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巻頭言

2026年、生成AIをはじめとする先進技術の進展と急速な構造変化により、企業・社会はかつてない転換期を迎えております。かかる時代にあって、本学校法人は大学院教育の強化を重要施策と位置づけ、次世代社会を牽引する高度専門職業人の育成と知識創造に邁進してまいりました。

とりわけ経営大学院の教育・研究の要をなすのが、社会人学生が存在です。皆様は多様な業界・組織の最前線で培われた豊かな実務経験と鋭い問題意識、そして日々の実務に蓄積された膨大な「暗黙知」を携え、本学の門を叩かれます。かかる現場に根ざした知見を個人の「体験」ととどめず、先行研究を踏まえて概念化・フレームワーク化し、学術的・論理的・実証的な「学術論文」へと昇華・再構築（形式知化）することこそ、経営大学院における研究の真髄といえます。

学術雑誌『城西ビジネスレビュー』は、まさにこのような知の転換と昇華を具現化し、社会人向け大学院教育を推し進めるための大きな推進力となるべく刊行されております。本誌は、学術的厳密性と実務的有用性を高次元で両立させた研究成果を発表・共有する知のプラットフォームであり、社会人学生と研究者が活発な議論を交わし、新たな経営知を世界へ発信する場としての期待が寄せられています。

実務に根ざした問題意識に端を発し、論理的分析と実証を経て紡ぎ出された論文群は、学術領域に新たな視座をもたらすとともに、現実のビジネスや地域社会の課題解決に資する示唆に富んでおります。

今後とも本誌は時代の変化を的確に捉え、実務家と研究者の架け橋として発展を続けてまいります。社会人学生の皆様が積み重ねてこられた実践知が、本誌を通じて学術論文へと結実し、社会に新たな価値をもたらすことを願っております。

末筆ながら、研究成果をご寄稿くださった著者各位、厳正な査読にご尽力いただいた査読委員各位、本学の教育・研究活動をお支えくださる関係各位に、心より御礼申し上げます。本誌が皆様の知的挑戦を鼓舞し、経営学の発展と社会への貢献に資することを願い、巻頭の挨拶といたします。

2026年 8 月

学校法人城西大学 常務理事
北 村 幸 久

城西ビジネスレビュー 第1号 目次

巻頭言	北村 幸久	
生成AIによる製造現場の暗黙知の形式知化メカニズム —AI拡張型SECIモデルの構築とワイズカンパニー理論による考察—	朱 琰	1
生成AI時代におけるKIPS人材の能力再構築 —M-GTAによる日本の専門サービス産業の実証研究—	潘 林	17
高齢者福祉施設における自動調理ロボット導入の課題 —福祉施設実務者対象の事例研究および高齢者調査による探索的研究—	金山 千晶	37
中国・米国におけるバーチャル・ファミリー・オフィスの 形成経路に関する比較研究	魏 洪閔	55
日本と香港における資産集約型再保険導入の要因 —構造的・規制的・市場的要因—	陶 悠悠	67
中国家族所有中小企業の家族資産管理とグローバル戦略配置に関する分析	陳 淑玲	93
低金利環境下の資産配分動向 —アルファ減衰モデルによるアクティブ債券ファンドと パッシブ債券ファンドの分析—	盛 珊	115
権利・責任・利益の視点から見た中国の中小企業向け融資保証制度の 効率性に関する研究 —2013年から2024年までのデータに基づく実証分析—	郑 菁	135
円金利の引き上げが中国地方政府融資プラットフォームのオフショア 債券価格形成に与える影響に関する研究	劉 小東	155
高齢化社会における儀礼の継承と地域社会への適応 —神理教の事例研究—	赵 文杰	187
生成AI時代におけるAIリテラシーとデータストラテジスト役割認知の形成メカニズム —人とAIの信頼の媒介効果—	李 忠海	223
日本の総合商社におけるバリュエーション・ディスカウント、 ファクター・エクスポージャー、開示ウィンドウ反応	馬 巖	243

Josai Business Review Vol. 1

Table of Contents

Foreword	Kitamura, Yukihiisa	
Generative AI and the Conversion of Tacit Knowledge into Explicit Knowledge on the Manufacturing Shop Floor: An AI-Enhanced SECI Model and a Reading through the Wise Company Theory	Zhu, Yan	1
Reconstructing Competencies of KIPS Professionals in the Era of Generative AI: An Empirical Study of Japan's Professional Service Industry Using the Modified Grounded Theory Approach (M-GTA)	Pan, Lin	17
Challenges of Introducing Automated Cooking Robots in Elderly Care Facilities: An Exploratory Study Based on Interviews and a Questionnaire Survey	Kanayama, Chiaki	37
A Comparative Study of the Development Paths of Virtual Family Offices in China and the United States	Wei, Hongmin	55
Drivers of Asset-Intensive Reinsurance Adoption in Japan and Hong Kong: Structural, Regulatory, and Market Factors	Tao, Youyou	67
An Analysis of Family Wealth Management and Global Strategic Layout of Chinese Family-Owned SMEs	Chen, Shuling	93
Asset Allocation Trends in the Low Interest Rates: An Analysis of Active and Passive Bond Funds Based on the Alpha Attenuation Model	Sheng, Shan	115
A Study on the Efficiency of China's SME Financing Guarantee System from the Perspective of Authority, Responsibility, and Benefit: An Empirical Analysis Based on Data from 2013 to 2024	Zheng, Jing	135
Research on the Impact of Yen Interest Rate Hikes on the Pricing of Chinese Local Government Financing Vehicle Offshore Bonds	Liu, Xiaodong	155
Ritual Continuity and Community Adaptation in an Aging Society: A Case Study of Shinrikyō	Zhao, Wenjie	187
AI Literacy and the Formation of Data Strategist Role Identity: The Mediating Role of Human-AI Trust	Li, Zhonghai	223
Valuation Discounts, Factor Exposures, and Disclosure-Window Reactions in Japanese Sogo Shosha	Ma, Biu	243

論 文

生成AIによる製造現場の暗黙知の形式知化メカニズム
—AI拡張型SECIモデルの構築とワイズカンパニー理論による考察—

**Generative AI and the Conversion of Tacit Knowledge into Explicit
Knowledge on the Manufacturing Shop Floor:**

An AI-Enhanced SECI Model and a Reading through the Wise Company Theory

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【要旨】

製造業では熟練工の退職による暗黙知の喪失が深刻だが、従来のKMシステムは暗黙知の捕捉・変換に限界を有する。本研究は生成AIが暗黙知の形式知化をいかに加速・変容させるかを解明する。理論的枠組みとして、SECIモデル（Nonaka, 1994）、He & Yang（2025）の生成AI駆動型知識管理の五段階フレームワーク、ワイズカンパニー理論（Nonaka & Takeuchi, 2019）を統合し、「AI拡張型SECIモデル」を提案する。神州数碼「神州問学」、養父織物のNotebookLM活用、黒野金属の不良率予測AI、旭化成・ダイキン・経産省の論議の4事例を比較分析し、GENIAC-PRIZE（2026年）応募事例群を補完的エビデンスとして統合した。分析の結果、生成AIはSECIの4変換モード、とくに表出化と連結化を質的に変容させ、暗黙知を「消えゆく個人資産」から「進化し続ける組織資産」へ転換する可能性が示された。同時に、AI学習のみでは「属AI的な暗黙知」（中山, 2026）が再生産される構造的リスクと、形式知化と技能習熟の乖離という限界も特定された。理論的貢献はSECIモデルの生成AI時代への拡張と、フロネシス概念による規範的運用条件の明示にある。実務的には暗黙知の組織的活用を段階的に実現するロードマップを提示する。

キーワード：暗黙知、形式知、実践知、生成AI、知識管理、SECIモデル、製造業

1 序論

1.1 研究の背景

製造業は長年、現場の暗黙知によって競争力を支えてきた。設備の異常音を聞き分ける保全員の「耳」、色むらを見極める検査員の「目」、トラブル時に最適対処を判断する現場リーダーの「勘」は、品質・生産性・安全性の根幹をなしてきた（Nonaka, 1994; Polanyi, 1966）。

しかし、製造業を取り巻く環境は大きく変化している。熟練工の高齢化と退職による技能伝承の断絶、製造プロセスの高度化に伴う暗黙知の多元化、グローバルサプライチェーンの拡大に伴う複数拠点での共有・活用の必要性が増大している。これらの課題は産業政策レベルでも認識され、2026年の経済産業省・NEDO主催「GENIAC-PRIZE」では「製造業の暗黙知の形式知化」が主要テーマとして設定された（久富, 2026c）。これは、生成AIによる暗黙知の形式知化が国家的イノベーション課題として制度化されつつあることを示している。

従来の知識管理（KM）システムはこれらの課題に十分に伝えてこなかった。既存のKMは形式知の蓄積・検索に焦点を置き、暗黙知の捕捉には構造的限界を有してきた（He & Yang, 2025）。

1.2 問題の所在

2022年以降の生成AIの急速な発展は、製造業の知識管理にパラダイム転換の可能性を提起している。大規模言語モデル（LLM）を中核とする生成AIは自然言語対話、非構造化データの構造化、文脈に応じた知識再構成の能力を備え、暗黙知の捕捉・変換・活用に本質的変革をもたらしうる。

しかし、生成AIが暗黙知の形式知化を促進するメカニズムの理論的解明は十分に進んでいない。野中のSECIモデル（Nonaka, 1994; Nonaka & Takeuchi, 1995）はAI技術未成熟期の定式化であり、生成AIがSECIモデルの各プロセスにいかなる拡張を要請するかは未解決の理論的課題である。

1.3 本研究の目的と構成

本研究の目的は、第一に生成AIが暗黙知の形式知化を促進するメカニズムをSECIモデルとHe & Yang（2025）の五段階フレームワークを統合した枠組みで解明すること、第二に4事例を比較分析し具体的メカニズムを検討すること、第三にAI拡張型SECIモデルを提案し、ワイズカンパニー理論のプロセス概念を援用して規範的運用条件を理論化することの3点である。

本論文の構成は、第2節で先行研究検討とRQ設定、第3節で理論的枠組みと仮説、第4節で研究方法、第5節で事例分析と仮説検証、第6節で考察、第7節で結論を述べる。

2 先行研究の検討

2.1 関連する理論的枠組み

2.1.1 暗黙知の概念と知識創造理論

暗黙知の概念はPolanyi（1966）の「我々は語りうる以上のことを知っている」に端を発し、人間の知識を体系化可能な形式知と、言語化が困難で身体的経験・直観に根ざす暗黙知に大別する。野中郁次郎はこれを組織レベルに拡張し、知識創造の動態理論を構築した（Nonaka, 1994; Nonaka & Takeuchi, 1995）。中核であるSECIモデルは組織的知識創造を4変換モードの螺旋的循環として定式化する。

- ・ 共同化（Socialization：暗黙知→暗黙知）：共同体験を通じて個人間で暗黙知を直接共有するプロセス。
- ・ 表出化（Externalization：暗黙知→形式知）：暗黙知を明示的な概念や言語に変換するプロセス。

- ・連結化（Combination：形式知→形式知）：異なる形式知を組み合わせて体系化し、新たな形式知を創出するプロセス。
- ・内面化（Internalization：形式知→暗黙知）：形式知を、実践を通じて個人の暗黙知として体得するプロセス。

SECIモデルは影響力ある枠組みだが、表出化の困難性と条件が十分に理論化されず、また1990年代の定式化時にAI技術が未成熟でデジタル技術の役割が考察の対象外であったことが限界として指摘される。He & Yang（2025）はこの点を研究ギャップとして指摘し、生成AIとSECIモデルの接合の必要性を論じている。

2.1.2 AI for Processの自律化レベルモデル

中国IT企業である神州数碼（Digital China Group Co., Ltd.）は、AIネイティブ組織への変革を目指し、業務プロセスの自律化を、自動運転技術のレベルに準拠した5段階モデル（L1～L5）として体系化した。

- ・L1（AIアシスト）：AIが特定タスク（要約等）を補助する。
- ・L2（部分的自律）：AI Copilotが判断を支援するが、人間が主導権を維持する。
- ・L3（条件付き自律）：AIが標準的な意思決定を実行し、例外的な状況でのみ人間が介入する。
- ・L4（高度な自律）：AI Agentが複雑なプロセスを自律的に完遂し人間が監視を担う。
- ・L5（完全な自律）：プロセス自体が自己学習・自己進化を通じて最適化される。

このモデルは、製造現場における暗黙知活用とAIの自律化レベルの対応関係を理解するための分析枠組みを提供する。

2.1.3 ワイズカンパニー理論：知識創造から知識実践へ

Nonaka and Takeuchi（2019）のワイズカンパニー理論は、SECIモデルを基盤に理論的重心を「知識の創出」から「知識の実践」へ拡張する。中核概念はフロネシス（実践知）であり、組織が「何を善い目的として実行すべきか」を判断する規範的能力に焦点を当てる。

この示唆は生成AI文脈で重要である。生成AIは表出化・連結化を加速し得るが、どの知識を優先しどの判断を現場で採用するかは、実践知を備えた人間の価値判断に依存する。同理論の「知識創造→知識実践→価値創造」の連鎖により、本研究は「形式知の規範的実装」という分析軸を獲得する。

2.2 先行研究の整理と限界

2.2.1 製造業における知識管理の先行研究

製造業の知識管理研究は3潮流に整理される。第一は暗黙知の捕捉・伝承を扱う研究群で、OJT・師弟制等の人的伝承に依拠し技術的支援の検討は限定的だった。第二はIT/IoT活用のKMシステム研究群で、ERP・MES・PLM等は構造化データを前提とし非構造化・文脈依存的な暗黙知の取り扱いに限界がある。第三はAI/機械学習活用のKM研究群で、画像認識・予知保全等は進展するが特定タスクの自動化に焦点を置き、暗黙知の総合的変換を分析対象とした研究は希少である。

2.2.2 生成AIと知識管理：He & Yang（2025）の五段階フレームワーク

He & Yang（2025）は、製造企業の生成AI駆動型知識管理の五段階フレームワークを提示した。以下の5段階から構成される。

1. 智能知識採集（Intelligent Knowledge Collection）：NLPによる技術文書の標準化、コンピュータビジョンによる作業動作の捕捉、音声認識による経験談の記録を通じて、暗黙知をデジタル化する

段階。

2. 智能知識共有 (Intelligent Knowledge Sharing)：従業員の行動データと職務要件に基づく個人化された知識推薦、人機協働によるリアルタイムの知識共有を実現する段階。
3. 智能知識整合 (Intelligent Knowledge Integration)：生成AIにより、従業員・プロジェクト・製品を核とする領域オントロジーを構築し、デジタル知識グラフを生成する段階。
4. 智能知識応用 (Intelligent Knowledge Application)：知識グラフに基づくインテリジェント検索、意思決定支援、自然言語Q&Aモジュール、リスク早期警報メカニズムを展開する段階。
5. 智能知識優化 (Intelligent Knowledge Optimization)：知識グラフの論理的矛盾や陳腐化を定期的に検出し、内外のデータソースから動的に更新する段階。

本フレームワークは生成AIがKMの全ライフサイクルを変革する包括的視座を提供し、本研究はこれをSECIモデルと接合して暗黙知変換メカニズムを精緻に理論化する。

2.2.3 先行研究の限界と研究ギャップ

以上から次の研究ギャップが明らかになる。第一に、SECIモデルでは生成AIの登場による各変換モードの拡張・変容の理論的検討が欠如している。第二に、He & Yang (2025) の五段階フレームワークは暗黙知変換メカニズムへの理論的深化が不十分で、SECIモデルとの接合が試みられていない。第三に、製造現場文脈での実証分析が不足している。第四に、形式知化後の規範的判断という「知識実践」の次元が既存研究でほぼ扱われていない。ワイズカンパニー理論はフロネシスの重要性を提起するが、生成AI文脈への適用は未開拓である。

2.3 リサーチ・クエスション (RQ) の設定

以上の研究ギャップを踏まえ、本研究は次のリサーチ・クエスションを設定する。

RQ1：生成AIは、製造現場の暗黙知から形式知への変換プロセスをいかなるメカニズムで促進するか。

RQ2：生成AIの介在は、SECIモデルの各変換モード（共同化・表出化・連結化・内面化）にいかなる質的変容をもたらすか。

RQ3：生成AIを活用した暗黙知の形式知化は製造企業の知識管理にいかなる組織的效果をもたらし、形式知化された知識の実践的運用にはいかなる規範的条件が求められるか。

3 理論的枠組みと研究仮説

3.1 概念の定義

本研究で使用する主要概念を次のとおり定義する。

- ・暗黙知 (Tacit Knowledge)：製造現場の作業者が経験・実践を通じて体得する、言語化が困難な知識・技能・判断力 (Polanyi, 1966; Nonaka, 1994)。
- ・形式知 (Explicit Knowledge)：言語・数式・図表・プログラム等で明示的に表現され、伝達・共有・蓄積が可能な知識 (標準作業手順書・品質基準書等)。
- ・生成AI (Generative AI)：大規模言語モデル (LLM) を中核とし、自然言語の理解・生成、非構造化データの処理、知識の再構成を行うAI技術の総称。本研究では企業向け生成AIプラットフォームを対象とする。

