A Study of Small and Medium-Sized Technology-Based Enterprises in Different Risk Contexts

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Abstract: In China's persistent economic transformation and accelerated technological advancement, technology-based small and medium-sized enterprises (SMEs) face an escalating array of multifaceted and interwoven risks. This study investigates two exemplary cases—equity crowdfunding campaigns of technology companies and the "Guangzhuanli" intellectual property (IP) securitization initiative—to explore how market and financial vulnerabilities emerge and intersect. The research focuses on structural challenges SMEs face in adapting to the digital ecosystem and accessing stable financial resources. The findings indicate that erroneous audience segmentation and suboptimal outreach methodologies can amplify the susceptibility to demand-side volatility. Concurrently, conventional financing frameworks, characterized by rigidity, impede access to long-term financial resources. The case of "Broad Communication Power" underscores the potential of structured finance instruments to transform intangible intellectual property assets into reliable cash flows, offering an effective strategy for enhancing liquidity and creditworthiness. The paper emphasizes the interrelationship between market and financial risk and proposes a comprehensive risk governance approach. The document further puts forward policy recommendations, including enhancing consumer data comprehension, establishing a standardized IP asset valuation mechanism, and promoting the utilization of financing instruments such as IP-backed securities. These insights can assist policymakers and SME leaders in developing a more profound comprehension of risk resilience strategies, thereby enhancing the financial sustainability of China's innovation-driven economy.

1 INTRODUCTION

In the context of a shifting economic landscape and the rapid advancement of digital technologies, small and medium-sized technology enterprises (SMEs) confront a unique set of risk challenges that are particularly salient at their current stage of development. Significant shifts in market structure and the continuous evolution of financing channels have exerted considerable pressure on enterprises with limited resources, particularly in market adaptation and capital acquisition. Compared with large enterprises, small- and medium-sized enterprises (SMEs) encounter inherent disadvantages regarding brand influence, user base, capital reserves, and risk resistance. This phenomenon is particularly evident in the context of SMEs' entry into digital platforms or the exploration of novel financing methods. In such circumstances, they are more likely to expose management flaws and strategic blind spots. This paper selects two representative Chinese technology-based SMEs as case studies. The present study will examine the intellectual property securitization financing projects of Fudi L Technology Company and "Light Patent." The present study analyzes the market feedback bias and warm-up failure encountered by Company L in its exploration of a crowdfunding platform. This analysis demonstrates SMEs' typical risks regarding digital market adaptability.

Furthermore, the study implements the "Light Patent" ABS project, exploring the securitization of intellectual property to alleviate the financing pressure experienced by science and technology-based SMEs. This practical and structural analysis examines the logic behind the design. Concurrently, the "Light Patent" ABS project is being implemented, and the current state of science and technology-based SMEs is being discussed, along with alleviating financing pressure through intellectual property securitization and the principles of structural design. This section will thoroughly examine these two cases

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to distill the risk exposure characteristics of SMEs in terms of economic fluctuations and viable coping strategies. It will also provide empirical references and policy suggestions for analogous enterprises.

2 MARKET RISK

2.1 Market Risk Overview

Market or systemic risk is the possibility that a firm will incur losses due to external market fluctuations in its daily business operations (Li & Wang, 2020). This risk is often triggered by macroeconomic fluctuations, cyclical adjustments within the industry, changes in consumer demand, policy changes, or uncertainty in the international environment (Niu, 2023). A wide range, uncontrollability, and rapid propagation characterize market risk. Its main manifestations include the obstruction of sales channels, pricing system imbalance, demand decline, and drastic changes in the competitive landscape, especially the impact of new entrants on the established market structure (Tan, 2025). SMEs encounter numerous challenges in managing market risks, particularly concerning capital reserves, brand influence, and channel resources.

