

Financing Dilemmas of Technology-Intensive Silver Economy Startups in China: An Abductive Multiple-Case Study of Asset, Capital, and Institutional Mismatches

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Abstract: China's rapidly ageing population has created demand for technology-intensive products and services in health, rehabilitation, smart eldercare, and age-friendly digital applications. Yet the financing of such ventures can remain difficult even when policy attention and market demand are strong. This study revisits the financing problem through an abductive multiple-case design. Rather than treating the Triple Mismatch framework as a pre-established empirical finding, the revised analysis uses entrepreneurial-finance theory and the New Quality Productive Forces (NQPF) context as sensitizing concepts and iteratively compares them with a multi-source evidence corpus summarized in the original study. The final case set comprises six identifiable Chinese ventures for which a reproducible public evidence trail was established. Unverifiable verbatim quotations and unsupported numerical claims from the earlier manuscript are not retained. Cross-case analysis identifies three recurring frictions: asset-recognition friction, capital-duration mismatch, and institutional-fit mismatch. These findings do not imply that intangible assets are inherently unfinanceable; rather, their financing value depends on verification, enforceable rights, cash-flow visibility, and the ability of financial intermediaries to process non-traditional risk information. The paper therefore develops a bounded Asset–Capital–Policy response architecture: verified intangible-asset and privacy-preserving risk signals at the asset level; staged, contract- or revenue-linked and patient capital at the capital level; and targeted risk sharing, coordinated standards, and controlled regulatory experimentation at the institutional level. International evidence is used as contextual comparison rather than as proof of direct transferability. The revised contribution is a theory-elaborating framework that connects asset morphology, capital duration, and institutional implementation without claiming causal proof.

Keywords: silver economy; technology-intensive startups; entrepreneurial finance; credit rationing; New Quality Productive Forces; patient capital; data governance; multiple-case study

1. Introduction

1.1 Background and research problem

Population ageing is becoming a defining structural feature of the Chinese economy. The National Bureau of Statistics reported that, at the end of 2025, 323.38 million people in China were aged 60 years or above, representing 23.0% of the population, while 223.65 million were aged 65 or above (15.9%). These figures indicate a large and heterogeneous demand base for products and services related to health, mobility, rehabilitation, care, digital inclusion, and ageing-in-place. The 2024 State Council policy on the silver economy also explicitly calls for stronger financial support for qualified silver-economy projects and for the application of information systems and intelligent equipment in eldercare (General Office of the State Council, 2024).

At the same time, a subset of silver-economy firms is increasingly technology intensive. Their productive resources can include software, algorithms, intellectual property, proprietary data-processing capabilities, clinical or operational know-how, and network relationships rather than large stocks of land and machinery. This configuration is relevant to the Chinese policy discussion on New Quality Productive Forces, which emphasizes new production factors, emerging industries, technological innovation, and structural upgrading (Huang & Sheng, 2024; Xi, 2024). The combination creates an important financing question: when the economic value of a young firm is concentrated in knowledge, data, software, or future cash flows, how do lenders and investors translate that value into credible, enforceable, and monitorable financing information?

Classical credit-rationing theory provides an important starting point. Stiglitz and Weiss (1981) show that credit markets can ration borrowers under imperfect information because interest rates do not simply clear the market. The small-business finance literature further emphasizes that financing sources vary with firm age, size, information quality, and stage of development (Berger & Udell, 1998). Venture-capital contracting research likewise shows that financing arrangements allocate cash-flow, control, voting, and liquidation rights rather than simply providing undifferentiated capital (Kaplan & Strömberg, 2003). These theories help explain why young firms may face financing constraints, but they do not by themselves specify how a technology-intensive silver-economy firm's asset structure, commercialization horizon, and policy environment interact.

1.2 Research gap

Three gaps are especially relevant here. Research on silver-economy startups is often folded into the broader SME-finance literature. That move is convenient, but it can hide financing problems associated with regulated health data, intangible technology, lengthy validation cycles, and interaction with public-service systems. NQPF creates a second gap: discussion has largely remained at the macro or industrial level, leaving its implications for firm-level capital access less developed. A third problem concerns remedies. Subsidies, guarantees, tax relief, and digital-finance initiatives are commonly discussed one by one, even though a startup may simultaneously face an asset-recognition problem, a poorly matched capital horizon, and fragmented implementation across institutions.

