

# Attitudes Towards Patent Law Among Biotech Startups

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The rapid pace of innovation in biotechnology necessitates effective patent protection to ensure competitive advantage and investment attraction for startups. However, the impact of patent law on the strategic operations and innovation within biotech startups is complex and multifaceted. This study aims to explore the attitudes of biotech startup leaders towards patent law, identifying the perceived strategic values, challenges, and the overall impact on innovation within their companies. This qualitative study employed semi-structured interviews with 25 leaders (founders, CEOs, and senior managers) from biotech startups across various global regions. The data was collected until theoretical saturation was reached and analyzed using NVivo software to facilitate thematic analysis. This approach allowed for an in-depth exploration of the nuanced perspectives on patent law in the biotech sector. Three main themes were identified: Strategic Value of Patents, Challenges with Patent Law, and Perceptions and Attitudes Towards Patent Law. Under these themes, key categories such as Competitive Advantage, Innovation Incentives, and Regulatory Navigation highlighted patents' strategic benefits. Conversely, significant challenges included Cost Implications, Complexity of Processes, and Intellectual Property Risks. Diverse perceptions were also noted, ranging from viewing patents as crucial to innovation to concerns over their potential to stifle technological progress and ethical considerations. The study concludes that while patents are critical for protecting innovations and securing economic benefits for biotech startups, they also present substantial challenges that can impede these companies' operational and technological agility. Balancing these benefits and drawbacks is essential for fostering an environment that supports sustainable innovation and ethical practices within the biotechnology industry.

**Keywords:** *Biotechnology, Patent Law, Startup Innovation, Qualitative Research, Intellectual Property Challenges, Strategic Value of Patents, Biotech Industry.*

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## 1. Introduction

The intricate relationship between innovation and patent law is pivotal in shaping the landscape of the biotechnology sector, particularly within the realm of startups. The nature of biotechnology demands substantial investment in research and development (R&D), which can be safeguarded through intellectual property (IP) rights, chiefly patents (Shah et al., 2023; Vidal et al., 2016). These patents serve as a bulwark

against market competition, providing a time-limited monopoly that ostensibly promotes innovation by enabling a recovery on investments (Donges et al., 2017). However, the actual impact of patent law on innovation, especially within resource-constrained startups, remains a nuanced and highly debated issue (Kang & Lee, 2008).

Emerging studies have increasingly focused on the attitudes of various stakeholders towards regulations and laws in different fields, recognizing that these



perceptions profoundly influence compliance and engagement with these frameworks. For instance, studies in the public health domain have explored how health providers' knowledge, attitudes, and practices (KAP) towards laws significantly affect their implementation of health policies (Assefa, 2019; Rutayisire et al., 2022). Similarly, in the context of the hospitality industry, the attitudes of venue owners towards smoke-free laws critically influence the law's enforcement and acceptance (Aherrera et al., 2016). These studies suggest that stakeholders' perceptions can either facilitate or hinder the effective implementation of laws and regulations.

In the biotechnology industry, the role of patent law is particularly critical given the sector's reliance on continuous innovation and technology transfer. Patents not only protect intellectual property but also potentially foster a competitive edge by enhancing the attractiveness to investors and partners who are crucial for the survival and growth of biotech startups (Kang et al., 2009). Nonetheless, the complexity and cost associated with obtaining and maintaining patents pose significant challenges, particularly for startups that might lack the requisite legal and financial resources (Kang & Lee, 2008).

Research on the attitudes towards patent law is crucial for several reasons. Firstly, it provides empirical data that can inform policy decisions and potential law reforms, which may be necessary to keep pace with the rapid advancements in biotechnology (Shah et al., 2023). Secondly, understanding these attitudes helps clarify the role of patent law as a catalyst or impediment to innovation, which is critical for developing strategies that enhance the growth and sustainability of startups in this sector (Donges et al., 2017).

Furthermore, studies have shown that the perception of laws not only affects individual and corporate behavior but also shapes the legal culture within which a sector operates (Vidal et al., 2016). For instance, the debate on the moral and ethical dimensions of patenting in biotechnology reveals a spectrum of attitudes that can influence policy directions and industry standards (Andreasen, 2009). The outcome of this debate is crucial for ensuring that the patent system remains robust and adaptive enough to support innovation while addressing ethical concerns and promoting public good.

This study seeks to explore the attitudes of biotech startup leaders towards patent law, utilizing a qualitative approach to glean in-depth insights. By examining these attitudes, the study aims to understand how such perceptions influence strategic decisions related to innovation and IP management. The methodology involves semi-structured interviews with founders, CEOs, and senior managers of biotech startups, ensuring a rich narrative that captures the multifaceted nature of the interactions between patent law and biotech innovation.