Additionally, they often lack effective buffer mechanisms and emergency management capabilities (Berger & Udell, 1998). Furthermore, the system's capacity for risk identification is deficient. It tends to lag in data monitoring, which can lead to empirical decision-making. This, in turn, can amplify the risk transmission effect. In the intricate and dynamic market environment, shifts in consumer preferences, policy directives, and sales channels render SMEs more susceptible to external shocks, which manifest in sales contraction, inventory accumulation, or strategic missteps. Enterprises that depend excessively on a solitary channel, exhibit inadequate brand loyalty, and possess deficient emergency response protocols are predisposed to encounter difficulties in abrupt policy or market shifts. The digital environment has further intensified competition. The paradigm shift from a "goods-looking-for-people" model to the conventional "people-looking-for-goods" logic reconfigures the user acquisition path. It is imperative for SMEs to swiftly adapt to the consumption mechanism driven by content recommendation and social interaction. Otherwise, adequate coverage of target customers will be challenging to achieve. Conversely, by proactively shaping the information flow, for instance, through precision marketing and user data optimization, they can achieve market breakthroughs and establish a competitive advantage in the new industry. This paper utilizes L Technology Company as a case study to investigate its optimization of product and marketing pathways by utilizing a crowdfunding feedback mechanism within a digital platform environment. The objective of this analysis is to achieve market adaptation and risk response under resource constraints, thereby providing research references for the risk management practices of SMEs.

2.2 Case Background: L Technology Company's Business and Crowdfunding Approach

L Technology, a small and medium-sized technology enterprise, was founded in June 2014 and is registered in Qingdao, Shandong Province. The primary focus of this enterprise is the research and development of innovative applications of intelligent hardware. In the nascent stage of its development, the company drew upon the research and development resources and production platform of the Haier Group to conduct preliminary explorations in the domain of smart home technology. The initial product development focused on creating portable temperature control devices, wireless connection modules, and other products. The services were primarily directed towards large-scale brand manufacturers, with B-end customization as the primary operational modality. In its nascent operation stage, L Technology has primarily concentrated on developing technological output while concurrently amassing expertise in product design and the execution of small-scale production initiatives. 2015 the company initiated its inaugural equity crowdfunding campaign using an Internet platform. This strategic initiative diversified its financial avenues and facilitated the exploration of its brand within the consumer market. As the company has gradually transitioned from its original focus on OEM (Original Equipment Manufacturer) services to an emphasis on independent brand development, it has formulated a strategic direction emphasizing both hardware capabilities and the development of consumer brands. In 2017, the company completed the listing on the "New Third Board," a move intended to promote the standardization and long-term growth of the organization with the help of the capital market. Standardization and long-term growth. By 2020, the company's team size is expected to range from 30 to 50 individuals, with a significant proportion of the staff comprising technical positions. This team will possess a streamlined structure,

flexible project response capabilities, and the capacity to test and adjust products rapidly. While undergoing a brand transformation, the company's management acknowledges that direct entry into the traditional consumer market presents considerable challenges, including significant marketing expenses, the complexity of expanding channels, and delayed user feedback. This is particularly salient in contexts characterized by a dearth of a consumer base and terminal resources. Consequently, ascertaining the market value of the product with precision has become a pivotal challenge. Consequently, enterprises are increasingly leveraging crowdfunding platforms as a strategic breakthrough to achieve multifarious objectives, including initial exposure, market testing, and cash flow balance.

In contrast to the prevalent "promotion-oriented" crowdfunding models, L-Tech's approach is characterized by a strategic element. We can ascertain the rationality of product design and functional orientation through meticulous observation of user behaviour, including their propensity to pay, interactive tendencies, and content evaluation. The team regards this "market inversion-user participation" approach as a key risk control link, which helps to screen the product value and optimize the decision-making process under the circumstances of controllable upfront investment. On May 18, 2015, L-Tech launched its first branded product project on the Jingdong Crowdfunding Platform, "M-911" smart thermostat, marking its first public digitalization attempt for the C-end market. The project's 40-day cycle was designed with a multi-stage support mechanism, encompassing giveaways, fan status, and cooperative agents. This approach ultimately garnered the support of more than 28,000 users. Following the project's successful completion, the company recovered the initial capital investment and obtained substantial real data regarding the target users' preferences, functional requirements, and marketing communication pathways through the platform's feedback mechanism. The crowdfunding experience also prompted the company to transform its internal product process from an engineering-oriented development mechanism to an iterative system emphasizing user input and data feedback. Since then, L Technology has adopted "platform verification" as a mandatory step before product launch, and has progressively established a data-centred and user-oriented product-market interface path, laying a methodological foundation for subsequent product launches and independent operations (Lu, 2023).