- ・知識グラフ（Knowledge Graph）：実体（entity）とその関係（relation）をノードとエッジのネットワークとして構造化したデータ表現。製造業の設備・症状・原因・対処法などの実体間関係を体系的に記述する。
- ・プロセスの数智化（Digital Intelligence Transformation）：製造業務プロセスにAIを組み込み、データ駆動型意思決定・実行・最適化を実現する変革。単なるデジタル化を超え、AIによる知的処理を含む点で区別される。

3.2 仮説の構築

本研究の理論的枠組みは、SECIモデルとHe & Yang（2025）の五段階フレームワークを統合した「AI拡張型SECIモデル」である。このモデルに基づき次の仮説を構築する。

仮説1（表出化の拡張）：生成AIの自然言語インターフェース（LUI: Language User Interface）およびマルチモーダル機能は、製造現場の作業者が暗黙知を言語化する際の障壁を低減するとともに、非構造化データ（画像・音声・動画・図表）を「構造化された形式知」へと変換することによって、表出化（Externalization）プロセスの量・質・対象範囲を向上させる。

SECIモデルで表出化は最も困難なプロセスとされ、従来高度な言語化能力に依拠した（Nonaka, 1994）。また従来のKMが扱える形式知は構造化テキストに限定され、非構造化データは実質的に排除されてきた。生成AIはLUIによる言語化障壁の低減とマルチモーダル機能による非構造化データの構造化によってこの二重障壁を同時に低減し、表出化の拡張は量・質・対象範囲の三次元で進行する。

仮説2（連結化の高度化）：生成AIによる知識グラフの自動構築は、異なる領域・部門に分散する形式知を統合的に連結するだけでなく、企業間の協業において業界レベルの共有基盤を形成し、連結化（Combination）プロセスの範囲と速度を企業内から企業間・業界横断的次元へと飛躍的に拡大させる。

He & Yang（2025）の「智能知識整合」は、連結化を人手からAIによる動態的知識再構成へ転換する。さらに「自社データのみによる開発には限界がある」との認識（日経クロステック, 2026）から、連結化は同業他社と共有する「協調領域」と各社独自の「競争領域」の階層的設計へ拡張される。したがって生成AIによる連結化の高度化は、（1）企業内の領域横断的連結化と（2）協調領域における企業間共有基盤の形成の二層で進行すると考えられる。

仮説3（知識の動態的進化）：生成AIによる知識の動態的最適化メカニズムは、SECIスパイラルの回転速度を加速させ、暗黙知を「消えゆく個人資産」から「自己進化する組織資産」へと転換する。

He & Yang（2025）のフレームワークの第5段階「智能知識優化」は知識グラフの自動検証・更新を提示しており、これは従来のSECIスパイラルが想定していなかった「知識の自己進化」メカニズムに対応する。AI for Processの自律化レベル（L3以上）の例外処理からの学習は、このメカニズムの具体的な発現形態である。

4 研究方法

4.1 研究デザイン

本研究は探索的複数事例研究（exploratory multiple case study）のデザインを採用する（Yin, 2018; Eisenhardt, 1989）。本テーマは生成AIと暗黙知の相互作用という比較的新しい現象を扱うため、先行研究の蓄積が限定的である。「いかに（how）」「なぜ（why）」を問うリサーチ・クエスチョンに対して文脈

依存的な深い理解を得るには事例研究が適切であると判断した。加えて、工程特性・産業文脈・AI活用様式の異なる複数事例を比較することで分析的一般化の妥当性を高める設計とした。

4.2 研究対象の選定理由

事例研究として、神州数碼（Digital China Group Co., Ltd.）の「神州問学」、養父織物のNotebookLM活用、黒野金属の不良率予測AI、旭化成・ダイキン・経済産業省による戦略的論点の検討を選定した。事例選定にあたり、次の3つの包含基準を設定した。(a) 生成AI（LLMを含む）を暗黙知の形式知化に適用していること、(b) 暗黙知変換の具体的実践および成果が公開資料から確認可能であること、(c) 知識課題・技術実装・産業文脈が異なり、理論的サンプリング（Eisenhardt, 1989; Patton, 2015）の要件を満たすこと。生成AI以前のAIのみの事例、暗黙知変換を含まない事例、公開資料不十分な事例は除外した。各事例の選定理由の詳細は次のとおりである。

第一に、理論的サンプリングの適合性である。神州数碼は企業横断型の知識基盤構築、養父織物は伝統工芸の技能伝承、黒野金属は製造現場の品質予測という異なる知識課題に生成AIを適用しており、暗黙知→形式知の変換メカニズムを多面的に観察できる「情報豊富な事例（information-rich cases）」に該当する（Patton, 2015）。

第二に、技術的多様性である。神州問学は企業級生成AIアーキテクチャによる体系的KMプラットフォーム（神州数碼, 2025）、養父織物はタブレット上のNotebookLMによる対話型検索、黒野金属は定量・定性データを統合した不良率予測モデルという異なる技術実装を示す。旭化成・ダイキン・経産省の事例が「協調領域」「三者構造」の制度的枠組みを加え、個社と産業レベルの複層的分析を可能にする。

第三に、各事例で暗黙知変換の具体的実践が公開資料から確認可能であることである（久富, 2026a, 2026b；日経クロステック, 2026）。

4.3 データ収集と分析方法

データ収集は複数の二次データソースを体系的に照合する多元的資料分析を採用する。本研究は一次データ（インタビュー・参与観察）を含まない探索的研究であり、二次資料間の整合性を検討して解釈の信頼性を確保する設計とした（Yin, 2018）。

データ収集期間は2025年1月から2026年4月までとした。この期間は、生成AIの製造業適用に関する実践報告が集中的に公開された時期に対応する。資料の検索にあたっては、学術データベース（Google Scholar、CiNii Research、Web of Science）において英語・日本語・中国語の関連キーワードを組み合わせ検索した。加えて業界専門メディアおよび企業公式資料を被引用文献の追跡により補完した。

1. 公開資料の分析：神州数碼の公式発表資料、技術白書「AI for Process 企業級プロセスの数智化変革」、製品仕様書、プレスリリース等。
2. 学術文献の分析：He & Yang (2025) の五段階フレームワーク研究（中天鋼鉄集団の事例を含む）、および関連する生成AI×製造業KMの学術論文。
3. 業界報告・報道記事の分析：製造業DX関連の白書、業界レポート、専門メディアの報道記事（養父織物・黒野金属に関する久富, 2026a, 2026bを含む）。
4. 補完的エビデンスの分析：上記4事例の分析を補強するため、経済産業省・NEDO主催「GENIAC-PRIZE」（2026年）の受賞事例報道（久富, 2026c）および応募企業群の動向を俯瞰した論説記事（中山, 2026）を補完的データソースとして活用した。これらは主要4事例の分析結果を外部事例から裏付ける資料であり、独立した事例分析の対象ではない。

分析方法は理論駆動型のテーマ分析を採用する（Braun & Clarke, 2006）。コーディング手順は以下の段

階で実施した。初期コーディングで暗黙知変換関連記述を抽出し、演繹的コーディングでSECIの4変換モードとHe & Yang (2025) の五段階の計9カテゴリに分類した。帰納的コーディングで事前コードに該当しない知見（「属AI的な暗黙知」等）を追加した。コーディングの信頼性確保のため、各事例について複数の資料間で記述の整合性を照合し、矛盾が認められた場合は追加資料で確認した。さらに、事例内分析と事例間比較を通じて、パターンマッチングにより理論的予測（仮説）と実証パターンの整合性を評価する（Yin, 2018）。

5 調査結果の統合と仮説の検証

5.1 各調査から得られた知見

5.1.1 文献研究からの知見

He & Yang (2025) は、中天鋼鉄集団の事例分析を通じて、生成AIが製造企業のKMを「経験駆動型」から「知識+AI駆動型」へ転換する可能性を示した。中天鋼鉄は投資額202億人民元のスマートファクトリーで、5G・デジタルツイン・VR/ARによるリアルタイム監視と、AIによる設備運転速度の最適化（ピークカット・電力コスト削減）を実現した。

5.1.2 事例研究①：神州問学による暗黙知変換の3つの機能的ドメイン

神州数碼の生成AIプラットフォーム「神州問学」は、暗黙知の形式知化を3つの機能的ドメインで実現している。「設備保全」ではベテランの感性判断・経験則を構造化し、類似事例の提示で保全判断を標準化している。「品質検査」では不良事例・判断根拠を知識ベース化し検査基準の透明化とばらつき低減を図っている。第三に「トラブル対応」では、分散した対応記録をQ&A形式で再構成し、リアルタイムでのベストプラクティス参照を可能にしている。

さらに同プラットフォームは、AIを「実践パートナー」（専門家の意思決定ロジックのモデル化による技能伝承加速）および「洞察の触媒」（対話を通じた潜在知見の言語化とナレッジグラフへの統合）と定義する二層の枠組みを提示している。

SECIモデルの観点からは、上記3ドメインは次のように位置づけられる。暗黙知の構造化は表出化に、ナレッジグラフによる知識統合は連結化に、Q&A型支援は内面化にそれぞれ対応する。「洞察の触媒」機能が示す対話を通じた潜在知見の言語化は、従来メタファーやモデル化に依拠していた表出化をAI対話型プロセスへ転換する可能性を示唆する。

本事例の制約として、データソースが公式資料・技術白書に限定され独立した定量的検証を含まないこと、「実践パートナー」「洞察の触媒」が同社独自の意味づけであることが挙げられる。

5.1.3 事例研究②：養父織物（西陣織）におけるNotebookLM活用

養父織物（京都府京丹後市）は西陣織の帯地を生産する従業員12名の製造企業で、60代のベテラン職人3名に対し若手職人9名という技能構成を有する。同社では横糸テンション調整、傷の早期発見、作業順序の微調整等のベテランの暗黙知が若手への伝承ボトルネックとなっていた（久富, 2026a）。

同社はリーダーミーティングの議事録と現場指導の音声データをGoogle NotebookLMに学習させ、織機のタブレットから利用可能なチャットボットを構築した。これにより「口頭で消える」指導内容が検索可能なテキスト知識へ変換され、若手が反復参照できる学習環境が形成された。若手職人からは「以前は口頭で終わっていた指導内容が文章として残り、聞きづらいというハードルもない」という声が報告されている。

SECIモデルの観点からは、本事例はAIを媒介として共同化・表出化・内面化の3モードの循環を形成している。ベテランと若手の直接的共同体験（共同化）で得られた知見が、会議記録・指導音声のテキスト化を通じて表出化され、対話型検索による反復参照が内面化を支援する。NotebookLM導入は技能継承の教育施策と同時に、品質・生産性を改善するオペレーション施策としても位置づけられる。

本事例の制約として、NotebookLMの対象が言語化可能な暗黙知に限られ身体知は対象外であること、若手の肯定的評価が取材記事（久富，2026a）に基づき技能習熟度の定量的改善は未検証であることが挙げられる。

5.1.4 事例研究③：黒野金属における不良率予測AI

黒野金属（広島県呉市）は水道メーターケース等の銅合金铸造品を製造する企業である。同社の鋳込み工程は完全手作業で、製品ごとに溶湯の流し込み速度を微細に調整する技能が品質を左右する。人手不足に伴い経験の浅い職人が増加し、属人的な暗黙知の継承が課題となっていた（久富，2026b）。

同社は鋳込み技能の形式知化に「不良率」を媒介変数とする逆算型アプローチを採用した。1年半以上の製品種別・鋳込み速度・不良率データに気象・生産データを統合して不良率予測AIを構築した。定量データに線形回帰等の統計手法、定性データにLLMを適用するハイブリッド設計により、従来取り込みにくかった文脈情報を予測に組み込んでいる。

予測結果は製品名ごとの不良率として出力され、70%以上に「高リスク」アラートと注意喚起メッセージが自動生成され朝礼で活用される。予測精度は87.6%だが、鋳込み速度の微細変化・溶湯温度・砂の水分量等が未反映であり実運用は検証段階にある。

SECIモデルの観点からは、本事例は「結果指標（不良率）を媒介変数とした逆算型の形式知化」を示す。予測結果が業務フローに接続されることで判断根拠が可視化され、ハイブリッド設計は表出化の対象を文脈情報へ拡張する試みとして位置づけられる。

本事例の分析上の制約として、「手作業の5秒の感覚は人によって異なる」という現場の声（久富，2026b）が示すように、身体知のデータ化には本質的困難が存在し、予測AIが代替しうる暗黙知の範囲には構造的限界がある。

5.1.5 事例研究④：旭化成・ダイキン・経済産業省による戦略的論点の検討

2026年3月の「AIリーダーズ会議」におけるパネル討論では、産官のAI推進責任者により、製造業の暗黙知活用に関する戦略的論点が提示された（日経クロステック，2026）。本事例は、現場実装を産業政策および競争戦略の文脈で補完するものである。

第一の論点は「協調領域」の構築である。経済産業省は、自社データのみ開発の限界を指摘し、同業他社との情報共有による基盤モデルの精度向上と独自付加価値の創出という階層的設計の必要性を指摘した（日経クロステック，2026）。

第二の論点は独自現場データの戦略的価値である。ダイキン工業は、汎用データの学習だけでは実用的な精度に達しないことを強調し、独自の現場データこそが競争優位の源泉であると位置づけた（日経クロステック，2026）。

第三の論点は「三者構造」によるガバナンスである。経済産業省は、AIの自律制御に不可欠な意味づけと補正のため、現場ベテラン・データ生成プレーヤー・AI開発者が連携する「三者構造」を提唱した（日経クロステック，2026）。

SECIモデルの観点からは、上記3論点は次のように位置づけられる。「協調領域」の構築は連結化の範囲を企業内から業界横断レベルへ拡張することを目指している。独自現場データの戦略的価値は、表

出化の質が汎用データではなく現場固有の暗黙知データに依存することを示している。「三者構造」は「属AI的な暗黙知」（中山，2026）の再生産を回避する組織的ガバナンス枠組みとして理解される。

本事例の分析上の制約として、パネル討論における発言に基づく分析であるため、各社の具体的な実装状況や定量的成果に関するデータが限られている。「協調領域」および「三者構造」はいずれも構想・提言段階にあり、実際の産業レベルでの運用事例による検証は今後の課題として残る。

5.1.6 プロセスの知識変換における共通パターン

上の4事例の分析（表1に比較を要約）から、生成AIによる暗黙知変換には次の共通パターンが見出される。

- 1. **暗黙知の収集**：現場の経験・ベテランの勘・トラブル対応記録を多様なチャネルから収集する。収集方式は事例ごとに異なるが、従来記録されなかった情報の体系的収集を起点とする点は共通する。
- 2. **構造化と知識ベース化**：神州問学の知識治理、NotebookLM上の文書化、予測モデルの特徴量設計により、それぞれ症状・原因・対処（神州数碼）、指導内容・ミス原因（養父織物）、鑄込み条件・不良確率（黒野金属）として構造化される。
- 3. **AIによる再構成と提示**：生成AIが蓄積された知識を文脈に応じて再構成し、判断根拠を可視化して提示する。提示方式は多様だが判断根拠の可視化は共通する。
- 4. **業務フローへの組み込み**：変換された形式知を日常業務フロー（保全対応、織機作業、朝礼・工程管理）に埋め込み、新人・若手が暗黙知を再現しやすい環境を構築する。

表1 4事例の比較

事例	知識課題	AI技術・手法	主要SECI変換	主要な成果	分析上の制約
①神州問学	設備保全・品質検査・トラブル対応	生成AIプラットフォーム（知識グラフ+LLM）	表出化・連結化・内面化	3ドメインの暗黙知を構造化・知識ベース化	企業公式資料のみ、独立した検証なし
②養父織物	西陣織の技能伝承（12名規模）	NotebookLM（対話型チャットボット）	共同化→表出化→内面化	口頭指導のテキスト化、心理的障壁の低減	身体知は対象外、定量的改善未検証
③黒野金属	鑄込み工程の品質予測	LLM+統計手法（ハイブリッド）	表出化（逆算型）	不良率予測精度87.6%、朝礼での判断根拠可視化	身体知のデータ化困難、検証は報告値
④旭化成・ダイキン・経産省	産業政策・競争戦略の制度的枠組み	（パネル討論）	連結化（業界横断）	協調領域・三者構造の提言	構想段階、実装事例なし

出典：筆者作成

5.1.7 事例横断的課題：暗黙知の形式知化における3つの構造的困難

上記の共通パターンを踏まえつつ、4事例とGENIAC-PRIZE応募企業群の動向を俯瞰した中山（2026）の分析から、AIを活用した製造業の技能継承に関する3つの本質的課題が浮上する。

