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Global Patent Portfolio Strategy Using AHP and Legal Risk Indicators

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Abstract

This study proposes a robust, data-driven framework for optimizing global patent deployment strategies, focusing on hinge technologies developed by the Watson Group. Drawing from 257 patent applications across 30 jurisdictions, the research integrates macroeconomic and intellectual property (IP) indicators with legal risk considerations. Unlike traditional models, this study adopts the Analytic Hierarchy Process (AHP) to derive weights for 11 strategic indicators, including GDP, patent activity, and hinge-specific innovation trends. Furthermore, a Legal Risk Scoring (LRS) model is introduced to evaluate jurisdictional enforceability and litigation exposure. Countries are ranked based on composite scores and visualized through a two-dimensional deployment matrix. Sensitivity analysis confirms model stability under ±10% weight variation. Results highlight strategic opportunities in Austria, Italy, and Brazil, while reinforcing continued investment in the U.S., Germany, and Korea. The framework offers actionable insights for IP managers and can be generalized to other technology sectors.

JEL classification numbers: 034.
Keywords: Patent Portfolio Strategy, Analytic Hierarchy Process, Legal Risk Scoring, Hinge Technology, Global IP Deployment.

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1. Introduction

As global innovation accelerates and competition intensifies, intellectual property (IP) strategy has become integral to securing technological leadership. For technology-driven sectors, effective patent portfolio management not only safeguards innovations but also facilitates market expansion, cross-licensing, and long-term R&D alignment. Among these sectors, hinge-related technologies have seen rising complexity and commercial application in industries such as consumer electronics, smart furniture, and aerospace.

The Watson Group, with a substantial patent portfolio spanning 30 jurisdictions and 86 active patents, now seeks to refine its global IP strategy. Conventional patent planning, focused primarily on novelty and legal protection, often overlooks macroeconomic and legal risk variables. This paper addresses this gap by introducing a hybrid framework that blends economic performance, IP indicators, and legal enforceability to assess optimal jurisdictions for future filings.

The novel contribution of this research lies in integrating the Analytic Hierarchy Process (AHP) to weigh 11 indicators, coupled with a Legal Risk Scoring (LRS) model to evaluate enforcement feasibility. This dual perspective enables a more nuanced, actionable strategy that is particularly relevant for multifaceted technologies like hidden wire hinges and integrated damping mechanisms.

2. Literature Review

This section reviews the relevant literature on strategic patent portfolio management, legal risk, patent strategy and analytic hierarchical process.

Okutan and Kasapoğlu (2024) proposed a framework for managing university-owned patent portfolios, using a structured scoring system to facilitate effective patent selection and regular evaluation. The framework incorporates scoring criteria such as novelty, inventive step, commercialization potential, and the status of the inventor team. This will assist universities in selecting patent portfolios and regularly reassessing their relevance. Jayaraman and Prakash (2024) explored strategies for building, protecting, and managing a strong patent portfolio and analyze intellectual property challenges and patenting opportunities in sodium-ion battery technology. The authors find that sodium-ion batteries have become a powerful alternative to traditional lithium-ion batteries and that acquiring and maintaining a strong patent portfolio is crucial for companies to establish a competitive advantage. Neururer et al. (2025) explored the relationship between investor uncertainty and a company's patent portfolio structure. Using a sample of U.S. patents, they examined the impact of three key patent portfolio characteristics (total market capitalization, total number of patents, and value dispersion) on market-perceived uncertainty, as represented by option implied volatility. The results showed a positive correlation between the total market capitalization of a patent portfolio and market-perceived uncertainty. Liu and Lin (2022) used the Analytic Hierarchy Process (AHP) and S-curve modeling with patent data to evaluate and forecast emerging technologies in e-commerce. The study aims to help