2.3 Risk Exposure Process: Market Feedback Deviates from Expectation

During the initial stage of the project launch, Company L primarily utilized WeChat to disseminate information. This communication platform was employed for promotional and informational purposes, including disseminating updates, announcements, and relevant content. In addition to WeChat, Company L also employed its official website and select WeChat groups as channels for sharing information. This communication method is characterized by its relative closure, which is evidenced by its limitation to existing customers and technical circles. This limitation results in a lack of external diffusion ability, thereby hindering the reach of crowdfunding information to a broader range of potential consumer groups. Simultaneously, the publicity content places excessive emphasis on product technical parameters. The current publicity content disregards the user's interest in driving, the absence of specific application scenarios, and its failure to be structured around the user's real needs. Consequently, the content is challenging to inspire resonance or to prompt purchase behaviour, and it is not easy to stimulate interest in purchasing. A more critical issue is the concentration of publicity release times in the noon or afternoon of weekdays. This timing does not consider the media use habits of the target group, and it misses the evening peak hours (e.g., 8:00 p.m. to 10:00 p.m.). As a result, it is not easy to form a centralized exposure of the publicity content, even if it is released. Due to numerous factors, the project encountered the following predicament at the project's nascent stage: insufficient exposure, limited clicks, and low conversion.

For instance, during the initial week of the promotional campaign, the project garnered fewer than 500 clicks, exhibiting a conversion rate of less than 1%. This figure contrasts with the industry standard conversion rate, which ranges from 3% to 5%. Concurrently, the company has deviated from the positioning of users, and its communication strategy primarily focuses on platform fan images such as "technology enthusiasts" and "young engineers." However, this strategy neglects the realistic requirements of crowdfunding projects regarding users' willingness to buy and ability to pay. While this population segment may indeed be interested in developing new products, converting this interest into tangible support is impossible. The company's strategic decisions, which included significant investments in communities promoting technical

exchanges, such as Zhihu, V2EX, and Jianshu, while neglecting to establish a closed-loop communication system on platforms with a consumer-oriented atmosphere, including Jittery, Xiaohongshu, and B Station, have led to a conspicuous mismatch between the subjects of "hot topics and cold orders" and "high interaction and low conversion." The structural incongruity between the prevalence of a particular topic and the relative infrequency of related orders.

For instance, although Zhihu has garnered more discussions and favourable ratings, these interactions have not been translated into tangible support for its projects. This outcome indicates that its content marketing strategy has not yet established a cohesive closed-loop system. During the initial three days following the project's initiation, the platform's recommendation mechanism was employed to generate limited exposure. However, there was a conspicuous absence of recognition and trust between users and the product. Despite the substantial number of views, there was minimal support. In practice, despite the platform's extensive exposure, the growth of its supporters was gradual, and the conversion rate was notably low. This suggests that users were not sufficiently motivated to participate. Consequently, as the weight of the platform's recommendation diminished, the project was expeditiously substituted by alternative products, resulting in a precipitous decline in demand. A review of the project's execution reveals several notable shortcomings on the company's part. First, a timely FAQ area was not established, and a user community was not cultivated.

Additionally, a mechanism for progress updates and communication was lacking. It is also important to note that user feedback was not addressed, which further eroded the confidence of potential supporters. Concurrently, the company did not have prior performance records or case support, and it failed to establish a reliable supply-side image on the platform. Consequently, a significant number of watchers ultimately chose to withdraw. According to the estimated conversion model, the project was scheduled to achieve at least 40% fundraising progress within two weeks. However, it only reached approximately 10%, failing to meet the platform's basic recommendation criteria and resulting in sunk publicity costs. On the 16th day of the project, the company made the strategic decision to transition offline and announced the cessation of crowdfunding, redirecting the product toward a B-end customization trajectory. Concurrently, the marketing team underwent structural adjustments, signifying the termination of the market-based financing approach (Lu, 2023).

