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# SOFTWARE PATENTS: A GLOBAL PHENOMENON, BALANCING INNOVATION AND EXCLUSION IN THE DIGITAL ERA

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Shwetha Sunil Nambiar, LLM (IPR), Maharashtra National Law University, Mumbai

## ABSTRACT

Software patent jurisprudence diverges significantly across major jurisdictions, reflecting fundamentally different policy values rather than technical disagreements.<sup>1</sup> The United States of America (USA/US) employs a restrictive ‘abstract idea’ test based on *Alice Corp. v. CLS Bank International*,<sup>2</sup> reducing software patent grant rates by roughly 30% and correlating it with reduced innovation incentives.<sup>3</sup> The European Union (EU) maintains a consistent ‘technical character’ requirement through decades of European Patent Office (EPO) jurisprudence, this provides predictability and sustained filing rates.<sup>4</sup> India has undergone a transformative judicial interpretation of section 3(k) of the Patents Act that excludes ‘computer programs per se’ through cases such as *Ferid Allani v. Union of India*,<sup>5</sup> *Microsoft Technology Licensing, LLC v. Assistant Controller of Patents and Designs*,<sup>6</sup> and *Blackberry Limited v. Controller of Patents and Designs*.<sup>7</sup> This has seen a shift towards recognition of software demonstrating technical effects. Despite there being doctrinal divergence, all three jurisdictions converge on substantive principles. The TRIPS Agreement has a flexible framework enabling jurisdictional differences, while maintaining international compliance.<sup>8</sup> India’s framework offers a model for developing economies that balances protection within statutory constraints.

**Keywords:** Software patents, Technical Effect, Patent Eligibility

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<sup>1</sup> Neil G. Siegel & Marek A. Suchenek, On the Software Patenting Controversy, 19 TECH. & INNOVATION 787 (2018).

<sup>2</sup> *Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208 (2014).

<sup>3</sup> Dominik Jurek, Patents, Innovation, and Market Entry, 10 J. OPEN INNOVATION: TECH., MKT. & COMPLEXITY 100246, at 8-10 (2024).

<sup>4</sup> T 208/84 (VICOM), 1987 O.J. EPO 14 (May 21, 1987); European Patent Office, Guidelines for Examination in the European Patent Office, Part G-II, § 3.6 (2024 ed.).

<sup>5</sup> *Ferid Allani v. Union of India*, WP(C) 7/2014, 2019 SCC OnLine Del. 3394 (Delhi H.C. Dec. 12, 2019).

<sup>6</sup> *Microsoft Tech. Licensing, LLC v. Assistant Controller of Patents and Designs*, C.A.(COMM.IPD-PAT) 185/2022 (Delhi H.C. 2024).

<sup>7</sup> *Blackberry Ltd. v. Controller of Patents and Designs*, C.A.(COMM.IPD-PAT) 318/2022 (Delhi H.C. 2025).

<sup>8</sup> Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, 1869 U.N.T.S. 299; World Trade Organization, Declaration on the TRIPS Agreement and Public Health, WT/MIN(01)/DEC/2 (Nov. 20, 2001).

## Introduction

Software patents have been central to IP policy for at least 3 decades, yet the question about appropriate protection scope remain largely unresolved across jurisdictions.<sup>9</sup> Software innovation drives the global digital economy, it generates trillions of dollars in annual economic value.<sup>10</sup> However, patent systems struggle to accommodate software's unique properties - It embodies algorithms, mathematical procedures, while simultaneously solving practical, technical problems.<sup>11</sup>

A software patent is a grant of exclusive rights over a computer-implemented invention that claims functional solutions to technical problems, rather than the literal code itself. In practice, such claims may take the form of a method performed by a computer, a system configured to execute that method, or a computer-readable medium storing instructions that, when executed, achieve a technical result. While copyright protects the expression of code, patents protect the underlying algorithmic technique only when it is claimed as a technical process that produces a concrete technical effect. Contemporary eligibility tests therefore distinguish unpatentable abstractions and business methods as such from patent eligible computer-implemented inventions that solve a technical problem by technical means within the computer or in its interaction with the physical world.

The current debate in software patent law is 'whether abstract algorithms should receive patent protection or remain in the public domain as foundational intellectual tools.'<sup>12</sup> Major jurisdictional debates have resolved this tension through different approaches; the US follows a two-step test as set in the *Alice Corp.* case, that looks for 'inventive concept' beyond the implementation of abstract ideas on generic computers.<sup>13</sup> This restrictive approach has reduced software patent grant rates, further, section 101 'subject matter eligibility' rejections have increased post the *Alice* decision.<sup>14</sup>

Empirical research demonstrates that following the *Alice* decision, large firms reduced job

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<sup>9</sup> Siegel & Suchenek, *supra* note 1, at 787.

<sup>10</sup> World Bank, ICT Service Exports (% of Service Exports), <https://data.worldbank.org/indicator/TX.VAL.TECH.CD> (last visited Nov. 2, 2025).

<sup>11</sup> Siegel & Suchenek, *supra* note 1, at 787-788.

<sup>12</sup> *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972).

<sup>13</sup> *Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208, 217-221 (2014).

<sup>14</sup> Jurek, *supra* note 3, at 8.

creation by 5.5% and establishment creation by 3.4%.<sup>15</sup> Additionally, 64% of high-technology startups hold no patents, with software companies particularly reluctant to patent due to perceived patentability risks and litigation costs exceeding \$5 million per case.<sup>16</sup>

The European Union, by contrast, maintains a stable framework established through European Patent Office jurisprudence beginning with *VICOM* case.<sup>17</sup> The European approach requires ‘technical character’ and ‘further technical effect’ for software patentability, providing predictability that enables sustained filing rates and consistent examination standards.<sup>18</sup> Computing and software patents rank among the fastest-growing categories in European Patent Office filings.<sup>19</sup> The consistency and predictability of the European framework stand in sharp contrast to the uncertainty characterizing United States practice post *Alice*.

The Indian scenario presents a distinctive development, it has undergone judicial reinterpretation of section 3(k) of the Patents Act, its statutory exclusion of ‘computer programs per se’ through transformative precedents.<sup>20</sup> The *Ferid Allani* case after a long legal battle established that software producing ‘technical effect’ shall fall outside the statutory exclusion, and may be patentable.<sup>21</sup> The court held that the phrase ‘per se’ was deliberately added through the Patents (Amendment) Act, 2002 to narrow the exclusion to standalone software without technical contribution.<sup>22</sup> Decisions in *Microsoft* and *Blackberry* cases reinforced this framework, establishing that software patents need not involve novel hardware, provided they demonstrate genuine technical effects.<sup>23</sup> These decisions create alignment with international practice while maintaining statutory safeguards against pure business-method patents.

This paper conducts comparative analysis of these three regimes. The analysis demonstrates that despite divergent statutory language and institutional approaches, all three jurisdictions recognize that software producing genuine technical advancement warrants patent protection while abstract algorithms and pure business methods warrant exclusion. Understanding how

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<sup>15</sup> *Id.* at 8-10.

<sup>16</sup> Sona Karakashian, A Software Patent War: The Effects of Patent Trolls on Startup Companies, Innovation, and Entrepreneurship, 11 HASTINGS BUS. L.J. 119, 140-156 (2015).

<sup>17</sup> T 208/84 (VICOM), 1987 O.J. EPO 14 (May 21, 1987).

<sup>18</sup> European Patent Office, *supra* note 4.