1.3 Research questions and contribution

RQ1: How do technology-intensive asset configurations shape financing frictions in silver-economy startups?

RQ2: How does the timing of commercialization interact with the duration and structure of available capital?

RQ3: How do institutional and policy arrangements mediate the financing of these ventures?

RQ4: What bounded financing and policy mechanisms can mitigate the identified frictions without assuming that intangible data automatically become collateral?

The contribution is deliberately bounded. Triple Mismatch is treated as a framework refined against the cases, not as a pre-specified result. The analysis also brings entrepreneurial-finance theory into conversation with the NQPF context by examining how asset recognition, capital duration, and institutional implementation meet at the firm level. From that comparison, the paper develops an Asset–Capital–Policy response architecture and states where its claims should stop. In particular, the argument does not assume that data can simply become collateral, that information asymmetry disappears once more data are available, or that foreign policy instruments can be transferred to China without institutional adaptation.

2. Theoretical Foundations

2.1 Credit rationing and entrepreneurial finance

Credit rationing theory highlights the informational foundations of lending. When lenders cannot

perfectly observe project quality or borrower behavior, higher interest rates may increase adverse selection and moral hazard rather than simply restore equilibrium (Stiglitz & Weiss, 1981). For small and young firms, the problem is compounded by limited operating histories and changing financing needs. Berger and Udell's (1998) financial growth-cycle perspective emphasizes that firms move through different financing regimes as their information and asset structures evolve. Venture capital provides a different governance solution: Kaplan and Strömberg (2003) document that VC contracts separate economic and control rights, allowing investors to address uncertainty through staged financing and governance rather than relying only on collateral.

Taken together, these perspectives make 'lack of collateral' too coarse an explanation for the firms examined here. The harder question is what a financier can actually observe and contract on. Software, intellectual property, operating data, or clinical know-how may be economically valuable, but their financing relevance depends on whether they can be expressed as credible signals, enforceable rights, monitorable performance indicators, or sufficiently predictable cash flows.

2.2 New Quality Productive Forces as a contextual lens

In this paper, NQPF is treated as a contextual and analytical lens, not as a standalone causal theory of finance. Huang and Sheng (2024) conceptualize NQPF as a system involving new factors, new structural carriers, and new functional orientations. Xi (2024) similarly places technological innovation and productivity upgrading within a broader high-quality development agenda. For technology-intensive silver-economy firms, this lens draws attention to the changing composition of productive resources: software, data-processing capabilities, algorithms, intelligent equipment, and organizational knowledge may become more important than conventional physical assets.

The implication for this study is intentionally limited. NQPF does not make a digital resource a legally recognized asset, nor does it give an algorithm pledge value. What the concept does is direct attention to a possible mismatch between how a technology-intensive firm creates value and how a capital provider records, verifies, and prices that value.

2.3 Silver-economy startups and technology intensity

The State Council defines the silver economy broadly as economic activities that provide products and services to older people and prepare people for later life (General Office of the State Council, 2024). The present study focuses on a narrower subset: technology-intensive startups operating in smart eldercare, health technology, rehabilitation, digital care, and age-friendly intelligent products. This scope clarification is important because the financing characteristics of a software- or robotics-based AgeTech firm cannot automatically be generalized to the entire silver economy, which also includes tourism, food, retail, household services, and other sectors.

2.4 From Triple Mismatch to a refined analytical framework

The earlier version of the manuscript used three labels—Asset Configuration Mismatch, Investment Cycle Mismatch, and Institutional Support Mismatch. We retain the underlying intuition but change what those labels are allowed to mean analytically. They enter the study as provisional sensitizing concepts, not findings. Cross-case comparison can strengthen them, narrow them, or expose cases that do not fit. Figure 1 shows this abductive movement between theory and evidence. Figure 2 reports the resulting, less deterministic formulation: asset-recognition friction, capital-duration mismatch, and institutional-fit mismatch.