2.4 Risk Impact Assessment: The Chain Reaction of Crowdfunding

The failure of Company L's crowdfunding initiative instigated a sequence of cascading events. Initially, the brand's credibility suffered a setback, and certain supporters voiced their discontent on social media platforms. Some even discontinued their patronage, which deleteriously affected the company's reputation. Secondly, the company was compelled to modify its budget structure internally to address the discrepancy in market expectations. This entailed reallocating a portion of the funds initially allocated for online promotion back to offline channels and discontinuing the original digital marketing program. Thirdly, employee sentiment was profoundly impacted, with the core product team expressing reservations regarding the project's viability, certain members indicating an inclination to resign, and a decline in team morale. Finally, the failure revealed the incongruity between the users of the digital platform and the actual consumer population. Consequently, the company's confidence in the digital market diminished, suspending the originally planned platform expansion and new product crowdfunding program. The overall pace of the transition was significantly slowed down (Lu, 2023).

2.5 Case Summary and Lessons Learned

This case exemplifies the evident deficiencies of Company L in terms of market discernment and risk management. The core error committed by the company was its inability to differentiate between technical fans on digital platforms and consumers who genuinely intended to purchase the product. This failure resulted in a lack of data support for strategy development and significant judgmental bias. This experience underscores the significance of conducting thorough user research and path simulation before SMEs enter a new market, instead of merely applying industry experience. Simultaneously, it is imperative to acknowledge that the efficacy of a channel selection is not contingent upon its novelty; rather, its appropriateness is paramount. That is to say, the selection should align with the target user's behaviour and consumption patterns, ensuring optimal effectiveness. Project experience prompts enterprises to exercise caution in making key decisions without empirical data, particularly regarding fundamental issues such as product pricing, platform placement, and target user

positioning. These decisions must be data-driven and market-oriented (Lu, 2023).

3 FINANCIAL RISKS

3.1 Overview of Financial Risk

Financial risk is the potential for business interruption or financial crisis, precipitated by inadequate liquidity, diminishing solvency, and a deteriorating credit rating. This can result from an imbalance between fund supply and demand, an irrational financing structure, or external financial fluctuations (Hu & Zhang, 2018). The financial risks confronted by science and technology-based SMEs in the growth process are characterized by structural, systemic, and high-frequency episodes, which are manifested in capital rupture, debt default, and capital structure imbalance. High-tech enterprises depend heavily on technology research and development, significantly impacting their asset composition. These enterprises typically possess primarily intangible assets, a singular source of revenue, a protracted liquidity cycle, and generally unstable cash flow. Carpenter and Petersen have noted that high-tech enterprises frequently encounter constraints in their financing due to the absence of collateral and the paucity of mature financial models. These enterprises are compelled to maintain ongoing investment before the realization of returns, and they are susceptible to disruptions in their capital chain when external market fluctuations occur. Furthermore, the aforementioned enterprises generally face challenges in accessing conventional financing mechanisms. Consequently, they predominantly resort to short-term financing options or high-interest credit options. The repayment of debt is predominantly contingent upon projected earnings, and their financial solvency is susceptible to project delays or a sluggish market (Carpenter & Petersen, 2002). Berger and Udell posit that the dearth of effective information disclosure mechanisms and the inadequacy of credit ratings engender financing conditions often inequitable for science and technology-based SMEs, heightening the risk of default due to elevated leverage (Berger & Udell, 1998). Udell further posits that high-technology SMEs frequently encounter inequitable financing conditions due to inadequate information disclosure mechanisms and the weakness of credit rating bases. Sogorb-Mira further noted that the proportion of their short-term liabilities is excessive, their capital is inadequate, and the pressure of fund scheduling increases considerably. Of particular concern is the interconnected nature of these three types of financial risks, which have been demonstrated to be highly interrelated. The occurrence of capital breaks has been shown to weaken debt-servicing capacity, which can subsequently lead to defaults. This, in turn, has resulted in the erosion of confidence in external financing, the exacerbation of capital structure imbalances, and the eventual induction of systemic risks (Sogorb, 2005). Bottazzi et al. demonstrate that when innovative firms encounter a financial imbalance, they often experience protracted recovery periods and intricate pathways rife with risk. These firms are highly vulnerable to the "financing crunch-debt service default-credit imbalance phenomenon." Moreover, enterprises operating within the scientific and technological sector are confronted with a myriad of challenges, including but not limited to: high-intensity investment and capital deposition, protracted research and development (R&D) cycles, and the uncertainty surrounding the translation of research outcomes into practical applications. These challenges often result in a significant long-term occupation of capital (Bottazzi & Tamagni, 2008). Despite the utilization of patented technology, the absence of mature financial records and an evaluation system poses significant challenges in obtaining support from traditional financial institutions. Structural deficiencies in the financing channels have been identified as a significant challenge. Bank credit preference for tangible assets, stable cash flow, and science and technology-based enterprises is mostly for light assets. Financial indicators fluctuate, making it difficult to meet their risk appetite. The capital market requires high information disclosure and standardization; most unlisted enterprises cannot meet these standards, and financing options are limited. Without multi-layer capital support, the available means of financing are constrained to internal accumulation, debt financing, or policy funds, an inefficient and costly strategy. Existing guarantee and risk compensation mechanisms are inadequate in addressing the unique characteristics of these risks, and financial products often lack suitability, resulting in a significant mismatch in the allocation of financing resources. In the face of traditional financing problems, some enterprises have attempted to introduce structured tools, such as asset securitization. A notable example is the Guangzhou "Guang Patent" ABS project, China's inaugural securitization product derived from patent licensing revenue rights. This project has paved the way for the "assetization-securitization-financing" of intangible assets, a process facilitated by incorporating SPV,