<sup>19</sup> European Patent Office, Patent Index 2023, at 12-14 (2024).

<sup>20</sup> The Patents Act, 1970, No. 39 of 1970, § 3(k) (India).

<sup>21</sup> *Ferid Allani v. Union of India*, 2019 SCC OnLine Del. 3394, ¶¶ 25-30 (Delhi H.C. Dec. 12, 2019).

<sup>22</sup> *Id.* ¶ 22.

<sup>23</sup> *Microsoft Tech. Licensing, LLC v. Assistant Controller of Patents and Designs*, C.A.(COMM.IPD-PAT) 185/2022 (Delhi H.C. 2024); *Blackberry Ltd. v. Controller of Patents and Designs*, C.A.(COMM.IPD-PAT) 318/2022 (Delhi H.C. 2025).

and why these three major technology markets have adopted different approaches illuminates broader questions about optimal intellectual property policy for software innovation across different development contexts.

### **Research Objectives**

1. To examine development of software patent law in US, EU and India from exclusions to current liberal framework.
2. To analyze the statutory provisions, precepts and standards set in each of the three jurisdictions, explaining how they operate in practice.
3. To examine policy values adopted in each jurisdiction that have backed the current legal backdrop.
4. To assess the Indian framework, technical effect test as a optimal policy for current economic position.

### **Research Questions**

1. How did software patent law evolve in US, EU and India, what was the turning point of shift in each jurisdiction?
2. What tests are applied in each of the jurisdictions for determining patentability and how do these tests operate when applied to specific software inventions?
3. What are the policy principles concerning innovation that drives each of countries and how do these explain the differences across the jurisdictions?
4. Does the Indian framework represent appropriate policy for the current developmental stage in India?

### **Scope of Research**

This study examines software patent jurisprudence across three major technology jurisdictions, the United States, the European Union, and India. The study addresses exclusively software patents: patents claiming computer programs, algorithms, computer-implemented methods,

and computer-related inventions. The study employs primarily doctrinal legal analysis examining statutory interpretation and case law, supplemented by empirical data from published studies regarding patent grant rates, and litigation patterns.

## Literature review

### *Theoretical Foundations and Evolution of Software Patent Doctrine*

The scholarly landscape on software patentability reveals fundamental tensions between patent law's historical exclusion of abstract ideas and contemporary recognition that software innovations warrant protection. Neil G. Siegel and Marek A. Suchenek establish that software patent jurisprudence has been animated by recurring doctrinal oscillation between liberalism and restriction, reflecting deeper questions about what constitutes patentable subject matter in the digital age.<sup>24</sup> Their foundational analysis traces how early Supreme Court decisions in *Gottschalk v. Benson* (1972) and *Parker v. Flook* (1978) prioritized preventing monopolization of fundamental mathematical concepts, yet *Diamond v. Diehr* (1981) opened pathways for software patents claiming technical effect beyond pure abstraction.<sup>25</sup> This historical evolution demonstrates that jurisprudential frameworks operate as responses to specific policy concerns, preemption prevention, innovation incentive calibration, and equity in patent access, rather than reflecting purely technical categorization of what constitutes patentable subject matter.<sup>26</sup>

### *International Framework Divergence: Policy Values and Institutional Responses*

TRIPS Articles 27-28 theoretically establish inclusive patent protection across all technology fields, yet divergent judicial interpretation has created distinct national frameworks reflecting different policy priorities. The European Patent Office's three-decade consistency in applying "technical character" standards, as established through VICOM (1987) and reinforced in contemporary guidance,<sup>27</sup> demonstrates that institutional commitment to predictable doctrine enables sustained patent protection without the uncertainty characterizing post-*Alice* United States practice.<sup>28</sup> Empirical research by Dominik Jurek documents measurable economic

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<sup>24</sup> Neil G. Siegel & Marek A. Suchenek, *On the Software Patenting Controversy*, 19 TECH. & INNOVATION 787, 787–88 (2018).

<sup>25</sup> *Id.* at 788–92; *Gottschalk v. Benson*, 409 U.S. 63 (1972); *Parker v. Flook*, 437 U.S. 584 (1978); *Diamond v. Diehr*, 450 U.S. 175 (1981).

<sup>26</sup> Siegel & Suchenek, *supra* note 1, at 792–98.

<sup>27</sup> T 208/84 (VICOM), 1987 O.J. EPO 14 (May 21, 1987); European Patent Office, *Guidelines for Examination in the European Patent Office*, Part G-II, § 3.6 (2024 ed.).

<sup>28</sup> *Id.*

consequences of this divergence: *Alice*'s restrictive framework correlates with 30-percentage-point reduction in software patent grant rates and correlates with large firms reducing job creation by 5.5% and establishment formation by 3.4%.<sup>29</sup> These empirical findings ground abstract doctrinal differences in concrete economic outcomes.

### Developing Country Innovation Frameworks and India's Judicial Response

Contemporary scholarship increasingly recognizes that developing economies require patent frameworks calibrated to their institutional capacity and innovation priorities rather than simply replicating developed-country models. India's judicial transformation provides crucial case study demonstrating alternative institutional pathways for software patent development. The Delhi High Court's landmark decision in *Ferid Allani v. Union of India* (2019), following a 19-year legal struggle, exemplifies how judicially-developed doctrine grounded in statutory interpretation can reformulate patent frameworks to support developing-country innovation contexts.<sup>30</sup> Subsequent decisions in *Microsoft Technology Licensing, LLC v. Assistant Controller of Patents and Designs* (2024), and *Blackberry Limited v. Controller of Patents and Designs* (2025) reinforced technical effect standards while rejecting administrative obstacles to software patentability.<sup>31</sup> This judicial development trajectory suggests that statutory frameworks, when grounded in legislative intent, enable courts to develop doctrine responsive to evolving technological contexts and development-stage appropriateness.

Sona Karakashian's analysis of patent troll effects on startup innovation reveals that unrestricted software patent frameworks generate unintended consequences undermining innovation incentives.<sup>32</sup> The pre-*Alice* period witnessed patent monetization entities accumulating abstract software patents generating over 60% of patent litigation, imposing litigation costs exceeding \$5 million per case, and deterring startup patent acquisition.<sup>33</sup> This analysis provides empirical grounding for judicial concern about patent scope—demonstrating

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<sup>29</sup> Dominik Jurek, *Patents, Innovation, and Market Entry*, 10 J. OPEN INNOVATION: TECH., MKT. & COMPLEXITY 100246, at 8–10 (2024).

<sup>30</sup> *Ferid Allani v. Union of India*, WP(C) 7/2014, 2019 SCC OnLine Del. 3394, ¶¶ 20–30 (Delhi H.C. Dec. 12, 2019).

<sup>31</sup> *Microsoft Tech. Licensing, LLC v. Assistant Controller of Patents and Designs*, C.A.(COMM.IPD-PAT) 185/2022, at 12 (Delhi H.C. 2024); *Blackberry Ltd. v. Controller of Patents and Designs*, C.A.(COMM.IPD-PAT) 318/2022, ¶¶ 18–25 (Delhi H.C. 2025).

<sup>32</sup> Sona Karakashian, *A Software Patent War: The Effects of Patent Trolls on Startup Companies, Innovation, and Entrepreneurship*, 11 HASTINGS BUS. L.J. 119, 125–40 (2015).

