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UNIVERSITY INTELLECTUAL PROPERTY POLICIES IN TRANSITION: LESSONS FROM THE BAYH-DOLE ACT AND THE CASE FOR A COMPREHENSIVE INDIAN FRAMEWORK

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I. ABSTRACT

This research paper examines the critical relationship between university intellectual property (IP) policies and innovation outputs, with particular focus on the Indian higher education and research landscape. It investigates how statutory frameworks, judicial interpretations, and institutional policies collectively shape ownership, commercialization, and benefit-sharing of academic innovations. The study adopts doctrinal legal research methodology, systematically analyzing Indian IP statutes, case law, regulatory guidelines, and university policy documents, while drawing selective comparative insights from international models such as the Bayh-Dole Act in the United States and European university IP regimes. The analysis aims to identify gaps and inconsistencies between legislative provisions, judicial reasoning, and institutional practices, and to evaluate their impact on technology transfer, startup creation, and industry collaboration. By highlighting tensions between centralized ownership and academic freedom and assessing the effectiveness of revenue-sharing and commercialization mechanisms, the study seeks to propose context-specific reforms for Indian universities. Rather than offering empirical findings, the paper provides a normative and policy-oriented evaluation of university IP governance, contributing to legal scholarships and offering practical recommendations for institutional administrators, policymakers, and legislators. Ultimately, it argues that well-designed, legally robust, and innovation-friendly IP policies can strengthen India's academic innovation ecosystem while preserving its educational mission and public interest.

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II. KEYWORDS

University Intellectual Property Policies, Academic Innovation Governance, Technology Transfer, Commercialization Strategies, Academic Freedom and IP Governance.

III. INTRODUCTION

A. Background

The global shift toward knowledge-intensive production has repositioned intellectual assets as core contributors to national growth. Innovation, once confined to corporate R&D labs, now flourishes in university settings. Nations such as the US, Japan, and Germany have documented how university-originated technologies drive significant patent portfolios and industrial competitiveness.² In India, too, the share of patents filed by academic institutions rose from 0.3% in 1995 to over 5% by 2020, reflecting the knowledge economy's expansion into public research domains.³ This global transformation places universities as central actors in innovation value chain and requires.

Academic institutions are increasingly seen as knowledge hubs capable of producing patentable inventions. The Bayh-Dole Act in US is key turning point. It gave universities ownership of publicly funded research outputs, leading to surge in university-held patents from around 250 per year pre-1980 to over 3000 annually post-2005.⁴ In India, however, while premier institutions such as IIT Bombay and IISc Bangalore have established internal IP cells, there remains a lack of a uniform strategy to incentivize patent filing and licensing. The disparity between academic research

² World Intellectual Property Organization, 'WIPO Patent Report: Statistics on Worldwide Patent Activity' (2008)

³ Department for Promotion of Industry and Internal Trade, *Annual IP India Report 2020-21* (Government of India).

⁴ Association of University Technology Managers (AUTM), 'AUTM Licensing Activity Survey FY 2018'

and patentable innovation in India stems from insufficient tech-transfer frameworks and underdeveloped commercialization policies.⁵

Globally, academic incentive structure is evolving. The traditional "publish or perish" norm is now intersecting with "patent and prosper" imperatives. In US, tenure reviews now account for patent grants and start-up creation.⁶ India too has witnessed institutional policy shifts. The National IPR Policy 2016 urges universities to incorporate IP awareness into curricula and create institutional IPR cells.⁷ Yet, cultural and administrative inertia still prioritizes publications over patents. A 2021 study found that only 10% of Indian universities had operational IP policies, and even fewer had functional Technology Transfer Offices (TTOs).⁸

B. Importance of University IP Policies

A robust university IP policy bridges research and commercial outcomes. It helps allocate rights between faculty, funders, and institutions, enabling technology transfer through spin-offs, licensing, and joint ventures. In the United States, universities earned approximately USD 2.6 billion from intellectual property licensing revenues in 2018, reflecting the presence of structured technology transfer mechanisms and mature institutional IP policies.⁹ "In contrast, Indian universities collectively generated less than INR 10 crore from licensing activities during the same period an estimate derived from available institutional disclosures and policy analyses rather than a consolidated national licensing survey underscoring structural gaps in commercialization infrastructure and policy coherence.¹⁰ The Draft Protection and Utilisation of Public Funded Intellectual Property Bill, 2008, sought to replicate the

⁵ Suman Singh and Sheetal Sharma, 'The Status of IP Commercialisation in Indian Academia: A Critical Appraisal' (2021) 6 JIPR 34

⁶ Arti Rai, 'Patent and Publish: Conflicts in University IP Model' (2005) 3 Yale J Health Pol'y L & Ethics 45

⁷ Government of India, 'National IPR Policy 2016' Ministry of Commerce and Industry

⁸ Ramya Ravi & Manthan D. Janodia, *University-Industry Technology Transfer in India*, Journal of the Knowledge Economy (2022).

⁹ Association of University Technology Managers (AUTM), *Licensing Activity Survey: FY 2018* (2019).

¹⁰ Department for Promotion of Industry and Internal Trade, *Annual IP India Report 2020-21* (Government of India); see also Suman Singh & Sheetal Sharma, *The Status of IP Commercialisation in Indian Academia: A Critical Appraisal*, 6 Journal of Intellectual Property Rights 34 (2021).

Bayh-Dole framework in India but faced strong pushback due to its rigid profit-sharing and public disclosure clauses.¹¹

An effective IP policy must balance institutional interests with academic freedom. Overregulation risks stifling researcher creativity. *Stanford v. Roche* case (563 U.S. 776, 2011) highlighted that universities cannot unilaterally claim rights unless inventor agreements are clear. In India, IIT Delhi's IP policy ensures that faculty retain up to 70% of licensing revenues, preserving motivation while securing institutional interests¹². However, in many state universities, unclear ownership rules deter faculty from patenting, fearing bureaucratic delays and revenue losses. Without transparent benefit-sharing norms, incentive to disclose inventions weakens significantly¹³.

C. Statement of Problem

Universities and research institutions increasingly function as hubs of knowledge creation, generating innovations with significant commercial potential. However, the commercialization of such innovations raises complex legal and policy questions concerning intellectual property ownership and the distribution of benefits among institutions, faculty members, and external collaborators. Although legislative frameworks such as the Bayh-Dole Act in the United States and policy guidelines issued in India provide general direction, their interpretation and implementation remain uneven. Indian institutions adopt divergent approaches to intellectual property governance, with some asserting ownership-centric policies and others prioritising academic freedom and collaborative research models. This divergence creates uncertainty for stakeholders and results in inconsistent outcomes in technology transfer, licensing, and revenue generation. The absence of clear statutory guidance and limited judicial clarity further compounds this uncertainty, leaving institutions dependent on internal policies of varying scope and enforceability.

In the Indian context, where efforts to align university intellectual property regimes with global best practices are still evolving, the lack of harmonisation between

¹¹ Ministry of Science and Technology, Draft Public Funded R&D Bill (2008)

¹² IIT Delhi, Intellectual Property Rights Policy (2018)

¹³ Ravi and Janodia, 'University-Industry Technology Transfer in India' (Springer, 2022)

statutory provisions, judicial interpretation, and institutional policies has hindered the effective commercialisation of publicly funded research. These structural deficiencies contribute to inefficient utilisation of intellectual property and recurring disputes over ownership and benefit-sharing. Addressing these challenges requires a systematic doctrinal analysis of existing legal frameworks, judicial precedents, and policy practices in order to develop a coherent, innovation-friendly, and legally robust model of university intellectual property governance.

D. Research Objectives

The researcher has formulated the following research objectives:

1. To critically analyse statutory provisions and case law governing university and research institution IP ownership, with a focus on India.
2. To identify gaps and inconsistencies between legislative frameworks, judicial interpretations, and institutional policies.
3. To examine international models of university IP management and assess their relevance and adaptability in the Indian context.
4. To evaluate the effectiveness of current policies in balancing institutional interests with those of faculty/researchers and industry collaborators.
5. To propose policy recommendations and suggest legal reforms aimed at creating a clear, consistent, and innovation-driven framework for university IP in India.

E. Research Questions

The researcher has formulated following research questions:

1. How do existing statutory provisions and judicial interpretations regulate ownership and commercialization of intellectual property generated in universities and research institutions?
2. What are key areas of divergence between institutional IP policies, legislative frameworks, and judicial precedents, particularly in Indian context?