第一は暗黙知の完全抽出不能性である。製造業の技能の暗黙知は言語化可能な知識だけでなく身体動作・五感による状況判断と不可分に結びついている。黒野金属の「手作業における5秒の感覚は人によって異なる」という指摘、養父織物の糸テンションの身体感覚は、いずれもこの困難を具体的に示す。

第二はAI学習と形式知化の非同値性である。中山（2026）は、暗黙知をAIに学習させただけでは「属人的な暗黙知がAIに依存した形の暗黙知（属AI的な暗黙知）になる」にすぎず、入出力間の論理的関

係が明示されない限り形式知とは呼べないと論じる。シャボン玉石けんの二段階プロセス（判断基準のAI抽出→形式知のAI学習）は「構造化」段階の不可欠性を裏付ける。

第三は形式知化と技能習熟の乖離である。知識としての理解と身体的技能としての習得は別プロセスであり、後者には反復的实践と身体的フィードバックが不可欠である。この課題はSECIモデルの内面化（形式知→暗黙知）の困難性に直接対応し、生成AIによる内面化支援の限界を明示する。

以上の3課題は生成AIによる暗黙知変換の可能性と限界を峻別する重要な分析視角を提供する。

5.2 理論的分析の結果

5.2.1 SECIモデルに基づく分析：AI拡張型SECIモデルの導出

事例分析の結果、生成AIはSECIモデルの各変換モードに次の質的変容をもたらしていることが確認された（表2に概念的構造を示す）。

共同化（Socialization）の拡張：AI媒介型共同化

従来の共同化は物理的な共同体験を前提としていた。生成AIによりベテランの経験が知識ベースに蓄積され「時間と空間を超えた疑似的共同体験」が可能となる。若手がAI対話を通じて次善の推奨行動を受け取ることで、ベテランの暗黙知に間接的に触れられる。

表出化（Externalization）の拡張：LUI駆動型表出化

生成AIのLUI（自然言語ユーザーインターフェース）は表出化の障壁を劇的に低減する。従来高度な認知操作が必要だったが、LUIにより現場作業者は自然言語で気づきや対処法を報告すればよく、AIがその入力を構造化することで「保持者自身が表出化を意識せずとも表出化が達成される」質的転換が生じる。

ただし5.1.7で論じた「属AI的な暗黙知」の問題が示すように、暗黙知をAIに学習させるだけでは入出力間の論理的関係が不透明なまま留まるリスクがある。シャボン玉石けんの二段階プロセス（判断基準のAI抽出→形式知のAI学習）が示すように、LUI駆動型表出化が真の形式知化たりうるにはAI内部で暗黙知が「構造化された判断基準」として再構成される段階が不可欠である。

連結化（Combination）の拡張：知識グラフ駆動型連結化

神州問学の知識グラフ機能は異なる部門・領域に分散する形式知を自動的に連結し、従来人手で行われていた連結化を大規模かつ高速に実行する。生成AIは文脈に応じた「知識の再構成」を行う点で従来の連結化を質的に超えている。

内面化（Internalization）の拡張：Copilot支援型内面化

生成AIのCopilot機能は形式知を実践に適用する内面化プロセスをリアルタイムの文脈的支援によって加速する。若手作業者がAI提示の「過去事例に基づくベストプラクティス」を参照しながら実作業を行うことで、形式知が身体的実践を通じて暗黙知へ内面化される速度が向上する。

GENIAC-PRIZEで1位のダイキン工業はこの先端形態を示す。同社は3,000時間の作業動画から構築した基盤モデルを活用し、首掛け型ウェアラブルで作業をリアルタイム解析するAIエージェントを開発した（久富, 2026c）。このシステムは、熟練者が不在でもAIエージェントが作業状況を認識し文脈に即した指示を提供することで、形式知（動画から抽出された作業パターン・判断基準）を現場実践の中で内面化させる。すなわちテキストベースのQ&A型支援（神州問学、養父織物NotebookLM）を超え、視

覚・動作の文脈を捉えたマルチモーダルな内面化支援へ拡張されている。同時に中山（2026）が指摘する「形式知化と技能習熟の乖離」（中山，2026）はウェアラブル型AIでも完全には解消されず、反復的实践の必要性は残る。

表2 AI拡張型SECIモデルの概念的構造

知識変換	暗黙知へ（宛先）	形式知へ（宛先）
暗黙知から （起点）	共同化（Socialization） 【AI拡張】AI媒介型共同化 ・時空間を超えた疑似的共同体験 ・知識ベースを介した間接的共有	表出化（Externalization） 【AI拡張】LUI駆動型表出化 ・自然言語対話による障壁低減 ・マルチモーダルデータの構造化
形式知から （起点）	内面化（Internalization） 【AI拡張】Copilot支援型内面化 ・リアルタイム文脈の支援 ・ウェアラブルAIによる実践支援	連結化（Combination） 【AI拡張】知識グラフ駆動型連結化 ・自動的・動態的知識再構成 ・企業間協調領域への拡張

出典：筆者作成
注：各変換モードにフロネシス（実践知）が規範的ガイドとして作用する（Nonaka & Takeuchi, 2019）。智能知識優化（He & Yang, 2025）はSECIスパイラル全体の加速に対応する。

5.2.2 五段階フレームワークとSECIモデルの対応関係

He & Yang（2025）の五段階フレームワークとSECIモデルの各変換モードの関係は表3として位置付けることができる。

表3 He & Yang（2025）の五段階フレームワークとAI拡張型SECIモデルの関係

五段階フレームワーク	SECIモデルの変換モード	AI拡張の内容
智能知識採集	共同化→表出化の入口	マルチモーダルデータからの暗黙知デジタル化
智能知識共有	共同化の拡張・内面化の支援	個人化された知識推薦による疑似的共同体験
智能知識整合	連結化の高度化	知識グラフによる大規模・自動的な形式知統合
智能知識応用	内面化の加速	Q&A・意思決定支援・リスク警報による実践支援
智能知識優化	SECIスパイラル全体の加速	知識の自動検証・動態的更新による自己進化

出典：筆者作成

5.3 調査結果の統合的分析

5.3.1 質的知見の対応関係

文献研究（He & Yang, 2025の五段階フレームワーク）と事例研究（神州問学・養父織物・黒野金属）の知見を照合した結果、以下の点で整合的なパターンが確認された。

第一に、いずれの事例においても生成AIが暗黙知の収集→構造化→提示→業務適用というライフサイクル全体にわたって機能しており、暗黙知の形式知化が単発的なイベントではなく継続的なプロセスであることを裏付ける。

第二に、知識の構造化（神州問学の知識グラフ、NotebookLMの文書検索基盤、黒野金属の予測モデル特徴量設計）が暗黙知の再利用の鍵であるという認識が共有されている。

第三に、自然言語インターフェースによる入力・検索障壁の低減（心理的障壁を含む）が知識創造を促進する点で一致している。

5.3.2 AI for Processの自律化レベルとの接合

4つの事例における暗黙知変換は、AI for Processの自律化レベルモデルと以下のように接合されることができる。

- **L1-L2段階**（現状の多くの適用）：神州問学の要約提示、養父織物のチャットボット参照、黒野金属の不良率予測提示はいずれも人間判断を補助する段階に位置づけられ、「AIアシスト」から「部分的自律」への移行に相当する。
- **L3段階**（展望）：AIが標準的判断を実行し例外時のみ人間が介入する。例外処理からの学習蓄積が暗黙知の組織資産化を加速する。
- **L4-L5段階**（将来的展望）：暗黙知を学習したAIが生産プロセスを自律的に再設計する（Auto-BPR）段階であり、L1-L3で蓄積された現場知が源泉となる。

5.4 仮説の検証

5.4.1 仮説1の検証

仮説1「生成AIのLUIおよびマルチモーダル機能が表出化プロセスの量・質・対象範囲を向上させる」は、次の3つの点で検証することができる。

神州問学・養父織物においてLUIが言語化障壁を低減し、とくに養父織物では心理的障壁の解消により暗黙知アクセスの頻度・範囲が拡大した。対象範囲の拡張として、ダイキン工業のTHINKLET®による映像・音声収集や黒野金属の鋳込み条件・気象データ統合により、非構造化データの形式知化が実現された。質的水準に関しては、中山（2026）がAI学習に先行する「判断基準の構造化」の不可欠性を指摘し、シャボン玉石けんの二段階プロセスがこれを裏付ける。また表出化の質は汎用データではなく現場固有の暗黙知データに依存する（日経クロステック、2026）。

以上より仮説1は支持された。ただし質的水準は構造化プロセス設計と現場固有データ確保という二重の境界条件に依存する。

5.4.2 仮説2の検証

仮説2「知識グラフの自動構築が連結化の範囲と速度を企業内から企業間・業界横断的次元へと拡大させる」は、以下の3層で支持された。

第一に企業内統合として、神州問学の知識治理機能や黒野金属のLLM統合モデルが異種データの連結化を促進し、中天鋼鉄集団の事例（He & Yang, 2025）もこれを裏付ける。第二に企業間連結として、経済産業省が提唱する「協調領域」は連結化の範囲を業界共有基盤（協調領域）と企業固有領域（競争領域）の二層構造へ拡張する。第三に組織的アーキテクチャとして、「三者構造」（現場ベテラン・データ生成プレーヤー・AI開発者）に基づく外部連携を含む協働ネットワークへの拡張が提唱されている。

ただし企業間連結の実現には信頼・成果分配・責任分担の規範的枠組みが前提となり、実装事例による検証は今後の課題として残る。

5.4.3 仮説3の検証と代替的説明の検討

仮説3「知識の動態的最適化がSECIスパイラルを加速させ、暗黙知を自己進化する組織資産に転換する」は部分的に支持された。智能知識優化（第5段階）に対応する知識グラフの自動更新・整合性検証は確認されたが、L4-L5レベルの自律のプロセス再設計は展望段階にとどまる。代替的説明として組織の「データ文化」や経営層コミットメント（He & Yang, 2025）の寄与が考えられるが、生成AIの技術的能力は不可欠な促進要因であり、「構造化を介した真の形式知化」の設計が「属AI的な暗黙知」（5.1.7）

に陥ることの回避に必要な組織的条件である。

5.4.4 仮説で未カバーの変換モードに関する探索的知見

探索的知見として、共同化と内面化に関する質的変容が特定された。共同化に関しては、生成AIが「時間と空間を超えた疑似的共同体験」を媒介し、暗黙知共有の範囲を拡張する。内面化に関しては、テキストベースのCopilot支援から、ダイキン工業のウェアラブルAIエージェントによるマルチモーダルな実践支援へと拡張されている。ただし、形式知化された知識と技能習熟の乖離は完全には解消されないという限界も特定された（中山，2026）。

5.4.5 ワイズカンパニー理論による規範的論点

以上の3仮説の検証は生成AIによる暗黙知変換のメカニズムをSECIモデルの拡張として記述したが、変換された形式知が現場でいかに適用されるべきかという規範的次元は機能分析だけでは扱えない。各仮説は表出化対象の優先選択（H1）、企業間の信頼・成果分配の規範的枠組み（H2）、「属AI的な暗黙知」回避のためのワイズリーダーシップ（H3）という規範的次元を伴う。ワイズカンパニー理論のフロネシス概念を援用した規範的再解釈は6.3節で展開する。

表4 仮説検証結果の要約

仮説	対応事例	支持する証拠	評価	残された課題
H1：表出化の拡張	神州問学、養父織物、ダイキン工業（THINKLET®）、黒野金属、シャボン玉石けん	LUIによる言語化障壁低減、マルチモーダル機能による非構造化データの形式知化、二段階プロセスによる質的担保	支持	構造化プロセス設計と現場固有データ確保が境界条件
H2：連結化の高度化	神州問学、黒野金属、中天鋼鉄集団（He & Yang, 2025）、経産省「協調領域」	知識グラフによる領域横断的データ統合、協調領域と競争領域の二層構造、三者構造の提唱	支持	企業間の信頼・成果分配の規範的枠組み、実装事例なし
H3：知識の動態的進化	He & Yang (2025) 智能知識優化、AI for Process L3+	知識グラフの自動更新・整合性検証メカニズム	部分的に支持	L4-L5の自律的加速は未実証、組織文化の寄与の弁別

出典：筆者作成

5.5 本節のまとめ

分析結果（表4に仮説検証結果を要約）に基づき、生成AIは製造業の暗黙知の形式知化プロセスに以下4つの本質的変容、①共同化の「AI媒介型疑似共同体験」による時空間拡張、②表出化の「LUI駆動型民主化」、③連結化の「知識グラフ駆動型高度化」、④内面化の「Copilot支援型加速」をもたらすことが確認された。

一方で、暗黙知の完全抽出不能性、「属AI的な暗黙知」問題、形式知化と技能習熟の乖離という3つの構造的困難も特定された（中山，2026）。さらに、産業政策レベルの議論（日経クロステック，2026）は、「協調領域」と「三者構造」による組織横断的アーキテクチャへの再構想が示唆されている（日経クロステック，2026）。

これらの知見は、SECIモデルの全変換モードが生成AIの介在により質的に変容し、知識創造理論の拡張が不可避であることを裏付けるとともに、その変容が真の形式知化たりうるための設計条件の明確化に貢献する。

6 考察

6.1 理論的貢献

本研究の理論的貢献は、以下の3点に集約される。

第一に、AI拡張型SECIモデルの提案である。本研究は、野中（1994）のSECIモデルに対して、生成AIという新たな技術的アクターがもたらす質的変容を理論的に位置づけた。4変換モードそれぞれにAI固有の拡張概念を導出し、AI技術の介在を知識創造理論に内生化した点に学術的意義がある。

第二に、He & Yang（2025）の五段階フレームワークとSECIモデルの理論的接続である。別個に発展してきた両者の対応関係を明示し、技術的プロセスと認知的プロセスの連動を説明する統合的枠組みを構築した。

第三に、暗黙知の「動態的組織資産化」概念の提示である。生成AIの知識最適化機能（第5段階）とプロセス自律化レベル（L3以上）により、暗黙知は一回性の変換ではなく継続的に更新・再構成される動態的資産へ転換する可能性を示した。

6.2 実務的示唆

本研究の実務的示唆は、以下のとおりである。

第一に、暗黙知の形式知化をAI for Processの自律化レベル（L1～L5）に沿った段階的ロードマップとして設計すべきである。

第二に、生成AIによる非構造化データの意味理解・構造化、文脈に応じた知識再構成は、これまで「語られなかった」暗黙知を組織の知識ベースに取り込む転換点となる。工場は多主体（人間・AI・設備・顧客）が相互作用しながら実践知を生成・適用し価値を共創する“場（Ba）”として再定義できる。

第三に、知識グラフの構築と動態的更新を知的資産マネジメントの中核に据えるべきである。「智能知識優化」（He & Yang, 2025）の実装は知識の陳腐化防止と持続的競争力の維持に不可欠である。

第四に、経営層のコミットメントとデータ文化の構築を生成AI導入の前提条件として整備すべきである（He & Yang, 2025）。自律化レベルの上昇に伴いセキュリティ・プライバシー・説明責任のガバナンス課題が顕在化する。

6.3 ワイズカンパニー理論からの再解釈

本研究結果をワイズカンパニー理論（Nonaka & Takeuchi, 2019）の観点から再解釈すると、生成AIは「知識創造のツール」ではなく「暗黙知を実践知に転換し組織の内外で循環させる増幅装置」と位置づけられる。ただし現場の最終判断は人間のフロネシスに基づく規範的判断に依拠する。

第一に、ワイズカンパニー理論が強調する「善い目的（what is good）」の明確化はAI運用の評価基準に直結する。成果指標は生産性のみならず知識継承率・再発防止率・説明可能性を含む多元的指標へ拡張されるべきである。

第二に、同理論の「場（Ba）」概念はAI時代に再定義を要する。本研究事例では人機協働空間が新たな「場」として機能しており、「場」概念のデジタル空間への拡張に理論的根拠を提供する。

第三に、ワイズリーダーシップの観点からは、生成AI導入の成否は「どのAIモデルを使うか」より「どの判断原理を組織に埋め込むか」に左右される。経営層・現場管理者はAI提案を無批判に採用するのではなく、例外事象の解釈・失敗からの学習・実践知の更新を制度化する役割を担う。ここにSECIの知識循環とフロネシスの規範循環を統合する経営実践上の課題が存在する。

以上より、本研究の理論的範囲はAI拡張型SECIモデルによる知識変換メカニズムの説明に加え、ワ

イズカンパニー理論が示す規範的実践論へ接続される。生成AI時代の知識管理研究は知識創出の効率のみならず、実践適用の規範的条件をも検討対象に含める必要がある。

6.4 研究の限界と今後の課題

本研究は、以下の限界が存在している。

- ・事例数の制約と一般化の範囲：探索的複数事例研究であるため、事例数が4件に限定され、大規模製造業の組織横断的分析が不足する。分析的一般化の範囲には制約があり、多様な業種・規模・国際比較による拡張が求められる。
- ・データソースの制約：主として二次資料に基づいており、暗黙知変換の微視的メカニズムの解明に不可欠な一次データ（インタビュー、参与観察）収集が欠如している。
- ・実証の限界：AI for Processの自律化レベルL4-L5における暗黙知の動態的進化については、実証的検証が今後の課題として残される。
- ・「形式知化の罣」：暗黙知の文脈依存性・身体性を捨象するリスクの批判的検討が不十分であり、「属AI的な暗黙知」の再生産回避に向けた理論的深化が必要である。