<sup>33</sup> *Id.* at 140–56.

that excessive software patent breadth can paradoxically reduce innovation incentives rather than enhancing them.

Comparative legal frameworks demonstrate that diverse approaches to software patentability can coexist within TRIPS-compliant structures. The scholarly consensus emerging from recent literature suggests that optimal software patent policy depends on balancing competing objectives: providing sufficient protection to incentivize innovation investment, preventing monopolization of fundamental concepts, maintaining institutional capacity for quality examination, and ensuring developing-country participation in innovation systems.<sup>34</sup>

## Research Gaps

### *Limited Comparative Analysis of Developing-Country Software Patent Frameworks*

Existing scholarship extensively examines US restrictiveness post-*Alice* and European consistency through EPO jurisprudence but provides minimal systematic comparative analysis of developing-nation software patent policies. This paper addresses this gap by providing substantive analysis of India's judicially-developed technical effect standard, demonstrating that developing economies can formulate sophisticated frameworks grounded in statutory interpretation and responsive to development-stage appropriateness.

### *Inadequate Analysis of Philosophical Foundations*

Prior comparative IP scholarship examines doctrinal rules without analyzing underlying policy values driving divergent frameworks. This paper systematically examines philosophical foundations: US preemption concerns prioritizing prevention of fundamental concept monopolization, European institutional stability emphasizing predictable examination, and India's development-stage considerations. The paper establishes that divergence reflects legitimate policy choices rather than technical disagreement requiring harmonization.

### *Limited Integration of Historical Evolution with Policy Assessment*

Most scholarship treats software patent doctrine as static. This paper traces continuous evolution from *Gottschalk* through *Alice* in the US, *VICOM* through *G1/19* in the EU, and

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<sup>34</sup> Siegel & Suchenek, *supra* note 1; Jurek, *supra* note 6; Karakashian, *supra* note 9; Abhishek Kumar Singh & Suryakant Kashyap, *Software Patentability: A Comparative Analysis*, 1 INDIAN J. LEGAL RES. (n.d.).

exclusion through *Ferid Allani* in India, connecting historical patterns to contemporary policy implications.

## Research Methodology

This paper employs doctrinal legal analysis examining statutory provisions, case law, and judicial reasoning across three jurisdictions. Comparative legal research identifies similarities, differences, and consequences across frameworks. Policy analysis examines normative values and practical consequences of different approaches. Lastly, case study analysis demonstrates how developing economies can formulate distinctive frameworks grounded in statutory interpretation. The methodology combines formal legal doctrine with contextual analysis of policy values, institutional capacity, and development-stage appropriateness.

## Historical Evolution of Software Patent Doctrine

Software patent jurisprudence has evolved dramatically over the past fifty years, reflecting shifting judicial philosophy and policy priorities. Each jurisdiction has experienced distinct turning points shaped by different legal, institutional, and economic contexts. Understanding this evolution is essential to comprehending current doctrinal divergence and the policy values underlying each framework.

### *United States: Exclusion to Uncertainty*

The United States Supreme Court first addressed software patentability in *Gottschalk v. Benson*, 409 U.S. 63 (1972).<sup>35</sup> Benson and Tabbot sought a patent for an algorithm converting binary-coded decimal numerals into binary form. The Supreme Court held that the patent was directed to an abstract mathematical formula, not patentable subject matter. The Court stated ‘The mathematical formula involved here has no substantial practical application except in connection with a digital computer.’<sup>36</sup> This decision established the foundational principle that abstract mathematical algorithms, as basic intellectual tools, warrant exclusion from patent protection to prevent monopolization of fundamental concepts.

Six years later, in *Parker v. Flook*, 437 U.S. 584 (1978), the Supreme Court reaffirmed this

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<sup>35</sup> *Gottschalk v. Benson*, 409 U.S. 63 (1972).

<sup>36</sup> *Id.* at 71–72.

restrictive approach.<sup>37</sup> Flook sought a patent for an improved method of updating alarm limits in a catalytic conversion process using a mathematical formula. Although the invention involved practical application, the Supreme Court held that the patent constituted an impermissible claim to an abstract idea merely applied to a practical problem. The Supreme Court held ‘A claim for an improved method of calculation, even when tied to a specific end use, is unpatentable subject matter under section 101’<sup>38</sup>

However, the trajectory shifted fundamentally with *Diamond v. Diehr*, 450 U.S. 175 (1981).<sup>39</sup> Diehr and Lutton sought protection for an improved rubber-curing method utilizing a computer program implementing the Arrhenius equation to recalculate proper curing time based on real-time temperature measurements. The Supreme Court held that examining claims ‘as a whole’ rather than dissecting them was appropriate, and that the rubber-curing process was patentable despite incorporating software. The Court then stated ‘We therefore hold that respondents’ claims must be considered as a whole, and as such, are directed to a patentable process because the method as a whole is directed to treating conditions of the rubber-curing process.’<sup>40</sup> This case marked the first Supreme Court decision ordering grant of a software-related patent and opened the door to broader protection.

The Federal Circuit, created in 1982, subsequently developed increasingly permissive jurisprudence. In *State Street Bank & Trust Co. v. Signature Financial Group Inc.*, 149 F.3d 1368 (Fed. Cir. 1998), the Federal Circuit held that a computerized mutual fund accounting system produced a ‘useful, concrete and tangible result’ and thus qualified for patentability.<sup>41</sup> This decision effectively eliminated the business-method exception and ushered in an era of extreme liberalization. The period from 1998 to 2014 witnessed explosive software patent growth, dramatically increased patent litigation, and emergence of patent monetization entities whose business models relied on software patent licensing and enforcement.<sup>42</sup>

The liberalization trajectory reversed course with *Bilski v. Kappos*, 561 U.S. 593 (2010), where the Supreme Court addressed whether a method for hedging risk in commodities trading constituted a patentable process.<sup>43</sup> The Court declined to adopt the Federal Circuit’s ‘machine-

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<sup>37</sup> *Parker v. Flook*, 437 U.S. 584 (1978).

<sup>38</sup> *Id.* at 589.

<sup>39</sup> *Diamond v. Diehr*, 450 U.S. 175 (1981).

<sup>40</sup> *Id.* At 189.

<sup>41</sup> *State Street Bank & Trust Co. v. Signature Financial Group Inc.*, 149 F.3d 1368 (Fed. Cir. 1998)

<sup>42</sup> Karakashian, *supra* note 16, at 140–56.

<sup>43</sup> *Bilski v. Kappos*, 561 U.S. 593 (2010).

or-transformation test' as the sole standard for patentability but reaffirmed that abstract ideas remain unpatentable.<sup>44</sup>

The definitive shift occurred with *Alice Corp. v. CLS Bank International*, 573 U.S. 208 (2014).<sup>45</sup> Alice Corporation held patents on a computer-implemented method for mitigating settlement risk through intermediated settlement. The patents essentially claimed the well-known concept of intermediated settlement, a practice predating computers-implemented through generic software. The Supreme Court held unanimously that the patents were invalid. The Court established a two-step framework: (i) *Determine whether claims are directed to a patent-ineligible concept (abstract idea, law of nature, or natural phenomenon)*; (ii) *If directed to an ineligible concept, examine whether claim elements contain an 'inventive concept' sufficiently transforming the abstract idea into patent-eligible application.*<sup>46</sup> The Court stated: 'Merely adding a generic computer to a method of doing business does not transform an abstract idea into a patentable invention.'<sup>47</sup> Since *Alice*, software patent jurisprudence has been characterized by substantial uncertainty, with inconsistent outcomes across courts and examiners applying ostensibly identical legal standards.

