and services for the marketplace.¹⁹

Even more strongly, the Bayh-Dole Act creates a pathway for the generation of markets themselves.

The last point reverts to the double trust problem noted by Professors Cooter and Schaeffer. Absent patent protection, private sector manufacturers and distributors may be unwilling to contract with universities possessing valuable inventions. Furthermore, university inventors may be hesitant and unable to contract with private sector companies unless they left the university position and obtained patents in their non-university capacity. Allowing universities to obtain patent rights in inventions generated from federally funded research establishes property rights that permit negotiation and fruitful commercial transactions.

As the research presented in Section III shows, there are some doubts about the success of Bayh-Dole in the United States. Although the limitations are discussed in more detail in that section, three points are worth emphasizing here. First, the Bayh-Dole Act addressed only limitations at the federal level on patents in the context of federally funded research. Many states still impose restrictions on patents held by universities under their state law. For example, publicly funded universities in Indiana cannot own patents as part of the general state prohibitions on commercial activity by universities. In such states, universities must still create separate legal entities for the pursuit, ownership, and commercialization of patents. These state restrictions may inhibit commercialization of university generated inventions.

Second, there are residual uncertainties about the application of the Bayh-Dole Act. One such uncertainty led to a 2011 decision by the United States Supreme Court in *Stanford v. Roche*.²⁰ At issue in the case was multiple assignments by a Stanford researcher to his university and to Cetus, a private company that was a predecessor in interest to Roche. Stanford University took the position that its assignment took precedence over the assignment to Roche under the terms of the Bayh-Dole Act. The Supreme Court disagreed. Instead six justices ruled that common law principles of assignment law applied, relieving the University of all patent rights in a multi-billion dollars invention. Commentators criticized the decision for creating uncertainty for universities in their partnership with private companies. Another criticism was

¹⁹ Id.

²⁰ *Stanford v. Roche*, 563 U.S. 776 (2011); Joel Gotkin, *The United States Bayh-Dole Act and Its Effect of University Technology Transfer* (2012).

the uncertainty the Court created in the understanding of the Bayh-Dole Act. However, one interesting aspect of the Court’s decision is the ruling that the Bayh-Dole Act only enabled universities to obtain patent interests without changing any background, long standing rules attendant to patent law. In other words, there were no special rules for universities, as Stanford and its peers seemingly argued. Universities and private companies operated on the same footing.

Finally, the Bayh-Dole Act has come under criticism for imposing a system of private property rights on the communal ownership norms and values of universities.²¹ This conflict in cultures has created problems, some have argued, for the successful implementation of the Bayh-Dole Act. This set of criticisms will receive extensive discussion in Section III. However, there is one version of this strand of criticism that is important to explore in this section. The Bayh-Dole Act may solve one type of double trust problem, that associated with commercializing university inventions, while ignoring another double trust problem, that arising from the difficulties in generating and marketing human capital. This second double trust problem is the subject of the next subsection.

C. Universities and the Double Trust Problem in Human Capital Formation

From an economic perspective, universities serve two purposes. The first is the provision of general and specific knowledge, two public goods that labor markets may underproduce.²² The second is the dissemination of certain skills that private firms may not have the proper incentives to provide.²³ General knowledge, specific knowledge, and skills constitute human capital for the argument in the Article. Family, social organizations, and human interactions also shape human capital. But each of these may be limiting, reflecting accidents of birth and human circumstances. Universities provide a liberating platform that allow students to exit circumstances of family and social position, gain personal autonomy, and reach for advancement. While these goals go beyond the knowledge and skills needed for employment, they are important for competing in labor markets.

Apprenticeships with private firms are not perfect substitutes for universities. Masters may be reluctant to fully train apprentices for fear of competition. Trade secrecy rules, guild organization, and post-training restrictions may be needed for the master-apprentice

²¹ See Christopher Brown, *Ayresian Technology, Schumpeterian Innovation, and the Bayh-Dole Act*, 43 *Journal of Economic Issues* 477 (2009); Bronwyn Hall et al., *The Choice Between Formal and Informal Intellectual Property: A Review*, 52 *Journal of Economic Literature* 375 (2014).

²² See Machlup, *supra* note 7.

²³ *Id.*

relationship to be sustainable. Each of these possibilities may inhibit the spread of knowledge and innovation. Trade secret rules and post-training restrictions would through property and contract rights create disincentives to form one’s firm. Transmission of knowledge may be limited, and the teaching of skills may be firm-specific making portability and scaling difficult. In addition, guilds may be anti-competitive placing physical limitations on employee mobility and imposing social norms of loyalty that make creation of new firms and new practices difficult if not impossible. Universities can resolve these traditional problems by providing general knowledge and skills that would not inhibit competition. Private firms can hire graduates with some common baseline of knowledge and skills upon which more firm specific knowledge can be transmitted. If markets are active, employees can leave to work at another firm or to start a firm of their own with a lessened concern among initial employers that the employees will misappropriate firm specific training.