今後の研究課題として、(1) AI拡張型SECIモデルの他産業適用、(2) 生成AIの自律化レベルと暗黙知変換の関係に関する縦断的研究、(3) 生成AI導入の組織的前提条件（組織文化・リーダーシップ・ガバナンス）に関する比較研究、(4) 「属AI的な暗黙知」概念を起点とした「形式知化の罣」に対する理論的枠組みの構築——とりわけ、構造化を介した真の形式知化と、AI学習のみによる暗黙知の再暗黙知化との境界条件の解明、(5) フロネシス概念を組み込んだ生成AI運用評価指標の開発、(6) ウェアラブルデバイスやマルチモーダルAI（動画・音声・センサーデータの統合）が内面化プロセスに及ぼす影響の実証的検証が挙げられる。

7 結論

本研究は、生成AIを活用した製造業における暗黙知の形式知化メカニズムを、SECIモデル、He & Yang (2025) の五段階フレームワーク、ワイズカンパニー理論 (Nonaka & Takeuchi, 2019) の統合的視座から解明した。4事例の比較分析とGENIAC-PRIZE応募事例群の横断的知見 (中山, 2026; 久富, 2026c) の統合により、生成AIは暗黙知変換に4つの変革をもたらすことが明らかになった。①AI媒介型共同化の時空間拡張、②LUIによる表出化障壁の低減（「判断基準の構造化」を欠く場合の「属AI的な暗黙知」リスクを含む）、③知識グラフによる領域横断的連結化、④ウェアラブルAIを含むマルチモーダルな内面化支援である。

理論的には、本研究はAI拡張型SECIモデルの提案、フロネシス概念による規範的条件の理論化、「属AI的な暗黙知」概念 (中山, 2026) に基づく設計条件の解明を理論的貢献として提示した。実務的には製造企業が暗黙知の組織的活用を段階的に実現するロードマップを提示した。

製造業の暗黙知は生成AIにより「消えゆく個人資産」から「進化し続ける動態的組織資産」へ転換することができる。ただしフロネシスに基づく規範的判断と「属AI的な暗黙知」の再生産リスクへの対処が不可欠である。AI拡張型SECIモデルはこの転換のメカニズムと限界条件を理論化する試みであり、今後の学術的対話の礎となることが期待される。

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論 文

生成AI時代における KIPS 人材の能力再構築
—M-GTAによる日本の専門サービス産業の実証研究—

**Reconstructing Competencies of KIPS Professionals in the Era of
Generative AI:**

**An Empirical Study of Japan's Professional Service Industry
Using the Modified Grounded Theory Approach (M-GTA)**

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【要旨】

本研究は、生成AIの台頭が日本のKIPS（Knowledge-Intensive Professional Services：知識集約型専門サービス）業界に与える影響をM-GTA（Modified Grounded Theory Approach）により分析し、AI時代に求められる新たな人材能力構造を明らかにすることを目的とする。分析対象は戦略・総合コンサルティング業と法務・監査業の2業種とし、『日経新聞』『ダイヤモンド』などの報道・業界レポート13編を質的二次データとして収集した。M-GTAの6ステップ分析により、207の第1水準概念を抽出し、11の第2水準範疇に統合し、AIによる業務再編、パープルピープルの能力構造、組織の変革と人間的価値の再定義の3つのコア・カテゴリーを抽出した。構造マッピングにより、現象の因果条件、脈絡条件、介入条件、行動戦略、結果を明らかにした。本研究の知見は、専門サービス企業の人材育成に実践的示唆を与えると同時に、職業社会学への実証的貢献を行うものである。

キーワード：生成AI、KIPS、パープルピープル、能力再構築、M-GTA、構造マップ

1 はじめに

本研究は、生成AIの台頭が日本のKIPS（知識集約型専門サービス）業界に与える影響を質的研究により分析し、AI時代に求められる新たな人材能力構造を明らかにすることを目的とする。本章では、まず研究の背景と課題を提示し、先行研究の限界を整理する。次に、本研究の目的と研究課題を明確化し、研究方法の概要を述べる。

1.1 研究背景と課題

2022年11月のChatGPT公開以降、生成AI技術は指数関数的な進化を遂げ、社会・経済の全領域に不可逆的な影響を及ぼしつつある。McKinsey Global Institute（2023）によれば、生成AIは現在の知識労働者の業務時間の約60～70%を自動化ないし高度化する潜在力を有する。この技術的再構築の波のなかで、知識集約型専門サービス（KIPS）業界は、従来人間の深い専門知識、複雑な論理的推論、創造的思考への依存によって保持されてきた「参入障壁」が、生成AIの自然言語処理能力と深層学習機能によって根本から揺さぶられるという、前例のないパラダイム転換圧力に直面している。

日本国内においても、三菱UFJフィナンシャル・グループによる「AI行員」導入（2025年1月～）や、デロイト、PwC等の大手総合コンサルティングファームにおける業務プロセスへの生成AI組み込みは、単なる効率化ツールの域を超え、KIPS企業の存続と競争優位を規定する基盤的インフラストラクチャーへと変貌しつつあることを示している。しかしながら、技術浸透の加速と並行して、KIPS業界が依拠してきた階層的人材育成モデル、時間単価型報酬体系、そして専門家の職業的アイデンティティは未曾有の動揺に晒されており、これらに対する深い理論的解明と実証的分析が喫緊の課題となっている。

1.2 先行研究のレビューと限界

生成AIが専門職に及ぼす影響について、これまで職業社会学、労働経済学、技術批判理論、組織適応理論の四つの領域から多くの研究が蓄積されてきた。以下、本研究に関連する代表的な先行研究を表1にまとめ、その主要な成果を整理する。

表1 代表的先行研究のレビュー

研究領域	著者（年）	主要な成果・理論枠組み	本研究との関連
職業社会学・組織適応	Abbott（1988）	専門的管轄権理論：専門職の正当性は「診断・推論・治療」への排他的統制に根ざす	KIPS業務のAI代替メカニズムの分析基盤
	Faulconbridge et al.（2025）	生成AI（LLMs）は「診断」段階を超え、核心的な「推論・治療」段階に実質的に侵入している	専門的管轄権の再編動態の解明
	Bell & Rogers（2025）	混合専門主義とアイデンティティ作業：専門アイデンティティの「形成・実践・存在」の全次元が揺さぶられる	アイデンティティ再構築の理論的基盤
労働経済学	Autor（2015）	タスクベースモデル：コンピュータは定型的・符号化可能タスクを代替し、非定型的抽象的タスクを補完・増幅する	AIの代替・補完効果の分析枠組み
	Dell'Acqua et al.（2023, 2025）	「鋸歯状技術境界」：AI能力はタスク間で極端に不規則に分布し、従来のタスク類型に基づく機械的分業モデルは破綻する	AI能力の不規則性と人と機械の協働メカニズムの類型化
技術批判	Ferdman（2025）	AIの大規模媒介化が組織内に「能力敵対的環境」を醸成。基礎タスクの代替が高次能力育成の「土壌」を剥奪する	基礎学習欠損症候群の検証基盤

研究領域	著者（年）	主要な成果・理論枠組み	本研究との関連
技術批判	金融庁金融研究センター(2025)	生成AIのハルシネーションリスクと推論過程のブラックボックス化が監査品質を脅かし、初級監査人の専門的直観蓄積経路を断絶させる	スキル退化の実務的裏付け

出典：各研究をもとに筆者作成

以上の先行研究は、生成AIが専門職の業務構造、能力要求、アイデンティティに多層的な変容をもたらすことを明らかにしてきた。しかしながら、本研究の分析対象である日本のKIPS業界に照らし合わせると、以下の四点において理論的・実証的な限界が看取される。

第一に、KIPS業界に特化した深度分析の欠如である。先行研究の多くは製造業、汎用的サービス業、またはマクロ労働市場を対象としており、KIPS業界に固有の「知識独占性」と専門家権威が、AIの台頭によっていかに解体・再編されるかという、微細かつ深刻な状態を捕捉しえていない。

第二に、日本固有の文化的・制度的文脈への配慮不足である。支配的な理論枠組みの多くは、欧米の自由市場経済と流動性の高い労働市場を前提として構築されている。しかし、日本のKIPS業界は長期OJT文化、強固な徒弟制、年功序列型の昇進構造といった独自の制度的文脈に深く埋め込まれており、これらを捨象した分析では、AIによる代替のプレッシャーに直面する日本の専門人材の真の葛藤と適応経路を正確に解明することは不可能である。

第三に、質的研究アプローチによる深い理解の不足である。主流の文献は、タスク特性に基づく代替確率マトリクス等の量的推計モデルを用いてマクロな失業率や生産性向上幅を予測するものが大半を占め、ミクロおよびメゾレベルから経営者や専門家の「生の語り」を捉える視点が決定的に欠落している。量的モデルは、専門職能アイデンティティの再構築過程において生じる認知的葛藤、心理的抵抗、能動的適応といった複雑な動態を開示することができない。

第四に、統合的理論枠組みの不在である。一部の先行文献が生成AIに起因する局所的事象（スキル退化や人と機械の協働等）を捉えているものの、それらは断片的な指摘に留まっている。学術的には、技術衝撃から個々人の能力解体、さらには組織形態の再構築へと至る一連のプロセスを包括的に説明する体系的な理論モデルの構築が強く求められている。

以上の背景と先行研究の限界を踏まえ、本研究は生成AIの台頭が日本のKIPS業界に与える影響を質的研究により分析し、AI時代に求められる新たな人材能力構造を明らかにすることを目的とする。

1.3 本研究の目的と中核的研究課題

上述した研究背景と先行研究の顕著な限界を踏まえ、本研究は明確な中核的目的を次のように設定する。すなわち、質的研究アプローチの一手法である修正版グラウンデッド・セオリー・アプローチ(M-GTA)を採用し、生成AIの普及が日本のKIPS（知識集約型専門サービス）業界に及ぼす構造的影響を深く分析するとともに、その分析結果に立脚して、人工知能時代において専門サービス人材が具備すべき新たな能力構造モデルを構築し、解明することである。

さらに本研究は、単一学問領域への視野狭窄に陥ることを回避するため、職業社会学、労働経済学、技術批判理論、ならびに組織適応理論という四つの理論的視点を統合する。これにより、KIPS人材の能力再構築という複雑な事象の全体像を、多次元的かつ交差的に描出することを企図するものである。具体的には、以下の相互に深く連関する三つの中核的研究課題（Research Questions: RQs）の解明に取り組む。

1. RQ1（構造的再編の次元における考察）：

生成AIの全面的介入は、日本のKIPS業界における伝統的な業務タスク区分、組織階層構造、ならびに労働分業様式に対して、いかなる実質的転覆と再構築をもたらすのか。

2. RQ2（個人的能力の次元における考察）：

従来の認知タスクがAIによって大規模に代替される新たな業務環境下において、専門人材がその代替不可能な職業的価値を維持し続けるためには、いかなる多層的な新能力構造を構築する必要があるのか。とりわけ、実務界において要請されている「パープルピープル（Purple People）」とは、理論的にいかなる能力内実を有する人材像として定位されるのか。

3. RQ3（組織とアイデンティティの次元における考察）：

個人レベルにおける能力構造の飛躍的転換は、いかにして組織全体の運営メカニズムの変革を誘発し、最終的に「専門家」という職業的アイデンティティとその社会的存在意義の再定義へと帰結するのか。

2 本研究の理論的枠組みと実務界の新たな動向

本章では、本研究が採用する四つの理論的視点の統合的意義を簡潔に位置づけたうえで、実務界における新たな動向として登場した「パープルピープル」概念を取り上げ、本研究の理論的関心を明確化する。

2.1 四つの理論的視点の統合

本研究は、職業社会学、労働経済学、技術批判理論、組織適応理論の四つの視点を援用する。職業社会学の専門的管轄権理論（Abbott, 1988; Faulconbridge et al., 2025）は業務構造の再編を、労働経済学のタスクベースモデル（Autor, 2015; Dell’Acqua et al., 2023, 2025）は代替・補完のメカニズムを、技術批判理論（Ferdman, 2025；金融庁金融研究センター，2025）はスキル退化のリスクを、組織適応理論（Bell & Rogers, 2025）はアイデンティティ変容をそれぞれ照らし出す。これらの理論的支柱については第1.2節で詳述した先行研究を参照されたい。

2.2 実務界の新たな動向：「パープルピープル」と混合専門主義

技術的脅威に直面した専門職の適応過程は、単なる新規ソフトウェア習得に留まらず、専門的アイデンティティ（Professional Identity）の再構築を必然的に伴う。BellとRogers（2025）は、生成AIの全面的浸透が「混合専門主義（Hybrid Professionalism）」——伝統的専門知識体系と先端的データ・アルゴリズム運用能力との均衡を個体に要求する新たな専門形態——を生み出し、この適応過程が本質的に困難な「アイデンティティ作業（Identity Work）」であることを洞察した。混合専門主義の登場は、従来の「純粋な専門家」像の終焉を告げるものであり、専門家は自らの職域境界を自覚的に越えて、異質な知識体系を統合する能力を獲得せねばならない。

本研究の理論的貢献は、ビジネス界で提唱された実務概念「パープルピープル（Purple People）」を学術的視野に導入し、体系的に理論化する点にある。同概念はデロイト トーマツ（2025）が企業変革の戦略的指標として提唱したもので（図1参照）、「ビジネス知見（青：冷静な論理と戦略）」と「テクノロジー知見（赤：技術の活力と硬質性）」を兼備する越境融合型人材を指す。

実務概念から学術概念への位置付けの論理は以下の三つによって担保される。第一に、学術的系譜において、本概念は組織行動論の「境界越境者（Boundary Spanner）」（Tushman & Scanlan, 1981）に淵源を持つ。境界越境者は、組織内の異質なサブユニット間を仲介し、情報を統合する役割を担うとされてきた。パープルピープルは、この概念的伝統を継承しつつ、生成AIの衝撃という新たな文脈において、ビジネスとテクノロジーという異質な知識体系を統合する能力を持つ人材として再定義される。第二に、職業社会学の「混合専門主義（Hybrid Professionalism）」（Bell & Rogers, 2025）概念と接続する。混合専

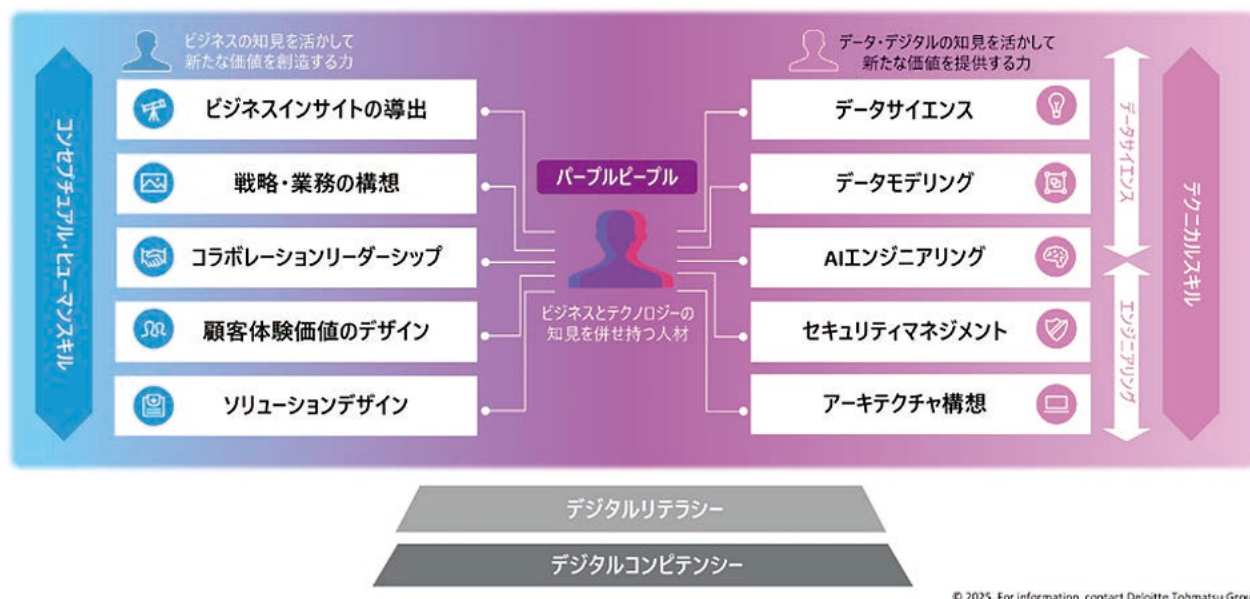


図1 「パープルピープル」能力構造の概念図

出典：デロイト トーマツ（2025）「AI時代に求められる人材とは デロイト トーマツが語る企業変革を推進するAI人材育成戦略」より引用（本稿B03）

門主義は、伝統的専門知識体系と先端的データ・アルゴリズム運用能力との均衡を個体に要求する新たな専門形態である。パープルピープルは、この混合専門主義の具体的な能力構成を示す「操作化概念」として機能する。第三に、本研究はM-GTAによる実証分析を通じて、パープルピープルの能力構造を技術的リテラシー・高次概念能力・人間的相互作用能力・境界越境能力からなる四層モデルとして具体化し（第4節）、組織行動論の「境界越境者」概念と職業社会学の「混合専門主義」概念を統合的に発展させる。これにより、実務概念としてのパープルピープルを、検証可能な学術的構成概念へと昇華させる。