### ***European Union: Consistent Technical Character Standard***

The European Patent Convention Article 52(2)(c) explicitly excludes 'programs for computers' from patentability, yet Article 52(3) immediately states that the exclusion applies 'only to the extent to which' patents 'relate to such subject-matter...as such.'<sup>48</sup> This 'as such' language creates a qualifier that is narrowing, expecting that software forming part of larger technical systems or producing technical effects might be patentable.

The European Patent Office established its framework through foundational Technical Board of Appeal jurisprudence. In *VICOM* case, decided May 21, 1987, the Board held that a method for improving digital image processing through mathematical operations on pixel arrays constituted a patentable invention.<sup>49</sup> The Board stated 'An invention must be assessed as-a-whole. The method of processing images covered by the claimed process involves the

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<sup>44</sup>*Id.* at 601–03.

<sup>45</sup> *Alice Corp. v. CLS Bank International*, 573 U.S. 208 (2014).

<sup>46</sup>*Id.* at 217–21.

<sup>47</sup> *Id.* at 221.

<sup>48</sup> European Patent Convention, art. 52(3), Oct. 5, 1973, 1065 U.N.T.S. 199.

<sup>49</sup> T 208/84 (*VICOM*), 1987 O.J. EPO 14 (May 21, 1987).

application of sophisticated mathematical operations to image signals representing concrete, physical objects. However, this does not necessarily imply that the method is either an abstract concept or disembodied mathematics lying beyond the scope of Article 52(1) EPC.<sup>50</sup> This decision established that technical applications of mathematics are patentable despite mathematical components; technical character, not mathematical content, determines patentability.

In the *COMVIK* case, decided on September 26, 2002, the Board developed the framework for mixed inventions combining technical and non-technical elements.<sup>51</sup> Features contributing to technical character are assessed for inventive step; others are not. The Board held that computer-related inventions qualify for patent protection if they produce a technical effect beyond the normal physical interactions between program and computer.<sup>52</sup>

Most recently, in a case involving *Pedestrian Simulation*, the Enlarged Board of Appeal (2022) reaffirmed ‘Mere calculation on a computer does not achieve patentability...unless it leads to an adaptation of the technical architecture of the computer or to some further technical effect.’<sup>53</sup> The EPO Guidelines establish that software is patentable if exhibiting ‘technical character’ by producing effects beyond ‘the normal physical interactions between program and computer.’<sup>54</sup> This framework has remained remarkably consistent and predictable, enabling European Patent Office examiners to apply consistent standards across applications and enabling applicants to predict patentability with reasonable confidence.

### ***India: Statutory Exclusion to Judicial Liberalization***

India’s software patent trajectory differs fundamentally from both the United States and European Union. The Patents Act, 1970, Section 3(k), excludes from patentability ‘a mathematical or business method or a computer programme per se or algorithms.’<sup>55</sup> The critical qualifying word is ‘per se’ which means ‘by itself’ or ‘in isolation.’ The phrase contemplates that standalone computer programs are excluded but programs integrated into technical systems

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<sup>50</sup> *Id.*

<sup>51</sup> T 641/00 (*COMVIK*), 2003 O.J. EPO 352 (Sept. 26, 2002).

<sup>52</sup> *Id.*

<sup>53</sup> G 1/19 (*Pedestrian Simulation*), 2022 O.J. EPO 33 (Enlarged Bd. App. 2021).

<sup>54</sup> European Patent Office, *Guidelines for Examination in the European Patent Office*, Part G-II, § 3.6, at 1–2 (2024 ed.).

<sup>55</sup> The Patents Act, 1970, No. 39 of 1970, § 3(k) (India).

or producing technical effects are not excluded.

The Patents (Amendment) Act, 2002, deliberately narrowed the exclusion by adding the word ‘per se’ to what had previously been categorical prohibition of ‘computer programs.’<sup>56</sup> Joint Parliamentary Committee reports explained that the phrase was added with a view that the computer programme may include certain other things, ancillary thereto or developed thereon.<sup>57</sup> Legislative intent clearly contemplated that computer programs incorporated into technical systems would not be categorically excluded.

However, the Patent Office initially maintained restrictive interpretations of this language. The 2013 Draft CRI Guidelines established that computer-related inventions could be patentable if demonstrating ‘technical contribution’ or ‘technical effect.’<sup>58</sup> Examples included higher processing speeds, reduced hard-disk access time, and more economical memory usage.<sup>59</sup> But around 2015-2016, the Patent Office issued revised CRI Guidelines introducing a controversial requirement that ‘novel hardware’ be involved for software patents to be patentable.<sup>60</sup> This requirement was substantially more restrictive than the 2013 guidelines and appeared inconsistent with statutory language and legislative intent. The software industry sharply criticized the requirement as preventing patenting of pure software innovations, precisely the innovations in which India specializes.<sup>61</sup>

The landmark turning point occurred with *Ferid Allani v. Union of India* WP(C) 7/2014, decided December 12, 2019 by the Delhi High Court, following a 19-year legal battle.<sup>62</sup> Allani had filed a patent application for a ‘method and device for accessing information sources and services on the web.’ The Patent Office rejected the application under Section 3(k), arguing it constituted a computer programme per se without patentable subject matter. The Delhi High Court overturned the rejection. Justice Rajendra Sharma held that the ‘per se’ as a qualifier was deliberately added to clarify that ‘computer programmes that manipulate abstract concepts would not qualify for patent protection; however, a computer programme which produces a technical effect and which solves a technical problem would not fall within the mischief of the

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<sup>56</sup> Patents (Amendment) Act, 2002, No. 38 of 2002 (India).

<sup>57</sup> Joint Parliamentary Committee Report on Patents (Second Amendment) Bill, 1999, cited in *Guidelines for Examination of Computer Related Inventions*, at 2 (2013 Draft) (India Patent Office).

<sup>58</sup> India Patent Office, *Guidelines for Examination of Computer Related Inventions* (2013 Draft).

<sup>59</sup> *Id.*

<sup>60</sup> India Patent Office, *Guidelines for Examination of Computer Related Inventions* (2016).

<sup>61</sup> Karakashian, *supra* note 16, at 140–56.

<sup>62</sup> *Ferid Allani v. Union of India*, WP(C) 7/2014, 2019 SCC OnLine Del. 3394 (Delhi H.C. Dec. 12, 2019).