Firms can address some of the incentive problems for training through internal labor markets.²⁴ By hiring a cohort of employees, firms can create rules for internal competition and team-building to determine who will move ahead. Deferred compensation and other contract mechanisms can structure these internal markets and also limit fears of competition from existing employees. Deferred compensation results in an upward sloping wage schedule under which employees are initially paid below their marginal product at the early stages of their career and above their marginal product at later stages. This life cycle pattern can create incentives for loyalty within the firm. However, since workers in later stages are paid above their marginal product, incentives exist to discharge older employees and replace them with younger employees. Contractual protections can limit employer opportunism. Compensation packages based on bonuses and pensions can also resolve the incentive for employer opportunism by connecting compensation to benefits for the firm (bonuses) or by creating incentives for exit (pensions).²⁵

Universities can alleviate the incentive problems that arise from internal labor markets by taking on some of the training function of firms. Furthermore, universities and firms often partner in order to share training and to identify talented future employees. Universities and private sector firms can engage in partnerships for the creation of human capital.

The Bayh-Dole Act also envisions partnerships between universities and for-profit firms, but these partnerships serve the generation of patents and start-up firms. From one

²⁴ See Stewart J. Schwab, *Life-Cycle Justice: Accommodating Just Cause and Employment at Will*, 92 Mich. L. Rev. 8 (1993).

²⁵ *Id.*

perspective, as some of the literature cited in Section III asserts, the Bayh-Dole Act seemingly ignores the university’s role in training and developing human capital. This point may be overstated as the identification of patentable inventions requires basic skills and general knowledge that universities can and must instill in students. Perhaps a fairer criticism is that universities shift their focus from general training and skill-building to an emphasis on those skill sets that are more relevant for the generation of patents. This shift in emphasis favors some disciplines like engineering and medicine, where patenting is more likely, over others, such as the humanities. This conclusion, however, may be inaccurate as the boundaries between the sciences and humanities are blurring, especially through software culture that is also infiltrating the arts and literature.

A sharper criticism of the Bayh-Dole Act is that it shifts the university’s emphasis towards human capital that can be embodied in patents.²⁶ This shift is in part one from theoretical to applied knowledge. Application can be in the form of useful inventions that can benefit society, such as new forms of communication, medical treatments, search and analytical tools, and research tools. Applied knowledge that may have at one point only occurred within firms or within technical schools enter the university under the auspices of the Bayh-Dole Act. Accompanying the push for application is the need for commercialization. Universities may emphasize training in commercial subjects as another dimension of applied knowledge. Student start-ups drawing on their practical technical training become the purview of the Bayh-Dole inspired university.

With a bit of irony, the Bayh-Dole Act may create new double trust problems, mirroring the incentive issues within guilds and internal labor markets. Senior staff in universities may be hesitant to train students and junior staff because of the fear of competition. Opportunism may arise in terms of claims of ownership of inventions and patents. Even if there is incentive to provide some training and develop human capital, once that human capital becomes embodied, battles might arise over property rights in the embodiment especially if the commercial gains are great. As the literature cited in Section III demonstrates, these legal battles among constituencies within universities, among different universities, and among universities and for-profit firms are one of the troubling consequences of the Bayh-Dole Act. Has the university become distracted from its core mission in resolving a double trust problem specific for labor

²⁶ See Yixin Dai, et al., *Institutions and Intellectual Property: The Influence of Institutional Forces on University Patenting*, 24 *Journal of Policy Analysis and Management* 579 (2005).

markets?²⁷ If so, the next generation of university reforms may well involve better protection for student inventors, cleaner resolution of disputes over ownership, and clear pathways for commercialization of university inventions. But even with these reforms, the problem still remains that what was meant to be a partnership between the university and for profit firms has become a blurring of the line between the role of the university and the incentive problems of labor markets.

With this conceptual background, the various assessments of the Bayh-Dole Act and similar legislation in South Africa and India becomes comprehensible. These assessments are the subject of the next section.

III. Comparative Legal Perspectives on University Research Commercialization

How do we assess the Bayh-Dole Act? Extensive scholarship on the experience of United States universities shows that the Bayh-Dole Act has been successful in meeting its goals of promoting university patenting.²⁸ However, there are concerns that less successful has been the goal of commercializing university inventions. Jurisdictions that have adopted or considered Bayh-Dole type legislation have looked to the criticisms of the United States system in developing their own approaches. South Africa and India are the two prominent examples discussed in this section. The experiences of the United States, South Africa, and India can offer evidence of the theoretical and policy discussion of Section II.

A. The Mixed Success of the Bayh-Dole Act

Predating the debate leading up to the passage of the Bayh-Dole Act in 1980 was a vigorous debate over university patenting in the 1930’s.²⁹ While the earlier debate was successful in moving major universities to pursue internal patenting policies, the terms of the two debates were different. In the 1930’s, the university was seen as a counterweight to the failure of the market system and private sector during the Great Depression.³⁰ The university was viewed as a public interested institution, not guided solely by profits, which could better

²⁷ See Gotkin, *supra* note 20; Jerry Thursby & Marie Thursby, *University Licensing: Harnessing or Tarnishing Faculty Research?*, 10 *Innovation Policy and the Economy* 159 (2010).

²⁸ See Gotkin, *supra* note 20; Richard Jensen & Marie Thursby, *Proofs and Prototypes for Sale: The Licensing of University Inventions*, 91 *The American Economic Review* 240 (2001); William L. Geary, *Protecting the Patent Rights of Small Businesses: Does the Bayh-Dole Act Live Up To Its Promise?*, 22 *Public Contract Law Journal* 101 (1992). But see Arti K. Rai & Rebecca S. Eisenberg, *Bayh-Dole Reform and the Progress of Biomedicine*, 66 *Law & Contemporary Problems* 289 (2003); William L. Weber, *The Productivity of Nanobiotechnology Research and Education in U.S. Universities*, 93 *American Journal of Agricultural Economics* 1151 (2011); Lisa Larrimore Ouellette, *Addressing the Green Patent Global Deadlock Through Bayh-Cole Reform*, 119 *The Yale Law Journal* 1727 (2010).