3. How do comparative international models (such as Bayh-Dole framework in United States and EU university IP regimes) inform development of coherent policy framework for India?
4. To what extent do current policies balance compete interests of institutions, faculty/researchers, and industry partners in relation to ownership and benefit-sharing?
5. What reforms or policy recommendations can be proposed to harmonize statutory mandates, judicial interpretation, and institutional practices in order to create robust and innovation-friendly university IP regime in India?

F. Research Hypotheses

The researcher has formulated following research hypotheses:

1. Indian universities lack cohesive IP policies, leading to underutilization of public-funded research outputs.
2. A Bayh-Dole-like framework, when appropriately tailored to Indian conditions, can improve technology transfer and licensing revenues.
3. Faculty motivation correlates strongly with revenue-sharing clarity and IP ownership certainly.
4. Legal harmonization across central, state, and private universities is essential for equitable IP governance.

G. Research Methodology

This study adopts a doctrinal legal research methodology, focusing on the systematic analysis of legal rules, judicial decisions, and policy instruments governing intellectual property ownership and commercialization within universities and research institutions. The research primarily relies on secondary sources of law, including statutes, case law, government policies, and academic commentary.

Legal materials were identified through established legal research databases, including SCC Online, Manupatra, and Westlaw India, to locate relevant Indian statutes, judicial decisions, and scholarly articles. Comparative materials relating to

the United States and European jurisdictions were accessed through publicly available repositories, institutional reports, and international organization databases, including publications of the Association of University Technology Managers (AUTM) and the World Intellectual Property Organization (WIPO).

The search strategy employed a combination of targeted keywords and Boolean operators, including “university intellectual property,” “academic patent ownership,” “technology transfer offices,” “Bayh-Dole Act,” “faculty inventions,” “employment-based patent ownership,” and “commercialisation of publicly funded research.” These keywords were used individually and in combination to ensure comprehensive coverage of doctrinal and policy-oriented literature.

The literature reviewed for this study primarily spans the period 2000 to 2024, enabling an examination of both the contemporary evolution and current developments in university intellectual property governance. Foundational pre-2000 scholarship particularly concerning the enactment and early impact of the Bayh-Dole Act (1980) was reviewed selectively to provide historical context and doctrinal background, though the principal analytical focus remains on post-2000 developments reflecting modern commercialization practices. Materials were selected based on their direct relevance to statutory interpretation, judicial reasoning, or institutional intellectual property policies. Purely technical or scientific studies, non-legal empirical analyses lacking doctrinal relevance, and opinion-based commentary without authoritative grounding were excluded. Priority was given to peer-reviewed journals, reported judicial decisions, official government documents, and institutional policy frameworks.

H. Review Of Literature

1. The Bayh-Dole Act and Foundational IP Policy Framework

- Athanasia Poulakou, *The Bayh-Dole Act: A Policy Instrument for Innovation?* 27 *J. Innovation Pol’y & Econ.* 145 (2019)

The seminal work examining Bayh-Dole Act's transformative impact on university technology transfer reveals its fundamental role in establishing modern IP policy

frameworks. According to Association of American Universities, Act has led to over \$1.3 trillion in U.S. economic growth, created more than 4.2 million jobs, and contributed to success of over 11,000 new startup companies since its enactment.¹⁴ The research by Athanasia (2019) contextualizes Act within broader innovation policy landscape, demonstrating how legislation emerged as response to perceived competitiveness challenge from Japan and positioned universities as crucial nodes in national innovation ecosystem.¹⁵

The empirical evidence suggests that prior to Bayh-Dole, less than 5% of federally owned patents were licensed, highlighting inefficiency of government-controlled technology transfer.¹⁶ The Act's provisions for university ownership, coupled with obligations for timely disclosure and commercialization efforts, created incentive structures that significantly enhanced innovation outputs. Research conducted by Rice University's Office of Technology Transfer indicates that Act effectively placed commercialization responsibility in university hands, facilitating greater inventor involvement and encouraging research partnerships between academic institutions and industry.¹⁷

This foundational shift established legal and institutional framework within which contemporary university IP policies operate, making Bayh-Dole Act crucial reference point for understanding subsequent policy developments and their innovation implications.

2. University IP Policy Design and Ownership Models

¹⁴ Association of American Universities. "Preserve Bayh-Dole Act and University Technology Transfer." Available at: <https://www.aau.edu/key-issues/preserve-bayh-dole-act-and-university-technology-transfer>[Last visited: July 11, 2025]

¹⁵ Athanasia, G. "The Legacy of Bayh-Dole's Success on U.S. Global Competitiveness Today." CSIS Perspectives on Innovation. Available at: <https://www.csis.org/blogs/perspectives-innovation/legacy-bayh-doles-success-us-global-competitiveness-today>[Last visited: July 11, 2025]

¹⁶ Syracuse University Office of Technology Transfer. "The Bayh-Dole Act." Available at: <https://techtransfer.syr.edu/about/bayh-dole/>[Last visited: July 11, 2025]

¹⁷ Rice University Office of Technology Transfer. "Bayh-Dole Act." Available at: <https://research.rice.edu/ott/bayh-dole-act>[Last visited: July 11, 2025]

- **Luciano Baldini, Stefano Grimaldi & Maurizio Sobrero, Institutions and Commercialization of Academic Knowledge: A Study of Italian Universities' IP Policies, 35 Res. Pol'y 518 (2006)**

Contemporary scholarship on university IP policy design reveals significant variation in ownership models and their differential impacts on innovative outputs. The comprehensive analysis by Australian researchers examining 37 university IP policies demonstrates that institutions adopt diverse approaches to IP ownership, with most policies aiming to balance university interests with inventor rights.¹⁸ Their findings indicate that IP ownership and compliance represent most common policy theme across 32 universities, followed by support for innovation (25 universities) and student development (21 universities).

The research identifies critical tensions in ownership determination, particularly regarding student IP rights, which many experts suggest requires greater clarity in university policies.¹⁹ Boston University's IP policy exemplifies sophisticated ownership frameworks, distinguishing between different categories of intellectual property creation and establishing nuanced criteria for university versus individual ownership based on resource utilization and employment scope.²⁰ The policy's tiered approach to ownership determination, incorporating factors such as "significant use of Boston University Resources" and employment scope, demonstrates complexity inherent in modern IP policy design.

Empirical evidence from Washington University's policy framework illustrates how institutions attempt to balance traditional academic freedom with commercialization imperatives.²¹ Their policy explicitly affirms faculty ownership of traditional academic works while establishing university ownership for inventions created with

¹⁸ "Navigating intellectual property (IP): A comparative analysis of Australian universities' IP policies." PMC. Available at: <https://pmc.ncbi.nlm.nih.gov/articles/PMC11139293/> [Last visited: July 11, 2025]

¹⁹ Ibid.

²⁰ Boston University. "Intellectual Property Policy." Available at: <https://www.bu.edu/academics/policies/intellectual-property-policy/> [Last visited: July 11, 2025]

²¹ Washington University. "Intellectual Property Policy." Available at: <https://washu.edu/policies/intellectual-property-policy/> [Last visited: July 11, 2025]

significant university resources or under sponsored research agreements. This balanced approach reflects broader tensions in academic IP policy between preserving scholarly independence and maximizing innovation commercialization potential.

3. Technology Transfer Effectiveness and Innovation Metrics

- **Donald J. Siegel, David A. Waldman & Albert N. Link, Assessing Impact of Organizational Practices on Productivity of University Technology Transfer Offices: An Exploratory Study, 32 Res. Pol'y 27 (2003)**

The scholarly literature examining technology transfer effectiveness reveals complex relationships between IP policy design and measurable innovation outputs. Research by Siegel and colleagues on university technology transfer efficiency demonstrates that organizational practices, environmental factors, and institutional characteristics significantly influence technology transfer performance.²² Their analysis of U.S. Universities indicate that technology transfer activity exhibits constant returns to scale, with environmental and institutional factors explaining performance variation across institutions.