businesses prioritize e-commerce types and predict future growth trends by combining AHP's decision-making framework with the S-curve's ability to forecast technological adoption and market growth. Saaty (1977) proposed the eigenvector method for scaling priorities in hierarchical structures. The method uses pairwise comparisons to create a matrix, and then the principal eigenvector of that matrix is used to derive the priorities. This paper laid the foundation for many applications, including multi-criteria decision-making and has been widely used in fields like project management, urban planning, and environmental science. Samariya et al. (2025) reviewed two decades (2003–2023) of research on intellectual property management and strategy (IPMS) using bibliometric methods. Early literature emphasized value creation and using IP to support business growth, while later studies focused on appropriation strategies and navigating complex legal frameworks. The review traces the shift from legislative perspectives to strategic management and identifies emerging themes that guide future IPMS research.
Tjandrawinata and Budi (2025) explored the role of structural innovation in improving patent approval rates, reducing legal risks, and accelerating the market entry of technological innovations. The study employed a mixed-methods approach, integrating legal analysis, case study evaluation, empirical data collection, and artificial intelligence predictive modeling to gain a deeper understanding of the factors contributing to successful patent applications and the long-term sustainability of intellectual property rights. By evaluating practical applications and examining cross-jurisdictional intellectual property structures, the study provides a strategic roadmap for optimizing patent applications and obtaining global protection. Moro-Visconti (2025) argued that determining the economic value of patents is crucial for investment decisions, licensing negotiations, and litigation, but can be challenging due to uncertainty in technology, regulations, and market conditions. Currently, there are no universal metrics for assessing sustainability-based valuations when considering environmental, social, and governance (ESG) factors. Blockchain and other emerging technologies promise transparency but also face regulatory pitfalls. Therefore, a hybrid approach that combines elements of the three aforementioned methods is crucial for accurate patent valuation. Zhang and Yang (2025) developed a patent management maturity model to help companies gradually analyze, understand, and improve their patent management maturity. Authors identified the core elements of patent management capabilities and divided them into seven dimensions, each containing two to four key elements. Finally, they used two manufacturing companies as case studies to demonstrate the application and effectiveness of the model. Jung et al. (2025) developed an analytical method for identifying the technological and commercial competitive landscape, enabling visualization of patent strategies and assisting in the formulation of future patent strategies focused on technological feature information. The authors validate the method through empirical research in the autonomous vehicle industry. Vasudeva (2017) indicated that patenting in the life sciences has expanded rapidly since 1980, leading to new national and international patent frameworks. As innovation becomes globalized and competitive, the sector faces ongoing challenges in

balancing patent protection with ethical concerns and the public good.

Wan et al. (2025) explored the technological development trends and market landscape of electric vehicle battery management systems through patent analysis. Combining the Analytical Hierarchy Process (AHP) and the Entropy Weight Method, the results showed that battery management system patents are primarily concentrated in China, the United States, and South Korea, with companies such as LG Energy Solution, BYD, and Hyundai. Lin and Chou (2025) systematically synthesized how diverse AI techniques are applied to patent analytics by constructing an AI Technique and Analytical Task matrix, integrating bibliometric analysis, BERT-based topic modeling (Bidirectional Encoder Representations from Transformers), and a review of 718 publications to reveal key thematic clusters, leading methods, and global research trends in AI-driven patent analysis. Wang (2024) used SPSS reliability and validity testing to construct a comprehensive patent pledge financing indicator system. Combining the TFAHP algorithm model with fuzzy evaluation, they determined the final correction coefficient. This study employed the income approach to determine the pledge valuation of a new energy vehicle power battery patent portfolio and employed the analytic hierarchy process to determine the value weight of the invention patent portfolio within the patent portfolio. Therefore, this paper multiplied the pledge value of the patent portfolio by a certain percentage of the invention patent portfolio value, and then multiplied it by the correction coefficient to obtain the final pledge value of the new energy vehicle power battery invention patent portfolio.

3. Methodology

This study adopts a hybrid methodology that integrates patent analytics, the Analytic Hierarchy Process (AHP), and Legal Risk Scoring (LRS) to evaluate global patent deployment strategies. Patent data for 257 filings by the Watson Group was collected from WIPO, USPTO, CNIPA, and TIPO. The AHP model was used to assign weights to 11 economic and IP indicators (e.g., GDP, patent applications, hinge-related patents) through pairwise comparisons. Simulated expert judgments produced normalized weights, ensuring consistency and reducing subjective bias. A complementary LRS model assessed enforceability and litigation exposure across jurisdictions using four parameters: litigation rate, IP enforcement strength, average prosecution time, and invalidation rate. Each parameter was normalized to a 0-1 scale and averaged into a composite score. The combined AHP and LRS outputs were plotted in a two-dimensional deployment matrix, classifying countries into Primary Targets, Monitor/High Risk, Secondary Candidates, and Avoid categories. Sensitivity analysis (±10% variation in AHP weights) confirmed the robustness of results, showing minimal changes in country rankings.