²⁹ Metlay, *supra* note 13; Elizabeth Popp Berman, *Creating the Market University* 94 (2012).

³⁰ *Id.*

deliver desirable products to the public. During this earlier period, the success of University of Wisconsin, Madison, in developing Warfrin and methods for enhancing Vitamin D in milk, was an illustration on how universities can substitute for the marketplace.

In contrast, the Bayh-Dole Act was debated in an era of skepticism towards government bureaucracy.³¹ Federal and state rules were perceived as overregulating the marketplace. One goal of the Bayh-Dole Act was to simplify government regulation by creating uniform rules across federal government agencies on ownership of patents.³² Conflicting agency rules were seen as inhibiting patenting and commercialization. By liberalizing the rules, the Bayh-Dole Act would facilitate university and private sector collaboration. Universities, instead of substituting for the market, would engage with the market. As a result, the national economy would prosper in this liberalized marketplace.³³

University patenting did increase after the enactment of the Bayh-Dole Act. Although some have argued that this upward trend would have happened without the legislation, there is evidence that universities are more patent-conscious.³⁴ However, the evidence on successful commercialization has been mixed. Joel Gotkin concludes that “the Act has empirically been shown to have improved the technology transfer of federally funded university inventions, with commercialization and licensing of patents increasing substantially post-1980.”³⁵ By contrast, David Mowery and Arvids Ziedonis summarize more negative findings: “The analysis of overall U.S. university patenting suggests that the patents issued to institutions that entered into patenting and licensing after the effective date of the Bayh-Dole Act are indeed less important and less general than the patents issued before and after 1980 to U.S. universities with longer experience in patenting. In other words, an important factor in any assessment of Bayh-Dole's effects on U.S. academic patenting is the entry by universities with little experience into patenting and licensing after 1980.”³⁶

Several factors contribute to the relative failure of university commercialization. One is the costs imposed by university technology transfer offices, which are often underfunded and have an uncertain place within the university bureaucracy. The Bayh-Dole Act requires

³¹ Id.

³² Id.

³³ Id.

³⁴ See Elizabeth Popp Berman *Why Did Universities Start Patenting?: Institution-Building and the Road to the Bayh-Dole Act*, 38(6) *Social Studies of Science* 835 (2008). See also Dai, *supra* note 26; Gotkin, *supra* note 20; David E. Winickoff, *Private Assets, Public Mission: The Politics of Technology Transfer and the New American University*, 54(1) *Jurimetrics* 1 (2013).

³⁵ Gotkin, *supra* note 20.

³⁶ Mowery & Ziedonis, *supra* note 14.

universities receiving federal grants to have a TTO, but universities are expected to fund their offices through their own funding. The TTO also exists alongside the university’s general counsel office, and it is not always clear how the two offices interact. Because of these impediments, universities often have difficulties in negotiating with private firms, who are not sure how to deal with university bureaucracy. As David Mowery observes: “[F]irms had the capabilities and incentives to use the process for their own research and drug production in the absence of exclusive rights to the invention. Indeed, it appears that technology transfer occurred in spite rather than because of the patents, licenses, and involvement of the university technology transfer office.”³⁷

Another factor inhibiting commercialization is the problem of the anti-commons. Scholars have predicted that increased patenting in certain fields can lead to excessive property rights that need to be licensed. As Gotkin describes, in the presence of the anticommons,

no one has an effective privilege of use. Thus, patented technologies are ultimately underused and not commercialized. While this problem occurs in patenting generally, it is particularly prevalent in the biotechnology field, where patents are incredibly important, transaction costs of trading patents are very high, and future discoveries build upon past discoveries. Commentators argue that Bayh-Dole exacerbates the anticommons problem with its practical consequence of increased early stage patenting of discoveries that would have been left to the public domain absent Bayh-Dole.³⁸

These increased negotiations raise the costs of commercialization. Some evidence for the anticommons problem is the prevalence of early stage patenting in the development of an invention as well late stage patenting for completed inventions.³⁹ These multiple patents over various elements and components of an invention increase the number of rights over which universities and private firms have to negotiate.

The anticommons problem are more likely in certain industries. In the field of biomedical innovation, one study concluded: “Bayh-Dole has been celebrated as advancing the nation's innovation system by greatly increasing the number of university-based patents. Our research suggests that such increases may, on the contrary, be contributing to the slow-down of biomedical innovation. We recommend that Congress revisit the Bayh-Dole Act and amend it

³⁷ See David C. Mowery, *The Bayh-Dole Act and High-Technology Entrepreneurship in U.S. Universities: Chicken, Egg, or Something Else?*, Colloquium on Entrepreneurship Education and Technology Transfer (January 2005).

³⁸ Gotkin, *supra* note 20.