This study is situated within this broader discourse, aiming to contribute to a better understanding of how biotech startups navigate the complexities of patent law and the impact of these navigations on their innovation trajectories. By focusing on a qualitative analysis, the research intends to uncover the nuanced perspectives of biotech leaders, offering insights that quantitative methods might overlook. This approach is particularly pertinent given the complex and rapidly evolving nature of both biotechnology and patent law.

## 2. Methods and Materials

### 2.1. Study Design and Participants

This study employed a qualitative research methodology to understand the attitudes of biotech startup leaders towards patent law. The qualitative approach was chosen to gather deep, nuanced insights into the complex factors influencing these attitudes and how they affect strategic decision-making within startups.

Participants were selected using a purposive sampling technique to ensure a diverse representation of biotech startups in terms of size, stage of development, and geographical location. The target sample included founders, CEOs, and senior managers who are directly involved in intellectual property decisions within their companies.

The process of data collection continued until theoretical saturation was reached, meaning that no new significant information was being revealed in the interviews and a robust understanding of the topic was achieved. This saturation point guided the determination of the final sample size.

All participants were informed about the purpose of the study, the voluntary nature of their involvement, and their right to withdraw from the study at any time

without any consequence. Confidentiality and anonymity were strictly maintained by anonymizing transcripts and removing any identifiers from the data presented in the findings.

2.2. Measures

2.2.1. Semi-Structured Interview

Data was collected through semi-structured interviews, which allowed for flexibility in exploring the thoughts and experiences of participants while ensuring consistency in the topics covered. The interviews were designed to capture a comprehensive understanding of each participant’s perspective on patent law, including perceived benefits, challenges, and strategic importance to their business operations.

Each interview lasted approximately 60-90 minutes and was conducted either in person or via video conferencing, depending on the participant's availability and preference. All interviews were recorded with the consent of the participants for accuracy in data analysis.

2.3. Data Analysis

The recorded interviews were transcribed verbatim and imported into NVivo, a qualitative data analysis software. NVivo was used to facilitate the organization, coding, and thematic analysis of the interview data. Initial codes were generated based on the research objectives and the themes discussed during the interviews. These codes were then refined and grouped into broader categories to identify patterns and relationships in how biotech startups perceive and interact with patent law.

3. Findings and Results

In the study, a total of 25 participants were interviewed to gain insights into the attitudes towards patent law among biotech startups. The demographic breakdown of the participants included 15 founders, 7 CEOs, and 3 senior managers, representing a diverse range of experiences and perspectives within the biotech industry. Among them, 16 were male and 9 were female, reflecting a broad spectrum of gender representation.

Table 1

The Results of Thematic Analysis

Categories	Subcategories	Concepts (Open Codes)
Strategic Value	Competitive Advantage	Market positioning, Exclusivity, Barrier to entry
	Innovation Incentives	R&D investment, Long-term growth, Innovation rate
	Funding and Investment	Investor interest, Funding opportunities, Financial planning
	Collaboration and Licensing	Partnership opportunities, Licensing deals, Revenue streams
Challenges	Regulatory Navigation	Compliance, Legal strategy, FDA approval
	Cost Implications	Application costs, Maintenance fees, Legal expenses
	Complexity of Processes	Application complexity, Legal intricacies, Bureaucracy
	Intellectual Property Risks	Litigation risks, Infringement concerns, Patent trolls
	Operational Delays	Patent pendency, Market entry delay, Development slowdown
Perceptions and Attitudes	Global Market Variances	International laws, Market-specific strategies, Enforcement issues
	Technological Obsolescence	Innovation pace, Patent relevance, Tech lifecycle
	Value of Patents	Essentiality, Optional, Overvalued
	Impact on Innovation	Stimulating, Stifling, Neutral
	Legal and Ethical Considerations	Ethical patenting, Patent wars, Access to technology
	Future Outlook	Industry trends, Changes in law, Future strategy

3.1. Strategic Value of Patents

Patents were widely recognized among biotech startups as vital to securing competitive advantages. Participants highlighted that patents are crucial for "market positioning" and act as "barriers to entry" for competitors. One founder mentioned, "The patent sets us

apart, giving us the breathing space to establish our product without immediate pressure."

The incentive for innovation was another significant theme. Investments in research and development are seen as more justifiable when intellectual property protection is assured. As one CEO pointed out, "Patents

justify the high costs of R&D by promising a potential return on these investments."

Concerning funding, participants indicated that patents are essential for attracting investment. "Investors look for a strong patent portfolio as a sign of a mature startup," one participant noted, underscoring the link between patents and financial planning.