Figure 1. Abductive analytical process

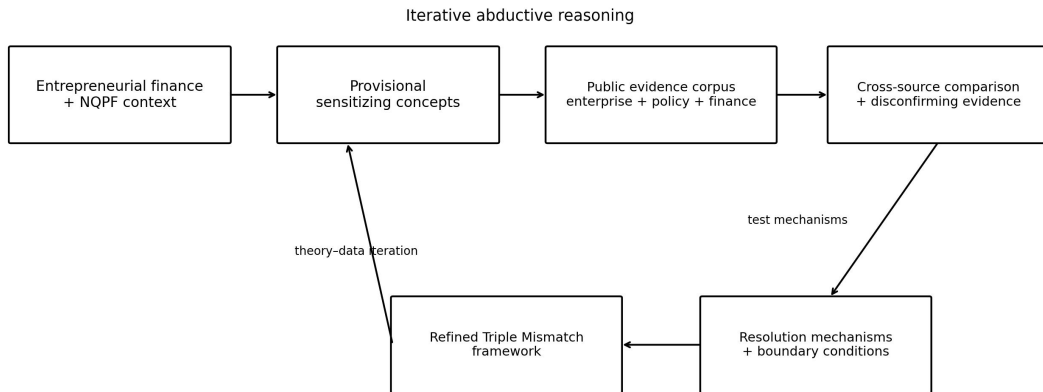
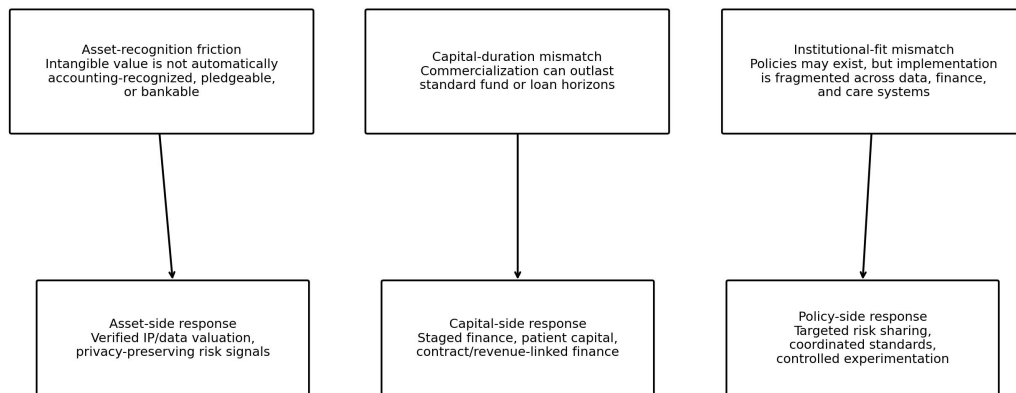


Figure 2. Refined Triple Mismatch framework and bounded responses



3. Research Design

3.1 Abductive multiple-case design

We use an abductive multiple-case design. The choice follows the nature of the problem: financing episodes are contemporary, strongly context dependent, and difficult to detach from the institutional setting in which they occur (Eisenhardt, 1989; Yin, 2018). A purely inductive account would overstate what the evidence can do, because the analysis does not begin from a theoretical blank slate. Entrepreneurial-finance concepts and the NQPF policy context are already in view. What matters is whether the cases reinforce, complicate, or contradict those starting ideas. This iterative movement between concepts and evidence follows systematic combining and abductive theory construction (Dubois & Gadde, 2002; Timmermans & Tavory, 2012), while the separation of first-order observations from higher-order interpretation draws on qualitative-rigor principles (Gioia et al., 2013).

The unit of analysis is the financing episode of a technology-intensive silver-economy startup, understood within its surrounding financial and policy environment. The original study corpus contained six cases and additional public materials concerning investors and policy actors. For the final audited manuscript, the case set was reconstructed around six identifiable ventures with a reproducible public evidence trail; case-level factual claims are linked to the Evidence-Traceability Register in Appendix A.