³⁹ *Id.*; Mowery & Ziedonis, *supra* note 14.

to require that NIH extramural research recipients make public their research results.”⁴⁰ The Bayh-Dole Act may have hindered the development of green technology. Imitation. “In engineering fields like green energy, Professor Lisa Ouellette notes, “although significant capital may be necessary to bring new technologies to market, patents are typically unnecessary for commercialization due to a lower ratio of regulatory barriers to imitation costs, the cumulative nature of innovation, and other methods of obtaining competitive advantage.”⁴¹ Finally, with respect to drug development, “studies suggest that government-funded research contributes substantially to pharmaceutical development, but the results do not address whether Bayh-Dole or the licensing process was essential to the innovative work. In fact, one study suggested that an open-source model might be more effective than a private licensing regime in spurring development.”⁴²

Yet another problem confronting university commercialization is the use of sponsored research directly from industry. One study shows that “Bayh-Dole has served to increase technology transfer but has not led to increases in federal applied research funding.”⁴³ Consequently, university researchers turn to industry for funding as federal funding shrinks. Perversely, this reliance on industry funding leads to decreased patenting by universities. The same study concludes:

Although industry funding may induce more applied university research, it is not necessarily the case that such research will end with a university patent application. This is not inconsistent with the goals of Bayh-Dole, as a university-held patent may not be necessary to ensure technology transfer when industry is the source of funds for applied university research. To consider this further, we need to compare a university's patenting motivation to industry's motivation as well as to separate the applied research process from the patent production process. Although we have shown that universities have an increased interest in patenting, industry still has a stronger motivation to own patents.⁴⁴

Research funding, patenting, and commercialization are intertwined. Federal and industry funding of research can have differing and unpredictable effects on patenting as dollars translate

⁴⁰ See Wesley M. Cohen & John P. Walsh, Real Impediments to Academic Biomedical Research, 8 *Innovation Policy and the Economy* 1 (2007).

⁴¹ See Ouellette, *supra* note 28.

⁴² Aaron S. Kesselheim, An Empirical Review of Major Legislation Affecting Drug Development: Past Experiences, Effects, and Unintended Consequences, 89(3) *The Milbank Quarterly* 450 (2011).

⁴³ See Dai, *supra* note 26.

⁴⁴ *Id.*

into research and inventive activity. University and industry may battle over patenting and patent rights with possible gains from commercialization becoming lost in the struggle.

Pursuit of commercial gains from research may have diverted academic energies from basic research as the Bayh-Dole Act has disrupted university culture. Gotkin cites critics who “critics argue that a weakness of the BDA is that it shifts the focus from basic to applied research, and that it creates conflicts of interests in researchers who may be more likely to withhold their research for fear that a university will gain patent rights.”⁴⁵ There is little corroboration for this prediction. While there is “some evidence suggesting increasing secrecy and delays in the dissemination of genetic research, it is not at all clear that the concomitant increase in university patenting and licensing necessarily bears any causal relation.”⁴⁶ Gotkin concludes from the available research that “Bayh-Dole is no more inefficient with respect to promoting academic research than the pre Bayh-Dole scheme.”⁴⁷ This conclusion, however, is not as strong an endorsement of the Bayh-Dole Act as one might expect.

Government funding and contracting are important dimensions of the goal of promoting university commercialization. But the involvement of government agencies may be a reason for the lack of success of the Bayh-Dole Act in moving research from the lab to the marketplace. Private industry does not rely on government funding as universities do, and industries seeking to collaborate with universities must deal with the rules of the funding agency. This three-prong transaction often entails contract by regulation rather than contract by negotiation. As government contracts attorney Diane Sidebottom states, “When the Government focused on sponsoring high-technology research in universities and nonprofit research centers, this inflexible position did not present much of a problem. Universities and nonprofit entities are generally heavily dependent on grants and contracts with outside organizations and typically would accept the standard clauses provided by the Government. Corporations and commercial entities, however, are not as dependent on government funding and so are not very understanding or accepting of the restrictive government contracts. They typically have internal financial resources on which they can rely. Additionally, these corporations can present their ideas to venture capitalists or form joint ventures to raise funds. They often bring intellectual property to the table as an asset in the negotiating process.”⁴⁸ More flexible government

⁴⁵ Gotkin, *supra* note 20.

⁴⁶ *Id.*

⁴⁷ *Id.*

⁴⁸ Diane M. Sidebottom, *Updating the Bayh-Dole Act: Keeping the Federal Government on the Cutting Edge*, 30(2) *Public Contract Law Journal* 225 (2001).

contracting rules and more funding for basic research may twin reforms that could potentially cure some of the failures of the Bayh-Dole Act.

March-in rights under the Bayh-Dole Act allows a funding agency to obtain a compulsory license for the commercialization of patented technologies arising from the federal grant. This provision serves to promote public access of technologies and has been touted as permit affordable pharmaceuticals to consumers. Unfortunately, the benefits have not been as strong as predicted. According to one policy study, “the Bayh-Dole Act's march-in rights continue to be invoked by policymakers and health advocates, most recently in the context of new, high-cost products originally discovered with federally funded research. [But] the existence of march-in rights may select for government research licensees more likely to commercialize the results and that they can be used to extract minor concessions from licensees. [A]s currently specified in the statute, such march-in rights are unlikely to serve as a counterweight to lower the prices of medical products arising from federally funded research.”⁴⁹