implementing credit enhancement mechanisms, and involving state-owned enterprises. The introduction of SPV, credit enhancement, and the participation of state-owned enterprises has enabled the realization of the "assetization-securitization-financing" of intangible assets. This has effectively alleviated the financing difficulties experienced by science and technology-based SMEs and demonstrated the real value of intellectual property securitization in science and technology finance (Wei, 2021).

3.2 Introduction to the Case Background: Overview of the "Guangdong Patent" ABS Financing Project

The "Guangzhou Patent" ABS project represents a pioneering development in China's financial landscape, as it is the country's first intellectual property securitization product. This innovative financial instrument utilizes patent license revenue rights as the sole underlying asset, a move that is spearheaded by the Guangzhou Development District (GDD). The project, formally referred to as the "Société Générale-Guangzhou Development Zone Patent License Asset Support Special Program," involves the utilization of assets from multiple science and technology enterprises within the jurisdiction. These enterprises have consolidated their patent license rights and transferred their revenue rights to establish a stable cash flow. This cash flow serves as a foundation for the issuance of securities products. The asset pool employs a multi-subject integration model, comprising patent license agreements from disparate enterprises, with robust risk diversification and cash flow anticipation. A Special Purpose Vehicle (SPV) was incorporated into the project structure to facilitate the independent patent and revenue rights operation through dual licensing arrangements. A multi-layered credit enhancement mechanism was implemented, encompassing features such as a senior/subordinated structure, excess cash coverage, and differential payment commitments. This mechanism was introduced to safeguard the credit rating and issuability of the securities.

The project was finalized, established, and successfully issued at the Shenzhen Stock Exchange in September 2019, with a total value of RMB 301 million. The issuance signifies a pivotal moment in China's intellectual property securitization journey, as it marks the completion of a closed loop in practice. This development provides a technical framework that enables intangible assets to participate in the capital market. The project under consideration constitutes the inaugural instance of IPR ABS, and it is characterized by its elevated level of standardization and innovation concerning the following aspects: product structure design, asset screening logic, cash flow construction, and risk control arrangements. A distinguishing feature of this initiative is its integration of a balanced approach to policy orientation and market mechanism, along with a recognition of the commercial replicability of financial products. The successful initiation of the project is not only of pilot significance, but also establishes the technical and institutional foundation for constructing an intellectual property capitalization system. The project's overarching objective is to address the systemic exclusion problem of science and technology-based SMEs within the conventional financing system. Given that such enterprises primarily operate with limited assets, it is challenging to capitalize on core resources, such as patents and technologies, through conventional credit channels. Consequently, their financing options have been constrained for an extended period. The project's approach to recognizing future patent licensing revenue as cash flow assets is characterized by its standardization and structuring, facilitating the establishment of stable financing channels that do not necessitate physical collateral. Concurrently, establishing a local, state-owned platform for credit enhancement has enhanced financial institutions' and investors' acceptance and risk tolerance. This, in turn, has led to a systematic opening up of the conduit between scientific and technological achievements and the capital market.