3.2 Case selection and evidence corpus

The final audited version reconstructs the case set around six identifiable Chinese technology-intensive silver-economy ventures for which a reproducible public evidence trail can be established. This is a substantive correction to the earlier manuscript: the labels Yuexin, Xingfu, Kangyang, Zhihui, and Aishen could not be tied with sufficient confidence to the financing episodes and quotations originally attributed to them. Rather than guessing those identities, the revised study substitutes six real cases selected for maximum variation in technology, financing stage, and commercialization model.

The cases are: A) Shanghai Rushen Robotics (RobotGym), rehabilitation and eldercare robotics; B) Shanghai BestCovered Technology, digital cognitive-impairment assessment and intervention; C) Beijing CAS Ruiyi Information Technology , intelligent diagnosis and quantitative assessment for neurological disease; D) Shanghai Yufu Technology , low-code/PaaS eldercare SaaS; E) Soft Sense / Xiamen Guanjun Zhichuang Technology, medical-grade flexible wearable sensing; and F) Shanghai Deyin Technology , intelligent eldercare robots including nursing, mobility, and AI-companion products.

Case	Verified entity	Technology domain	Verified financing evidence	Operational/public evidence	Audit status
A	Shanghai Rushen Robotics Co., Ltd. (RobotGym)	Rehabilitation & eldercare robotics	Angel+ tens of millions RMB (2025); multiple rounds; Pre-A RMB 100m announced in 2026	Official company site; VCBeat; GIES 2025 profile	Verified
B	Shanghai BestCovered Network Technology Co., Ltd.	Digital cognitive-impairment assessment & intervention	RMB 100m A round (2021); RMB 100m A+ round (2022)	Official site; VCBeat; Shanghai Civil Affairs deployment record	Verified
C	Beijing CAS Ruiyi Information Technology Co., Ltd.	AI-enabled neurological assessment/diagnosis	Pre-A (2022), A (2023), A+ tens of millions RMB (2024)	Lenovo Capital disclosures; official company archive	Verified
D	Shanghai Yufu Technology Service Co., Ltd.	Low-code/PaaS eldercare SaaS	Strategic industrial investment by Everjoy Duobao / Everjoy Health	Yufu official platform site; Everjoy Health announcement	Verified

			affiliate, disclosed 2024		
E	Soft Sense / Xiamen Guanjun Zhichuang Technology Co., Ltd.	Medical-grade flexible biosensing wearables	Multi- million-US- dollar angel round announced July 2026	VCBeat first- report financing article	Verified with one core industry- news source
F	Shanghai Deyin Technology Co., Ltd.	Eldercare robotics, mobility, nursing & AI companion	Tens of millions RMB angel round (Apr 2025); tens of millions RMB Pre-A (Nov 2025)	Investment profile; Pudong government deployment document	Verified

3.3 Evidence traceability and source hierarchy

Evidence was sorted by source type and by what each source could reasonably establish. Legal or regulatory records, official government documents, company disclosures, patent records, and dated institutional publications carried greater weight for factual claims. Media interviews and founder statements were useful for context, but we did not treat them as independent proof of financing outcomes. Where accounts diverged, the discrepancy was kept in the analytical record rather than resolved by selecting the more convenient version.

A key revision is the removal of six verbatim quotations that appeared in the original Table 3 without source identifiers. Direct quotations require a reproducible trail to a document, interview transcript, date, and location. Because that trail was not included in the manuscript package, the revised paper paraphrases the underlying themes and explicitly marks the case evidence limitation. This change reduces rhetorical vividness but materially improves research-integrity protection.

3.4 Abductive coding procedure

The coding moved back and forth between theory and case material rather than through a one-way sequence designed to recover three predetermined categories. We began with sensitizing ideas drawn from credit rationing, entrepreneurial finance, NQPF, and the silver-economy context. Case materials were then coded without requiring each observation to fit a mismatch label. Within-case summaries made it possible to compare recurrent mechanisms with exceptions and boundary conditions across cases. Only after that comparison was the provisional Triple Mismatch framework revised. A dimension was retained when it appeared across more than one evidence type or case and when the counterevidence did not point to a more plausible aggregate category.