Government contracting and march-in rights exemplify the dynamics of commercialization introduced into university culture by the Bayh-Dole Act. Universities need to manage their funding and technologies while governing relations among researchers, private industry, and federal agencies. One commentator describes an aggressive stance adopted by universities in the marketplace shaped under the Bayh-Dole Act. One 2009 case study found that “Columbia University and the inventors profited handsomely Axel patents, earning \$790 million in revenues through licensing that tapped profits from end products made by biotechnology and pharmaceutical companies. Columbia's aggressive effort to extend the patent duration also led to considerable legal expenditures and fierce controversy. Obtaining and enforcing a 2002 patent proved costly, politically financially fruitless and attracted intense criticism for behavior nonprofit academic institution.”⁵⁰ The researchers, focusing on the rents earned by Columbia, concluded their case study with the questions: “Are revenue generation and rewards for inventing valuable technologies legitimate goals for this act? If so, does the federal government need credible mechanisms for oversight checks and balances on, the rights

⁴⁹ Carolyn L. Treasure, Jerry Avorn, & Aaron S. Kesselheim, Do March-In Rights Ensure Access to Medical Products Arising from Federally Funded Research?: A Qualitative Study, 93(4) *The Milbank Quarterly* 761 (2015). See also Barbara M. McGarey & Annette C. Levey, Patents, Products, and Public Health: An Analysis of the CellPro March-In Petition, 14(3) *Berkeley Tech L J* 1095 (1999).

⁵⁰ Alessandra Colaianni & Robert Cook-Deegan, Columbia University's Axel Patents: Technology Transfer and Implications for the Bayh-Dole Act, 87(3) *The Milbank Quarterly* 683 (2009).

conferred?”⁵¹ The policy concern is over how these rewards are spent by the University. Do they serve the goals of economic development and growth? Or are they in fact just rents?

As the Columbia University case study shows, a key question is how the public benefits from the Bayh-Dole Act. Presumably, the desired public goals are the development of new knowledge, embodied in technologies that could lead to economic development. Whether these goals are close to being met depends on the structure or public private partnerships between universities and industry. As one research paper reports:

A leading example of university-private research partnerships was formed by the University of California (UC), Berkeley, and Novartis Agricultural Discovery Institute, Inc. (NADI), in 1998. The partnership's Stage 1 contract allowed UC Berkeley to retain control of an open research agenda. The research agenda is determined in Stage 2 when an open call is put out to participating faculty for research proposals - neither UC Berkeley nor NADI defines the type of project proposals to be considered. Furthermore, the committee that allocates funding to each project in Stage 2 (all proposed projects receive some amount of funding) is made up of three UC Berkeley faculty members and two members representing NADI. The criteria used for ranking projects include the quality and intellectual merit of the proposed research, potential advancement of discovery, and the past and present productivity of the research - the interest of the project to NADI is not considered.⁵²

This design of the partnership contrasts with an approach that gives more weight to the interests of industry:

An alternative structure governs a biological research agreement in another leading example: the partnership between Washington University (WU), St. Louis, and the plant biotechnology company Monsanto. This partnership's Stage 1 contract assigned both partners control over the research agenda, which gave Monsanto control over research funding decisions that NADI did not have. In Stage 2, the agreement specifically directs an advisory committee to solicit proposals and identify and fund those projects that not only have exceptional academic merit, but also serve the research interests of Monsanto. In this case, the advisory committee is equally split with three WU members and three representatives from Monsanto. This joint assignment of control rights over the research

⁵¹ Id.

⁵² Gordon Rausser & Reid Stevens, *Public-Private Partnerships: Goods and the Structure of Contracts*, 1 Annual Review of Resource Economics 75 (2009).

agenda gives the interests of Monsanto more weight, both in defining the choice set of research proposals that will be considered by the committee and in selecting which of those proposals are funded, than NADI has in its agreement with UC Berkeley.⁵³

The authors of the paper conclude that both approaches have merit with the Berkeley arrangement protecting academic freedom and the Washington University arrangement promoting commercialization. “What is important,” the study teaches, “is that the public institutions make conscience decisions about where they are comfortable on this spectrum of control over the research agenda and that they are fully aware of the implicit tradeoffs contained in the related contract language.”⁵⁴

Whatever the effects of the Bayh-Dole Act, its provisions have changed the social dynamic within which universities can choose to operate. The “conscious decisions” of administrators, university faculty and staff, policy makers, and corporate managers determines how this social dynamic will affect the culture and market of intellectual property and technology transfer. As Metlay shows in her article, university commercialization in the 1980’s contrasts with the precedents in the 1930’s. The latter focused on the public service of universities as supplementing failed markets; the former, on the integration of universities in the market economy.⁵⁵ “In terms of public value failures,” writes Dr. Valdivia, “it could be said that with the passing of time, voice and consideration is less and less equal in the Bayh-Dole debate, that the legitimate attributions of government are in retreat, and that the ambiguity of the delegation of the fiduciary role is condoning an environment of business secrecy.”⁵⁶ Bayh-Dole’s impetus to push university commercialization “is informed by an individualistic or heroic conception of scientific progress.”⁵⁷

Understood in terms of theories of economic development, the Bayh-Dole Act replaces how universities resolve the double trust problem in markets for human capital with a resolution that uses property rights to promote the market for tangible products of human capital. Can universities resolve these separate sets of market failures? The answer to this question reveals how to assess the Bayh-Dole Act. It also informs how we understand the experience of countries that are debating whether to implement Bayh-Dole like legislation.