3.1 Framework Overview

The study adopts a hybrid evaluation framework that integrates patent analytics, multi-criteria weighting, and legal risk assessment. The approach consists of four stages:

1. Patent Analytics: Collection of 257 Watson Group patent filings across 30 jurisdictions.
2. AHP-Based Indicator Weighting: Derivation of relative importance among 11 economic and IP indicators.
3. Legal Risk Scoring (LRS): Assessment of litigation intensity, enforcement strength, prosecution efficiency, and invalidation stability.
4. Deployment Matrix Construction: Integration of strategic scores (AHP) and legal feasibility (LRS) into a two-dimensional country classification.
5. Validation: Sensitivity analysis (±10% variation in AHP weights) to confirm robustness of results.

Figure 1 shows the hybrid AHP-LRS framework.

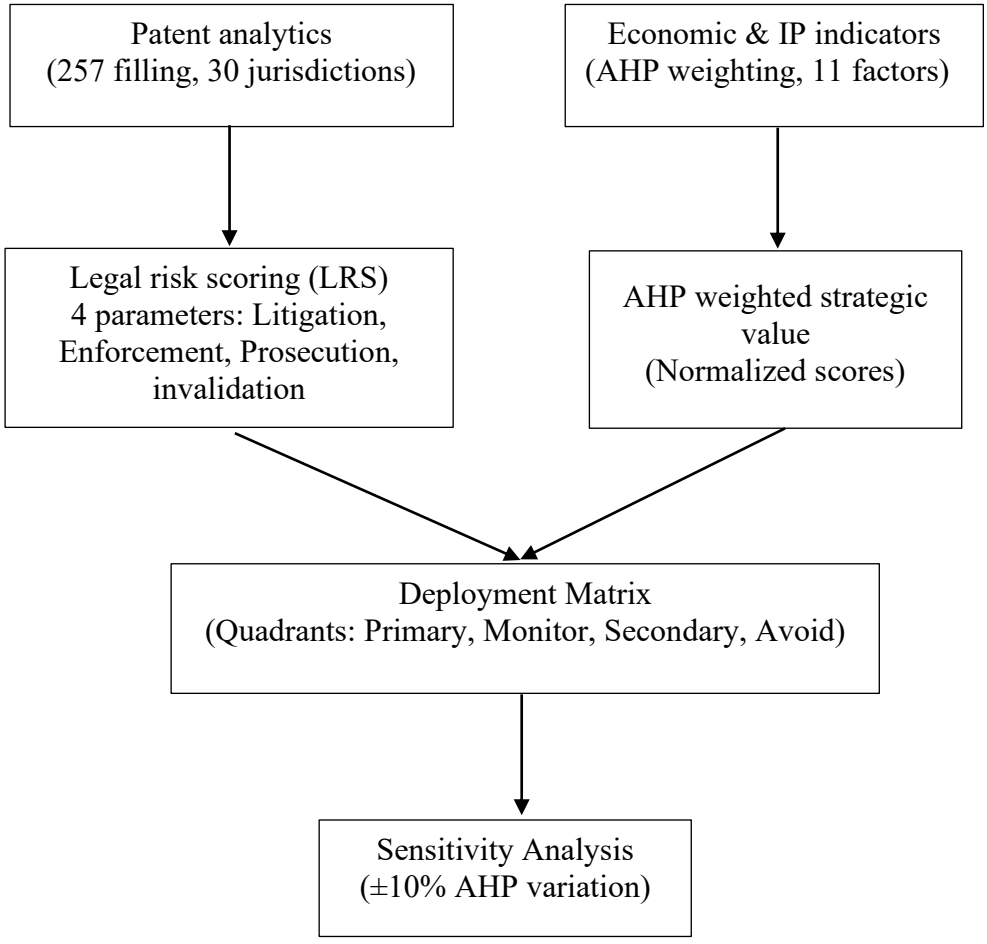

Figure 1: Hybrid AHP-LRS framework

3.2 Patent Analytics

The Watson Group portfolio comprises 257 applications filed between 1993 and 2023 in 30 jurisdictions, of which 86 remain active. Table 1 presents the top filing jurisdictions, while Table 2 categorizes filings by technology type.

Table 1 summarizes the Watson Group's patent portfolio by jurisdiction between 1993 and 2023. The data show that Taiwan (52 filings), China (39 filings), and the United States (37 filings) represent the company's three largest filing jurisdictions, together accounting for nearly half of total applications. These jurisdictions not only reflect Watson Group's core markets but also its emphasis on both manufacturing bases (Taiwan, China) and enforcement-oriented jurisdictions (United States).