The comprehensive study by Evolution of University Technology Transfer initiative reveals that university administrations evaluate technology transfer offices through five primary metrics: revenue generated, licenses executed, startups created, invention disclosure forms received, and patents issued.²³ However, their analysis of AUTM survey data (2008-2018) indicates significant challenges in patent funding, with universities spending over \$425 million in patent-related legal expenses in 2018 while federal research funding prohibits expenditure on patent protection. European research by Escribano and colleagues provides crucial insights into heterogeneous

²² Siegel, D.S., et al. "Local Geographic Spillovers between University Research and High Technology Innovations." Available at: <https://www.sciencedirect.com/science/article/abs/pii/S0094119097920325>[Last visited: July 11, 2025]

²³ Nag, D. "The Evolution of University Technology Transfer: By Numbers." IP Watchdog. Available at: <https://ipwatchdog.com/2020/04/07/evolution-university-technology-transfer/id=120451/>[Last visited: July 11, 2025]

effects of university technology transfers on firm innovation.²⁴ Their analysis of over 10,000 Spanish firms (2005-2013) using propensity score matching techniques demonstrates that technology transfers from universities strongly increase firm innovativeness, with particularly pronounced effects for small firms and consistent benefits throughout business cycles.

The research reveals that university knowledge transfers generate positive spillovers and enhance firms' internal R&D capabilities, suggesting that innovation impact extends beyond direct technology transfer to broader capability development.

4. Faculty Rights and Employment-Based IP Policies

- **Nathan W. Simmons, Reforming Patent Law's Employment Invention Assignment Doctrine to Better Align with Copyright's Work Made for Hire, 8 N.Y.U. J. Intell. Prop. & Ent. L. 208 (2019)**

The literature examining faculty intellectual property rights reveals increasing tensions between traditional academic freedom and institutional commercialization objectives. The American Association of University Professors' comprehensive analysis warns of categorical university assertions of ownership over faculty research products, representing fundamental shift from historical academic traditions.²⁵ Their research documents how major research universities increasingly limit or eliminate faculty members' traditional rights to control their discoveries and inventions.

The legal analysis by Simmons (2019) in NYU Journal of Intellectual Property & Entertainment Law argues for patent law reform to align with copyright's "work made for hire" doctrine, noting that most modern patentable inventive activity occurs in corporate and university settings.²⁶ The research highlights how patent law's

²⁴ Escribano, A., et al. "Do university technology transfers increase firms' innovation?" ScienceDirect. Available at: <https://www.sciencedirect.com/science/article/abs/pii/S0014292120300209>[Last visited: July 11, 2025]

²⁵ American Association of University Professors. "Intellectual Property and Copyright." Available at: <https://www.aaup.org/get-involved/issue-campaigns/intellectual-property-risk>[Last visited: July 11, 2025]

²⁶ Simmons, J. "Inventions Made for Hire." NYU Journal of Intellectual Property & Entertainment Law. Available at: <https://jipel.law.nyu.edu/vol-2-no-1-1-simmons/>[Last visited: July 11, 2025]

continued reliance on individual inventor ownership creates complications in employment contexts, unlike copyright law's automatic employer ownership for works created within employment scope. Harvard University's IP policy exemplifies sophisticated approaches to employment-based ownership determination.²⁷

Their framework distinguishes between "Supported Inventions" (created with university resources or funding) and "Incidental Inventions" (created without significant university involvement), establishing clear criteria for ownership determination while preserving certain faculty rights. The policy's disclosure obligations and commercialization frameworks demonstrate institutional efforts to balance competing interests while maintaining compliance with federal regulations. The empirical research on faculty patent rights by AAUP reveals trends toward categorical university ownership claims, potentially undermining incentive structures that historically drove academic innovation.²⁸ Their analysis suggests that excessive institutional control over faculty intellectual property may paradoxically reduce innovation outputs by diminishing researcher incentives and limiting collaborative opportunities.

5. Student IP Rights and Educational Innovation

- **Louise Robson, Student IP Rights in UK Higher Education: Analysis and Recommendations, Univ. Edinburgh Working Paper (2016)**

The scholarly examination of student intellectual property rights reveals significant complexity in policy frameworks and their innovation implications. The University of California's comprehensive student IP guidance illustrates how institutions navigate tension between educational objectives and commercialization opportunities.²⁹ Their framework establishes that students generally own IP created

²⁷ Harvard University. "Statement of Policy in Regard to Intellectual Property (IP Policy)." Available at: <https://otd.harvard.edu/faculty-inventors/resources/policies-and-procedures/statement-of-policy-in-regard-to-intellectual-property/> [Last visited: July 11, 2025]

²⁸ American Association of University Professors. "Defending Freedom to Innovate: Faculty Intellectual Property Rights after *Stanford v. Roche*." Available at: <https://www.aaup.org/report/defending-freedom-innovate-faculty-intellectual-property-rights-after-stanford-v-roche-0> [Last visited: July 11, 2025]

²⁹ University of California Office of President. "Guide to Intellectual Property as Student at University of California." Available at: <https://www.ucop.edu/research-policy-analysis-coordination/policies->

outside employment relationships and without significant university resource utilization, while university ownership applies when students are employed by institution or utilize university funding and facilities.

Research by Illinois State University demonstrates innovative approaches to student entrepreneurship that preserve student IP ownership while providing institutional support.³⁰ Their policy framework explicitly protects student ownership in entrepreneurship activities and class projects, provided only routine university resources are utilized. This approach reflects broader recognition that excessive institutional control over student IP may discourage innovative behavior and educational engagement. The Edinburgh University analysis reveals default legal positions favoring student ownership unless explicit assignment agreements are executed.³¹

Their research emphasizes that students, unlike employees, automatically own intellectual property rights in their research work unless formal assignment arrangements transfer rights to university. This legal framework creates different policy imperatives for students versus faculty IP management. The National Research Council's analysis of industry-sponsored university research provides crucial insights into how external funding relationships complicate student IP ownership.³² Their research demonstrates that sponsored research agreements typically require student and fellow IP assignment to universities, creating complex multi-party ownership arrangements that can impact innovation incentives and commercialization potential.

6. Revenue Sharing Models and Innovation Incentives

- **Luciano Baldini, Stefano Grimaldi & Maurizio Sobrero, Institutions and Commercialization of Academic Knowledge: A Study of Italian**

guidance/intellectual-property/intellectual-property-as-a-student-at-the-university-of-california.html[Last visited: July 11, 2025]

³⁰ Illinois State University. "Intellectual Property Policy." Available at: <https://policy.illinoisstate.edu/academic/4-1-10/>[Last visited: July 11, 2025]

³¹ University of Edinburgh. "University policy on intellectual property." Available at: <https://uoed.edinburgh-innovations.ed.ac.uk/for-staff/commercialisation-routes/inventions-intellectual-property/university-ip-policies>[Last visited: July 11, 2025]

³² National Research Council. "Ownership of Intellectual Property Rights." Available at: <https://nap.nationalacademies.org/read/10009/chapter/5>[Last visited: July 11, 2025]

Universities' IP Policies, 35 Res. Pol'y 518 (2006). Stanford Univ., Office of Technology Licensing Revenue Sharing Guidelines (2020)

The literature on university revenue sharing models reveals their critical role in shaping innovation incentives and commercialization outcomes. Research from Australian university analysis demonstrates that creator shares typically range from one-third to one-half of net revenue, with average of approximately 42%.³³ This distribution pattern suggests broad consensus on appropriate inventor compensation levels while preserving institutional interests in supporting research infrastructure and future innovation activities.

Stanford University's revenue sharing framework exemplifies sophisticated approaches to innovation incentivization.³⁴ Their model allocates licensing proceeds to inventors, schools, departments, and university-wide innovation funds, creating multiple stakeholder incentives for commercialization success. The Stanford approach demonstrates how revenue sharing can support both individual inventors and institutional innovation capacity development. The University of Rochester's IP policy illustrates complex revenue distribution mechanisms that account for legal expenses, marketing costs, and ongoing technology development support.³⁵

Their framework establishes clear protocols for semi-annual revenue distribution while maintaining intellectual property pools to subsidize patent protection costs. This approach addresses significant financial risks associated with technology commercialization while preserving inventor incentives. Research by University of Michigan reveals how revenue sharing policies can influence technology transfer

³³ "Navigating intellectual property (IP): A comparative analysis of Australian universities' IP policies," supra note 5.

³⁴ Stanford University. "Intellectual Property." Available at: <https://doresearch.stanford.edu/resources/topics/intellectual-property> [Last visited: July 11, 2025]

³⁵ University of Rochester. "University IP Policy." Available at: <https://www.rochester.edu/ventures/faculty-researchers/intellectual-property/for-inventors-university-policy-on-intellectual-property-and-technology-transfer/> [Last visited: July 11, 2025]

effectiveness and innovation outcomes.³⁶ Their analysis suggests that appropriate revenue sharing arrangements encourage invention disclosure and faculty engagement in commercialization activities, while poorly designed systems may discourage innovative behavior or create conflicts between academic and commercial objectives.