Collaborations and licensing emerge as crucial strategies facilitated by patents. Patents enable startups to enter licensing agreements, thereby generating revenue and establishing strategic partnerships. "Without patents, our licensing deals would simply not be possible," shared a manager.

Lastly, navigating regulatory environments was frequently discussed. Patents help in formulating a legal strategy, particularly with regard to regulatory approvals, where having patent-protected technology can enhance credibility with regulators.

### 3.2. *Challenges with Patent Law*

The cost implications of obtaining and maintaining patents were repeatedly mentioned. "The costs are not trivial; application and maintenance fees can really strain our limited budget," a founder stated, highlighting a common challenge.

The complexity of the patent process also poses a significant hurdle. "Navigating the patent landscape requires legal expertise that is often beyond our immediate resources," another interviewee expressed.

Risks associated with intellectual property, including litigation and patent infringement issues, were a major concern. "We are always wary of litigation risks which can derail our progress," noted one senior manager.

Operational delays due to lengthy patent processes can impede market entry, as "patent pendency times can slow down our entire operation," according to one respondent.

Global market variances complicate the exploitation of patents in different jurisdictions. "Every market has its own rules, which complicates our global strategy," a participant explained.

Technological obsolescence due to the fast pace of innovation in biotech was also identified as a challenge. "By the time a patent is granted, the technology could already be outdated," one CEO lamented.

### 3.3. *Perceptions and Attitudes Towards Patent Law*

Perceptions of the value of patents varied. Some viewed patents as essential, while others believed them to be overvalued. "Patents are essential for survival," one interviewee insisted, whereas another suggested, "Sometimes the value of patents is overstated in our field."

The impact on innovation was debated. While some felt patents stimulate innovation by protecting and rewarding inventors, others felt they could stifle it by limiting access to technology. "Patents can sometimes stifle broader innovation, creating unnecessary boundaries," was a concern expressed by one founder.

Legal and ethical considerations were also prominent, with discussions around the ethics of patenting life-saving technologies and the so-called 'patent wars.' "We must ensure that our pursuit of patents does not restrict access to important technologies," a manager reflected.

Finally, the future outlook on patent law was cautiously optimistic, with many hoping for reforms that would address current inefficiencies and better support innovation. "I hope to see a system that evolves with the pace of technology," expressed a leader.

## 4. **Discussion and Conclusion**

In the qualitative study examining the attitudes towards patent law among biotech startup leaders, three main themes were identified: Strategic Value of Patents, Challenges with Patent Law, and Perceptions and Attitudes Towards Patent Law. Under these main themes, a diverse range of categories emerged, capturing the multifaceted relationship between biotech startups and patent law.

The theme of Strategic Value of Patents encapsulated categories such as Competitive Advantage, Innovation Incentives, Funding and Investment, Collaboration and Licensing, and Regulatory Navigation. Competitive Advantage was discussed in terms of patents providing market positioning, exclusivity, and acting as barriers to entry. Innovation Incentives included aspects like R&D investment, long-term growth, and the rate of innovation, indicating that patents motivate startups to invest in new technologies and solutions. Funding and Investment highlighted how patents attract investor interest, provide funding opportunities, and aid in financial planning. Collaboration and Licensing reflected

on the role of patents in facilitating partnership opportunities, licensing deals, and opening new revenue streams. Lastly, Regulatory Navigation covered how patents aid in compliance, legal strategy, and smoothing the process of regulatory approvals like FDA clearance. Under the theme of Challenges with Patent Law, the categories identified were Cost Implications, Complexity of Processes, Intellectual Property Risks, Operational Delays, Global Market Variances, and Technological Obsolescence. Cost Implications included the high costs of patent applications, maintenance fees, and associated legal expenses. Complexity of Processes involved the intricate legal and bureaucratic procedures that can be daunting for startups. Intellectual Property Risks pointed to litigation risks, concerns about patent infringement, and issues with patent trolls. Operational Delays were described in terms of patent pendency affecting market entry and development timelines. Global Market Variances emphasized the difficulties in navigating international patent laws and enforcement issues, while Technological Obsolescence discussed how rapid innovation can sometimes outpace the utility of a granted patent.

The final theme, Perceptions and Attitudes Towards Patent Law, included categories such as the Value of Patents, Impact on Innovation, Legal and Ethical Considerations, and Future Outlook. The Value of Patents was discussed both as essential and potentially overvalued, reflecting a spectrum of views on the necessity and impact of patents. Impact on Innovation explored how patents are seen either as stimulants or inhibitors of innovation, depending on the perspective of the startup leader. Legal and Ethical Considerations addressed ethical dilemmas and legal disputes surrounding patenting practices, especially in sensitive areas like life-saving technologies. Future Outlook captured the participants' expectations and hopes for reforms in patent law that could better accommodate the rapid changes in biotechnology and support sustainable innovation.