Analytical stage	Purpose	Output
1. Sensitizing concepts	Define what to look for without predetermining the result	Asset recognition, capital duration, institutional fit
2. First-order coding	Capture financing-relevant observations in case context	Observed financing frictions, enabling conditions, exceptions
3. Within-/cross-case comparison	Identify recurrence and variation	Case matrices and rival explanations

4. Abductive refinement	Compare evidence with the provisional model	Refined framework	Triple	Mismatch
5. Mechanism mapping	Link each friction to bounded responses	Asset–Capital–Policy architecture		

3.5 Reliability, validity, and ethics

The original manuscript reported a Cohen's kappa of 0.86, but the underlying double-coded file and coding-unit definition were not included in the materials available for this revision. The statistic is therefore removed rather than reproduced without an audit trail. Qualitative rigor is addressed instead through source hierarchy, case comparison, negative-case attention, an explicit distinction between fact and interpretation, and a transparent statement of evidentiary limits. No new human participants were recruited for this revision, and no unpublished personal data are reported.

4. Findings

4.1 Cross-case pattern

Across the source corpus, a simple 'shortage of capital' explanation does not fit the evidence particularly well. Firms that raised external finance could still face a poor match between the kind of resources they possessed and the information financiers could underwrite. Timing mattered too: capital that was available was not always capital structured for the venture's commercialization path. A third issue appeared at the institutional interface, where finance, health, eldercare, data, and technology rules meet. We read these as related frictions, but not as interchangeable ones.

4.2 Asset-recognition friction

The cases make the asset problem more concrete. Rushen Robotics combines physical robots with software, control systems, and accumulated deployment data. BestCovered sells digital cognitive-assessment and intervention capabilities, while CAS Ruiyi relies on quantitative neurological assessment and software-enabled diagnostic infrastructure. Soft Sense adds another configuration: flexible sensors, algorithms, and longitudinal physiological signals. None of this is equivalent to saying that these firms hold readily collateralizable 'data assets'. A more precise reading is that productive value exists in forms that conventional underwriting may struggle to verify, price, or convert into enforceable claims.

What counts for financing, then, is not intangibility by itself. Ownership or lawful usage rights have to be demonstrable; technical performance and regulatory status may need verification; contracts and revenue histories matter; and lenders or investors must be able to observe enough of the risk to price it. Health-related data make the limit particularly visible because privacy and regulatory constraints rule out any simple move from 'valuable data' to assetization.

4.3 Capital-duration mismatch

The financing histories are uneven, which is analytically useful. BestCovered moved from Pre-A to A and A+ financing while developing a regulated digital-cognitive-health offering. CAS Ruiyi also progressed through several rounds as its products moved through clinical, registration, and market-development stages. Rushen Robotics and Deyin Technology raised successive early-stage rounds while taking robotics from development toward deployment; Soft Sense, by contrast, remains at the angel stage. The evidence points toward a stage-fit interpretation. It does not show a universal capital shortage. What changes across these firms is the mix of technical, regulatory, and commercialization uncertainty—and, with it, the type of capital that can plausibly fit.

This does not mean that venture capital is inherently too short-term. The mismatch is more specific: an instrument can become a poor fit when its expected holding period, repayment structure, milestone schedule, or risk tolerance runs ahead of—or lags behind—the venture's validation and adoption cycle.

4.4 Institutional-fit mismatch

Financing is also entangled with the institutions through which these products are validated, purchased, and deployed. BestCovered has participated in local-government cognitive-health programs. Deyin products have entered eldercare settings through public-sector-supported application scenarios, while Yufu's SaaS model spans institutional, community, and home-care environments. For CAS Ruiyi and Soft Sense, medical-device requirements, clinical validation, and data governance add another layer. This is not evidence of a simple 'policy gap'. The more specific problem is coordination: finance, health, eldercare, data, procurement, and technology rules can impose different evidentiary requirements on the same venture.

The 2024 State Council silver-economy policy supplies a broad mandate for support. The cases suggest, however, that the practical bottleneck sits one level below that mandate: standards, verification arrangements, procurement pathways, and the ability of intermediaries to evaluate technology-specific risks determine how much of the policy direction becomes usable in financing decisions.