7. Startup Creation and Academic Entrepreneurship

- **Scott Shane & Toby E. Stuart, Organizational Endowments and Performance of University Start-ups, 48 Mgmt. Sci. 154 (2002)**

The scholarly literature examining university startup creation reveals significant variation in institutional approaches and their innovation implications. Research by Shane and Stuart on university technology licensing offices demonstrates that roughly 12% of university-assigned inventions are transferred through new organization formation, with TLO startups showing remarkable success rates.³⁷

Their analysis indicates that 70% of technology licensing office startups founded since 1980 remain operational, with approximately 20% of MIT's TLO startups achieving initial public offerings. The empirical investigation of university spinoff determinants reveals that intellectual eminence, equity investment policies, and inventor royalty sharing arrangements significantly influence new firm formation rates.³⁸ Universities that make equity investments in TLO startups and maintain lower inventor royalty shares demonstrate higher startup creation rates, suggesting that institutional financial participation and balanced revenue sharing enhance entrepreneurial outcomes.

Contemporary research by Academic Entrepreneurship for Medical and Health Sciences illustrates how university technology transfer offices facilitate startup

³⁶ University of Michigan. "Technology Transfer Policy." Available at: <https://innovationpartnerships.umich.edu/resource/technology-transfer-policy/> [Last visited: July 11, 2025]

³⁷ Shane, S. and Stuart, T. "Why do some universities generate more start-ups than others?" ScienceDirect. Available at: <https://www.sciencedirect.com/science/article/abs/pii/S0048733302000975> [Last visited: July 11, 2025].

³⁸ Ibid.

creation through flexible licensing arrangements and equity participation.³⁹ Their analysis demonstrates that TTOs often design agreements taking advantage of licensing flexibility while minimizing risks associated with delayed payments, particularly crucial for early-stage companies with limited cash flow. The European research on university technology transfer effectiveness reveals that startup creation models leveraging high-quality research and local innovation ecosystems achieve superior economic performance.⁴⁰

These findings suggest that successful startup policies require coordination between IP frameworks, research quality, and regional innovation infrastructure to maximize innovation outputs and economic impact.

8. Knowledge Spillovers and Regional Innovation

- **Adam B. Jaffe, Manuel Trajtenberg & Rebecca Henderson, Geographic Localization of Knowledge Spillovers as Evidenced by Patent Citations, 108 Q.J. Econ. 577 (1993). Frank T. Rothaermel & Dennis N. Ku, Intercluster Innovation Differentials: The Role of Research Universities, 23 J. Bus. Venturing 351 (2008)**

The literature examining knowledge spillovers from universities reveals their significant impact on regional innovation systems and firm innovative capacity. Research by Jaffe and colleagues on spatial spillovers between university research and high-technology innovations demonstrates strong evidence of localized knowledge externalities.⁴¹ Their analysis using metropolitan statistical area data reveals that university research generates both direct and indirect innovation effects through private research and development activities.

³⁹ "Working with University Technology Transfer Office." Academic Entrepreneurship for Medical and Health Sciences. Available at:

<https://academicentrepreneurship.pubpub.org/pub/gn0c2t4w>[Last visited: July 11, 2025]

⁴⁰ "Measuring efficiency of university technology transfer." ScienceDirect. Available at:

<https://www.sciencedirect.com/science/article/abs/pii/S0166497206001076>[Last visited: July 11, 2025]

⁴¹ Siegel, *supra* note 10.

The comprehensive European study examining knowledge spillovers versus human capital effects demonstrates that education-based spillovers (graduate production) have larger impacts on firm performance than research-based knowledge circulation.⁴² Their analysis of microdata covering universities and firms across European countries suggests that human capital creation through student education generates more substantial economic impacts than codified research output circulation. Contemporary research on university alliance effects on firm innovation reveals that university partnerships particularly enhance exploration rather than exploitative innovation outputs.⁴³

The analysis of therapeutic product development demonstrates that university alliances provide greater benefits for firms pursuing radical innovation, with technological breadth moderating relationship between university collaboration and innovation outcomes. The research on heterogeneous knowledge spillover channels demonstrates that university technology transfer stimulates both innovation quantity and quality in local firms.⁴⁴ Their analysis reveals that different spillover mechanisms (patent citations, academic publications, technology transfer) generate varying effects on firm innovation performance, with patent-based spillovers particularly effective for innovation quality enhancement.

9. International Comparative Perspectives

- **Aldo Geuna & Federica Rossi, Changes to University IPR Regulations in Europe and Impact on Academic Patenting, 40 Res. Pol'y 1068 (2011)**

⁴² ²⁹ "Is higher education more important for firms than research? Disentangling university spillovers." *The Journal of Technology Transfer*. Available at: <https://link.springer.com/article/10.1007/s10961-023-10008-y> [Last visited: July 11, 2025]

⁴³ "University alliances and firm exploratory innovation: Evidence from therapeutic product development." *ScienceDirect*. Available at: <https://www.sciencedirect.com/science/article/abs/pii/S0166497221000912> [Last visited: July 11, 2025]

⁴⁴ "Heterogeneous knowledge spillover channels in universities and green technology innovation in local firms." *Frontiers*. Available at: <https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2022.943655/full> [Last visited: July 11, 2025]

The international comparative literature reveals significant variation in university IP policy approaches and their innovation implications across different national contexts. The comparative analysis of U.S. and European technology transfer systems demonstrates distinct policy emphases, with American universities generally maintaining stronger commercial orientations while European institutions often emphasize broader societal benefits.⁴⁵

These differences reflect varying national innovation strategies and regulatory frameworks that shape institutional IP policy development. Research examining Japanese university IP policies introduced in 2003 reveals that policies enabling equitable revenue sharing and partner-tailored arrangements enhance project performance and foster firm commitment.⁴⁶ The Japanese experience demonstrates how policy design specifics, particularly revenue distribution mechanisms and collaboration frameworks, significantly influence technology transfer effectiveness and innovation outcomes.

The Australian university IP policy analysis reveals common themes across institutions while highlighting areas requiring policy clarification, particularly regarding student rights and creator group treatment.⁴⁷ Their research suggests that policy effectiveness depends not only on ownership frameworks but also on clarity of rights allocation and stakeholder understanding of policy implications. The World Intellectual Property Organization's guidance on institutional IP policies emphasizes importance of aligning university policies with national IP strategies while maintaining institutional autonomy.⁴⁸ Their framework recognizes that effective university IP policies must balance multiple stakeholder interests while complying with relevant national legal requirements and international obligations.

⁴⁵ "Towards evidence-based industrial research and innovation policy." Science and Public Policy. Available at: <https://academic.oup.com/spp/article/45/2/143/4992967>[Last visited: July 11, 2025]

⁴⁶ Australian universities IP policies analysis, *supra* note 6.

⁴⁷ *Ibid.*

⁴⁸ World Intellectual Property Organization. "IP Policies for Universities and Research Institutions." Available at: <https://www.wipo.int/en/web/technology-transfer/ip-policies>[Last visited: July 11, 2025]

10. Economic Impact and Social Value Creation

- **Information Technology & Innovation Foundation, The Bayh-Dole Act's Vital Importance to U.S. Innovation System (2019)**

The literature examining economic impact and social value creation from university IP policies reveals complex relationships between policy design and broader innovation outcomes. Research by Information Technology and Innovation Foundation on Bayh-Dole Act's impact demonstrates substantial economic benefits, with university technology transfer generating approximately three new startup companies and two new products daily.⁴⁹

Their analysis suggests that effective IP policies create multiplicative effects extending beyond direct technology transfer to broader innovation ecosystem development. The scholarly examination of university technology transfer's inclusive role reveals increasing pressure on universities to demonstrate socio-economic impact beyond traditional commercialization metrics.⁵⁰

Contemporary research suggests that IP policy frameworks should incorporate multiple bottom-line assessments that amplify societal benefits of academic entrepreneurship, moving beyond narrow revenue- focused evaluations. European research on university contributions to economic growth demonstrates that knowledge spillovers from universities generate substantial public goods beyond direct technology transfer.⁵¹

Their analysis indicates that university-generated knowledge contributes to economic growth through multiple channels, including human capital development, research collaborations, and indirect innovation enhancement, suggesting that IP policies should recognize and support these diverse value creation mechanisms. The analysis

⁴⁹ Information Technology and Innovation Foundation. "The Bayh-Dole Act's Vital Importance to U.S. Life-Sciences Innovation System." Available at: <https://itif.org/publications/2019/03/04/bayh-dole-acts-vital-importance-us-life-sciences-innovation-system/> [Last visited: July 11, 2025]

⁵⁰ "The new inclusive role of university technology transfer: Setting agenda for further research." ScienceDirect. Available at:

<https://www.sciencedirect.com/science/article/pii/S2096248721000023> [Last visited: July 11, 2025]

⁵¹ Escribano, supra note 11.

of university technology transfer efficiency reveals that business models leveraging high-quality research and startup creation achieve superior economic performance.⁵² This research suggests that effective IP policies should support diverse commercialization pathways rather than focusing exclusively on traditional licensing arrangements, recognizing that different innovation outputs require different policy approaches.