パープルピープル概念の提唱は、単なる人材育成戦略のスローガンではなく、生成AI時代における専門サービス産業の根本的ビジネスモデル転換を反映している。従来のKIPS業界では、高度な専門知識の独占が価値の源泉であったが、AIによって知識の希少性が失われた現在、価値の源泉は「知識の保有」から「知識の創造的統合」と「変革の伴走」へと移行している。パープルピープルは、まさにこの新たな価値創造プロセスを担う担い手として実務界から生まれてきた概念である。

3 研究方法

本研究は、質的研究アプローチを採用し、M-GTA（Modified Grounded Theory Approach）によりデータ分析を行う。M-GTAは、日本の質的研究者・木下康仁によって提唱された、現場の語りから理論を構築するための質的分析手法である（木下，2010；木下，2016）。本章では、データ収集方法、M-GTAの分析手順、および単一研究者による質的厳密性確保策について詳述する。

3.1 二次データ分析

本研究は質的研究アプローチを採用し、二次データ分析（Secondary Data Analysis; SDA）によりデータを収集する。データ源は『日経新聞』『Diamond オンライン』『Deloitte』『LAWYERS GUIDE』『Generative AI Japan』などの報道・業界レポート13編とした（表2参照）。選別基準は以下の4つである：（1）対象業界を戦略・総合コンサルティング業（A素材群：A01～A05）と法務・監査業（B素材群：B01～B05、

B13～B15) に限定、(2) 対象者を企業の経営層・部門長レベルまたは専門家（パートナー弁護士、CKO、公認会計士）に限定、(3) 内容焦点を「業務タスクの再構築」「スキル要求の変化」「AI ガバナンス」に関する実質的記述とし、(4) 時間枠を2025年1月～2026年2月の最新データに限定した。

表2 分析対象データ源一覧

記事ID	タイトル	出典	キー・インフォーマント	日付	業界
A01	ADL日本代表の原田氏がコンサル業界に警鐘	DIAMOND online	原田裕介	2026/1/27	戦略コンサル
A02	コンサル業務がAIで大激変	DIAMOND online	金澤渉(著者)+現役コンサル3名	2026/1/30	戦略コンサル
B01/B02	法務DXの最前線	LAWYERS GUIDE	藤原大輔、根橋弘之、他	2025/10/3	企業法務
A03	「工数で稼ぐ」モデルは終焉へ	DIAMOND online	木村研一・長川知太郎	2025/12/31	戦略コンサル
A04	アーサー・ディ・リトルCEOを直撃	DIAMOND online	イグナシオ・G・アルベス、原田裕介	2025/8/29	戦略コンサル
A05	A.T. カーニーの新代表が規模を拡大	DIAMOND online	針ヶ谷武文	2026/2/13	戦略コンサル
B03	AI時代に求められる人材とは	Deloitte	宍倉剛、田中公康	2025/8/28	戦略コンサル
B04	生成AI有識者によるパネルトーク	Gen AI Japan	渡辺琢也、八木聡之、他	2025/12/11	産業・学術
B05	AIを使いこなす人が淘汰する	JIR	根橋弘之	2026/1/6	企業法務
B14	あずさ監査法人山田理事長	日経新聞	山田裕行	2026/2/27	監査
B13	法務の人材難時代到来	HUBBLE	松尾高幸、他	2025/5/27	法律事務所
B15	法学教授がAIに？	Deloitte	稲谷龍彦、他	2025/8/1	法律・学術

出典：各メディアをもとに筆者作成

本研究が二次データ（報道・業界レポート）のみを用いて専門家の能力構造や職業アイデンティティを理論化する妥当性について、以下の三点により担保する。第一に、M-GTAはデータの性質を問わず、テキストに含まれる「語り」を分析対象とできる柔軟な方法論である（木下，2010）。報道・業界レポートは、経営層や専門家が自らの業務変革や能力要求について語った一次情報を含んでおり、これらを質的二次データとして扱うことは方法論的に正当化される（Heaton,J., 2008）。第二に、分析対象を経営層・部門長レベルまたは専門家（パートナー弁護士、CKO、公認会計士）に限定することで、現場の実務担当者ではなく、業界全体の動向を俯瞰し戦略的判断を下す立場からの発言を収集した。これらの発言は、専門家の能力構造や職業的アイデンティティの変容を組織的・制度的文脈と関連づけて語るものであり、個人レベルのインタビューにはない「構造的視点」を提供する。第三に、異なるメディア（経済新聞、業界誌、コンサルティングファームのレポート等）からのデータを収集することで、特定メディアの偏向を排除し、多角的な視点を確保した。

データ収集は理論的サンプリング（Theoretical Sampling）の原則に基づき、二段階で実施した。第1段階では戦略的サンプリングによりコンサル業界5篇（A01～A05）と法務業界5篇（B01～B05）を収集し、逐次コーディングを実施した。第2段階では、第1段階終了時点でのGap Analysisに基づき、監査業界（B14）、法務業界の中堅・批判的視点（B13）、および法律AIの学術的検証（B15）を意図的に選択し、3篇を追加収集した。これにより、業界変異（監査業界の追加）、立場変異（中堅事務所・学術視

点の導入)、および時間変異(2026年2月最新動向の反映)の確保を図った。

3.2 M-GTAの分析手順

本研究ではM-GTA(Modified Grounded Theory Approach)によりデータ分析を行う(木下, 2010; 2016)。M-GTAは、日本の質的研究者・木下康仁によって提唱された、現場の語りから理論を構築するための質的分析手法である。M-GTAの特徴は、データを細かく分断せず、全体性やプロセスを重視しながら、分析ワークシートを中核ツールとして概念を生成し、範疇化し、図式化やストーリーラインで理論を構築する点にある。本研究では、以下の6ステップにより分析を行った。各ステップでは、M-GTAの方法論に基づき、分析ワークシートに概念ラベル、分析メモ、カテゴリー間の関係性を逐次記録し、理論生成のプロセスを可視化した。

ステップ1: データの準備

テキストデータを詳細に読み込み、分析対象となる記述を抽出した。具体的には、AI技術の影響、人材能力の変化、組織的適応に関する発言を抽出対象とし、発言者、文脈、メディア特性をメタデータとして記録した。抽出した記述は、分析ワークシートの「原始データ」欄に転記し、分析の出発点とした。

ステップ2: 分析ワークシートによる概念化

M-GTAの中核となる分析ワークシートを用いて、テキストの断片にラベルを付け、データに含まれる意味を抽出した。概念化は3水準で実施した。各水準の概念化過程は、分析ワークシートに逐次記録し、概念ラベルの生成理由・統合根拠を明確にした。

- ・第1水準の概念化: テキストの具体的な言葉やフレーズに即して、行為・思考・状態を簡潔な概念ラベルで捉える。概念ラベルは極力データの生の表現を尊重し、分析者の過度な抽象化を抑制した。例えば、「AIによって『ジュニアコンサルタントの修業の場』が奪われている」という記述から「修業場の喪失」という概念ラベルを生成した。13記事の分析から、合計207個の第1水準概念が抽出された。各概念は、原始データの引用文、出典記事ID、および生成理由を分析ワークシートに記録した。
- ・第2水準の概念化: 第1水準概念を統合し、より抽象度の高い範疇(カテゴリー)を構築する。統合の判断基準は以下の三つとした。(1)類似性: 概念間の意味の共通性(例:「AI代替-定型業務」と「エージェンティックAI」はいずれもAIによる業務代替の側面を示す)。(2)対比性: 概念間の対照的關係(例:「ピラミッド崩壊」と「余白創出」は、組織構造変容の異なる側面を示す対比概念)。(3)因果性: 概念間の因果・条件関係(例:「修業場の喪失」が「人-AI協働モデル」の形成を促進する)。第1段階の10篇分析(A01-A02-B01-B02-A03-A04-A05-B03-B04-B05)から68の第1水準概念を抽出し、これを「AI業務代替スペクトラム」「組織構造変容」「深層推論能力」など10の第2水準範疇に統合した(表4参照)。各範疇は「性質(Properties)」と「次元(Dimensions)」を明確に定義し、統合根拠を理論的メモとして分析ワークシートに付与した。
- ・第3水準の概念化: 第2水準範疇間の関連性を分析し、研究の中心となるコア・カテゴリー(核心範疇)を選定する。選定の判断基準は、(1)研究問題(RQ1~RQ3)への対応度、(2)出現頻度(全概念数に占める割合)、(3)解釈力(他の範疇を統合・説明する力)の三つとした。本研究では三つのコア・カテゴリーを抽出した(表5参照)。コア・カテゴリーの選定過程と根拠は、分析ワークシートの「カテゴリー統合メモ」欄に詳細に記録した。

ステップ3: 構造マップ(理論マップ)の構築

概念化の過程で見出されたカテゴリー間の因果・脈絡・介入・戦略・結果の関係を、M-GTAの「構造マッピング」手法により「構造マップ(理論マップ)」として可視化した。構造マップは、分析ワークシートに蓄積された概念間の関係性メモを基に構築し、生成AI時代のKIPS人材能力再構築という現象

の全体像を把握した。構造マップの各要素（因果条件、脈絡条件、介入条件、行動戦略、結果）の関係性は、データ上の根拠を伴って分析ワークシートに記録した（図2参照）。

ステップ4：理論的飽和の検討

理論的飽和の判定には、単一研究者の主観的「充足感」に依拠せず、以下の三つの定量的・論理的指標を設けた。（1）新規第2水準範疇の生成停止：追加分析において新たな範疇が生成されないこと。（2）Gap Analysisによる不足領域の充足：理論的サンプリングにより特定された不足領域（業界変異、立場変異等）が補完されること。（3）既存範疇への追加概念統合による概念密度の増大：新たなデータが既存範疇に吸収され、概念密度が増加すること。

第1段階：10篇時点（A01-A02-B01-B02-A03-A04-A05-B03-B04-B05）で68の第1水準概念を10の第2水準範疇に統合した。Gap Analysisを実施し、RQ3（統合層）の概念割合が17.7%と相対的に低く、「集合的知能力」範疇が未飽和であること、また監査業界および批判的立場のデータにギャップがあることが判明した。

第2段階：飽和検証のための理論的サンプリング（追加3篇）。上記のGapを補完するため、監査業界（B14）、法務業界の中堅・懐疑的視点（B13）、法律AIの学術的検証（B15）を理論的サンプリングにより追加した。追加分析では、既存概念辞書の優先使用を徹底し、新規ラベルの創設を最小化するコーディング規律を適用した。この規律は、飽和を「検証」するための手続きであり、新規概念が生成されないことを飽和の「証拠」の一つとして用いた。

追加分析の結果、追加データから全く新しい第2水準範疇は生成されず（0カテゴリー生成）、抽出された概念は既存範疇への包含のみが確認された。特に「集合的知能力」範疇は概念数が3→7に増加し飽和に近づき、監査業界データ（B14）の取得により業界変異が確保された。なお、最終的な範疇数が11となったのは、次のステップ5における範疇の精緻化によるものであり、新規データに由来する範疇の生成ではない（後述）。

ステップ5：仮説生成と検証

分析の過程で浮かび上がってきた概念間の関係性（例：「修業場の喪失」が「人-AI協働モデル」の形成を促進する）について、追加データ（B14、B13、B15）および既存データの再検討により検証を行い、理論を洗練させた。仮説の検証結果は分析ワークシートの「検証メモ」欄に記録し、反証された仮説と支持された仮説を明確に区別した。

この仮説検証の過程で、範疇7「変化適応とアイデンティティ再構築」に包含されていた「意図的AI非使用」（B14-017）や「オールドスクール形式による育成」（A03-023）等の概念群が、単なる変化適応とは質的に異なる理論的意義——AIを意図的に使わないことが能力育成戦略として機能するという逆説——を持つことが確認された。そこで、これら7概念を既存範疇から分離し、「対面型能力育成のパラドックス」（範疇8）として再編成した。これは新規データからの範疇生成ではなく、既存概念の再配置による範疇の精緻化（refinement）であり、M-GTAにおける理論洗練の一環として分析ワークシートの「カテゴリー統合メモ」欄に分離根拠を記録した。これにより、最終的な第2水準範疇は11となった。

ステップ6：理論の記述

最終的に、分析を通じて構築された理論を記述する。理論の中心となるコア・カテゴリー、その構成要素、概念間の関連性、現象のプロセスを明確に説明する（第4節）。理論記述には、構造マップと分析ワークシートを参照し、データ上の根拠を明示しながら記述した。

3.3 単一研究者の質的厳密性確保策

本研究は単一研究者により実施されるため、以下の厳密性確保策を講じる（Lincoln & Guba, 1985；木

下、2010)。

三角検証：

データ源三角検証：異なるメディア（DIAMOND online、日経新聞、Deloitte、LAWYERS GUIDE、JIR等）からのデータを収集し、特定メディアの偏向を回避した。

業界三角検証：戦略コンサルティング業（A01～A05）、法務業（B01、B02、B05、B13、B15）、監査業（B14）の3業界を横断し、業界特異性と普遍性を区別した。

役職三角検証：経営層（CEO、代表取締役）、部門長（部門統括）、専門家（パートナー弁護士、公認会計士、CKO）、実務担当者（リーガルオペレーションズ）の多層的視点を確保した。

間隔分析（Interval Analysis Protocol）：

分析対象13記事のうち、特に概念化の安定性が研究の信頼性に直結する中核的な5記事（B03、B13、B14、A05、B15）について、初回分析から24～72時間の意図的な「認知冷却期間」を設定し、初回分析で作成された概念ラベル、分析メモ、コードブック等の一切の記録を参照することを禁じ、分析者の記憶を意識的にリセットした状態で、同一の素材に対し同一のコーディング手順を反復した。その結果、5記事全体でのラベル一致率（完全一致＋本質的一致）は89.6%（範囲82.4%～100%）であり、単一研究者による質的分析の信頼性基準として一般的に求められる80%を十分に上回るものである。法務・監査業界の高度な専門用語を多く含む素材（B13、B14、B15）においても一致率はそれぞれ89.7%、100%、94.7%と極めて高く、概念化の操作的安定性が実証された。本手続きは、単一研究者に内在する解釈の揺らぎを抑制し、分析結果の再現可能性を保障する中核的戦略として機能した。

省察的ノート（Reflexive Notes）：

分析過程での思考や潜在的偏見を逐次記録し、分析の透明性を確保した。特に「AI代替論」と「AI協働論」の間の中立性を保つための自己監視を行い、分析者の事前知識（コンサルティング業界経験）がデータ解釈に与える影響を省察した。

理論的飽和：

単一研究者の主観的「充足感」に依拠せず、ステップ4で詳述した三つの定量的・論理的指標を設けた。(1) 新規第2水準範疇の生成停止（追加分析3篇において、データから新規に生成された範疇は0。なお範疇8はステップ5における既存概念の再配置・精緻化によるものであり、新規生成には該当しない）、(2) Gap Analysisによって特定された不足領域（監査業界データ）の充足、(3) 既存範疇への追加概念統合による概念密度の増大（「集合知」範疇の概念数が3から7へ増加）。これら三指標が同時に満たされたことを確認し、理論的飽和に到達したと判定した。飽和判定の詳細は、分析ワークシートの「飽和検証メモ」に記録している。

4 分析結果

本章では、M-GTAの6ステップ分析により得られた結果を提示する。第1水準概念化から第2水準範疇化、コア・カテゴリーの抽出、構造マップの構築までの過程を詳述し、生成AI時代におけるKIPS人材の能力再構築プロセスを明らかにする。

4.1 第1水準概念化

13記事の分析から、合計207個の第1水準概念が抽出された。M-GTAの分析ワークシートを用いた概念抽出のプロセスを、以下にA01素材を例示として示す（表3参照）。同様の手順で13篇全ての分析を行った。