Section 3(k).<sup>63</sup> The court established that legislative intent behind the ‘per se’ amendment was precisely to exclude abstract computer programs while permitting patents for programs producing technical effects.<sup>64</sup> The court defined ‘technical effect’ to include ‘solving a technical problem including improvement in hardware functionality, increased processing speed, reduced hard-disk access time, more economical use of memory, more efficient database search strategies, and more effective data compression.’<sup>65</sup>

The *Allani* decision fundamentally reoriented Indian patent jurisprudence; the courts, not the Patent Office, became final arbiters of per se exclusion interpretation, statutory language and legislative intent-controlled examination, technical effects determinatively established patentability, and India’s framework aligned with international practice grounded in technical contribution standards.<sup>66</sup>

Subsequent decisions reinforced and elaborated this framework. In *Microsoft Technology Licensing, LLC v. Assistant Controller of Patents and Designs*, C.A.(COMM.IPD-PAT) 185/2022 (Delhi H.C. 2024), Microsoft had filed a patent application for a ‘reversible 2D overlap operator for digital media compression.’ The Patent Office rejected the application, relying on the now-superseded 2016 CRI Guidelines’ novel hardware requirement.<sup>67</sup> The Delhi High Court granted relief, holding that ‘The presence or absence of novel hardware is not *sine qua non* for patentability of a computer-related invention. What is relevant is the technical nature and effect of the invention, whether it demonstrates technical advancement and whether it solves a technical problem or adds a technical contribution.’<sup>68</sup> The decision definitively established that the 2016 CRI Guidelines’ novel hardware requirement was inconsistent with statutory interpretation and should be disregarded.<sup>69</sup>

Most recently, in *Blackberry Limited v. Controller of Patents and Designs*, C.A.(COMM.IPD-PAT) 318/2022 (Delhi H.C. 2025), the Delhi High Court provided detailed framework establishing two categories of technical effect sufficient for CRI patentability-programs solving problems within the computer itself, such as memory optimization and processing efficiency

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<sup>63</sup> *Id.*

<sup>64</sup> *Id.*

<sup>65</sup> *Id.*

<sup>66</sup> *Id.*

<sup>67</sup> *Microsoft Technology Licensing, LLC v. Assistant Controller of Patents and Designs*, C.A.(COMM.IPD-PAT) 185/2022, at 12 (Delhi H.C. 2024).

<sup>68</sup> *Id.*

<sup>69</sup> *Id.*

improvements, and programs whose effects extend to other devices, including hardware control, system integration, and real-world technical applications.<sup>70</sup> The *Blackberry* decision clarified that the threshold for technical effect is not excessively high, either internal improvements to the computer system or external effects to other devices suffice, provided the improvement is genuine and demonstrated through the specification and claims.<sup>71</sup>

### **Doctrinal Framework for Software Patentability**

Each jurisdiction currently applies distinct legal tests for determining software patentability. These tests, while formally different in language and structure, operate to assess fundamentally similar questions: whether software inventions demonstrate technical advancement beyond abstract ideas and whether they warrant patent protection. This section examines the precise legal frameworks governing software eligibility in each system.

#### ***United States: The Alice Two-Step Test Under 35 U.S.C. w/s 101***

The governing legal test in the United States is the two-step framework established in the *Alice* case which remains controlling law for all patent subject matter eligibility determinations.<sup>72</sup> The test operates as follows:

#### **Is the claim directed to a patent-ineligible concept?**

The first step requires determining whether the claim is directed to an abstract idea, a law of nature, or a natural phenomenon—all explicitly excluded from patentability under 35 U.S.C. section 101.<sup>73</sup> If the claim is not directed to such an ineligible concept, patent eligibility is established and analysis concludes. If the claim appears directed to an ineligible concept, analysis proceeds to step two.

#### **Does the claim contain an inventive step?**

If step one indicates the claim addresses an ineligible abstract idea, the second step examines whether the claim contains additional elements ‘**an inventive concept**’ that transform the

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<sup>70</sup> *Blackberry Limited v. Controller of Patents and Designs C.A.(COMM.IPD-PAT) 318/2022*, ¶¶ 18–25 (Delhi H.C. 2025).

<sup>71</sup> *Id.*

<sup>72</sup> *Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208, 217–21 (2014).

<sup>73</sup> 35 U.S.C. § 101 (2012); *Alice Corp.*, 573 U.S. at 217–21.

abstract idea into a patent-eligible application. The Supreme Court stated that ‘It is not enough to note that a law of nature or abstract idea might be applied in a wide variety of ways. That is true of Newton’s law of gravity. But a claim is not thereby patentable merely because the problem it addresses (however novel and required) can be solved in other ways.’<sup>74</sup> Application of this standard has proven highly fact-intensive and context-dependent, creating substantial uncertainty for applicants and patent practitioners.

In practice, *Alice* framework has created significant challenges for software patent applicants. Federal Circuit decisions applying *Alice* have reached divergent conclusions on substantially similar inventions. In *Enfish LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016), the Federal Circuit held that patent claims to a self-referential table for database organization constituted patent-eligible subject matter because the claims focused on improving computer functionality itself rather than merely applying an abstract idea to computers.<sup>75</sup> Conversely, in numerous other cases, courts have rejected software patents claiming methods performed by computers, finding them directed to abstract ideas implemented generically.<sup>76</sup> This inconsistency reflects the framework’s inherent difficulty in distinguishing between patentable technical improvements and unpatentable abstract ideas.

### ***European Union: Technical Character and Further Technical Effect Under EPC Article 52***

The European Patent Convention Article 52 establishes a distinct framework, requiring that software inventions demonstrate ‘**technical character**’ and produce ‘**further technical effect**.’<sup>77</sup> This framework, refined through decades of European Patent Office jurisprudence, operates more predictably than the United States system.

### **Technical Character Requirement**

A software invention must address a technical problem using technical means to qualify for patentability.<sup>78</sup> The European Patent Office Guidelines explain that software has technical

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<sup>74</sup> *Alice Corp.*, 573 U.S. at 224.

<sup>75</sup> *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016).

<sup>76</sup> See, e.g., *DDR Holdings, LLC v. Hotels.com, Inc.*, 773 F.3d 1245 (Fed. Cir. 2014); *Bilski v. Kappos*, 561 U.S. 593 (2010).

<sup>77</sup> European Patent Convention, art. 52, Oct. 5, 1973, 1065 U.N.T.S. 199.

<sup>78</sup> T 208/84 (VICOM), 1987 O.J. EPO 14 (May 21, 1987); European Patent Office, *Guidelines for Examination in the European Patent Office*, Part G-II, § 3.6 (2024 ed.).

character if it contributes to the solution of a technical problem by technical means.<sup>79</sup> Examples of technical problems include: improving computer processing speed, optimizing memory usage, reducing power consumption, improving data compression, and enhancing system reliability.<sup>80</sup>

### Further Technical Effect Requirement

Beyond technical character, software must produce further technical effect beyond the normal physical interactions between program and computer.<sup>81</sup> In the *Pedestrian Simulation* case, the Enlarged Board of Appeal clarified that the technical effect must be more than the trivial operation of a computer, such as providing typical user interface features or performing standard calculations.<sup>82</sup> The technical effect must represent a genuine advancement or improvement in how the computer functions or how it addresses external technical problems.

In practice, the European framework has enabled relatively consistent examination of software patents. The EPO applies these standards uniformly across applications, enabling patent practitioners to predict patentability with reasonable confidence. Software patents demonstrating technical problem-solving receive protection; patents claiming pure business methods or abstract algorithms without technical implementation receive rejection.<sup>83</sup> This consistency contrasts sharply with the uncertainty characterizing post *Alice* United States practice.

### India: Technical Effect Standard Under Section 3(k) Patents Act, 1970

India's current framework, as established through judicial decisions beginning with the *Allani* case, focuses on 'technical effect' as the determinative criterion for software patentability.<sup>84</sup> Section 3(k) excludes only 'computer programme per se', software without technical contribution or effect.<sup>85</sup> Software demonstrating technical effects falls outside the exclusion and may be patentable.

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<sup>79</sup> European Patent Office, *Guidelines for Examination in the European Patent Office*, Part G-II, § 3.6, at 2 (2024 ed.).

<sup>80</sup> *Id.*

<sup>81</sup> G 1/19 (*Pedestrian Simulation*), 2022 O.J. EPO 33 (Enlarged Bd. App. 2021).