4.5 Disconfirming evidence and boundary conditions

The cases also resist an overly deterministic reading of Triple Mismatch. BestCovered, CAS Ruiyi, Rushen Robotics, Soft Sense, and Deyin all obtained external capital, so intangible intensity plainly does not make a venture unfinanceable. Bank debt is not the only route either. Strategic investment, venture capital, public programs, and customer-linked commercialization can partly substitute for collateralized lending. Nor are institutions uniformly restrictive: local-government deployment programs and state-backed technology or eldercare initiatives can create market access and validation opportunities. Finally, a digital-software venture, a medical-device firm, and a robotics company should not be expected to require the same capital horizon. These differences are boundary conditions, not noise.

For that reason, the framework should be used selectively. It is most plausible where difficult-to-verify resources, extended commercialization, and cross-domain institutional interfaces occur together. The evidence here does not justify treating Triple Mismatch as an explanation for the silver economy as a whole.

5. Discussion

5.1 The refined Triple Mismatch framework

A more precise way to frame the refined model is as a problem of translation across three interfaces. At the asset interface, productive resources have to become information that a financier can verify or rights that can be enforced. At the capital interface, financing duration and contractual structure have to make sense for the venture's commercialization trajectory. The institutional interface is messier: policy, regulation, data governance, procurement, and financial intermediation may each be reasonable in isolation yet still create incompatible requirements when combined. Figure 2 summarizes this argument.

Dimension	Core mechanism	What the evidence supports	What it does not support
Asset-recognition friction	Gap between productive-resource value and finance-ready evidence	Verification and rights can improve financeability	Data automatically becoming collateral
Capital-duration mismatch	Mismatch between commercialization timing and instrument horizon	Stage-matched and patient capital can improve fit	A universal 12–15 year fund requirement
Institutional-fit mismatch	Fragmentation across finance, data, health/care and innovation rules	Coordination and controlled experimentation may	That generic subsidies are ineffective in all cases

		reduce friction	
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5.2 Theoretical implications

The theoretical contribution is therefore narrower than a new general theory of startup finance. The framework shifts attention from whether collateral is simply present or absent to how productive resources are translated into financeable information. Credit rationing remains relevant, but for knowledge-intensive firms the form, verifiability, and contractual usefulness of information matter alongside its quantity. The cases also make timing difficult to ignore: financing fit changes as validation, regulation, and commercialization progress. Institutions, in turn, enter the analysis as part of that financing interface rather than as a distant policy backdrop.

NQPF therefore functions here as context, not as a causal variable. It helps us ask why emerging productive resources may sit awkwardly within inherited financial infrastructure. The cases do not show that NQPF itself causes financing constraints, and we do not make that claim. Keeping this distinction explicit also makes the argument easier to relate to the wider entrepreneurial-finance literature.

5.3 International comparison: lessons without direct transplantation

The international comparisons are used to clarify mechanisms, not to supply ready-made solutions for China. Social impact bonds are useful because they show one way of financing verified outcomes: private investors fund an intervention upfront and repayment is linked to results. That is an alternative to collateral-centered finance, but it says nothing about turning health data or algorithms into collateral (Gustafsson-Wright et al., 2015).

Japan provides a different lesson through the Japan Finance Corporation. Its startup financing programs can offer unsecured and unguaranteed financing to eligible early-stage firms, with equipment loans available for up to 20 years and working-capital loans generally up to 10 years. This demonstrates the value of longer repayment horizons without requiring the unsupported claim that Japan operates a specialized 'Silver Economy Promotion Fund'.

Israel's Yozma experience provides a third mechanism. The OECD describes the original 1993 Yozma Fund as a government-backed fund-of-funds intended to attract foreign investors and develop a domestic venture-capital industry. The lesson is institutional crowd-in and ecosystem building, not a blanket government guarantee of startup losses. These examples support the logic of mechanism matching but do not establish that the same instruments would work identically in China.

6. Resolution Paths

6.1 Asset-side: from intangible resources to finance-ready evidence

On the asset side, verification is a more defensible starting point than automatic collateralization. In practice, financial institutions, data exchanges, sector regulators, and qualified intermediaries could standardize evidence on ownership or lawful use rights, data-compliance status, intellectual-property scope, model performance, operating history, and recurring contractual revenue. Where lenders need risk signals but should not receive raw sensitive data, privacy-preserving computation may be worth testing. The aim is narrower: make relevant risks more observable and underwriting more informed. This is not to claim that raw personal data should be treated as financial assets.