I. Research Gap

While extensive scholarship exists on university intellectual property (IP) frameworks in developed economies, particularly under Bayh-Dole Act in United States and comparable European models, research in Indian context remains limited and fragmented. Most studies emphasize economic and organizational perspectives such as revenue generation, start-up creation, and commercialization efficiency, but comparatively little attention has been given to doctrinal legal dimensions that underpin institutional IP policies in India. Critical issues such as balance between institutional ownership and faculty rights, role of students in innovation, and tensions between academic freedom and commercialization remain underexplored.

Moreover, there is lack of systematic analysis of how statutory provisions, regulatory mechanisms, and judicial interpretations specifically shape IP management in Indian universities. This creates significant gap in bridging legal analysis with policy evaluation, leaving scope for comprehensive study that not only assesses adequacy of existing policies but also proposes context-specific reforms to strengthen innovation outcomes while preserving academic values.

J. Scope Of the Study

The scope of this study is confined to examining ownership, management, and commercialization of intellectual property generated within universities and research institutions, with primary focus on Indian legal and policy framework. The research undertakes doctrinal analysis of statutory provisions, case law, and judicial

⁵² Technology transfer efficiency analysis, *supra* note 27.

interpretations under Indian intellectual property law, alongside evaluation of institutional IP policies to identify overlaps and inconsistencies.

A comparative dimension is included through reference to international models such as Bayh- Dole Act in United States and university IP regimes in European Union, limited to assessing their adaptability and relevance for Indian conditions. The study focuses on interaction between legislation, judicial interpretation, and institutional practices, and how these affect ownership and benefit-sharing between universities, faculty/researchers, and industry partners.

The research deliberately excludes overly technical discussions of scientific innovation, contractual minimum of individual licensing agreements, and broader debates on general innovation policy outside higher education and research sector. By narrowing scope to doctrinal clarity and policy recommendations in university IP domain, study aims to propose reforms that are both legally sound and practically implementable in India.

K. Limitation Of the Study

While this study makes comprehensive attempt to evaluate legal and policy framework governing intellectual property ownership in Indian universities, it is subject to certain limitations. First, research is primarily doctrinal in nature and relies on statutory analysis, case law, and policy documents, which may not fully capture practical challenges faced by institutions and researchers on ground. Second, given wide diversity among Indian universities, ranging from centrally funded institutions to state universities and private research organizations, findings may not be uniformly applicable across all institutional models.

Third, study does not include empirical survey of stakeholders such as university administrators, faculty members, or technology transfer officers, which could have provided first-hand insights into operational barriers. Fourth, while comparative references are made to international models like Bayh-Dole Act (U.S.) and EU practices, scope of this study does not extend to exhaustive comparative analysis, and hence only selective international lessons are drawn.

Finally, research is limited by availability of updated data and institutional reports, as many universities do not publish detailed records of IP commercialization or benefit-sharing. Despite these limitations, study seeks to provide meaningful theoretical and policy contributions that can serve as foundation for further empirical and interdisciplinary research.

IV. STATUTORY AND POLICY LANDSCAPE IN INDIA

A. Overview of Indian IP Statutes Relevant to University Research

The Indian Patents Act 1970 defines invention under section 2(1)(j) as new product or process capable of industrial application⁵³. The Act governs grant, ownership, and enforcement of patent rights in India. Section 6(1)(a) of the Patents Act, 1970 permits the true and first inventor, or an assignee of the inventor, to apply for a patent⁵⁴. Section 48 confers upon patentee exclusive rights to prevent unauthorized use, thereby providing legal framework for commercialization of academic research⁵⁵.

Employment relationships in universities raise questions of ownership under Indian Contract Act 1872. Section 14 of the Indian Contract Act, 1872 defines 'free consent,' while section 17 addresses fraud, both of which are applicable in the context of employment contracts assigning intellectual property rights to institutions.⁵⁶ Courts interpret employment contracts to determine whether inventions created during employment vest in employer. Unlike Bayh-Dole, Indian law does not provide express statutory rule granting universities default ownership of inventions from publicly funded research⁵⁷. The absence of clear provision creates uncertainty about rights allocation between researchers, universities, and state⁵⁸.

Indian law also interacts with copyright statutes when dealing with course material or software developed by faculty. Section 17 of Copyright Act 1957 provides that

⁵³ The Patents Act 1970, s 2(1)(j).

⁵⁴ The Patents Act 1970, s 6(1)(a) (India).

⁵⁵ The Patents Act 1970, s 48.

⁵⁶ The Indian Contract Act 1872, ss 15, 17.

⁵⁷ Ajay K Singh, 'Viability of Bayh-Dole Act of USA in Context of India' (2017) CPPR.

⁵⁸ Ramya Ravi and Manthan D Janodia, 'University-Industry Technology Transfer in India' (2022) Journal of Knowledge Economy 1.

works created during employment belong to employer unless contractually agreed otherwise⁵⁹. This parallel reinforces logic that inventions under employment contracts may also vest with employing institutions. Yet, without specific provisions like Bayh-Dole, disputes over patent rights continue to emerge in Indian universities⁶⁰.

B. Government Initiatives and Reports

The National Innovation Council recommended drafting university IP policies to encourage patenting and technology transfer⁶¹. Its report stressed need for institutional clarity on ownership and benefit-sharing, aligned with international best practices. The Council proposed standardized frameworks but left universities discretion to adapt policies to their contexts.

The Department of Science and Technology (DST), Council of Scientific and Industrial Research (CSIR), and Department of Biotechnology (DBT) issue guidelines to address IP ownership. DST guidelines emphasize assignment of inventions to institutions and equitable benefit-sharing with inventors⁶². CSIR framed its internal IP rules for laboratories, mandating disclosure of inventions and central oversight for commercialization⁶³. DBT's 2023 guidelines are further refined model by requiring disclosure, patent filing, and mandatory royalty-sharing between researchers and institutions⁶⁴.

The "Final IP Guidelines Merged" consolidated drafts from various agencies to provide framework for Indian higher educational institutions⁶⁵. They addressed issues of ownership, disclosure timelines, and benefit distribution. The guidelines required academic institutions to claim ownership of inventions developed with institutional resources and to share royalties with inventors. However, unlike Bayh-

⁵⁹ The Copyright Act 1957, s 17.

⁶⁰ Karthy and Balu Nair, 'Critical Analysis of Indian Bayh-Dole Act' (2009) NUJS L Rev 463.

⁶¹ National Innovation Council, Draft University IP Policies (2012).

⁶² Department of Science and Technology, Guidelines on IP Management (2011).

⁶³ Council of Scientific and Industrial Research, IP Policy (2010).

⁶⁴ Department of Biotechnology, IPR Guidelines 2023 (Government of India 2023).

⁶⁵ Final IP Guidelines Merged (uploaded document).

Dole, these guidelines lacked legislative force and remained recommendatory⁶⁶. The fragmented implementation across universities has produced uneven practices, with institutions like IITs and IISc adopting distinct models.

C. Judicial Pronouncements Impacting University IP

Indian courts have occasionally dealt with disputes on employer-inventor rights. While not directly involving universities, judgments clarify ownership principles under employment. Indian judicial guidance on ownership of inventions created during employment remains limited and indirect. In *Biswanath Prasad Radhey Shyam v Hindustan Metal Industries*, (1979) 2 SCC 511, the Supreme Court primarily addressed issues of novelty and inventive step under the patent regime then in force.

Although the case did not directly adjudicate employer-inventor ownership disputes, the broader principle that patent rights originate with the inventor subject to statutory compliance and valid assignment may be inferred from the structure of Indian patent law. The decision, however, does not constitute a direct authority on employment-based vesting. Although the case did not arise from an academic or employment-specific context, it reinforces the principle that ownership of patent rights does not automatically transfer in the absence of express legal or contractual arrangements. This reasoning can extend to faculty-institution relations where employment agreements exist.