Table 1: Patent portfolio by jurisdiction (1993-2023)

Jurisdiction	Applications Filed	Active Patents	Notes
Taiwan	52	18	Major base of filings
China	39	12	Rapid growth in hinge patents
United States	37	15	Strong enforcement jurisdiction
Germany	16	9	Key EU market
EPO	16	8	Regional coverage
Japan	12	6	Advanced hinge tech market
South Korea	11	5	High hinge-related innovation
Austria	10	4	Emerging hinge niche
Brazil	8	2	Growth market, moderate risk
Italy	7	2	Niche market
Israel	6	2	Specialized R&D activity
Others (19 jurisdictions)	43	5	Low-volume filings

Within Europe, Germany (16 filings) and the European Patent Office (16 filings) emerge as important strategic regions, complemented by Austria, Italy, and Israel, which serve as niche but growing markets for hinge technologies. Japan (12 filings) and South Korea (11 filings) demonstrate the company's engagement with technologically advanced East Asian economies that are central to hinge innovation. The remaining 19 jurisdictions contribute relatively small numbers of filings (43 total), indicating selective coverage in secondary markets. Across all 30 jurisdictions, Watson Group filed 257 applications, of which 86 patents remain active. This distribution illustrates a strategy that balances strongholds in major economies with exploratory filings in emerging or specialized markets.

Table 2: Patent portfolio by technology type

Technology Domain	Applications Filed	Active Patents	Share of Portfolio
Hinges	145	69	80% of active patents
Locking Mechanisms	45	10	12%
Seating Systems	32	7	8%
Total	222	86	100%

Note: Totals reflect invention patents only; utility models and design filings account for the remaining balance (257 total filings).

Table 2 presents the Watson Group's patent portfolio classified by technology domain. The data reveal a clear dominance of hinge technologies, which account for 145 filings and 69 active patents, representing approximately 80% of the active portfolio. This concentration highlights the company's strategic focus on hinge mechanisms as its core area of innovation and competitive advantage.

In comparison, locking mechanisms (45 filings, 10 active patents) and seating systems (32 filings, 7 active patents) represent smaller but complementary segments of the portfolio. Together, these two categories contribute just under 20% of active patents, indicating a diversification strategy that supports the hinge domain while exploring adjacent product functionalities.

Overall, the distribution suggests that Watson Group's patenting activity is highly specialized, with hinge technologies serving as the central pillar of its global IP strategy, supplemented by selective filings in related mechanical systems.

3.3 AHP-Based Indicator Weighting

The Analytic Hierarchy Process (AHP) was used to derive the relative importance of 11 indicators, spanning macroeconomic variables (GDP, GDP growth, GDP per capita, population) and IP-specific metrics (applications, grants, grant rate, active patent share, hinge approvals, national hinge share, global hinge share).

Pairwise comparisons were simulated to reflect established IP strategy priorities, with macroeconomic scale and general IP activity weighted more heavily than hinge-specific indicators. The normalized weights are shown in Table 3.

Table 3: AHP-based indicator weight

Indicator	Weight
GDP	0.18
GDP Growth	0.12
GDP per Capita	0.08
Population	0.07
Patent Applications	0.15
Patent Grants	0.10
Grant Rate (Global Share)	0.08
Active Patent Share	0.05
Hinge Approvals	0.07
National Hinge Share	0.05
Global Hinge Share	0.05

Table 3 presents the simulated AHP-derived weights assigned to the 11 strategic indicators. The results emphasize the importance of macroeconomic variables (GDP, GDP growth) and general IP system activity (patent applications, grants), which together account for the majority of explanatory power in the model. In contrast, technology-specific hinge indicators and share-based measures carry relatively lower weights, reflecting their supplementary role in refining jurisdictional selection rather than driving it. This distribution is consistent with the rationale that large, economically significant markets with active IP ecosystems should be prioritized, while niche indicators provide additional precision.

3.4 Legal Risk Scoring (LRS)

To complement the strategic evaluation, a Legal Risk Scoring (LRS) model was constructed to measure the enforceability and stability of patent rights across jurisdictions. Four parameters were selected to capture different aspects of legal feasibility:

1. Patent litigation rate (cases per 1,000 patents filed), measuring dispute intensity.
2. IP enforcement score (0-10), assessing the strength and reliability of judicial and administrative IP protection.
3. Average prosecution time (months), indicating the efficiency of the patent granting process.
4. Invalidation rate (%), reflecting the stability and durability of granted rights.