For suitable growth-stage firms, intellectual-property-backed lending, receivables finance, contract-based lending, or other established mechanisms may be more realistic than creating a new category of 'data collateral.' A specialized valuation or verification function could support these mechanisms, but any public institution should prioritize standard setting and independent verification rather than guaranteeing asset values.

6.2 Capital-side: match instruments to commercialization stage

Seed-stage firms with high technical uncertainty require risk-bearing equity or quasi-equity more than conventional working-capital loans. Firms with validated products and recurring contracts may become candidates for receivables finance, supply-chain finance, or revenue-linked structures. Growth-stage firms with predictable cash flows may be eligible for more conventional debt and securitization mechanisms subject to legal and cash-flow requirements.

Patient capital is better understood here as a portfolio-design principle than as a fixed number of years. Public guidance funds, institutional investors, insurers, and strategic corporate investors can combine staged milestones with follow-on reserves and differentiated performance metrics rather than force every venture onto the same exit timetable. The appropriate horizon will vary with technology validation, regulatory approval, customer adoption, and—eventually—cash-flow visibility.

6.3 Policy-side: targeted risk sharing and coordinated implementation

Policy design should begin with a specific friction rather than with a sector-wide subsidy. For qualified first-time loans, for example, a risk-sharing facility could combine explicit eligibility rules, loss-sharing caps, independent screening, and sunset provisions. A different problem calls for a different instrument. Where the obstacle is the lawful use of data in underwriting, a regulatory sandbox could allow banks, startups, regulators, and data-rights holders to test compliance-preserving processes under controlled conditions before wider adoption.

The 2024 State Council policy already provides a legitimate policy basis for stronger financial support to eligible silver-economy projects. The research implication is to connect this broad policy direction to operational standards: who verifies data rights, who certifies technology performance, how banks document due diligence, and how risk-sharing arrangements are monitored. The paper does not recommend arbitrary increases in NPL tolerance or administrative immunity for lending officers, because such measures could weaken financial discipline.

7. Conclusion, Limitations, and Future Research

7.1 Conclusion

This study reads financing difficulty in technology-intensive silver-economy startups as a set of interacting translation problems rather than as a single capital deficit. One problem concerns whether intangible productive resources can be rendered legible to financiers. Another is temporal: commercialization may proceed on a timetable that sits awkwardly with the duration or structure of available capital. The third lies at the institutional interfaces connecting data, finance, technology, health, and eldercare. Taken together, these patterns support the Triple Mismatch framework as a diagnostic device. They do not establish a universal causal law. The framework remains abductively refined, case-bounded, and subject to the evidentiary limitations stated in this paper.

The practical implication is not simply to supply more money. It is to improve financing fit. On the asset side, that means better verification and more usable risk information. Capital instruments need to reflect stage and duration rather than impose a common timetable. Policy intervention is most defensible where it coordinates standards or shares a clearly identified risk. Across all three levels, intangible value becomes financeable only to the extent that it is observable, legally usable, connected to cash flows through enforceable arrangements, and intelligible to the financing institution's risk-management process.

7.2 Limitations

The manuscript package did not contain a complete source register for Cases B–F. The revised version therefore anonymizes these cases and removes untraceable quotations.

The study is exploratory and cannot estimate the prevalence or causal effect of the three mismatches across the entire silver economy.

International examples are mechanism analogies and should not be interpreted as evidence of direct policy transferability.

The proposed mechanisms require legal, accounting, data-governance, and financial-regulatory testing before implementation.

7.3 Future research

The next empirical step is a case database that can be audited from source to claim, including source IDs, document dates, financing outcomes, and comparable measures of asset recognition, capital duration, and institutional fit. If pilot programs later generate meaningful regional variation, quasi-experimental designs could examine whether targeted guarantees, data-enabled underwriting, or long-horizon financing change financing costs or firm survival. Survey and transaction-level data would address a different question: whether the three dimensions identified here actually predict lender behavior and investor allocation.

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