表3 第1水準概念の代表例

カード No	原始データ引用	概念 ラベル	標準ラ ベル (辞書 準拠)	RQ 帰属	分析者注 (省察)
A01-001	ADLが欲しい人材として、ナイフのように頭が切れるのではなく、ノコギリのように切れる人という人物像をよく挙げています。その一つの重要な側面は、枝葉の表層的・短期的なテーマではなく、本質的に変えるべき大きな幹に対して、腰を落としてノコギリのように切り込む能力が必要、という点です。	ノコギリ型人材	深層推論 - 本質課題把握	RQ2-概念	「切れる」という比喩を「課題解決の深さ」として解釈した。ナイフは「鋭さ」(速度・表層)、ノコギリは「深さ」(徹底性・本質)を表すと考えたが、これは分析者の専門家知識(コンサル業務の性質理解)に基づく解釈である。他の解釈として「ナイフ=個人の機転、ノコギリ=組織的な綿密さ」という読みも可能。
A01-002	ADLが欲しい人材として、ナイフのように頭が切れるのではなく、ノコギリのように切れる人という人物像をよく挙げています。その一つの重要な側面は、枝葉の表層的・短期的なテーマではなく、本質的に変えるべき大きな幹に対して、腰を落としてノコギリのように切り込む能力が必要、という点です。	本質課題把握	深層推論 - 本質課題把握	RQ2-概念	「幹」と「枝葉」の比喩を「戦略的課題(本質) vs 運用的課題(表層)」という管理学的フレームで解釈した。ただし発言者は必ずしもこの二元論的区分を意識していない可能性がある。「大きな幹」は組織の核心問題を指すと解釈したが、具体的業務プロセス(診断か推論か)の区別は不明確。
A01-003	腰を落としてノコギリのように切り込む能力	深層切込能力	深層推論 - 本質課題把握	RQ2-人間	身体的比喩(腰を落とす)を「持続的な集中力・忍耐力」という心理的スキルに変換した。M-GTAの「生の言葉」を尊重すべく「腰を落とす」という表現をそのまま「深層」と結びつけたが、これは分析者の身体的・経験的解釈の投影である。他の解釈として「謙虚な姿勢」という人間性の読みも可能。
A01-004	“平均的に優秀”な人たちが多く入っている	平均的優秀	(削除-記述的特徴)	RQ2-人間	「平均的に優秀」という表現を「標準化されたスキルセットを持つ人材」として解釈した。これはAI時代における「凡庸な卓越性」を指していると考えたが、発言者の意図は「個性のない均質な人材」という批判的含意を持つ。データの忠実性として、これは入社人材の変化を指摘する記述である。
A01-005	“志”や“やり抜く力”が備わっている人たち	志の欠如	志・やり抜く力	RQ2-人間	「志」という文化的・哲学的概念を「内発的動機づけ」という組織心理学的概念に翻訳した。ただし「志」は日本語の文脈で「社会的使命」や「大義」を含意する可能性があり、単なる個人の動機づけより広い。他の解釈として「ビジョン」や「使命感」も可能。この引用は文脈として「現在の人材に欠けているもの」として語られている。

カード No	原始データ引用	概念 ラベル	標準ラ ベル (辞書 準拠)	RQ 帰属	分析者注 (省察)
A01-006	“やり抜く力”が備わっている	やり抜く力	志・やり抜く力	RQ2-人間	Duckworthの「グリット」(Grit: 情熱と持続力) 概念と関連付けて解釈したが、発言者はこの学術的概念を意識しているかは不明。日本語の「やり抜く力」は「粘り強さ」「不屈性」を含意する。データへの忠実性として、これは長期的な困難に対処する能力を指す。他の解釈として「実行力」や「完遂力」も可能。
A01-007	“もはやAIに代替される仕事”と揶揄される	AI代替業務	AI代替-表層診断	RQ1-業務	「AIに代替される」という表現を「自動化・標準化された推論／診断業務」として解釈した。ただし発言者は具体的に「どの業務」が代替されるかを明示していない(表層的業務を指唆するが)。分析者の事前概念(AIは単純な推論を代替する)により「表層的なコンサル業務」と解釈したが、文脈上は「価値を生まない形骸化した業務」を指す可能性もある。
A01-009	“ピラミッド型”の経営モデルも激変する	ピラミッド崩壊	ピラミッド崩壊	RQ1-業務	「ピラミッド型」を「ジュニア層(スタッフ)→シニア層(パートナー)という階層的業務構造」として解釈した。生成AIの台頭により、ジュニア層の単純推論・情報収集業務が代替され、組織構造が平坦化するとの予測。ただし「激変するかもしれない」という不確実性を含む言及であり、確定的予測ではない。
A01-010	スタッフ層の人数が多い“ピラミッド型”	スタッフ層消滅	ピラミッド崩壊	RQ1-業務	「スタッフ層」を「入門レベルの分析・診断業務を行う人材」として解釈した。AIによりこの層の業務が代替されるという意味。ただし「人数が多い」という記述は単に組織形態の記述であり、必ずしも「消滅」を意味しない。分析者の推論が含まれる。
A01-015	表層的な思考	表層思考業務	AI代替-表層診断	RQ1-業務	「表層的」を「深い推論を伴わない、パターン認識に留まる思考」として解釈した。これはAIが得意とする領域(パターン認識・類推)と人間の差別化すべき領域(深い推論)を示唆していると考えた。ただし「表層的」という言葉の定義は文脈に依存する。
A01-016	表層的なテーマというのは、マニュアルに落とせばある程度誰でもできるような課題です。	マニュアル業務	AI代替-定型業務	RQ1-業務	「マニュアル化できる業務は最も儲かるモデル」という記述を「AI代替論への反証」と誤解釈していた。原文の文脈は「マニュアル化(表層的)業務は儲かるが本質課題を解けない」という批判的・否定的な意味合いであり、むしろ「AIに代替されるべき業務」として位置づけている。すなわち「誰でもできる(マニュアル化された)業務」は人間がやる価値がなく、AIに任せて人間は本質課題に集中すべきという論理構造。分析者の事前概念(「儲かる=存続理由」という経済学的思考)により誤った極性を付与した。正しくは「AI代替対象業務」の典型例としての概念。
A01-017	少数精鋭で経営陣とタッグを組み	少数精鋭業務	ピラミッド崩壊	RQ1-業務	「少数精鋭」を「AI時代の業務形態」として解釈した。ピラミッド崩壊後の組織形態として、ジュニア層を介さずシニアコンサルタントが直接AIと協働し経営層と対峙するモデルを示唆。ただしこれはAI導入後の予測ではなく、本来あるべきコンサルの姿としての記述である。

出典：筆者作成 (A01 素材の M-GTA 分析結果に基づく)

4.2 第2水準範疇化

概念は、意味的類似性に基づいて11の第2水準範疇に統合された。

表4 第2水準範疇一覧

範疇No	範疇名	概念数	主要な概念
1	AIによる業務代替のフロンティア	26	AI代替-定型業務、エージェントックAI
2	業務構造の再編と階層変容	32	ピラミッド崩壊、休業場の喪失、余白創出
3	AIガバナンスとリスク管理	10	AI法務リスク、AI品質管理、AI倫理
4	人間に残る高次概念・推論能力	29	洞察-矛盾抽出、深層推論、課題設定
5	AI時代の技術的リテラシー	9	AI活用能力、プロンプトエンジニアリング
6	人間的相互作用と共感能力	18	合意形成力、非言語コミュニケーション
7	変化適応とアイデンティティ再構築	16	受容性-変化適応、自分変革の勇気
8	対面型能力育成のパラドックス	7	対面型能力育成
9	集合知と境界越境能力	19	戦略-実行統合、コレクティブインテリジェンス
10	専門家の役割進化と新規業務創出	27	専門家役割転換、AI内製化-戦略
11	AI能力の構造的限界	14	現場力学理解、言語・文化依存性

出典：筆者作成（M-GTA分析結果に基づく）

4.3 コア・カテゴリー（核心範疇）の抽出

11の第2水準範疇から、研究課題に最も関連性の高い三つのコア・カテゴリー（核心範疇）が抽出された。

表5 コア・カテゴリーの選定根拠

コア・カテゴリー	研究問題への対応度	出現頻度	解釈力	包含サブ範疇
AIによる専門業務の構造的再編	◎RQ1に対応。業務代替と構造変容を示し、全変容プロセスの因果的起点として機能する。	◎全概念の約35%を占め、最も頻出した現象群である。	◎AI導入による具体的業務変化を示し、後続の能力要求（RQ2）と組織変革（RQ3）を生み出す原因として高い説明力を有する。	範疇1, 2, 3
パープルピープルを構成する三層能力構造	◎RQ2に対応。業務再編への適応に必要な能力群を統合し、現象全体の「中核現象」に位置づけられる。	◎技術・概念・人間スキル関連で全体の約46%を占め、最も詳細に語られたテーマである。	◎AIに代替されない専門家の価値発揮メカニズムを多層的に説明し、「パープルピープル」の具体的内実を定義する。	範疇4, 5, 6, 7, 8, 11
組織的適応と専門家アイデンティティの再定義	◎RQ3に対応。個人の能力変化が組織全体へ波及し、専門家の役割と存在意義が再定義されるプロセスを説明する。	◎役割転換や組織変革に関する概念が全体の約19%を占め、個人スキル論に次ぐ重要な論点群を形成する。	◎核心範疇1・2を経た最終的な帰結を描き、「パープルピープル」を個人能力から組織能力へ拡張し、KIPSの新たな価値提供モデルを提示する。	範疇9, 10

※ ◎はM-GTAにおける核心範疇の選定基準（研究問題への対応度・出現頻度・解釈力）を満たすことを示す。

出典：筆者作成（M-GTA分析結果に基づく）

4.4 構造マップ（理論マップ）の構築

本節では、M-GTAの分析結果に基づき、KIPS人材の能力再構築プロセスを可視化した構造マップ（理論マップ）を提示する。

構造マップに示された概念間の関係性を時系列的に整理すると、以下のストーリーラインが導かれる。生成AIの導入により、KIPS業界の「診断」業務が代替され、ピラミッド型組織構造が崩壊しジュニア

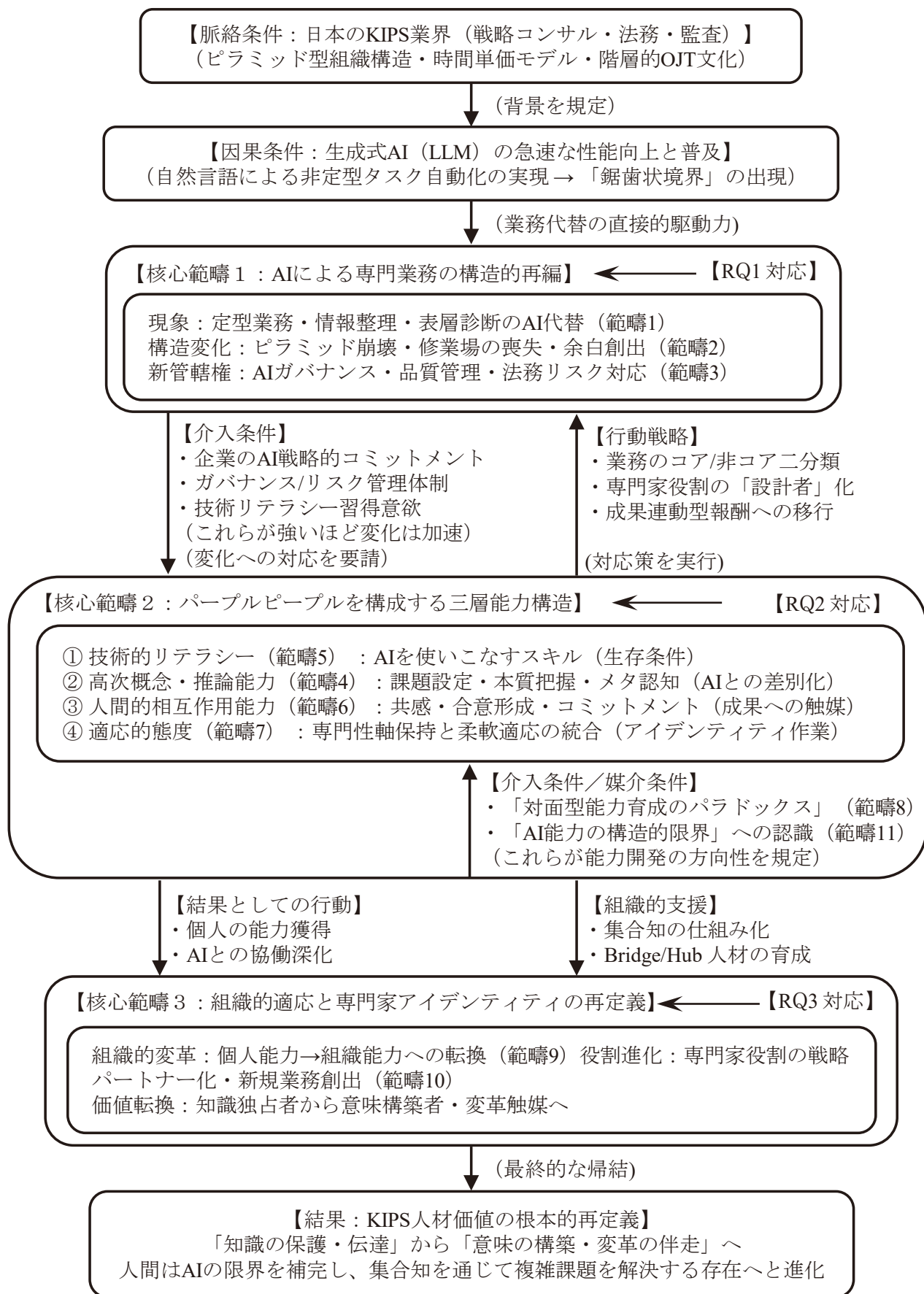


図2 KIPS人材能力再構築の構造マップ（理論マップ）

出典：筆者作成（M-GTA分析結果に基づく）

層の「修業場」が喪失する（コア・カテゴリー1）。この業務環境の激変に対し、専門人材は技術的リテラシー・高次概念能力・人間的相互作用能力・境界越境能力を統合した「パープルピープル」としての新たな能力構造を獲得せねばならない（コア・カテゴリー2）。個人レベルでの能力進化は組織全体へ波及し、専門家部門は「守りの管理部門」から「攻めの戦略パートナー」へと役割を進化させ、最終的に専門家アイデンティティは「知識の独占者」から「意味の構築者」「変革の触媒」へと再定義される（コア・カテゴリー3）。

4.5 各コア・カテゴリーの詳細分析

本章では、M-GTAの6ステップ分析により得られた結果を提示する。第1水準概念化から第2水準範疇化、コア・カテゴリーの抽出、構造マップの構築までの過程を詳述し、生成AI時代におけるKIPS人材の能力再構築プロセスを明らかにする。

なお、以下の詳細分析では、業務再編のプロセスを3層モデル（4.5.1）、能力構造を4層モデル（4.5.2）をそれぞれ用いる。このうち、本研究が新たに構築し、KIPS人材の能力再構築という中核的研究課題に対して中核的な理論的貢献を担うのは、4.5.2に示す4層モデルである。

4.5.1 コア・カテゴリー1：AIによる業務再編

定義：生成AIの導入により、KIPS業界の業務タスクがどのように代替・変容し、組織構造と専門家の役割が再編されるかという現象を捉えたカテゴリー。

表6 コア・カテゴリー1におけるパラダイム分析

要素	内容
因果条件	生成AI（特にLLM）の急速な性能向上と自然言語による対話機能の実現。これにより非定型知的業務への自動化の波が到達した。
脈絡条件	情報収集・レポート作成等の「診断」業務への依存度が高く、階層的な人材育成モデル（ピラミッド型）と時間単価型報酬体系を前提としてきた日本のKIPS業界。
介入条件	企業のAI導入に対する戦略的コミットメント（内製化／外部活用）、ガバナンス・リスク管理体制の整備状況。
行動戦略	(1)「コア（人間）」と「非コア（AI）」への業務二分類の徹底、(2) 専門家の役割を「実行者」から「判断プロセスの設計者」へ再定義、(3) 時間単価から成果連動型への報酬体系の移行。
結果	ジュニア層における「修業場の喪失」とシニア層への「余白創出」の二極化、ピラミッド型組織構造の平坦化、そしてAIガバナンスという専門家の新たな管轄領域の発生。

出典：筆者作成（M-GTA分析結果に基づく）

3層モデル：

第1層：診断業務の代替（基盤層）：情報収集・整理、定型文書作成といった「診断」タスクの入門段階が生成AIにより広範に代替され、ジュニア層の能力形成パスを変容させる（A02-014; A06-001）。

第2層：推論業務の増強（中間層）：論理構築やデータ分析においてAIは強力な増幅器として機能し、人間はAIの出力を懐疑的に検証し文脈を加味して解を最適化する役割へ移行する（A02-010; A04-003）。

第3層：業務プロセスの再設計（統合層）：上記を前提に、人間とAIの役割分担を含む業務プロセス全体を再設計する層であり、専門家は「実行者」から「プロセスの設計者」へと役割を進化させる（B05-L026; A06-007）。