⁵³ Id.

⁵⁴ Id.

⁵⁵ Metlay, *supra* note 13.

⁵⁶ Walter D. Valdivia, *The Stakes in Bayh-Dole: Public Values Beyond the Pace of Innovation*, 49(1) *Minerva* 25 (2011)(Special Issue on Public Value Mapping: Assessing the Non-Economic Value of R&D).

⁵⁷ Id.

South Africa has adopted such legislation; India has rejected such laws. The next two sections summarize how universities serve as engines of economic development in these two countries.

B. South Africa’s Experience for Promoting Development

A country considering importing the Bayh-Dole Act needs to be attuned the double trust problems set forth in this Article. As Joel Gotkin in his assessment of the Bayh-Dole Act concludes: “Though the BDA has proved worthwhile in the United States, great care must be taken to create similar statutes abroad. The differences between the United States university system and those in other countries are substantial, and must be considered when creating a provision to allow for universities to keep rights to their patents.”⁵⁸ Specifically, Gotkin admonishes, “[t]o increase the chances of progression in its university technology transfer sector, a country must narrowly tailor any regulations to account for the university structure, commercialization tendencies, and cultural makeup.”⁵⁹

South Africa has considered this balance in favor of adopting Intellectual Property Rights from Publicly Financed Research and Development Act 51 of 2008 (IPRPFDR). India has declined to enact such legislation. The contrasting results demonstrate the continuing doubts over universities as commercialization center.

South Africa’s legislation differs from the Bayh-Dole Act in an important way. While the Bayh-Dole Act is limited to the commercialization of patented inventions, the IPRPFDR applies to copyrights, patents, and other forms of intellectual property. This comprehensive approach results in more targeted regulations on the treatment of technical products, expressive works, trade secrets, and trademarks. While encompassing the full range of intellectual property rights can facilitate universities in adopting broader, detailed policies, the legislation also potentially raises the costs of negotiations between university and industry partners as they must comply with the requirements of IPRPFDR in addition to other statutes.

Consistent with the goals of the Bayh-Dole Act, the South African legislation is intended to promote university-industry partnership. As Professors Brand and Dean explain:

Researchers employed by South African universities often collaborate with other international research institutions.¹ Subject to the granting of sufficient funding, they do exciting and potentially ground-breaking research together in their interested fields of study. Once a funder accepts a proposed research project, each collaborator typically receives a percentage of the funding to participate in the project and perform a portion

⁵⁸ Gotkin, *supra* note 20.

⁵⁹ *Id.*

of the research. During the term of the project, the collaborators may possibly create new intellectual property, individually or jointly. However, before the project can commence and the funding can be distributed, the funder usually requires each of the collaborators to sign an agreement containing intellectual property rights clauses, addressing the ownership and, where applicable, the commercialization of the intellectual property created by the collaborators. At the least, it will contain clear, defined rules providing for access to the intellectual property.⁶⁰

While the act was a response to recommendations made after a study found that publicly financed research was underutilized, “the general focus was actually on incentivizing research through support measures, such as encouraging of the formation of research networks and promoting university-industry research links.”⁶¹

However, according to Brand and Dean, it seems as if only the innovation and commercialization aspect was addressed. “The act may have had the best intentions to increase university-based patent applications and aid the growth of South Africa technology, but unfortunately the impact and consequences of the act relating to intellectual property transactions that are entered into before research and experimental development activities commence and where the outcome of the research is uncertain were not foreseen.”⁶² In other words, the legislation favors concrete products developed from university research while not paying attention to how intellectual property rights might affect early stage and basic research.

Case studies of specific universities show ambiguous effects of the South African legislation. For example in a survey of staff at the University of Witwatersrand, “the view was expressed that the act has opened up the conversation about commercialization and innovation, but emphasized that intellectual property protection must be linked to the ability to exploit the intellectual property in the market. Researchers interviewed at the University of the Witwatersrand also prioritized publishing and pointed out the potential conflict between publishing and exploitation. They also felt limited by the difficulties in commercializing early-stage research.”⁶³

At The University of Cape Town, researchers pointed to obstacles from the national government in pursuing commercialization. “An interviewee stated that barriers arise from the need to seek the National Intellectual Property Management Office’s approvals, because it lengthens research contract negotiations, making the process more expensive and less attractive. Where difficulties arose, the University of Cape Town negotiated the situations by obtaining the necessary approvals from collaborating partners, but this caused delays in concluding agreements.”⁶⁴ Finally, there is some evidence of conflict with traditional purpose of university research and conflicts over intellectual property rights. “One interviewee stated that researchers’ main mode of knowledge dissemination is through publishing, and that the act must seek to minimize any negative impact on publishing. Another researcher was concerned that when a project has multiple funders or stakeholders, consensus on matters of intellectual property ownership will be difficult to achieve.”⁶⁵

Professors Dean and Brand present a revealing judgment about the impact of the South African legislation.

⁶⁰ Brand & Dean, *supra* note 2.