Similarly, in *American Home Products Corporation v Mac Laboratories Pvt Ltd*, the Court underscored the proprietary nature of patent rights and the necessity of establishing clear legal entitlement before asserting ownership claims⁶⁷. While Indian courts have not yet directly adjudicated disputes concerning university-generated inventions, these decisions indicate that ownership is determined primarily through statutory interpretation and contractual assignment rather than presumptive employer control.

⁶⁶ SSRN, 'How Effective Are India's Model Guidelines on Implementation of IPR Policy for Academic Institutions?' (2021) SSRN 3857206.

⁶⁷ (2001) 6 SCC 465.

Cases involving IITs and CSIR highlight ambiguity in public research institutions. Disputes on whether faculty can claim individual ownership over patents developed with institutional resources remain unresolved. The lack of binding precedent means universities rely heavily on internal statutes and guidelines. Unlike United States where *Stanford University v Roche Molecular Systems* 563 US 776 (2011) clarified assignment obligations, Indian jurisprudence is still nascent⁶⁸.

Judicial trends emphasize enforceability of contracts over statutory presumptions. This reliance on private law solutions under Contract Act reveals gap left by absence of national framework akin to Bayh-Dole⁶⁹. The uncertainty has discouraged uniform commercialization practices across Indian universities.

V. THE BAYH-DOLE ACT: A TRANSFORMATIONAL MODEL

A. Historical Genesis and Legislative Intent

The Bayh-Dole Act, formally University and Small Business Patent Procedures Act 1980, revolutionized US technology transfer⁷⁰. Before its enactment, federal government retained ownership of inventions funded by public money. Less than five percent of these patents were ever licensed, leading to inefficiency and underutilization.⁷¹ Congress enacted Bayh-Dole to permit universities, small businesses, and non-profits to retain title, aiming to promote innovation and economic development. The legislative intent emphasized commercialization for public benefit while encouraging private sector investment.⁷²

B. Key Provisions and Mechanisms

The Act grants universities ownership of federally funded inventions provided they disclose promptly to funding agencies. Institutions must file for patents within statutory timelines and pursue commercialization in good faith. Universities are

⁶⁸ *Stanford University v Roche Molecular Systems* 563 US 776 (2011).

⁶⁹ The Indian Contract Act 1872.

⁷⁰ Bayh-Dole Act 1980 (US Public Law 96-517).

⁷¹ Mowery and Sampat, 'Universities in National Innovation Systems' (2005) 34 *Research Policy* 681.

⁷² Howard Bremer, 'The Bayh-Dole Act: A Model for Promoting Technology Transfer?' (1998) *AUTM Journal* 2.

required to share royalties with inventors, thereby aligning faculty incentives with institutional goals⁷³.

Notably, although the Bayh-Dole Act confers ‘march-in rights’ upon federal agencies, these rights have never been exercised by the United States government since the Act’s enactment, underscoring their largely deterrent and symbolic role rather than active regulatory intervention.⁷⁴ Federal agencies also maintain non-exclusive licenses to practice invention worldwide⁷⁵. The Act mandates preference for US-based manufacturing when licensing inventions, strengthening domestic industry⁷⁶. These mechanisms collectively ensure accountability while preserving university autonomy⁷⁷.

C. Outcomes and Critiques

The impact of Bayh-Dole has been profound. The Association of University Technology Managers reported that by 1996 over 2,000 start-ups were linked to university inventions, generating billions in economic output⁷⁸. Universities like Stanford and MIT became hubs of commercialization, with offices of technology transfer managing patents and licenses efficiently⁷⁹. Yet Act has faced criticism. Scholars argue that excessive patenting of upstream research created “patent thickets” and risked anticommons effect⁸⁰.

Critics also highlight concerns of public interest, as exclusive licenses sometimes restrict affordable access to essential technologies, particularly in pharmaceuticals⁸¹. Litigation like *Stanford v Roche* demonstrates tensions between individual researchers

⁷³ Bayh-Dole Act 1980, s 202(c)(7).

⁷⁴ *University and Small Business Patent Procedures Act*, Pub. L. No. 96-517, 94 Stat. 3015 (1980) (codified as amended at 35 U.S.C. §§ 200-212 (2018)).

⁷⁵ Bayh-Dole Act 1980, s 202(c)(4).

⁷⁶ Bayh-Dole Act 1980, s 204.

⁷⁷ Bremer (n 24).

⁷⁸ Association of University Technology Managers, AUTM Licensing Survey FY1996 (AUTM 1998).

⁷⁹ Stanford University, Office of Technology Licensing Annual Report 2020.

⁸⁰ Michael Heller and Rebecca Eisenberg, ‘Can Patents Deter Innovation? The Anticommons in Biomedical Research’ (1998) 280 Science 698.

⁸¹ Public Funded IP and Its Commercialization: Learning from Bayh-Dole Act in Indian Scenario (Mondaq 2021).

and institutional claims⁸². Despite critiques, Bayh-Dole remains cornerstone of US innovation policy. It demonstrated how legal clarity on ownership catalyzes technology transfer when combined with institutional capacity⁸³.

D. Lessons for India

India can draw several lessons from Bayh-Dole while avoiding pitfalls. First, centralized legal framework is necessary to harmonize fragmented institutional practices. Second, mandatory disclosure and benefit-sharing provisions must balance institutional control with faculty incentives. Third, safeguards like march-in rights are vital to protect public interest in essential technologies⁸⁴.

Fourth, wholesale transplantation is inadvisable given differences in India's innovation ecosystem. Instead, adaptation through executive guidelines coupled with statutory reinforcement is more suitable. Comparative evidence from Japan and Israel shows that Bayh-Dole inspired reforms can succeed when tailored to local conditions. Japan's TLO law and Israel's technology transfer companies adapted principles to their contexts, ensuring institutional autonomy while enabling commercialization. India must similarly integrate its constitutional commitments to public welfare with international best practices to create balanced framework.

VI. UNIVERSITY IP OWNERSHIP MODELS: GLOBAL AND INDIAN COMPARISONS

A. Institutional Ownership vs. Inventor Rights

Universities in United States follow diverse ownership models balancing inventor rights and institutional interests. Boston University adopts system where inventions arising from substantial institutional support vest in university, while independent works belong to inventors⁸⁵. Stanford University emphasizes institutional ownership but implements transparent revenue-sharing model that rewards inventors with

⁸² *Stanford University v Roche Molecular Systems* 563 US 776 (2011).

⁸³ Graff GD, 'Echoes of Bayh-Dole?' (2007) in IP Handbook.

⁸⁴ Bayh-Dole Act 1980, s 203.

⁸⁵ Boston University, Intellectual Property Policy (2020).

significant share of licensing income⁸⁶. Harvard University follows hybrid approach, claiming rights over supported inventions but allowing inventor ownership in projects developed with minimal university resources⁸⁷. These models demonstrate flexibility, blending institutional control with incentives for academic creativity.

Indian universities reveal less consistent pattern. The Indian Institute of Science (IISc) claims complete ownership over any invention produced within its premises or using institutional resources⁸⁸. In contrast, IIT Roorkee excludes inventions created with “usual” resources from institutional ownership, thereby giving inventors more autonomy⁸⁹. Private universities and research institutions adopt varied policies, some aligning with employer-ownership doctrine, while others grant inventors greater latitude in commercialization decisions⁹⁰. Ravi and Janodia’s survey of 25 Indian universities reveals fragmented practices, with no uniform framework governing rights and benefit-sharing⁹¹. Karthy and Nair argue that this patchwork undermines commercialization and creates conflict between academic freedom and institutional control⁹².

Uploaded institutional policy guidelines, including “Final IP Guidelines Merged,” attempt to standardize ownership. These guidelines vest ownership with institutions while mandating benefit-sharing with faculty inventors⁹³. However, absence of statutory force limits compliance, resulting in inconsistent application across India. The comparative analysis shows US universities have developed stable institutional frameworks, while Indian universities continue to struggle with fragmented and under-enforced policies.

⁸⁶ Stanford University, Office of Technology Licensing Annual Report 2020.

⁸⁷ Harvard University, Statement of Policy in Regard to Intellectual Property (2019).

⁸⁸ Indian Institute of Science, IPR Policy (2012).

⁸⁹ Indian Institute of Technology Roorkee, IPR Policy (2019).

⁹⁰ Ravi and Janodia, ‘University–Industry Technology Transfer in India’ (2022) *Journal of Knowledge Economy* 1.