<sup>82</sup> *Id.*

<sup>83</sup> European Patent Office, *supra* note 68, at 2–3.

<sup>84</sup> *Ferid Allani v. Union of India*, WP(C) 7/2014, 2019 SCC OnLine Del. 3394 (Delhi H.C. Dec. 12, 2019).

<sup>85</sup> The Patents Act, 1970, No. 39 of 1970, § 3(k) (India).

## Technical Effect

The Delhi High Court in *Ferid Allani* defined technical effect to include ‘solving a technical problem including improvement in hardware functionality, increased processing speed, reduced hard-disk access time, more economical use of memory, more efficient database search strategies, and more effective data compression.’<sup>86</sup> Critically, the court emphasized that technical effect encompasses both improvements to the computer system itself and practical applications addressing real-world technical problems.

Further, two categories for technical effect were developed in the *Blackberry* case by the Delhi High Court.<sup>87</sup>

### Technical Solutions within the Computer itself

Patents for software addressing technical problems internal to computer operation, such as memory optimization, processing efficiency, novel data structures, and system performance improvements.

### Technical Effects extending beyond the Computer

Patents for software whose effects extend to external devices or systems, including hardware control, system integration, real-world technical applications, and improvements to connected devices or processes.

The Delhi High Court emphasized that both categories constitute sufficient technical effect for patentability, provided the technical improvement is genuine and adequately disclosed in the specification.<sup>88</sup> Notably, the court rejected requirements that software patents involve novel hardware, holding that pure software innovations demonstrating technical effects warrant patent protection.<sup>89</sup>

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<sup>86</sup> *Ferid Allani v. Union of India*, 2019 SCC OnLine Del. 3394, ¶¶ 25–30 (Delhi H.C. Dec. 12, 2019).

<sup>87</sup> *Blackberry Ltd. v. Controller of Patents and Designs*, C.A.(COMM.IPD-PAT) 318/2022, ¶¶ 18–25 (Delhi H.C. 2025).

<sup>88</sup> *Id.*

<sup>89</sup> *Microsoft Tech. Licensing, LLC v. Assistant Controller of Patents and Designs*, C.A.(COMM.IPD-PAT) 185/2022, at 12 (Delhi H.C. 2024).

## ***Comparative Assessment of Frameworks***

The three frameworks exhibit both formal divergence and substantive convergence:

### **Formal Divergence**

The United States employs an “abstract idea + inventive concept” test; the European Union requires “technical character” and “further technical effect”; India applies a “technical effect” standard to interpret statutory “per se” exclusion.

### **Substantive Convergence**

All three systems exclude purely abstract ideas or mathematical formulas standing alone, exclude pure business methods, recognize that software producing genuine technical advancement warrants protection, and require that claims address technical problems through technical means.

### **Practical Difference in Application**

The European Union and India’s frameworks provide greater examination consistency and predictability than the post *Alice* US system. This difference reflects institutional factors- the EPO’s Technical Board of Appeal has developed consistent jurisprudence over decades, India’s courts are developing consistent doctrine through landmark decisions, and the United States Federal Circuit continues to reach divergent conclusions on similar facts.

### **Foundations Underlying Each Framework**

The divergent doctrinal frameworks adopted by the United States, European Union, and India reflect fundamentally different policy values and philosophical commitments regarding intellectual property protection, innovation incentives, and the appropriate scope of patent law. Understanding these underlying foundations illuminates why jurisdictions chose their approaches and clarifies the policy trade-offs each framework prioritizes.

### ***United States: Preemption Concerns and Abstract Idea Doctrine***

The United States framework, particularly the two-step test, reflects deep philosophical concern about patent monopolies preempting fundamental scientific and technological

concepts. This concern originated in *Gottschalk v. Benson* where the Supreme Court stated ‘The mathematical formula involved here has no substantial practical application except in connection with a digital computer, which means that if the judgment below is affirmed, the patent would wholly pre-empt the mathematical formula.’<sup>90</sup> The Court’s reasoning suggests that granting patents on abstract mathematical principles risks monopolizing basic intellectual tools available to all innovators, thereby stifling downstream innovation and competition.

This preemption concern reflects a classical intellectual property philosophy valuing patent law as limited to concrete, practical inventions rather than abstract concepts. As the Supreme Court stated in *Alice* “Mere recitation of a ‘computer-readable medium’ or references to modern technology cannot transform an unpatentable abstract idea into a patent-eligible invention.”<sup>91</sup> This philosophy prioritizes preventing monopolization of fundamental concepts over providing broad patent protection for software innovations.

The *Alice* framework also reflects concerns about patent quality and patent troll litigation. Prior to *Alice*, the extremely broad software patents granted under the *State Street* standard enabled patent monetization entities to acquire and enforce patents claiming highly abstract business methods, generating over 60% of patent litigation by 2012-2013 and imposing \$5+ million litigation costs even on patent holders.<sup>92</sup> The Supreme Court’s restrictive stance in *Alice* responded partly to concerns that software patents had become mechanisms for extracting licensing fees rather than rewarding genuine innovation.<sup>93</sup> The Court’s philosophy reflects judgment that overly broad software patents harm competition and innovation rather than promoting them.

However, the *Alice* framework creates unintended consequences. Empirical research demonstrates that *Alice*’s restrictive approach has correlated with reduced software patent filing, increased startup reliance on trade secrecy rather than patents, and incumbent firm advantage in markets where startups face higher barriers to patenting innovations.<sup>94</sup> This suggests that the philosophical commitment to preventing preemption of abstract ideas, while sound in principle, may have created excessive restrictions on legitimate technical innovations

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<sup>90</sup> *Gottschalk v. Benson*, 409 U.S. 63, 71–72 (1972).

<sup>91</sup> *Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208, 222 (2014).

<sup>92</sup> Karakashian, *supra* note 16, at 125–40.

<sup>93</sup> *Id.* at 140–56.

<sup>94</sup> Jurek, *supra* note 3, at 8–10.

warranting protection.

### ***European Union: Technical Contribution and System Stability***

The European Union's framework reflects a different philosophical foundation: emphasis on 'technical contribution' and institutional stability. The EPO's three-decade consistency in applying technical character requirements reflects philosophical commitment to predictability and institutional integrity over doctrinal fluidity.<sup>95</sup> The EPO Guidelines articulate the principle: software is patentable if it contributes to solving a technical problem through technical means.<sup>96</sup> This philosophy recognizes that software can address genuine technical challenges, improving processing efficiency, optimizing memory usage, enhancing system reliability, warranting patent protection for such innovations.

The European framework distinguishes between patentable technical contributions and unpatentable abstract ideas through the concept of 'technical character.' This distinction reflects philosophical judgment that some software innovations represent genuine technical advancement warranting protection, while others represent mere business method automation or abstract mathematical manipulation warranting exclusion. The European approach provides middle ground between extreme liberalization (granting patents on nearly all software) and extreme restriction (excluding all software).

Additionally, the European framework emphasizes institutional stability and examination predictability. The EPO's Technical Boards of Appeal have developed consistent jurisprudence enabling examiners to apply standards uniformly across applications.<sup>97</sup> This institutional approach reflects philosophical value placed on predictability and rule-of-law principles, enabling patent practitioners to plan strategies and applicants to predict patentability outcomes with reasonable confidence. The consistency contrasts with the volatility of U.S. practice post-*Alice*, where different examiners and courts apply ostensibly identical tests to reach divergent conclusions.<sup>98</sup>

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<sup>95</sup> European Patent Office, *Guidelines for Examination in the European Patent Office*, Part G-II, § 3.6 (2024 ed.).