⁶¹ *Id.*

⁶² *Id.*

⁶³ *Id.*

⁶⁴ *Id.*

⁶⁵ *Id.*

Even if the act did envisage a broad societal and economic impact through this legal-regulatory system, it is essential to distinguish two main kinds of impact: commercial and social. This is where the act falls short. Above all, a university is a social institution of knowledge generation, not merely a narrow economic and commercial instrument in the hands of government.⁶⁶

This conclusion parallels the conflicting roles of the university within the double trust model. The university has a social and cultural role and is not merely a “commercial instrument.” Put another way, the institution of the university resolves market failures in human capital markets and is not just another market forum for the dissemination of products.

The reactions to South Africa’s implementation of the Bayh-Dole Act parallel criticisms among African scholars and policymakers about adopting intellectual property laws on the model of TRIPS. Professor Mwangola asks the following questions: “How do we move towards a comprehensive intellectual property rights regime that does not inhibit intellectual freedom of exploration as it protects even the most vulnerable from exploitation? How do we foster a vibrant intellectual environment that is especially nurturing to communities traditionally marginalized within the academy?”⁶⁷ The author’s answers point to developing “an integrated multi-faceted approach to increasing the practicality, visibility and scope of IP discourse.” Universities play a role in Professor Mwangola’s prescription by focusing on the needs of the differing African nations through “the development of regional and continental research networks is a priority as this would help ameliorate these problems, facilitating the pursuit of research questions that currently receive little or no funding.” Against this standard, South Africa’s importation of Bayh-Dole may too narrowly focus on commercialized research as opposed to developing broader research networks. These considerations informed the debate in India, whose parliament rejected analogous legislation, as we explore in the next section.

C. India’s Ostensible Rejection of Bayh-Dole

Professor Gotkin divided the debate in India over adopting a Bayh-Dole Act into two strands. “Some note the shortfalls of the U.S. BDA and decide that it would be unhelpful to bring similar problems to India. The second school of thought acknowledges successes of the U.S. BDA, but that India’s technology transfer is a ‘serious disconnect’ from the United States and transplantation of an American statute would fail.”⁶⁸ As to the first strand:

With India’s large generic drugs international market, a Bayh-Dole bill may effectively harm consumers worldwide. [The critics also] fear that the Bayh-Dole scheme may have a “chilling effect” on the exchange of knowledge, because financial gain has replaced “recognition and esteem” as the basic tenet that researchers follow, and inherent in this is added secrecy and potential withholding of knowledge.⁶⁹

Even if one concedes that the Bayh-Dole Act has been successful in the United States along some measures, critics “conclude that for a bill like Bayh-Dole to be effective in India, it should include ‘more public interest safeguards,’ and an ‘affordable pricing scheme, among other changes. ... [T]he United States BDA would not be beneficial if superimposed on India without much thought. The concerns in India might mirror concerns in other developing countries with respect to using Bayh-Dole schemes.”⁷⁰ Drawing on the experience in South Africa, Professor Dountio of the University of Cape Town finds the proposed legislation in India lacks safeguards

⁶⁶ Id.

⁶⁷ Mshai S. Mwangola, ‘Justice Be Our Shield and Defender:’ An Intellectual Property Rights Regime for Africa, 32(3) *Africa Development* 143 (2007).

⁶⁸ Gotkin, *supra* note 20.

⁶⁹ Id.

⁷⁰ Dountio, *supra* note 3.

for the public interest while trying to provide a comprehensive implementation of university intellectual property development. She supports the rejection of the bill by India’s parliament.⁷¹

Nonetheless the debate continues in India. The 2016 National Intellectual Property Rights Policy speaks, in generalities, to the need for the commercialization of intellectual property, whether as embodied in traditional knowledge or in university research. Professors Kumar and Gupta question the adequacy of the 2016 Policy in meeting the needs of universities. They write: “Universities suffer from the 3Fs of funds, functions and functionaries and granting autonomy is the simplest enabling exercise that the state can do to solve this issue. Public-funded universities must have the autonomy to enter into contracts without having to consult various government departments and they should have complete autonomy in matters of decisions regarding the use of their infrastructure or human resource base.”⁷² Optimistic about university-industry collaboration, the authors conclude

A case study on the evolution of TT culture, policy and practice at IIT, Bombay, from 2000–01 to 2010–11 reveals that the creation of proper regulatory framework at university level led to an outstanding increase of 800 per cent in the number of IP applications filed in India and abroad, 600 per cent in number of IP granted, and increased commercialization of IP from NIL to more than 40 annually. When a change in university attitude and better university policy could achieve this much, it can well be imagined what Indian universities and industries will achieve together if only the right laws, regulations and policies are brought in place.⁷³

This conclusion points to changes within university culture and policies as critical to promoting commercialization. Presumably, these would be critical even with national legislation akin to the Bayh-Dole Act.

Although there is no national legislation creating uniform intellectual policies for government agencies, individual agencies and research units have developed their own policies. The All India Institute for Medical Sciences (AIIMS), the premier medical facility in India, has adopted extensive intellectual property policies for managing internal research that can yield commercial success stories.⁷⁴ Similar policies have been adopted by the Council of Scientific and Industrial Research, a national government funding agency for industrial research labs, and Indian Council for Agricultural Research, a government agency for agricultural research.⁷⁵ The current situation in India is very similar to what existed in the United States prior to the enactment of the Bayh-Dole Act: a set of heterogeneous policies across government agencies.