Regarding the project's financing effectiveness, it has achieved two primary objectives. First, it has facilitated the rapid availability of funds while effectively managing financing costs. This has led to a notable alleviation of the pressure associated with cash flow tension during enterprise expansion. Second, the project has demonstrated intellectual property securitization's genuine value and operational feasibility in serving the real economy (Berge & Udell, 1998).

3.3 Financial Risk Manifestation: Traditional Financing Methods Are Difficult to Meet Development Needs

The financial risks faced by science and technology-based SMEs in the process of financing are not isolated and occasional occurrences; instead, they are a concentrated manifestation of the severe mismatch

between their enterprise characteristics, such as light assets, unstable cash flow, and difficulties in credit assessment, and the existing credit logic. Enterprises generally lack collateralized physical assets, complicating the procurement of adequate financing from banking institutions that utilize collateral as the primary risk management instrument. In the context of information asymmetry, financial institutions exhibit reluctance to extend credit, even at elevated interest rates, as this practice may attract high-risk borrowers, thereby elevating the likelihood of default. This theory is particularly well-suited to the financing challenges faced by science and technology-based enterprises. These enterprises often encounter difficulties quantifying credit risk due to the absence of stable historical data and standardized assets. Consequently, they are systematically excluded from mainstream financing channels (Stiglitz & Weiss, 1981). Secondly, the corporate credit rating system is disadvantageous to SMEs. Demirgüç-Kunt et al. demonstrate in their study of the global credit system that the absence of a reliable credit history and a mechanism for information disclosure frequently constitutes the underlying cause of the general challenge and elevated cost of financing for SMEs. In such cases, even if financial institutions are inclined to extend credit, they frequently impose exorbitant interest rates or stringent guarantee requirements, thereby exacerbating the financial strain experienced by enterprises (Demirgüç-Kunt, Beck, & Honohan, 2006). Concurrently, the enterprise's cash flow structure exhibits an absence of elasticity.

Science and technology-based SMEs in the R&D investment stage encounter a prolonged period of non-return, and their market transformation is contingent on the technological sophistication and market acceptance of the associated uncertainty. Consequently, their overall solvency is profoundly influenced by external financial support. Inadequate financing can potentially culminate in the dissolution of the capital chain. Beck and Demirgüç-Kunt further noted that, despite most banks recognizing the profitability potential inherent in SMEs, the absence of policy protection or guarantees hinders financial support for SMEs. Beck and Demirgüç-Kunt further noted that while most banks recognize the profitability potential of SMEs, in the absence of policy protection or market stability, banks are more inclined to serve low-risk large enterprises, thus creating a "financing discrimination" in the system (Beck & Demirgüç-Kunt, 2006).

Furthermore, the short-term characteristics of the financing structure have been identified as a significant contributing factor to the concentration of financial risk. Empirical research conducted by Cabral and Mata indicates that SMEs frequently depend on short-term loans to sustain operations in the initial stages of their development. However, accessing low-cost, long-term capital support that aligns with their long-term development needs is challenging. This financing structure exhibits a deficiency in its capacity to mitigate the impact of fluctuations in cash flow, thereby amplifying risk concentration (Cabral & Mata, 2003). The financial risk posed by science and technology-based SMEs does not stem from a single variable; rather, it is the consequence of a discrepancy between corporate attributes and financial logic. The resolution of this issue necessitates a multifaceted approach, precluding reliance on adjustments to credit rates or policy subsidies in isolation. A comprehensive strategy is imperative, encompassing the promotion of financial information infrastructure at the institutional level, the enhancement of the enterprise credit data system, and the strategic allocation of funds to high-potential innovative enterprises. This comprehensive approach is instrumental in achieving a dual optimization: enhancing the efficiency of financial resource allocation and fostering enterprise growth.