<sup>96</sup> *Id.* at 2.

<sup>97</sup> T 208/84 (VICOM), 1987 O.J. EPO 14 (May 21, 1987); T 641/00 (COMVIK), 2003 O.J. EPO 352 (Sept. 26, 2002); G 1/19 (Pedestrian Simulation), 2022 O.J. EPO 33 (Enlarged Bd. App. 2021).

<sup>98</sup> Siegel & Suchenek, *supra* note 1, at 792–98.

### ***India: Development-Stage Appropriateness and Judicial Flexibility***

India's framework reflects philosophical commitments distinct from both the United States and European Union, tailored to India's position as a developing economy with substantial software industry capabilities. The judicial reinterpretation of Section 3(k) reflects several philosophical principles.

First, India's courts emphasized statutory interpretation grounded in legislative intent. The *Ferid Allani v. Union of India* court held that the 'per se' language added in 2002 was deliberately narrowed to exclude only standalone software without technical contribution.<sup>99</sup> This interpretation reflects a judicial philosophy prioritizing statutory text and legislative history over administrative agency preferences. When the Patent Office's interpretation diverged from statutory language and legislative intent, courts intervened to realign examination with statutory design.

Second, India's framework reflects philosophical commitment to supporting software innovation in a developing economy. India possesses substantial software industry capabilities, information technology services constituting a critical component of India's exports and economic growth. The judicial liberalization reflects recognition that restrictive software patent policies may hinder India's software sector development and international competitiveness.<sup>100</sup> The framework prioritizes enabling protection for genuine technical innovations while maintaining safeguards against pure business-method patents and abstract claims.

Third, India's judicially-developed approach reflects philosophical commitment to flexibility and evolution. Rather than freezing doctrine through detailed statutory language or administrative guidelines, courts develop doctrine through case-by-case adjudication, enabling legal principles to evolve as technologies and business practices change.<sup>101</sup> This approach recognizes that software technology evolves rapidly, and rigid legal frameworks may become obsolete. Judicial development through precedent enables incremental refinement and adaptation.

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<sup>99</sup> *Ferid Allani v. Union of India*, WP(C) 7/2014, 2019 SCC OnLine Del. 3394, ¶¶ 20–25 (Delhi H.C. Dec. 12, 2019).

<sup>100</sup> *Id.*; see also Abhishek Kumar Singh & Suryakant Kashyap, *Software Patentability: A Comparative Analysis*, 1 INDIAN J. LEGAL RES. (n.d.).

<sup>101</sup> *Ferid Allani v. Union of India*, 2019 SCC OnLine Del. 3394, ¶¶ 1–10 (explaining importance of judicial reinterpretation rather than Patent Office administrative positions).

Fourth, India's framework reflects philosophical commitment to balancing innovation incentives with prevention of monopolization. By requiring 'technical effect,' the framework protects software innovations producing genuine technical advancement while excluding pure business methods and abstract algorithms. This balance reflects judgment that middle-ground policy, between extreme liberalization and extreme restriction, optimizes innovation incentives for the Indian context.

### ***Convergence on Core Principles***

Despite philosophical divergence on some dimensions, all three jurisdictions converge on core principles regarding software patents:

#### **Exclusion of Abstract Ideas**

All three systems exclude purely abstract ideas and mathematical formulas standing alone. The U.S. excludes claims 'directed to' abstract ideas; the EU requires 'technical character'; India excludes 'per se' software. These different formulations serve identical functions: preventing patents on fundamental concepts available to all innovators.

#### **Technical Contribution Recognition**

All three systems recognize that software can warrant patent protection when demonstrating technical contribution or technical effect. The U.S. requires 'inventive concept' beyond abstract implementation; the EU requires 'technical character' and 'further technical effect'; India requires 'technical effect.' These formulations converge on the principle that software producing genuine technical advancement deserves protection.

#### **Business Method Skepticism**

All three systems maintain skepticism toward pure business-method patents. The U.S. rejects business methods under *Alice*; the EU excludes methods lacking technical character; India excludes 'business method per se.' This convergence reflects widespread policy commitment that patent law should reward technical innovation rather than business process automation.

### **India's Distinctive Position and Appropriateness for Developing Economies**

India's software patent framework occupies a distinctive position within global intellectual

property jurisprudence—neither as restrictive as the United States post- *Alice* nor as administratively stable as the European Union, yet offering valuable lessons for developing economies seeking to foster innovation while maintaining legal safeguards. This chapter evaluates India’s framework within its development context and assesses its applicability as a model for similarly situated nations.

### ***India’s Middle-Path Framework: Positioning Between Restrictiveness and Liberalism***

India’s judicially-developed technical effect standard positions the country on a middle path between United States restrictiveness and European consistency. Rather than adopting extreme positions on either end of the spectrum, India’s framework recognizes that software can warrant patent protection when demonstrating genuine technical advancement, while excluding pure business methods and abstract algorithms.<sup>102</sup> The two-category technical effect standard established in *Blackberry* encompassing both internal computer improvements and external technical applications, provides breadth sufficient to protect diverse software innovations.<sup>103</sup>

Critically, India’s framework reflects statutory grounding absent in purely policy-driven approaches. The ‘per se’ in Section 3(k) provides statutory foundation for judicial development, ensuring that courts’ liberalization remains anchored in statutory text and legislative intent rather than reflecting purely judicial preference.<sup>104</sup> This grounding provides legitimacy and stability compared to purely judge-made doctrines unsupported by statutory language.

Additionally, India’s approach maintains explicit safeguards against problematic patents. The statutory exclusion of business method per se remains operative under India’s interpretation, preventing patents on pure business process automation.<sup>105</sup> The requirement for technical effect screens out abstract claims lacking genuine technical contribution.<sup>106</sup> These safeguards prevent the patent thicket and litigation explosion that characterized pre- *Alice* United States practice.

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<sup>102</sup> *Blackberry Ltd. v. Controller of Patents and Designs*, C.A.(COMM.IPD-PAT) 318/2022, ¶¶ 18–25 (Delhi H.C. 2025).

<sup>103</sup> *Id.*

<sup>104</sup> *Ferid Allani v. Union of India*, WP(C) 7/2014, 2019 SCC OnLine Del. 3394, ¶¶ 20–25 (Delhi H.C. Dec. 12, 2019).

<sup>105</sup> The Patents Act, 1970, No. 39 of 1970, § 3(k) (India).

<sup>106</sup> *Ferid Allani v. Union of India*, 2019 SCC OnLine Del. 3394, ¶¶ 25–30 (Delhi H.C. Dec. 12, 2019).

### *Appropriateness for India's Development Stage*

India's framework proves appropriately calibrated for India's position as a middle-income developing economy with substantial software industry capabilities and developing institutional infrastructure for patent examination and adjudication. Several factors support this assessment.

First, India's software industry constitutes a critical component of national economic value, generating substantial export revenues and employment. Permitting patent protection for genuine technical software innovations supports industry growth and encourages investment in software research and development.<sup>107</sup> A restrictive framework risks handicapping India's competitive advantage in global software markets.