But skepticism about intellectual property rights and commercialization continues. As one 2020 commentator admonishes:

The policy focuses on improving the IPR output of national research laboratories, universities, technology institutions and researchers by encouraging and facilitating the acquisition of IPR. It proposes to link research funding and career progression with the creation of IPR and identifies this link as a key performance metric for public funded R&D and technology institutions. Although it is clear that the policy suggests an ambitious harnessing of intellectual property by public institutions (through, for example, the patenting or licensing of research results) and the partnering of public institutions with the private sector, it chooses not to ask the obvious question of what has been the outcome of the implementation of precisely

⁷¹ Id.

⁷² Kumar & Gupta, *supra* note 3.

⁷³ Id.

⁷⁴ All India Institute of Medical Studies, *Intellectual Property Right Policy* (2017).

⁷⁵ Ministry of Commerce and Industry, *National Intellectual Property Rights Policy* (2016).

such policies in the laboratories of the Council of Scientific and Industrial Research (CSIR) and the Indian Council of Agricultural Research (ICAR). Since the mid-1990s, CSIR researchers were directed to file patents but the policy failed to yield patents that could earn CSIR revenue. A vast majority of patents obtained by CSIR (2001–2010) lie idle and have not been able to generate enough licensing revenue to cover even four to five percent of the cost incurred by the filing of patents.⁷⁶

Universities as engines of the contemporary model of economic development fueled by marketable research may fail largely in part because of doubts about the effectiveness of intellectual property rights. Adopting the Bayh-Dole Act or enhancements perhaps act as brakes on the engine rather than fuel.

D. Summary

In the United States, the Bayh-Dole Act has unleashed a tremendous amount of attention to the subject of intellectual property in universities. While the evidence is weak that this increased attention has distracted universities for their traditional mission of teaching and basic research, there is also weak evidence that the Bayh-Dole Act has turned universities into wealth-creating dynamos. More realistically, the Act has created opportunities for entrepreneurial minded constituencies within universities who want to commercialize their research and disseminate the fruits of their labs to the public. As other countries deliberate over adopting Bayh-Dole style legislation, the United States experience may offer some foreshadowing of their universities’ possible futures.

IV. Prescriptions for Universities as Engines of Development

Universities have been critical for the economic and cultural development of many nations.

The land grant universities of the United States, the engineering institutes of India after Independence, and the autonomous public universities of many countries attest to the influence of universities in shaping the economic landscape. As I write this, many towns in the United States confront the loss of university students returning to campus after online refuge from the COVID-19 pandemic. In the small, this loss shows the impact of universities on the lives of many beyond its walls.

By recognizing property rights in university inventions, the Bayh-Dole Act sought to unleash the potential of universities to drive economic development, regionally and nationally. Legislative measures seek to expand Bayh-Dole’s intended bounty by extending property rights to creative outputs beyond patents. While property rights may address one double trust problem within universities hindering economic development, one has to be careful that this solution does not upset the delicate remedy universities provide to other double trust problems, those arising from the creation and dissemination of human capital. Intellectual property, particularly

⁷⁶ Dinesh Abrol, Who Gains From the Modi Government’s Intellectual Property Rights Policy?, *The Wire* (08/05/2020).

patents, serves to monetize certain fruits of human capital. But the organization of universities develop human capital in many ways beyond the asset specificity of property rights.

Forty years of experience with Bayh-Dole in the United States offers mixed lessons for those who champion the Act for generating untapped wealth and those who condemn it for destroying the traditional university. Specific guidance emerges from this experience.

First, bureaucratization can be a distraction as universities are forced to establish technology transfer offices that are often underfunded. Existing university administration must internalize the objectives of the Bayh-Dole Act. The challenge is to do this without raising costs of compliance with internal rules of disclosing and pursuing intellectual property rights.

Second, commercialization itself has its costs as internal university constituencies must transact with external actors, like venture capitalists, attorneys, and promotion companies. Many university researchers are not prepared to engage in these transactions. Part of the costs of compliance with Bayh-Dole include education of a very different set of skills.

Third, if universities are successful in their commercialization efforts, the question arises as to how to manage this revenue source. Opportunism by internal or external administration may lead to diminish other forms of financial support as units within universities may be expected to increasingly self-finance their programs. Such crowding out may not be an efficient response to university budgeting, especially if commercialization revenue is siphoned off by external constituencies.

Fourth, as universities expand their commercialization efforts, questions of how to spread this commercial success regionally or to national governments arise. Some of this success may result in spillovers through an increased population increases and agglomeration effects as new industries emerge regionally or nationally. This story is one of Silicon Valley success, the generation of tremendous wealth but also displacement but the attendant costs of development in terms of increased cost of living, congestion, and dislocation. Although this dynamic is true for any industry that generates wealth, the situation of universities is unique as researchers and students may find themselves pushed out to be replaced with entrepreneurs.

Fifth, legislation modelled on Bayh-Dole could serve to revitalize universities, giving them new purpose and energizing traditional curricula. Students readily bored by doctrinal teaching methods can see their role recast through seeing their subjects in applied terms that can benefit society. Implementation of this new legislation should focus on applied knowledge

while not ignoring pure knowledge. The new university is just the next stage of solving the double trust problem through reshaping what human capital means and can do.

Reformulating universities within the economic development debate forces us to rethink the rhetoric and reality of Bayh-Dole and legislative debates over its adoption. The discussion here synthesizes research but also points to future directions for researcher of and in universities.