The raw values for these parameters are reported in Table 4. To ensure comparability, each variable was normalized on a 0-1 scale, with higher values representing more favorable conditions. For parameters where lower values indicate greater strength (e.g., shorter prosecution times or lower invalidation rates), values were inverted prior to normalization. The normalized scores were then averaged to calculate the composite Legal Risk Score (LRS) for each country, shown in Table 5.

This process yields a single index ranging from 0 (highest legal risk) to 1 (lowest legal risk), which serves as the Y-axis input for the deployment matrix in Section 3.5.

Table 4: Legal risk score

Country	Litigation Rate (cases/1000 patents)	IP Enforcement Score (0-10)	Avg Prosecution Time (months)	Invalidation Rate (%)
USA	1.5	9.2	24	10
Germany	1.2	8.8	26	12
South Korea	1.3	8.5	28	11
Austria	0.8	8.6	22	9
Japan	1	8.9	25	10
Brazil	3.2	6.2	35	20
Italy	2.8	6.5	34	18
Israel	2.6	6.8	33	19
Taiwan	0.9	7	20	8
Philippines	3.5	5.5	38	25

Table 5: Normalized legal risk score

Country	Normalized Litigation	Normalized Enforcement	Normalized Prosecution Time	Normalized Invalidation	Legal Risk Score (LRS)
USA	0.74	1	0.78	0.88	0.85
Germany	0.85	0.89	0.67	0.76	0.79
South Korea	0.81	0.81	0.56	0.82	0.75
Austria	1	0.84	0.89	0.94	0.92
Japan	0.93	0.92	0.729	0.88	0.86
Brazil	0.11	0.19	0.17	0.29	0.19
Italy	0.26	0.27	0.22	0.41	0.29
Israel	0.33	0.35	0.28	0.35	0.33
Taiwan	0.96	0.41	1	1	0.84
Philippines	0	0	0	0	0

3.5 Deployment Matrix Construction

To translate the combined AHP and LRS results into actionable insights, a two-dimensional deployment matrix was constructed. The horizontal axis represents each country's strategic value derived from the AHP scores, while the vertical axis reflects the Legal Risk Score (LRS), which captures the quality of enforcement and litigation risk.

Thresholds of AHP ≥ 0.70 (high strategic importance) and LRS ≥ 0.80 (low legal risk) were used to divide the matrix into four quadrants:

Quadrant I: Primary Targets (high strategic importance and low legal risk)

Quadrant II: Monitor / High Risk (high strategic importance but high legal risk)

Quadrant III: Secondary Candidates (lower strategic value but low legal risk)

Quadrant IV: Avoid (lower strategic value and high legal risk)

This framework provides a structured basis for comparing jurisdictions and identifying differentiated filing strategies. The country-specific results of the deployment matrix are presented in Section 4.4.

3.6 Sensitivity Analysis

To assess the robustness of the AHP-derived weights, a sensitivity analysis was conducted. Each indicator weight was varied by ±10% while keeping the structure of the pairwise comparison matrix consistent. This procedure tested whether modest changes in judgment would significantly alter the resulting rankings.

The sensitivity analysis is presented in the Data Analysis section (Section 4.5, Figure 3), where the stability of indicator rankings under these variations is examined.

4. Data Analysis and Results

This section applies the AHP-LRS framework to the collected patent data and presents the resulting country rankings, legal risk assessments, deployment matrix classification, and robustness checks

4.1 Patent landscape of Watson group

The Watson Group's filings are concentrated in Taiwan (52), China (39), and the USA (37), together comprising nearly half of total applications. In terms of technology, hinge mechanisms dominate with 69 active patents (80%), underscoring the company's core innovation focus.

4.2 Country rankings based on AHP scores

Using the indicator weights derived from AHP, composite strategic scores were calculated for 20 jurisdictions. Results are shown in Table 6. The analysis reveals three distinct tiers of strategic importance.

Top Tier (≥0.73): USA (0.82), Germany (0.78), South Korea (0.75), Austria (0.74), and Japan (0.73), these represent the most strategically valuable jurisdictions.

Upper-Mid Tier (0.70-0.72): Canada (0.72), Australia (0.71), China (0.70), Brazil (0.70), strong markets with solid IP activity, though in some cases enforcement challenges remain.
Mid-Tier (0.66-0.69): Italy (0.69), Israel (0.68), Singapore (0.67), Finland (0.66), Denmark (0.66), offering moderate opportunities, often with niche or regional value.
Lower Tier (<0.66): Spain (0.65), Russia (0.65), Taiwan (0.60), Malaysia (0.58), Philippines (0.55), India (0.54), representing less attractive jurisdictions under the current framework.