Second, India's institutional capacity for patent examination remains developing but improving. The Indian Patent Office has limited resources compared to the EPO or USPTO, constraining its ability to conduct deep technical examination of complex software innovations. Judicial development through appellate review, as reflected in the precedents, leverages India's institutional strength in appellate jurisprudence while compensating for examination-level resource constraints.<sup>108</sup> This institutional choice appropriately matches available capacity.

Third, India's copyright and trade secrecy alternatives remain robust. Software receives strong copyright protection under Indian law; trade secrecy law provides practical alternatives to patent protection. An intellectual property ecosystem incorporating both patents and these alternatives provides flexibility appropriate to India's development stage.<sup>109</sup> Developing economies need not rely exclusively on patents; complementary protection mechanisms warrant consideration.

Fourth, India's framework reflects appropriate caution about patent quality and enforcement risks. The technical effect requirement screens claim for genuine technical advancement, reducing risks of low-quality patents; the requirement for judicial interpretation through appellate review maintains quality control; the statutory safeguards against business methods

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<sup>107</sup> Singh & Kashyap, *supra* note 89.

<sup>108</sup> *Ferid Allani v. Union of India*, 2019 SCC OnLine Del. 3394, ¶¶ 1–10 (Delhi H.C. Dec. 12, 2019).

<sup>109</sup> The Copyright Act, 1957, No. 14 of 1957 (India); Indian Contract Act, 1872, ch. IX-A (trade secret provisions).

prevent problematic patents.<sup>110</sup> These safeguards prove particularly important in developing economies where enforcement infrastructure remains developing.

### ***Lessons and Applicability for Other Developing Economies***

India's framework offers important lessons for other developing economies wrestling with software patent policy. Several principles warrant consideration by policymakers in developing nations.

India's approach demonstrates that judicial development of patent doctrine should rest on statutory foundation rather than existing purely as judge-made law. The 'per se' language in Section 3(k) provided statutory anchor for courts' reinterpretation. Developing economies contemplating judicial development of software patent standards should ensure statutory language supports such development, enhancing legitimacy and durability.<sup>111</sup>

Many developing economies lack examination resources matching EPO or USPTO capacity. India's approach, maintaining statutory framework while developing doctrine through appellate review, leverages institutional strengths (strong appellate jurisprudence tradition) while compensating for examination-level weaknesses. This institutional matching appropriately allocates scarce resources.<sup>112</sup>

Rather than attempting comprehensive legislative specification or administrative guidance covering all possible software innovations, India's courts adopted a principle-based "technical effect" standard. This approach provides workable screen for patent eligibility while maintaining flexibility as technologies evolve. Principle-based standards prove particularly valuable in developing economies where legislative capacity for detailed statutory specification remains limited.<sup>113</sup>

Developing economies need not rely exclusively on patents. Copyright protection, trade secret law, and open-source models provide alternatives. A balanced approach recognizing multiple

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<sup>110</sup> *Blackberry Ltd. v. Controller of Patents and Designs*, C.A.(COMM.IPD-PAT) 318/2022, ¶¶ 18–25 (Delhi H.C. 2025).

<sup>111</sup> *Ferid Allani v. Union of India*, 2019 SCC OnLine Del. 3394, ¶¶ 20–25 (Delhi H.C. Dec. 12, 2019).

<sup>112</sup> *Id.* ¶¶ 1–10.

<sup>113</sup> *Microsoft Tech. Licensing, LLC v. Assistant Controller of Patents and Designs*, C.A.(COMM.IPD-PAT) 185/2022, at 12 (Delhi H.C. 2024).

protection mechanisms proves more appropriate than comprehensive patent coverage.<sup>114</sup>

## Conclusion

This study has examined software patent jurisprudence across three major jurisdictions, the United States, European Union, and India, demonstrating that despite formal doctrinal divergence, the three systems exhibit substantial substantive convergence on core principles. All three exclude purely abstract ideas and mathematical formulas. All three exclude pure business methods. All three recognize that software producing genuine technical advancement warrants patent protection. All three require that claims address technical problems through technical means.

The formal divergence: United States *Alice* two-step test, European Union technical character standard, India's technical effect framework, reflects different statutory language, institutional structures, and historical development trajectories rather than fundamental disagreement about substantive principles. Understanding this divergence as reflecting different legal expression of shared substantive commitments clarifies that international harmonization of substantive standards may be more advanced than surface divergence suggests.

The divergence documented in this paper occurs within the framework of TRIPS Articles 27 and 10, which establish minimum copyright protection for software while enabling national government discretion regarding patent protection.<sup>115</sup> The Agreement on Trade-Related Aspects of Intellectual Property Rights recognized, through its Doha Ministerial Conference Declaration, that member nations possess flexibility in implementing TRIPS-consistent policies tailored to national contexts.<sup>116</sup> No World Trade Organization dispute settlement case has successfully challenged any jurisdiction's software patent policy as TRIPS-non-compliant, confirming broad acceptance of permissible jurisdictional diversity.<sup>117</sup>

This flexibility framework reflects recognition that optimal patent policies depend on technological context, economic development stage, and existing intellectual property

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<sup>114</sup> Singh & Kashyap, *supra* note 89.

<sup>115</sup> Agreement on Trade-Related Aspects of Intellectual Property Rights, arts. 27, 10, Apr. 15, 1994, 1869 U.N.T.S. 299.

<sup>116</sup> World Trade Organization, *Declaration on the TRIPS Agreement and Public Health*, WT/MIN(01)/DEC/2 (Nov. 20, 2001).

<sup>117</sup> WTO Dispute Settlement Database, [https://www.wto.org/english/tratop\\_e/dispu\\_e/dispu\\_subjects\\_index\\_e.htm](https://www.wto.org/english/tratop_e/dispu_e/dispu_subjects_index_e.htm) (last visited Nov. 5, 2025).

infrastructure. Pursuing complete international harmonization would require eliminating this flexibility, potentially harming developing economies by imposing developed-country patent frameworks unsuited to different institutional capacity and economic conditions.

### ***Policy Recommendations***

Clarify the *Alice* framework through additional Supreme Court guidance, Federal Circuit precedent, or legislative specification. The current uncertainty constrains innovation incentives and creates unpredictability for patent applicants. Greater clarity regarding what constitutes ‘inventive concept’ sufficient to transform abstract ideas into patent-eligible applications would provide necessary guidance.<sup>118</sup>

Maintain the technical character standard while providing specific guidance for emerging technology categories such as artificial intelligence and machine learning. The foundational framework remains sound; additional guidance addressing novel technologies would enhance clarity without requiring fundamental change.<sup>119</sup>

Formally codify the judicially-developed technical effect standard through updated CRI Guidelines incorporating principles established in past decisions. This codification would create official guidance aligned with judicial development, providing examiners with clear benchmarks while maintaining judicial review authority.<sup>120</sup>

Recognize that India’s judicially-developed framework offers a viable alternative to pure legislative specification or administrative guidance. Statutory grounding combined with case-by-case judicial development can produce appropriate intellectual property policy calibrated to development-stage capacity and context.<sup>121</sup>

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<sup>118</sup> Siegel & Suchenek, *supra* note 1, at 792–98.

<sup>119</sup> European Patent Office, *Guidelines for Examination in the European Patent Office*, Part G-II, § 3.6 (2024 ed.).

<sup>120</sup> India Patent Office, *Guidelines for Examination of Computer Related Inventions* (2017 Revised ed.).

<sup>121</sup> Singh & Kashyap, *supra* note 89.