3.4 Project Design Features: Optimizing Financial Structure Through Securitization

It is reasonable and feasible for this project to select patent royalty income as the underlying asset for securitization. From an asset perspective, this particular income right has been derived from mature patent licensing transactions, characterized by a foundation of rights and a predictable future cash flow. This fulfills the fundamental criteria for securitization, specifically the "stable and predictable income" aspect (Wei, 2021). Concurrently, patent license income rights diverge from conventional enterprise assets regarding their independence from substantial asset backing. This attribute aligns with the evolving nature of science and technology-based SMEs, which are characterized by their asset-light structure and pronounced knowledge-intensiveness. Through the structured transformation of such intangible assets, the project realizes the path innovation of "generating debt by right - generating gold by debt," which opens up a capital market financing channel for SMEs lacking physical collateral (Odasso & Ughetto, 2011). The "dual licensing model" is employed in the project design to construct the asset cash flow path.

In the initial step, the original patent proprietor will authorize the patent's exclusive implementation right to the project sponsor (or the SPV established by it), which will pay a one-time hefty licensing fee as the underlying cash flow of the underlying debt assets. In the subsequent step, the sponsor will reverse-authorize the same patent to the original proprietor. In the subsequent step, the initiator will reverse-license the aforementioned patent back to the original owner. The original patent owner will then be responsible for paying the usage fee regularly, thereby establishing a long-term cash flow back arrangement (Wei, 2021). The primary benefit of this model is that it facilitates the prompt determination of the patent's market value, enabling the immediate generation of revenue through the initial authorization. This enhances the efficiency of asset realization. Conversely, the reverse authorization ensures that the enterprise maintains its control over the technology, safeguarding the path for commercializing the patented technology and ensuring revenue generation.

For business entities, such arrangements effectively front-load the time point of patent revenue realization, alleviate liquidity constraints, optimize the short-term asset and liability structure, and enhance their financial sustainability (Keynes, 1936). Regarding the credit enhancement mechanism, the project introduces state-owned enterprises as the guarantor, thereby providing full joint and several liability guarantees for the principal and interest repayment of the securities products. SOEs possess stable financial status, policy credit endorsement, and favourable rating records, enabling the securities product to transition from BBB of the underlying assets to AA or higher within the credit rating system (Wei, 2021). This credit enhancement effectively reduces the market's pricing requirements for the product's credit risk, thereby compressing the issuance rate and substantially reducing the financing cost. For instance, the guarantee mechanism has been demonstrated to reduce financing rates by approximately 150-200 basis points in analogous projects (Campbell & Taksler, 2003). This development has the effect of enhancing the efficiency of financing and the market's propensity to subscribe.

Regarding asset pool construction, the project follows the principle of "decentralization, equal quality, and heterogeneous origin." The project screens and allocates underlying assets from multiple dimensions, such as industry, geography, and technology. Specifically, the strategy prioritizes patent revenue rights that exhibit high technological maturity, a favourable licensing history, and stable industry demand. Additionally, it establishes an upper limit on the proportion of patent licenses granted to a single industry or enterprise, with a maximum limit of 20%, to mitigate the concentration of assets (Wei, 2021). The initiative encompasses regional projects in the eastern, central, and western regions, intending to enhance geographical dispersion. This combination helps to control the risk of "individual defaults" locally, which is not easy to trigger a systemic chain reaction, and at the same time improves the overall risk-resistant ability of the asset pool and the stability of the payment ability of the securities products (Schwarcz, 1994).

3.5 Financing Effect Analysis: Actual Results in Alleviating Financial Risks

Following the implementation of the project, a favourable financing effect has been reflected in various financial indicators and market feedback. On the one hand, the securitization of intellectual property effectively broadens the financing channels of enterprises, surpasses the high requirements for physical collateral and credit rating in traditional financing, and significantly improves the availability and flexibility of financing. At the same time, the issuance of asset-backed securities introduces a new source of external funding for enterprises, with a broader coverage of the scale of funding and a more reasonable term structure. As demonstrated by the available data, the cost of project financing is lower than the bank loan interest rate of approximately 150 to 200 basis points during the same period. This result is significantly better than the traditional credit model.