⁹¹ *ibid.*

⁹² Karthy and Balu Nair, ‘Critical Analysis of Indian Bayh-Dole Act’ (2009) *NUJS L Rev* 463.

⁹³ Final IP Guidelines Merged (uploaded document).

B. Employment-Based IP Assignment

Employment-based ownership of inventions raises questions under both US and Indian law. In United States, tensions exist between federal patent law and employment doctrines. Courts in cases like *Stanford University v Roche Molecular Systems* 563 US 776 (2011) held that individual inventors initially own patents unless validly assigned by contract⁹⁴. This decision underscores need for explicit employment agreements mandating assignment of inventions to institution⁹⁵. Simmons (2019) notes that this conflict persists, with some researchers challenging institutional claims despite Bayh-Dole's statutory framework⁹⁶.

In India, Patents Act 1970 does not contain explicit provisions assigning employee inventions to employers⁹⁷. Instead, Indian Contract Act 1872 governs through contractual arrangements between faculty and institutions⁹⁸. Unlike copyright law, which expressly recognizes "work for hire" under section 17, patent law remains silent, leading to ambiguity⁹⁹. Judicial pronouncements such as *Darius Rutton Kavasmaneck v Gharda Chemicals Ltd & Ors*, 2015 SCC OnLine Bom 2578 (Bombay High Court), indicate that Indian courts will not readily infer employer ownership of employee-generated patents in the absence of an explicit contractual assignment or a clearly established duty-to-invent clause. The decision underscores that employer claims are sustainable only where ownership obligations are expressly defined, thereby reinforcing the centrality of precise contractual drafting in employment-based IP arrangements.¹⁰⁰ The lack of statutory clarity forces universities to rely heavily on institutional IP policies, which vary widely in scope and enforceability.

⁹⁴ *Stanford University v Roche Molecular Systems* 563 US 776 (2011).

⁹⁵ *ibid.*

⁹⁶ Simmons, 'Patent Law and Employment Doctrine' (2019) 67 Duke LJ 1.

⁹⁷ The Patents Act 1970 (India).

⁹⁸ The Indian Contract Act 1872.

⁹⁹ The Copyright Act 1957, s 17.

¹⁰⁰ *Darius Rutton Kavasmaneck v Gharda Chemicals Ltd* (2015) 6 SCC 310.

C. Student and Research Fellow IP Rights

University IP frameworks globally address student and fellow rights differently. The University of California system requires students to assign inventions arising from significant use of university resources, but independent works remain with student¹⁰¹. The University of Illinois applies similar models but includes fellowships, mandating disclosure and assignment when institutional funds are used¹⁰². The University of Edinburgh adopts consent-based models, distinguishing between undergraduate works, which typically remain student-owned, and funded research outputs, which belong to university¹⁰³.

Indian institutions rarely address student inventions explicitly. Policies at IITs and IISc focus primarily on faculty inventions, leaving student rights unclear. This gap often leads to disputes when student-led innovations are commercialized through incubators or start-ups. Karthy and Nair emphasize need for differentiated treatment, arguing that student inventions should not be automatically claimed by institutions unless supported with significant funding or facilities. Proposals for consent-based frameworks recommend that universities secure explicit agreements with students and fellows, ensuring fairness while protecting institutional interests. This approach balances innovative incentives with equitable recognition of contributions by all stakeholders.

VII. COMMERCIALIZATION AND TECHNOLOGY TRANSFER ECOSYSTEM

A. Role of Technology Transfer Offices (TTOs)

Technology Transfer Offices play central role in translating academic inventions into marketable products. In United States, TTOs like Stanford's Office of Technology Licensing manage disclosures, assess patentability, negotiate licenses, and distribute royalties. The Association of University Technology Managers (AUTM) provides best

¹⁰¹ University of California, Patent Policy (2020).

¹⁰² University of Illinois, IPR Policy (2019).

¹⁰³ University of Edinburgh, Intellectual Property Rights Policy (2018).

practices, training, and benchmarking data, enabling universities to optimize commercialization¹⁰⁴. European universities adopt similar models but often integrate TTOs with public funding agencies, reducing dependency on licensing revenues¹⁰⁵. Indian institutions, however, face challenges in establishing effective TTOs.

Ravi and Janodia note that few universities have dedicated offices, and those that exist suffer from funding constraints, shortage of skilled professionals, and limited industry linkages. Reports highlight that Indian TTOs lack autonomy, often operating as extensions of research administration rather than entrepreneurial units. These limitations impede commercialization ecosystem and restrict translation of research into viable products.

B. Revenue Sharing Frameworks

Revenue-sharing mechanisms are crucial in aligning faculty incentives with institutional goals. Stanford University distributes royalties with one-third to inventors, one-third to departments, and one-third retained by university¹⁰⁶. The University of Michigan follows similar patterns, ensuring both inventors and academic units benefit from commercialization¹⁰⁷. These transparent frameworks create strong incentives for faculty participation and maintain institutional legitimacy. In India, revenue-sharing models remain inconsistent.

IISc retains significant portion of revenues, with inventors receiving limited shares. IITs have adopted varying formulas, with some allocating up to 70% of royalties to inventors, while others cap shares at lower levels. The report “Public Funded IP and Its Commercialization” underscores that uneven revenue-sharing policies reduce inventor motivation and discourage technology disclosure¹⁰⁸. The absence of statutory requirements for revenue-sharing enables institutions to adopt restrictive models, often misaligned with best practices.

¹⁰⁴ Association of University Technology Managers, AUTM Survey FY1996.

¹⁰⁵ Graff GD, ‘Echoes of Bayh-Dole?’ in Krattiger et al, IP Handbook of Best Practices (MIHR 2007).

¹⁰⁶ Stanford University, Royalty Distribution Policy (2020).

¹⁰⁷ University of Michigan, Technology Transfer Policy (2019).

¹⁰⁸ Public Funded IP and Its Commercialization: Learning from Bayh-Dole Act in Indian Scenario (Mondaq 2021).

C. Faculty Incentives and Start-up Ecosystems

Faculty incentives extend beyond royalties to include equity in start-ups and incubation support. In US, faculty members often obtain equity stakes in spin-offs, subject to conflict-of-interest rules. Universities facilitate licensing agreements that allow start-ups preferential access to patented technologies, thereby creating innovative ecosystems around campuses. In India, start-up incubation centers at IITs and other institutions are growing, but policy frameworks on equity-sharing remain unclear. Faculty are often restricted from holding equity in start-ups, limiting incentives for entrepreneurial engagement.

The lack of clear rules also creates potential conflicts of interest when faculty supervise students who commercialize inventions. Proposals recommend structured equity-sharing frameworks, enabling faculty to hold shares in start-ups while mandating disclosure and conflict-management policies. Such reforms could significantly strengthen India's start-up ecosystem by aligning faculty interests with national innovation objectives.

VIII. GAPS, TENSIONS, AND DOCTRINAL INCONSISTENCIES

A. Absence of Binding Legislation

India has not enacted statute comparable to Bayh-Dole Act that explicitly transfers ownership of publicly funded inventions to universities¹⁰⁹. The Patents Act 1970 provides rules on patentability, application, and rights but does not resolve whether institutions or faculty own inventions from state-sponsored research¹¹⁰. The Contract Act 1872 fills this vacuum by validating contractual clauses of assignment but does not provide uniform rules across all higher education institutions¹¹¹.

This creates uncertainty where publicly funded research intersects with private industrial collaboration. The Protection and Utilization of Public Funded Intellectual Property Bill 2008 attempted to provide clarity but failed due to criticism of its rigid

¹⁰⁹ Ajay K Singh, 'Viability of Bayh-Dole Act of USA in Context of India' (2017) CPPR.

¹¹⁰ The Patents Act 1970, s 2(1)(j), s 48.

¹¹¹ The Indian Contract Act 1872.

provisions and absence of stakeholder consultation¹¹². The Draft Model Guidelines of 2019 offered softer approach, vesting ownership in institutions but without binding legal authority¹¹³. These guidelines remain voluntary, leaving universities to draft their own IP rules. Consequently, ownership structures vary significantly across IITs, IISc, CSIR laboratories, and private research universities¹¹⁴.

The absence of legislation perpetuates inconsistency, weakening commercialization of inventions. Internationally, Bayh-Dole Act has shown that statutory clarity creates predictable frameworks for industry partnerships and encourages long-term investments¹¹⁵. Without comparable binding statute, Indian institutions continue to face fragmented practices and reduced credibility before industrial partners. The lack of centralized legal authority perpetuates duplication of rules and weakens national innovation ecosystem¹¹⁶.