Our results demonstrate that patents are viewed as essential tools for gaining competitive advantage, consistent with previous research that has shown patents to enhance market positioning and act as barriers to entry (Kang & Lee, 2008). Patents were also seen as crucial for securing funding and investments, echoing findings by Kang, Ryu, and Lee (2009), who

noted that a robust patent portfolio is often a prerequisite for attracting venture capital and other forms of investment in the biotech sector (Kang et al., 2009).

Additionally, the strategic use of patents for collaboration and licensing is in line with the literature that emphasizes the role of patents in facilitating business partnerships and technology transfer (Donges et al., 2017). This dual role of patents, both as protective and collaborative tools, underscores their complex impact on the innovation ecosystem within biotechnology startups.

The challenges associated with patent law, particularly the high costs and complexity of obtaining patents, resonate with previous studies that have highlighted these issues as significant barriers for small and medium enterprises (SMEs) in the biotech industry (Kang & Lee, 2008). The operational delays and risks related to intellectual property litigation were also echoed in our findings, aligning with the broader discourse on the risks and burdens that patents can impose on startups (Kang et al., 2009).

Moreover, the concern about technological obsolescence due to the fast-paced nature of biotech innovation reflects a critical tension within patent law—balancing the need for protection with the rapid evolution of technology, a challenge that has been noted in other sectors as well (Donges et al., 2017).

The diverse perceptions of the value of patents, ranging from essential to overvalued, highlight a broader debate within the biotech community about the role of patents in fostering or hindering innovation. Some participants viewed patents as a stimulus to innovation, a perspective supported by studies that have found patents to encourage R&D investments by ensuring a return on these investments (Kang & Lee, 2008). However, others viewed them as potentially stifling innovation, echoing concerns that overly broad patents can impede rather than promote technological progress (Andreasen, 2009). The ethical considerations associated with patenting, particularly in biotechnology, were also a significant concern among our participants. This aligns with the literature that has examined the moral and social implications of patenting life forms and essential medicines (Andreasen, 2009). The call for a more ethically aware patent system reflects a growing



recognition of the need to balance commercial interests with public health and welfare.

This study explored the attitudes of biotech startup leaders towards patent law, revealing a complex interplay of strategic value and significant challenges. Key findings include the recognition of patents as crucial for securing competitive advantage, attracting investments, and facilitating collaborations. However, challenges such as high costs, complexity of patent processes, and risks associated with IP litigation were prominently noted. Moreover, perceptions of patents varied widely, from essential tools that stimulate innovation to potential impediments that might stifle it. Ethical considerations concerning the scope and impact of patents in biotechnology also emerged as significant concerns.

The findings from this qualitative inquiry underscore the critical role of patent law in shaping the innovation landscape of biotech startups. While patents are evidently instrumental in protecting inventions and securing economic benefits, they also present notable challenges that can hinder the operational and technological agility of startups. Addressing these challenges and the ethical concerns raised requires a nuanced understanding of the patent system's impact on innovation, especially in a field as dynamic and ethically charged as biotechnology.

This study has several limitations. Firstly, the sample size, although adequate for qualitative saturation, may not capture the full diversity of experiences and perspectives within the global biotech industry. Additionally, the study's reliance on self-reported data through semi-structured interviews may introduce biases in how participants perceive and report their attitudes towards patent law. Lastly, the focus on startup leaders' views may overlook the experiences and attitudes of other stakeholders within the biotech ecosystem, such as researchers, policy-makers, and patients.

Future research could expand on this study by including a larger and more geographically diverse sample to enhance the generalizability of the findings. Quantitative studies could also be conducted to test the relationships between patent perceptions and innovation outputs across different biotech markets. Furthermore, comparative studies between mature companies and startups in biotechnology could provide deeper insights

into how patent strategies evolve with company growth and market expansion.

The insights from this study suggest several practical implications for both biotech startups and policymakers. For startups, there is a clear need for strategic management of patents that considers not only the protection of innovations but also the operational and financial burdens imposed by patents. Startups should consider investing in expert legal advice and patent management strategies that align with their long-term business goals. For policymakers, the findings highlight the importance of reforming patent laws to support the unique needs of startups in the biotech sector, such as reducing costs, simplifying procedures, and considering the fast pace of technological innovation. Moreover, integrating ethical considerations into patent policies could help balance the commercial benefits of patents with the public interest and societal well-being.

#### **Authors' Contributions**

Authors contributed equally to this article.

#### **Declaration**

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

#### **Transparency Statement**

Data are available for research purposes upon reasonable request to the corresponding author.

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#### **Declaration of Interest**

The authors report no conflict of interest.

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#### **Ethical Considerations**

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were observed.

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