Table 6: AHP country rankings

Country	AHP Score
USA	0.82
Germany	0.78
South Korea	0.75
Austria	0.74
Japan	0.73
Canada	0.72
Australia	0.71
China	0.70
Brazil	0.70
Italy	0.69
Israel	0.68
Singapore	0.67
Finland	0.66
Denmark	0.66
Spain	0.65
Russia	0.65
Taiwan	0.60
Malaysia	0.58
Philippines	0.55
India	0.54

4.3 Legal risk score results

Using the four-parameter Legal Risk Scoring (LRS) model, normalized scores were derived for each jurisdiction. The composite LRS values are presented in Table 7. Results reveal clear differentiation between strong enforcement environments and high-risk jurisdictions.
Top Tier (≥0.85): Austria (0.92), Japan (0.86), USA (0.85), Taiwan (0.84): these countries combine efficient prosecution, low invalidation rates, and reliable enforcement systems.
Mid Tier (0.70-0.80): Germany (0.79), South Korea (0.75): generally robust, though with slightly longer prosecution times and moderate invalidation rates.

Low Tier (<0.70): Israel (0.33), Italy (0.29), Brazil (0.19), Philippines (0.00): these countries face challenges such as weak enforcement, higher litigation intensity, or unstable patent validity.

Table 7: Legal risk scores (selected jurisdictions)

Country	LRS
Austria	0.92
Japan	0.86
USA	0.85
Taiwan	0.84
Germany	0.79
South Korea	0.75
Israel	0.33
Italy	0.29
Brazil	0.19
Philippines	0.00

4.4 Strategic matrix insights

As shown in Figure 2, the integration of the AHP-derived strategic scores (X-axis) and Legal Risk Scores (LRS, Y-axis) produces a two-dimensional deployment matrix that classifies countries into four quadrants. This framework highlights where market and IP potential align with legal enforceability, and where gaps exist.

Quadrant I: Primary Targets (High Strategy, Low Legal Risk)

Countries such as USA, Germany, South Korea, Austria, and Japan occupy this quadrant. Their consistently high AHP and LRS scores indicate strong innovation ecosystems and stable enforcement environments, making them top priorities for Watson Group's global patent expansion.

Quadrant II: Monitor / High Risk (High Strategy, High Risk)

China and Brazil fall into this quadrant. While both offer large markets and high AHP scores, their weaker LRS values reflect enforcement challenges, suggesting the need for selective, carefully managed filings.

Quadrant III: Secondary Candidates (Low Strategy, Low Legal Risk)

Taiwan, Singapore, and Finland appear here. Although their AHP scores are lower, their relatively strong legal environments (LRS ≥ 0.80) make them suitable for niche protection or as regional IP hubs.

Quadrant IV: Avoid (Low Strategy, High Risk)

Countries such as Italy, Israel, Denmark, Spain, Russia, Malaysia, Philippines, and India are positioned in this quadrant. They demonstrate either limited strategic importance or heightened legal risk, making them low-priority jurisdictions for immediate investment.

Figure 2 confirms that Watson Group should prioritize Quadrant I countries, treat Quadrant II with caution, selectively file in Quadrant III, and deprioritize Quadrant

IV. This visual classification transforms quantitative results into actionable guidance for portfolio deployment.

4.5 Sensitivity analysis

The robustness of the AHP-derived indicator weights was tested using a ±10% sensitivity analysis. Figure 3 presents the results, showing how indicator weights respond to incremental adjustments while maintaining the structure of the pairwise comparison matrix.

The findings confirm that the ranking of indicators remains stable under all tested variations. GDP (0.18) and Patent Applications (0.15) consistently dominate as the most influential factors, even when reduced by 10%, while indicators such as Active Patent Share, National Hinge Share, and Global Hinge Share remain at the lower end of the weighting spectrum (0.05 each). Mid-level indicators, including GDP Growth (0.12), Patent Grants (0.10), and Grant Rate (0.08), also demonstrate minimal fluctuation, preserving their relative order.

This stability indicates that the framework is robust to small changes in expert judgment. Even if decision-makers assign slightly different importance to individual indicators, the overall prioritization of jurisdictions would not change significantly. The sensitivity analysis, therefore, reinforces the reliability of the AHP-LRS model for guiding patent deployment decisions.