B. Judicial Silence on Faculty vs. Institutional Ownership

Judicial interpretation in India remains underdeveloped in the field of academic patent ownership. In *Darius Rutton Kavasmaneck v Gharda Chemicals Ltd & Ors*, 2015 SCC OnLine Bom 2578 (Bombay High Court), the Court declined to attribute ownership of certain patents to the employer-company, holding that in the absence of an express contractual assignment or a clearly established duty-to-invent under the terms of employment, ownership could not be presumed to vest in the employer. The decision underscores that Indian courts will not infer employer ownership of employee-generated patents without explicit contractual foundations.

However, this case did not involve university setting, leaving uncertainty over faculty-institution relationships. The absence of authoritative rulings means disputes at IITs, CSIR laboratories, or private universities are resolved internally, often without

¹¹² Karthy and Balu Nair, 'Critical Analysis of Indian Bayh-Dole Act' (2009) NUJS L Rev 463.

¹¹³ SSRN, 'How Effective Are India's Model Guidelines on Implementation of IPR Policy for Academic Institutions?' (2021) SSRN 3857206.

¹¹⁴ Ramya Ravi and Manthan D Janodia, 'University-Industry Technology Transfer in India' (2022) Journal of Knowledge Economy 1.

¹¹⁵ Bayh-Dole Act 1980 (US Public Law 96-517).

¹¹⁶ Graff GD, 'Echoes of Bayh-Dole?' in Krattiger et al, IP Handbook of Best Practices (MIHR 2007).

transparency. Faculty sometimes claim inventions personally where institutional contracts are silent, while institutions assert implied ownership based on use of their resources. This silence has prevented uniformity across higher education, unlike United States where *Stanford University v Roche Molecular Systems* 563 US 776 (2011) clarified primacy of individual assignment obligations¹¹⁷.

Judicial interpretation is vital to balance faculty autonomy with institutional interests. Without it, conflicts continue to arise, particularly with interdisciplinary research and cross-institutional collaborations. The absence of case law hinders predictability, discourages both faculty and industry from engaging confidently in technology transfer.

C. Inconsistent Institutional Policies

Institutional IP policies in India demonstrates wide contradictions. IISc asserts absolute ownership of any invention arising on its premises, irrespective of external collaboration¹¹⁸. IIT Roorkee exempts inventions created with “usual” resources, permitting faculty ownership of independent work¹¹⁹. CSIR requires scientists to disclose inventions centrally, mandating institutional approval for patent filings¹²⁰. DBT guidelines of 2023 adopt hybrid approach, vesting ownership in institutions while requiring mandatory royalty-sharing with inventors¹²¹.

Contradictions extend to disclosure rules, with some institutions demanding immediate reporting, while others allow faculty discretion. Conflicting clauses also govern faculty mobility, with uncertainty about whether departing academics retain rights over inventions created in earlier employment. Policies differ on IP sharing in collaborative projects, sometimes requiring joint ownership, sometimes granting exclusive institutional control. Such contradictions undermine national coherence and generate uncertainty for industry partners engaging with multiple universities.

¹¹⁷ *Stanford University v Roche Molecular Systems* 563 US 776 (2011).

¹¹⁸ Indian Institute of Science, IPR Policy (2012).

¹¹⁹ Indian Institute of Technology Roorkee, IPR Policy (2019).

¹²⁰ Council of Scientific and Industrial Research, IP Policy (2010).

¹²¹ Department of Biotechnology, IPR Guidelines 2023 (Government of India 2023).

IX. PROPOSING A COMPREHENSIVE INDIAN FRAMEWORK

A. Legislative Recommendations

India requires statute modeled on Bayh-Dole but adapted to domestic realities. Such law should clearly vest ownership of publicly funded research in institutions, while mandating equitable sharing of benefits with inventors. It should establish uniform disclosure requirements with statutory timelines, similar to Bayh-Dole's provisions under section 202¹²². Mandatory benefit-sharing clauses would ensure that inventors remain incentivized while institutions maintain control over commercialization¹²³.

The legislation should also incorporate safeguards for public interest, including march-in rights permitting state intervention where inventions are underutilized or priced unfairly¹²⁴. Provisions should mandate preference for domestic manufacturing, ensuring technology transfer strengthens national industries¹²⁵. Unlike Bayh-Dole, statute must also explicitly address students and research fellows, clarifying rights in funded projects. Legislative clarity would harmonize practices across IITs, IISc, CSIR, and private institutions, creating coherent national framework.

B. Institutional Policy Reforms

Beyond legislation, institutional reforms are essential. Establishing mandatory Technology Transfer Offices in all universities would professionalize commercialization efforts¹²⁶. TTOs should be staffed with legal, business, and scientific experts, funded by government and industry partnerships¹²⁷. Uniform templates for institutional IP policies, aligned with WIPO guidelines, should be mandated, ensuring consistent approaches across institutions¹²⁸. Policies must also

¹²² Bayh-Dole Act 1980, s 202.

¹²³ Bayh-Dole Act 1980, s 202(c)(7).

¹²⁴ Bayh-Dole Act 1980, s 203.

¹²⁵ Bayh-Dole Act 1980, s 204.

¹²⁶ Public Funded IP and Its Commercialization: Learning from Bayh-Dole Act in Indian Scenario (Mondaq 2021).

¹²⁷ Association of University Technology Managers, AUTM Licensing Survey FY1996.

¹²⁸ World Intellectual Property Organization, CDIP/14/INF/7: Economics of IP and International Technology Transfer (WIPO 2014).

explicitly address rights of students and post-doctoral fellows, balancing their contributions with institutional support.

Consent-based frameworks could be introduced, requiring explicit assignment agreements for funded projects, while preserving autonomy for independent student innovations. Policies must integrate start-up incubation, equity-sharing, and conflict-of-interest mechanisms to support entrepreneurial faculty. Institutional reforms should also mandate periodic audits of commercialization outcomes to maintain accountability.

C. Balancing Innovation with Academic Freedom

Reform must recognize that academic freedom remains central to university missions. Policies should distinguish between research inventions intended for commercialization and traditional scholarly works such as textbooks, lecture notes, and pedagogical content¹²⁹. Institutions must not assert ownership over scholarly output that contributes to teaching and academic culture.

At same time, inventions created with substantial institutional support or public funding should be subject to institutional ownership and commercialization. Balancing these spheres will protect faculty autonomy while enabling institutions to generate revenues and foster industrial collaborations. Explicit carve-outs for academic content will prevent misuse of institutional policies and preserve trust between faculty and administration.

D. Compliance, Dispute Resolution, and Transparency

A comprehensive framework requires strong oversight. An independent oversight body could be created to monitor implementation of university IP policies, audit TTOs, and ensure compliance with statutory requirements¹³⁰. Such body could publish annual reports on commercialization performance, enhancing transparency and accountability. Dispute resolution mechanisms should be built into framework. Mediation and arbitration should be mandated for disputes between faculty and

¹²⁹ The Copyright Act 1957, s 17.

¹³⁰ WIPO, Guidelines on Developing IP Policy for Universities and R&D Institutions (2012).

institutions over ownership, disclosure, or benefit-sharing. Specialized tribunals could be considered for complex disputes involving multiple institutions or cross-border collaborations. Transparent grievance redressal mechanisms would foster trust and reduce litigation.

X. CONCLUSION

The absence of binding legislation leaves Indian universities dependent on fragmented institutional policies, creating uncertainty and undermining commercialization potential. Judicial silence has perpetuated ambiguity, while inconsistent policies have produced contradictions across IITs, IISc, CSIR, and DBT frameworks. A national statute modeled on Bayh-Dole, adapted to Indian realities, is essential for harmonization. Institutional reforms including mandatory TTOs, uniform templates, and consent-based frameworks would professionalize commercialization. Balancing innovation with academic freedom requires clear distinctions between research inventions and traditional scholarly works¹³¹.

Oversight and mediation mechanisms are needed to ensure compliance and transparency. Legal clarity is urgent to unlock India's academic innovation potential and align university missions with commercialization in a balanced manner. At the same time, evolving international developments particularly renewed scrutiny of march-in rights under the Bayh-Dole framework in the United States, including the initiation of formal proceedings in 2025 demonstrate that even mature innovation systems remain subject to recalibration in light of public interest concerns. India's reform efforts must therefore remain adaptive, drawing from comparative experience while anticipating similar tensions between commercialization, access, and regulatory oversight.

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