4.5.2 コア・カテゴリー2：パープルピープルの能力構造

定義：AIによって再編された業務環境において、KIPS人材が専門家としての価値を発揮し続けるために求められる、技術・概念・人間のスキルを統合した多層的な能力構造。デロイト トーマツ（2025）が提唱する「ビジネス知見（青）」と「テクノロジー知見（赤）」（図1参照）の二重知見を基盤とし、それらを高次概念能力と人間的相互作用能力によって統合するハイブリッド専門職像として定義される。

表7 コア・カテゴリー2におけるパラダイム分析

要素	内容
因果条件	核心範疇1で示された業務代替の進展と、それに伴う従来型能力開発経路（OJTによる修業）の機能不全。
脈絡条件	AIを使いこなすことが「生存条件」となり、顧客からは「AIでは出せない示唆」が期待されるようになった専門サービス現場。
介入条件	個人の「変化への受容性」や「自己変革の勇氣」、そして組織による戦略的な「対面型能力育成」への投資の有無。
行動戦略	(1) プロンプトエンジニアリングを含む技術リテラシーの能動的獲得、(2) AI任せにせず本質的な「問い」を立てる高次概念能力の研鑽、(3) 共感と対話による合意形成を差別化要因とする人間的スキルの重視、(4) 専門性の軸を保持しつつ役割変化を柔軟に受け入れるアイデンティティの再構築。
結果	AIを「分身」あるいは「伴走者」として使いこなす新たな専門家像の確立と、提供価値の重心が「情報整理」から「深層推論」と「合意形成」へと移行する現象。

出典：筆者作成（M-GTA分析結果に基づく）

4層モデル：

分析の結果、パープルピープルの能力構造は、デロイト トーマツ（2025）が提唱する「ビジネス知見（青）」と「テクノロジー知見（赤）」の二重構造を基盤としつつも、より複合的な以下の四層から構成されることが明らかとなった。各層は相互に排他的ではなく、上位層が下位層を統合・指揮する重層的関係にある。

第1層：技術的リテラシー層（Technical Layer）

本層は、AI時代におけるKIPS人材の「生存条件」を構成する基盤層である。具体的には、プロンプトエンジニアリング、AIエージェント構築、API連携による業務自動化設計等、AIを単なる受動的ツールではなく能動的に「使いこなす」能力を指す（A02-021; B03-006）。本層の欠如は、いかに高度な専門知識を有しようとも、生産性と判断精度において致命的な格差をもたらす。

第2層：高次概念・推論能力層（Conceptual Layer）

本層は、AIとの差別化を図る中核的認知能力である。AIが「解」を生成する速度と網羅性において優越する一方で、人間には「真に解くべき問い」を設定する能力が求められる。これには、AIの出力に対する懐疑的検証（批判的思考）、メタ認知、アナロジーによる異領域知見の転用、データの背後にある構造的矛盾の抽出（洞察力）が含まれる（A04-008; B15-009）。本層の習熟度が、AIの「鋸歯状境界」の外側における人間の優位性を決定づける。

第3層：人間的相互作用・共感能力層（Human-Centric Layer）

本層は、技術的合理性のみでは克服しえない「人間の抵抗」を乗り越え、分析結果を実際の組織変革へと結実させる触媒機能を担う。非言語コミュニケーション、共感、利害調整、合意形成力といった対人影響力がこれに該当する（A02-012; A03-014）。これらの能力は、AIが最も不得手とする領域であり、KIPS人材の代替不可能性を支える最後の砦であると同時に、成果報酬への転換を可能にする価値源泉でもある。

第4層：境界越境統合力層（Integration Layer — Bridge/Hub）

本層は、上記三層を統合し、組織内の異質な知見（ビジネスとテクノロジー、戦略と実行）を連結するメタ能力である。組織においては「Bridge/Hub人材」として顕在化し、「コレクティブインテリジェンス」の触媒として機能する（B03-010; A04-015）。本層の担い手は、状況に応じて技術者、戦略立案者、調整者の役割を流動的に切り替え、組織の集合知を最大化する結節点となる。

4.5.3 コア・カテゴリー3：組織的変革と人間的価値の再定義

定義：個人レベルでの能力再構築が組織全体の適応を促し、最終的にKIPSにおける専門家の存在意義と提供価値そのものが根本的に再定義されるプロセスを捉えたカテゴリー。

表8 コア・カテゴリー3におけるパラダイム分析

要素	内容
因果条件	核心範疇2で示された個人の能力獲得の進展と、それにより顕在化する個人間のAI活用格差。
脈絡条件	成果連動型報酬への移行圧力や、AI保証といった新規サービスの模索等、ビジネスモデル変革を迫られるKIPS企業の経営環境。
介入条件	経営陣の変革リーダーシップ、異なる専門性を繋ぐ「Bridge/Hub人材」の存在、そして組織として集合知を活用する仕組みの有無。
行動戦略	(1) 専門家部門を「守りの管理部門」から「攻めの戦略パートナー」へと公式に役割再定義する、(2) 個人の学びを組織知へと転換する「コレクティブインテリジェンス」の仕組みを組織的学習として促進する、(3) AIガバナンスやAI倫理といった領域において新たな専門的管轄権を確立する。
結果	専門家アイデンティティが「知識の独占者」から「意味の構築者」「変革の触媒」へと再構築され、KIPSの提供価値が「問題解決」から「課題設定と変革の伴走」へと深化する。

出典：筆者作成（M-GTA分析結果に基づく）

第一の変化は、個人能力から組織能力への転換である。個人の境界越境能力を単なる個人の資質に留まらせるのではなく、組織全体の「コレクティブインテリジェンス」へ昇華させることが求められる。個々の専門家が持つ「Bridge/Hub」機能を組織として「厚く」育成し、部門間や専門領域間の知見を系統的に連結する仕組みを構築することが、AI時代におけるKIPS企業の競争優位の源泉となる（A04-015; B03-012）。

第二の変化は、専門家役割の戦略的進化である。従来の専門機能は組織の「ガーディアン」——リスク管理とコンプライアンスの守りの役割——に偏重していたが、AI時代には「攻めの戦略パートナー」へと進化する。AIが生み出す業務上の「余白」を単なるコスト削減に充てるのではなく、経営課題への戦略的伴走支援や新規サービス開発に再投資することで、専門家部門は企業価値創造の中核を担う存在へと変貌する（B01-016; B05-L027）。

第三の変化は、人間的価値の根源的再評価である。AIの能力限界が明確化する一方で、非言語コミュニケーション、共感、倫理的判断、直感的洞察といった人間固有の価値が、専門家の存在基盤として再評価される。技術的な情報処理能力がAIに代替されるほど、これらの人間的スキルは専門サービスの差別化要因として相対的に希少性を増し、KIPS人材の価値の核心を構成する（A03-017; B15-010）。

5 考察

本章では、M-GTAによる分析結果に基づき、本研究の理論的含意と実践的示唆を論じる。さらに、研

究の限界と今後の課題について考察する。

5.1 理論的含意

本研究の知見は、第1.2節でレビューした先行研究の理論的枠組み、ならびに第2章で論じた実務界の新たな動向と深く呼応し、それぞれに対して実証的知見と理論的發展を提供する。

第一に、職業社会学への貢献：Abbott管轄権理論の動的拡張——AIによる管轄領域の侵食と「能動的適応モデル」の発見。

第1.2節でレビューした専門的管轄権理論に基づき、本研究は生成AIの影響がAbbott（1988）の「診断・推論・治療」に非対称的に及ぶことを実証した。診断タスクは広範に代替される一方、高度な推論と治療は人間の独占領域として残存する（A02-001; B14-009）。また、専門家が「判断者」から「判断プロセスの設計者」へ役割を進化させる新たな管轄権獲得様式を発見し（B05-L026）、これはAIとの協働を前提とした「能動的適応」として管轄権理論を拡張する知見である。

第二に、タスクベースモデルへの実証的貢献：「鋸歯状境界」の実証的解明と「パープルピープル」の学術的理論化。

第1.2節でレビューしたタスクベースモデルに対し、本研究はAutor（2015）とDell’Acquaら（2023）の枠組みを発展させる知見を提供する。「AI代替-定型業務」等の概念群で境界「内側」を、「深層推論-本質課題把握」等で「外側」を具体的に特定した。さらに、「人-AIハイブリッド」（A03-007）といった協働モードの設計を通じて境界が動的に調整されることを発見し、C氏の事例（A02-022）はAIを推論の「増幅器」として活用する新たな協働形態を示す。

第2章で論じた実務界の新たな動向に対し、本研究は「パープルピープル」概念を学術的に理論化するという点で画期的な貢献を行う。技術的リテラシー・高次概念能力・人間的相互作用能力・境界越境能力からなる四層モデルとして具体化し、これまで学術的未理論化であった実務概念を検証可能な構成概念へと昇華した。「Bridge/Hub人材」（B03-010）や「コレクティブインテリジェンス」（A04-015）の発見は、混合専門主義論を個人から組織能力へ拡張する新たな展開方向を示す。

第三に、技術批判理論への貢献：「能力敵対環境」の実証的裏付けと「対面型育成のパラドックス」の発見。

第1.2節でレビューした技術批判の視点に基づき、Ferdman（2025）の「能力敵対的環境」論を実証的に裏付ける知見を提供する。「修業場の喪失」（A02-014）はAI媒介化がもたらす基礎学習経路の断絶を示し、金融庁（2025）の警告とも符合する。一方、本研究の独自貢献は「対面型能力育成のパラドックス」の発見にある。「AIを使わない業務」（B14-017）や「オールドスクール形式」（A03-023）は、AI媒介に対する専門家側からの戦略的抵抗として位置づけられる。

5.2 実践的示唆

本研究の知見は、専門サービス企業の人材育成と組織変革に以下の実践的示唆を与える。

第一に、「四層能力モデル」に基づく人材アセスメントと育成体系の抜本的再構築である。従来の採用選考が「平均的に優秀」な人材、すなわち高い論理的思考力や情報処理能力を有する人材を偏重してきたのに対し、AI時代においては、特に第2層（高次概念能力）と第3層（人間的相互作用能力）の評価比重を高める必要がある。育成面では、AIリテラシーを全社必修科目とする一方で、メタ認知トレーニングや即興型交渉演習といった、AIでは代替不能な能力開発プログラムへの戦略的投資が不可欠となる。

第二に、「修業場の喪失」への代替策としての「認知的徒弟制（Cognitive Apprenticeship）」の制度的設計である。若手専門家の基礎業務がAIに代替された現状を放置すれば、中長期的に組織の判断能力は確

実に空洞化する。この危機に対処するため、一部の高リスク業務においては「意図的AI非使用」ルールを設定し、純粋な人間の判断プロセスを経験させる場を確保すること、またAIが生成したアウトプットを熟練者と若手が徹底的に吟味する「対話型レビュー」を制度化することが有効である（B14-017）。これは短期的効率性を犠牲にしてでも、組織の長期的な知的体力を維持するための逆説的戦略である。

第三に、「余白」を戦略資源と捉えたビジネスモデルの転換である。AI導入によって生み出された時間的余裕を単純なコスト削減（人員削減）に転化するのではなく、高付加価値業務への再投資、具体的には経営課題への戦略的伴走支援や、AIガバナンス保証といった新規サービス領域の開拓に振り向けることが、本質的な競争優位を生む。これと連動して、報酬体系についても、創出された価値に基づく評価指標の導入を検討する方向性が示唆される。ただし、専門サービスにおける「成果連動型（Value-based）」報酬の評価は困難を伴い、多様な能力要素を適切に定量化することの難しさは本研究が指摘する重要な実務課題の一つである。

5.3 研究の限界と今後の課題

本研究には以下の限界があり、今後の研究によって克服されるべき課題である。

第一に、サンプルの偏りである。本研究は主に『日経新聞』『ダイヤモンド』などの報道・業界レポートを質的二次データとして分析した。これらのデータは経営層や部門長レベルの発言が中心であり、現場の若手専門家が直面する具体的な葛藤や、組織内のミクロな相互作用については十分に捉えきれていない。今後は、異なるキャリアステージにある専門家への半構造化インタビューを実施することで、能力再構築プロセスのより微細なメカニズムを解明する必要がある。

第二に、時点情報の制約である。本研究のデータは2025年から2026年の間に収集されたものであり、分析時点における生成AIの技術水準と社会受容性を反映している。AI技術は現在も急速に進化を続けており、特に「エージェンティックAI（自律型AI）」（A03-009）の発展は、本研究が描いた「人-AI役割分担」の構図をさらに大きく変容させる可能性がある。長期的な影響を追跡する縦断的研究が不可欠である。

第三に、業界カバレッジの偏りである。本研究は戦略・総合コンサルティング業と法務・監査業を対象を限定した。これらの業界はKIPSの中でも特に知識集約度が高いが、会計業界、税理業界、知的財産業界、あるいは企業内の研究開発部門など、他のKIPS領域においては異なる能力再構築プロセスが展開されている可能性がある。知見の一般化可能性を高めるためには、対象業界の拡大が必要である。

今後の研究では、上記の限界を踏まえ、インタビュー調査による一次データの収集、縦断的な追跡調査、対象業界の拡大、そして複数研究者による共同分析を進めることで、生成AI時代におけるKIPS人材の能力再構築に関する、より頑健で一般化可能性の高い理論モデルの構築を目指すべきである。

6 おわりに

本研究は、生成AIの台頭が日本のKIPS業界に与える影響をM-GTAにより分析し、AI時代に求められる新たな人材能力構造を明らかにした。

本研究の主要な知見は以下の通りである。第一に、生成AIはKIPS業務を「診断」「推論」「治療」の各層で非対称的に再編しており、特にジュニア層の「修業場の喪失」とシニア層への「余白創出」という二極化をもたらしている。第二に、AI時代のKIPS人材には「パープルピープル」としての多層的能力構造——技術的リテラシー、高次概念能力、人間的相互作用能力、境界越境能力——が求められる。第三に、この個人の進化は組織的な「コレクティブインテリジェンス」へと昇華され、専門家の価値は

「知識の保護」から「意味の構築」へと転換する。

生成AIは、専門家精神の終焉を告げる者ではない。むしろそれは、人間の知性が纏ってきた虚飾を剥ぎ取り、その本質的価値を極限まで研ぎ澄ます「増幅器」である。反復的業務と記憶の再生産に依存する「知的労働者」が淘汰された後に現れるのは、より深く、より創造的な人間固有の知性の輝きである。

このケイ素の知性が席卷する波濤のなかで、KIPS人材の価値は、もはや知識の「保有」や「伝達」には存しない。それは、情報の混沌に「意味」を与え、アルゴリズムが感知しえない利害と情念の狭間で「倫理的判断」を下し、冷徹な数字と生身の人間との間に「橋」を架ける営為へと、不可逆的に移行する。これは単なる技術適応ではない。専門家としての尊厳と存在意義を根底から問い直す、人間精神の内なる革命に他ならないのである。

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論 文

高齢者福祉施設における自動調理ロボット導入の課題 —福祉施設実務者対象の事例研究および高齢者調査による探索的研究—

Challenges of Introducing Automated Cooking Robots in Elderly Care Facilities:

An Exploratory Study Based on Interviews and a Questionnaire Survey

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【要旨】

本研究は、高齢者福祉施設の深刻な人手不足と利用者ニーズの高度化を背景に、自動調理ロボット導入の可能性と課題を検討した。前著（金山，2026）は飲食店の実証データに基づき、サービス・ドミナント・ロジックおよびSocial Business Model Canvasを用いた高齢者食支援への応用モデルを提案した。本研究はその続編として、施設の給食提供現場における理念と実践の葛藤、および受容構造の解明を目的とする。特別養護老人ホームおよびグループホームの実務者・現場スタッフ計4名を対象に半構造化インタビューを実施し、修正版グラウンデッド・セオリー・アプローチ（M-GTA）を用いて分析した。その結果、「規範／実践」および「現状維持／変革対応」の四象限フレームワークを構築し、食の生活価値化と自立支援理念という「規範」が、体制の二重制約（介護職員の調理・配膳兼務）という「実践」と拮抗し、技術導入を「留保」させて自己完結的に現状を維持する姿勢を明らかにした。また、高齢者・家族への質問紙調査（N=50）により、導入への高い受容度（賛成72%）を確認した一方、「手作り」への情緒的愛着と機能的価値の葛藤や居住文脈によるニーズの異質性を明らかにした。これらを踏まえ、前著モデルを拡張し、調理ロボットを「介護職が入居者と向き合う時間を創出する手段」と位置づけ、自立支援の理念を損なわない部分支援型技術の探索と、施設規模に応じた段階的・協働的なサービス・エコシステム設計の必要性を提言する。

キーワード： 高齢者福祉施設、自動調理ロボット、食事提供、QOL、人手不足、サービス・ドミナント・ロジック、事例研究、修正版グラウンデッド・セオリー・アプローチ（M-GTA）

1 序論

1.1 研究の背景

1.1.1 高齢化の進行と施設入所需要の構造的増大

日本の2025年時点の65歳以上人口は約3,619万人（総人口の29.4%）に達する。要介護認定者数は、2000年の介護保険制度創設時の約218万人から2023年度末には約708万人へと約2.7倍に増加した。この「要介護高齢者の量的拡大」が、特別養護老人ホーム（以下、特養）やグループホームをはじめとする高齢者福祉施設への入所需要を押し上げ、施設ケアへの依存度を構造的に高めている。