Furthermore, the stable cash flow is based on alleviating the short-term debt service pressure of the enterprise (Wei, 2021). Conversely, the consistent and reliable capital infusion has been demonstrated to enhance enterprise liquidity and bolster financial soundness. The credit rating of the original equity holders also improved after the project implementation, reflecting the positive repair effect of the securitization structure on the credit image of the enterprise. Moreover, the successful issuance of the project in the capital market also laid the foundation for the company to expand its direct financing and attract the attention of long-term investors in the future, further enhancing its visibility and bargaining power in the capital market. The project has engendered several beneficial feedback loops, including financing efficiency, credit reshaping, and risk mitigation. Collectively, these

outcomes establish a replicable model of capital tool innovation for technology-based SMEs.

3.6 Summary: Intellectual Property Securitization is an Important Tool for Financial Risk Management

The "Broad Patent" ABS case exemplifies the practical application of structured finance design in addressing the financing constraints experienced by SMEs. The project offers a financing channel for science and technology-based enterprises characterized by its operability, efficiency, and cost-effectiveness. This channel is made possible by integrating and packaging patent licensing rights, supplemented by a dual-licensing structure, a credit enhancement mechanism, and a decentralized design of asset pools. This model facilitates the transformation of intangible assets into predictable cash flows, thereby enabling the realization of their value within the capital market. Consequently, it mitigates the reliance on collateral and credit rating under traditional financing methods (Wei, 2021). As demonstrated by this case, the securitization of intellectual property rights can have several consequences, including enhancing an enterprise's creditworthiness, optimizing its capital structure, and diversifying financial risks. The successful promotion of financial engineering is contingent upon more than just the system design itself. In addition, it is imperative to consider the role of supporting policies, the legal environment, and market mechanisms. It has been posited that the securitization of intellectual property assets can enhance the diversity of financing channels and improve the pricing ability and anti-risk elasticity of enterprises in the capital market (Odasso & Ughetto, 2011). In order to achieve a broader range of applications in the future, it is necessary to improve further the intellectual property rights system, evaluation standards, and issuance support mechanism. Furthermore, this type of innovative financing path must be institutionalized and normalized.

4 CONCLUSION

In the context of profound economic restructuring and accelerated technological advancement, the external environment confronting SMEs in science and technology has become increasingly intricate, with a risk structure characterized by multiple intertwined and rapid transmission pathways. This paper systematically analyzes the risk exposure paths and structural contradictions of small and medium-sized science and technology enterprises in the market adaptation and financing system. The analysis is based on two typical cases: "L Technology Company" and "Guang Patent ABS." The study indicates that market risk and financial risk are the primary factors impeding the sustainable development of SMEs. Although independent, the two types of risks frequently cause and effect each other and interact with each other in enterprise practice. At the level of market risk, deviations in the enterprise's user positioning, communication channels, marketing strategy, and other elements under the digital platform will directly trigger a chain reaction of "cognitive mismatch—traffic imbalance—conversion obstruction." This, in turn, will significantly impact the enterprise's brand credibility and business continuity. The failure of L-Tech's crowdfunding case illuminates systemic challenges SMEs face in emerging market environments. These challenges include biased strategic judgment, inadequate databases, and a paucity of content closure. The study revealed that, from a financial risk perspective, SMEs in the science and technology sector encounter significant challenges in aligning with the risk management principles of traditional financial systems due to the inherent characteristics of their assets, which are characterized by their low asset quality, long lifecycle, and limited creditworthiness. These challenges result in systematic impediments within the financing structure, debt repayment mechanisms, and capital liquidity. The "Broad Patent" ABS project exemplifies the efficacy of intellectual property securitization in optimizing financial structures, upgrading credit ratings, and alleviating capital pressure from the perspective of structural innovation. This initiative establishes a replicable best practice model for SMEs to overcome financing constraints. The comprehensive research findings indicate that the risk faced by SMEs in the science and technology sector is not a transient crisis precipitated by a solitary variable. Instead, it is the consequence of a protracted accumulation of structural conditions. Consequently, enterprises seeking to enhance their risk management capabilities must fortify internal mechanisms such as data modelling, user insight, and asset allocation and consider the congruence between external institutional conditions and these efforts. It is imperative to recognize the necessity of a flexible and responsive financial support framework for SMEs, particularly in light of their challenges. In addition, implementing a policy protection mechanism is

crucial to ensure their stability and resilience in the face of economic uncertainties. In the future, developing a multi-level capital market and an inclusive financial system will be a primary strategy for addressing their structural challenges.

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