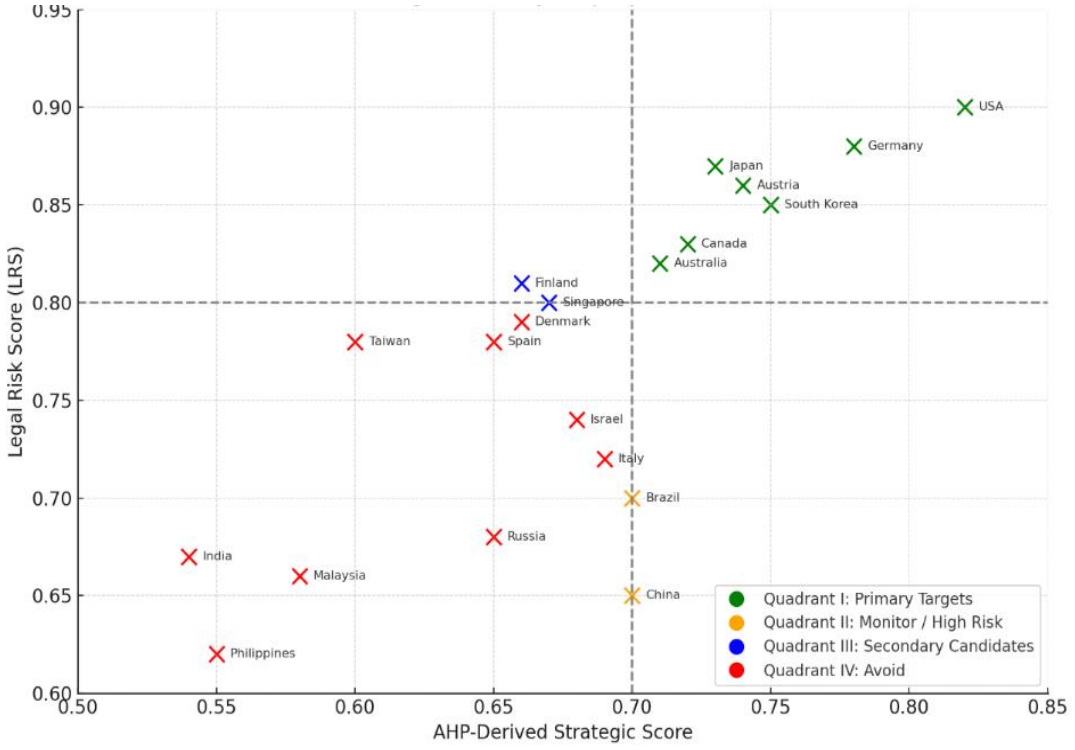

Figure 2: Strategic Country Deployment Matrix

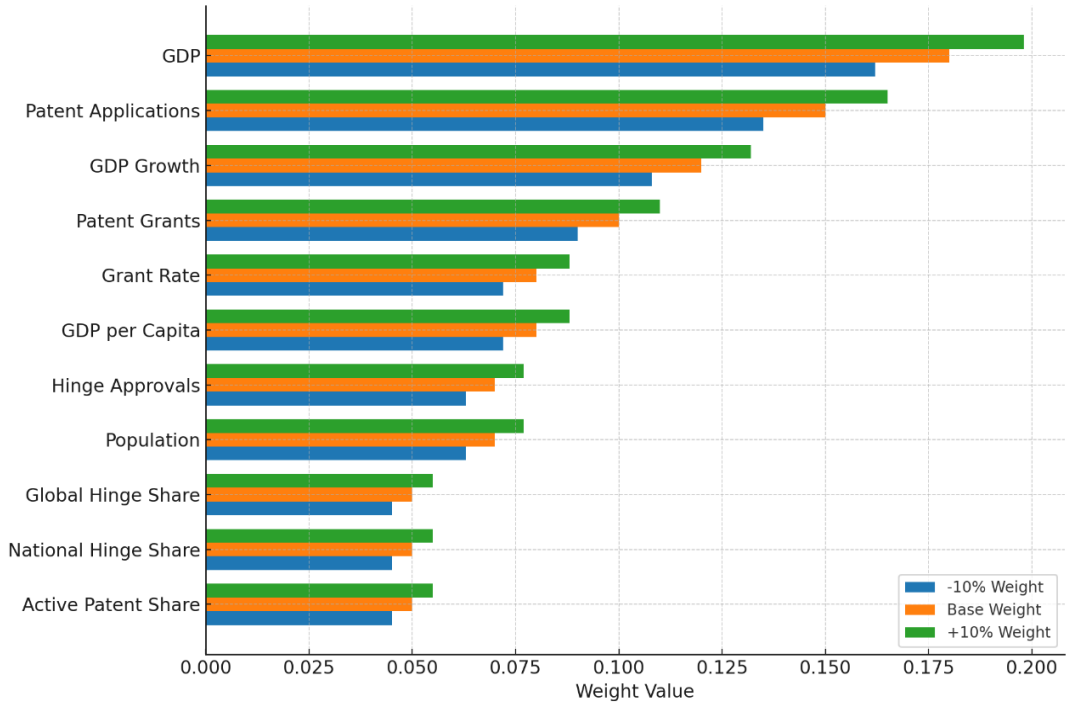

Figure 3: AHP Weight Sensitivity Analysis (±10%)

4.6 Discussion

The integration of AHP-based strategic scoring with Legal Risk Scoring (LRS) provides a more nuanced understanding of global patent deployment than traditional single-factor analyses. While market size and patenting activity remain important determinants of filing decisions, the addition of legal enforceability highlights critical risks that would otherwise be overlooked. For example, although China and Brazil rank highly on economic and IP indicators, their lower LRS values caution against indiscriminate expansion. Conversely, smaller markets such as Singapore and Finland, which might be deprioritized under a purely economic lens, emerge as viable secondary hubs due to their strong legal systems.

This dual evaluation framework makes three contributions. First, it operationalizes patent strategy as a multi-criteria decision problem, allowing firms to systematically balance opportunity and risk rather than relying solely on intuition. Second, it demonstrates the value of incorporating legal feasibility into strategic IP planning, an aspect often underrepresented in portfolio analyses. Third, the framework provides a scalable methodology that can be adapted across industries and technologies, ensuring its relevance beyond hinge-related innovations.

From a managerial perspective, the findings imply that firms should align filing strategies with both strategic importance and enforceability. Primary Target jurisdictions deserve proactive investment, but even these require ongoing monitoring of enforcement trends. High-risk markets should be approached

selectively, with filings concentrated on core innovations or supported by complementary strategies such as licensing, joint ventures, or defensive publications. Secondary Candidates provide opportunities for cost-effective reinforcement of IP positions, while Avoid jurisdictions may be deprioritized unless specific business circumstances justify entry.

Overall, the discussion underscores that optimal patent deployment is not solely a matter of market potential but also of legal certainty. By integrating economic, technological, and legal dimensions, the AHP-LRS model offers firms like the Watson Group a robust framework for navigating increasingly complex global IP landscapes.

5. Conclusion and Recommendations

This study developed and applied a hybrid framework that integrates the Analytic Hierarchy Process (AHP) with Legal Risk Scoring (LRS) to guide global patent deployment. By combining strategic indicators with enforceability metrics, the model provides a more comprehensive basis for decision-making than approaches focused solely on market or technological potential.

The findings indicate that jurisdictions such as the USA, Germany, South Korea, Austria, and Japan represent optimal environments for immediate patent expansion, as they combine both strong strategic importance and favorable legal conditions. By contrast, China and Brazil, despite their large markets, present higher legal risks that warrant cautious engagement. Smaller jurisdictions such as Singapore, Finland, and Taiwan emerge as secondary candidates due to reliable legal frameworks, while countries like Italy, Israel, and the Philippines remain low-priority under current conditions.

From a practical perspective, firms should adopt a tiered deployment strategy: prioritize filings in Quadrant I jurisdictions, apply selective approaches in high-risk markets, leverage secondary hubs where legal conditions are favorable, and deprioritize resource-intensive filings in weaker environments. For managers, this approach ensures more efficient allocation of IP budgets and reduces exposure to legal uncertainty.

Beyond the case of Watson Group, the study contributes a scalable methodological framework that can be adapted to other technology domains, such as semiconductors, medical devices, or renewable energy. By integrating both strategic and legal dimensions, the AHP-LRS model enhances the ability of firms to align patenting decisions with long-term innovation and enforcement realities.

Finally, future research should validate these simulated weights through expert panels, expand the LRS to incorporate cost and policy factors, and link deployment strategies to real-world performance outcomes such as licensing revenue or litigation success. Such work will further strengthen the model's value for both scholars and practitioners in intellectual property strategy.

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