1.1.2 施設入所需要の増大と食事支援の質的・量的負荷の拡大

施設入所需要の増大は、食事支援の負荷を二重の意味で拡大させる。第一に、入所者数の増加は一日三食×人数分の給食提供量を直線的に増やす。第二に、より深刻な質的負荷の増加である。高齢者施設の食事は、栄養摂取の手段にとどまらず、入居者の最大の楽しみであり、生活の質（Quality of Life: QOL）を左右する重要な要素である（Nieuwenhuizen et al., 2010）。加えて重度化・高齢化に伴い、嚥下機能に応じた食事形態の個別対応（常食、刻み食、ムース食等）、疾患別栄養管理、アレルギー対応などが求められる。

1.1.3 食事支援需要と調理・介護人材供給の構造的乖離

食事支援の負荷が増大する一方、それを担う人材の供給がひっ迫している。厚生労働省（2024）の推計では、2040年度に約272万人の介護職員が必要とされるのに対し供給見込みは約215万人にとどまり、約57万人の需給ギャップが生じる。この不足は調理専門職ではさらに深刻である。結果として、本来調理業務を担わない介護職員が準備・配膳・片付けを兼務する「業務境界の曖昧化」が常態化し、直接ケア（入居者との対話、リハビリ支援等）の時間が圧迫される。

1.1.4 自動調理ロボットへの期待と本研究の範囲

この課題を打開する手段として、「レシピ等の指示に基づき、食材の認識・把持・加工および調理器具の操作を通じて、料理の調理工程の一部または全部を自律的あるいは半自律的に実行する自動調理ロボット」の導入に対する期待が高まっている。近年、生成AIのLLM・VLMを活用してロボットが調理タスクを自律的に構成する研究（Kanazawa et al., 2024）も進展しているが、実用化には至っていない。本論文は、特定メニュー（炒飯・フライドチキンなど）の調理工程を事前にプログラムされた動作軌道・加熱条件で再現する従来型調理ロボットを対象とする。自動調理ロボットの実導入は、大阪王将における炒め調理ロボット「I-Robo」の展開（イートアンドホールディングス, 2024）など一部の外食チェーンの事例や筆者が経営する四川料理店「麻辣大学」などの事例にとどまり、高齢者福祉施設における導入事例は現時点で確認されていない。本研究は、この実装の空白を埋める探索的な研究として位置づけられる。

前著（金山, 2026）は、自らが経営する飲食店における自動調理ロボット導入の実証データに基づき、ロボット導入が人件費削減および業務標準化に寄与することを示した。その上で、当該技術を高齢者食支援へ応用するビジネスモデルを、サービス・ドミナント・ロジック（SDL）およびSocial Business Model Canvas（SBMC）の枠組みを用いて提案し、社会的・経済的価値を同時に創出する可能性を理論的に評価した。

しかし前著は主として事業全体の持続可能性や価値共創を論じたものであり、実際の福祉施設現場（特

養やグループホーム）でロボット技術が導入される際の現場固有の葛藤、ケア理念（自立支援等）と技術特性の対立、利用者の情緒的な受容構造は十分に解明されていない。定型的な大量調理を前提とする外食産業とは異なり、多品種少量生産かつケア理念を重視する高齢者施設で自動調理技術がいかに受容・拒絶されるかは実証的知見が乏しく、本研究はこの研究ギャップを補う。

1.2 研究の目的

本研究は、前著（金山，2026）が提示した「自動調理ロボットの高齢者食支援への応用」の実装可能性を検討する。下記のリサーチ・クエスション（RQ）に応えるため、高齢者福祉施設（特養およびグループホーム）の実務者・現場スタッフ4名への半構造化インタビュー、および高齢者とその家族ら50名への質問紙調査を通じて、施設における技術導入の可能性・阻害要因・受容規定要因を明らかにする。

RQ1：高齢者福祉施設における「食」は、いかなる価値を有し、いかに位置づけられているか。

RQ2：施設の食事提供において、いかなる構造的課題（人手不足、業務境界の曖昧化、個別対応の高度化）が存在するか。

RQ3：自動調理ロボットに対して、現場および利用者はいかなる認識・期待・懸念（技術的適合性、情緒的抵抗感）を有しているか。

RQ4：高齢者福祉施設における自動調理ロボットの導入を促進、あるいは阻害する組織的・心理的な要因は何か。

2 先行研究の検討

2.1 高齢者福祉における食事の多面的価値と組織的課題

高齢者の食事とQOLに関する先行研究は老年学で広く論じられてきた。Nieuwenhuizen et al. (2010) は、高齢者の栄養摂取に影響する多様な要因を整理し、食事が生理的機能を超え心理的・社会的側面を有することを示した。しかし既存研究の多くは栄養学的見地にとどまり、給食運営の組織的課題（人手不足、業務境界の曖昧化、ケア理念との相克）を経営学的に分析した研究は乏しい。

2.2 テクノロジー受容研究と福祉領域への適用

テクノロジー受容研究は、Davis (1989) の技術受容モデル (Technology Acceptance Model: TAM) を出発点とし、知覚有用性 (perceived usefulness) と知覚使用容易性 (perceived ease of use) が受容の主要な規定因であることを示してきた。しかしTAMは主として情報技術の個人レベルの採用を対象とし、福祉施設のように組織のケア理念（自立支援、残存能力の活用）が技術導入の可否を左右する文脈では、「組織の価値規範と技術特性の適合性」が十分に理論化されていない。Rogers (2003) のイノベーション普及理論 (Diffusion of Innovations Theory) も、観察可能性 (observability) や試行可能性 (trialability) といった属性を示すが、福祉施設固有の情緒的受容構造（「手作り」への愛着、家族の心理的抵抗）を十分に考慮していない。

2.3 サービス・ドミナント・ロジック (SDL) と福祉領域の交差

Vargo and Lusch (2004, 2016) のサービス・ドミナント・ロジック (Service-Dominant Logic: SDL) は、サービスを「オペラント資源 (知識やスキル) の適用」と定義し、価値は受益者との共創 (value co-creation) で実現されると主張する。前著（金山，2026）はこの枠組みを用いて自動調理ロボットを「価値共創を支援するオペラント資源」と位置づけ、SBMCに基づくビジネスモデルを提案した。しかしSDLの価値

共創論が福祉施設の現場レベルでいかなる緊張関係を生じさせるか、とりわけ入居者の自立支援理念がロボット導入を阻害するメカニズムは、実証的に解明されていない。

2.4 研究のギャップと本研究の位置づけ

以上の検討から、以下の研究ギャップが特定される。第一に、高齢者福祉施設における自動調理技術の受容構造を、ケア理念との相克の観点から実証的に探索した経営学的研究が存在しない。第二に、TAMや普及理論を福祉施設特有の規範的文脈（自立支援や情緒的受容）に拡張する実証が不足している。第三に、前著のSDL/SBMCモデルが現場レベルでいかなる境界条件（boundary conditions）に直面するかが未解明である。本研究は複数事例研究と探索的調査を通じて、福祉施設における自動調理技術の受容規定因を明らかにする。

3 研究方法

3.1 研究デザイン

本研究では、質的・量的アプローチを組み合わせた探索的混合研究法（exploratory mixed methods）を採用した。前半の質的調査では、運営特性の異なる高齢者福祉施設の異なる役割を担う現場実務者・スタッフを対象とした半構造化インタビューによる複数事例研究を実施した。運営形態（外部委託と自主運営）や施設規模（大規模な特別養護老人ホームと小規模なグループホーム）の異なる事例から多角的な知見を得るためである。後半の量的調査では、高齢者およびその家族らを対象に質問紙調査を実施し、態度構造の傾向を記述統計および多変量解析で分析した。

3.2 半構造化インタビュー調査の対象者

インタビュー調査の対象者は、運営特性の異なる高齢者福祉施設の実務者および現場スタッフ4名（事例1～4）である。調査は2026年5月11日から30日まで、東京近郊の4つの福祉施設に対して実施した。対象者の詳細は表1の通りである。

表1 インタビュー調査対象者の属性

事例	対象者の役職・立場	対象施設の種別・規模	食事提供体制の特徴
事例1	施設A 施設長	特別養護老人ホーム (定員160名)	厨房での一括調理と各階での介護職による配膳
事例2	施設B 看護主任	特別養護老人ホーム (定員160名)	外部調理済食品のフロア再加熱と介護職による加工
事例3	施設C 本部職員	グループホーム (定員18名)	完全配食（チルド・冷凍）の利用とフロア炊飯
事例4	(元施設長)	グループホーム (定員27名)	配達食材を用いたフロアごとのスタッフ調理

出所：筆者作成

この対象者構成は、無作為抽出ではなく、質的研究における目的的サンプリング（purposive sampling）に基づく意図的選定である。福祉施設調査は入居者のプライバシーや内部情報に触れるため信頼関係が前提となり、「施設長」「看護主任」「本部職員」「元施設長」という職務段階の異なる対象者確保は、限られた協力の中での交渉の結果である。

この制約は複数事例研究（multiple case study）の論理上、方法論的必然性を持つ。事例選定の目的は

統計的一般化ではなく理論的一般化にあり (Yin, 2018)、異なる事例の組み合わせにより現象を対比的に検討できる (最大変異法サンプリング, maximum variation sampling; Patton, 2014)。本研究の4事例は、施設規模 (特養160名 vs. グループホーム18～27名)・運営形態 (自主運営／外部委託・完全配食)・職務段階 (経営層～現場層) が異なる対象を選定した結果であり、限られたアクセスの中での多様性を反映している。

なお、研究倫理に厳格に配慮し、前著 (金山, 2026) が供給側 (委託給食会社統括実務者) からマクロな導入条件を提示したのに対し、本研究は需要側・現場実践側の独自データのみで複数事例研究を構成し、知見の重複を回避している。

3.3 調査手続き

半構造化インタビューは、表2の5つのカテゴリーの質問ガイドに沿って実施した。

表2 半構造化インタビューの主な質問項目

カテゴリー	主な質問項目
I. 施設の理念と「食」の位置づけ	施設規模、食事形態、「食事」の価値、入居者への効果
II. 運営上の課題	調理・人材・栄養管理の困難、利用者・家族からの要望、コスト・効率化の課題
III. テクノロジー導入の受容性	自動調理ロボットへの印象、導入条件、利用者の反応予測
IV. 地域連携と今後の展望	地域との連携、「食の支援拠点」としての役割
V. まとめ	「食の質」向上による変化、理想的な食環境

出所：筆者作成

3.4 分析方法

インタビューの録音データを文字起こした後、木下 (2003) の修正版グラウンデッド・セオリー・アプローチ (M-GTA) に準拠して分析した。分析焦点者を「高齢者福祉施設の実務者・現場スタッフ」、分析テーマを「食事支援が、QOL、安全管理、運営上の制約の中でいかに意味づけられ実践されるか」と設定した。各事例の語りから概念を生成し、施設形態や理念 (省力化重視と自立支援重視) に応じた技術受容の相違について事例間比較分析を行い、カテゴリー間の関係性を構造化した。

3.5 補足的質問紙調査

3.5.1 調査対象者

利用者・消費者側の態度構造を探索的に把握するため、高齢者とその家族ら50名 (N=50) への質問紙調査を実施した。年齢層は50～70代が中心で、居住形態は「高齢者施設」(15名)、「家族と同居」(18名)、「独居」(15名)、「その他」(2名) であった。

3.5.2 分析方法

設問は、利点認知 (Q1)、心理的抵抗感 (Q2)、健康貢献認知 (Q3)、導入賛成度 (Q4)、推奨意向 (Q5) の5項目 (「全く思わない：-2」～「強く思う：+2」の5段階リッカート尺度) と自由記述で構成した。各設問の記述統計量とピアソンの積率相関係数を算出して変数間の関連を検討し、さらに居住形態別クロス集計、メリット認知と心理的抵抗感の交差分類による態度類型分析、自由記述の主題分析 (Thematic Analysis) を行った。

4 調査結果

4.1 インタビュー内容の構造ツリー

半構造化インタビューから得られた知見を、4つのRQに沿って以下に構造化する。

RQ1:「食」の多面的価値と位置づけ

- ・QOLの維持向上（日常生活における最大の楽しみ、笑顔・会話の創出）
- ・ケア・マネジメント資源（時間認知のアンカー機能、食事量による体調不良の早期検知〔アラート機能〕）
- ・食事形態の個別最適化（常食・刻み・ムース食等、安全性と食べる楽しみの調整）

RQ2: 食事提供における構造的課題

- ・人手不足と業務境界の曖昧化（介護職の調理・配膳兼務による疲弊、ナースコール対応との二重負荷）
- ・厨房・フロアのマネジメント課題（新人・外国人スタッフの調理・盛り付け指導負担、早番人員の確保難）
- ・誤嚥リスクと配食エラー（多様な食形態の混在による確認作業の増大）

RQ3: 自動調理ロボットに対する認識・受容性

- ・基本的スタンス：条件付き歓迎（省力化・品質安定への期待）と情緒的不安（手作りの温かみの喪失）
- ・導入の現実的条件：職員の作業負担軽減効果、優れた操作性（ユニバーサルデザイン）、清掃・洗浄の簡素化
- ・施設特性による理念との対立
- ・大規模特養：高効率化・標準化による「介護職員の直接ケア専念」を歓迎
- ・グループホーム：「自立支援（入居者が調理に参加する）」理念との衝突、物理的スペースの制約
- ・普及プロセスの障壁：家族会等への正式な開示・説明義務（プロセスの透明性）

RQ4: 導入の促進・阻害要因

- ・促進要因：人手不足への対応、品質の安定、採用の容易化、業務境界の正常化
- ・阻害要因：多品種少量生産への非適合、付随業務の残存、自立支援理念との相克、説明・合意プロセスの負担

4.2 M-GTAによる分析ワークシート

4事例のインタビューデータにM-GTAを適用して抽出した上位カテゴリー（概念）の分析ワークシートを表3に示す。

表3 M-GTAによる分析ワークシート

概念名	事例記述	定義	背景 発生条件	結果・影響	関連概念
食事による 心理的・社会的・医療的 価値	「食事は一日の一番の楽しみ」(施設A・D)、「リズムが整い健康状態が改善する」(施設B)	栄養摂取を超え、心理的幸福・コミュニケーション・恒常性維持をもたらす価値。	施設生活という制限的環境、糖尿病や嚥下障害などの既往歴。	QOL向上、笑顔と会話の創出、健康改善による介護負担の軽減。	QOLの向上、コミュニケーション、健康マネジメント
ケアにおける食のアンカー・アラート機能	「朝食で朝だと認識し、食べた量で体調不良を検知する」(施設B)	認知症高齢者の時間感覚維持と、食事態度・摂取量から不調を早期検知する機能。	認知症の進行、自己表現の困難さ。	生活リズムの正常化（夜間活動の抑制）、病状や体調不良の早期発見。	認知症ケア、アセスメント、健康状態把握

概念名	事例記述	定義	背景 発生条件	結果・影響	関連概念
業務境界の曖昧化と介護職員の疲弊	「介護職が盛り付けや刻みを並行し、ナースコール対応に追われる」(施設A・B・D)	人手不足により介護職員が調理・配膳を兼務し、職種間の役割境界が曖昧化すること。	調理専属スタッフの不在・採用困難、早番人員の確保難。	介護職の精神的・肉体的負担増、利用者と向き合う直接ケア時間の喪失。	人手不足、業務負担、バーンアウト
個別対応の追求とエラーリスクの葛藤	「ミキサー食は嫌という要望に対し、誤嚥リスクを家族と合意の上で対応する」(施設C)	嚥下能力や嗜好に応じた食事形態の多様化と、配食ミス・誤嚥リスク回避とのトレードオフ。	利用者の身体機能の多様化、手作りや個別対応への要求水準の上昇。	確認作業・個別加工手間の増大、ヒューマンエラーによる事故リスクの並存。	食事形態の多様性、リスク管理、個別最適化
自立支援と自動化の理念の対立	「利用者にできることはやっていただくため、ロボットは合わない」(施設D)	残存能力の活用を重視する自立支援理念と、調理プロセスの完全自動化が相反すること。	グループホームなどの小規模施設における「家庭的な生活の場」というコンセプト。	自動調理ロボット導入の不適合性の露呈、本人の役割やりハビリ機会の喪失。	自立支援、価値共創機会の喪失、グループホーム特性
普及プロセスの説明責任と透明性	「食事提供の変更は家族会などで書類上および口頭で説明し理解を得る」(施設C)	食事提供体制の変更時に、家族など利害関係者へ透明性の高い説明を行い合意を得るプロセス。	厳格な運営ルール、手作りに対する情緒的愛着を持つ家族の存在。	心理的抵抗感の緩和、苦情リスクの低減、導入に向けた社会的合意形成。	家族会、心理的抵抗緩和、社会的合意

出所：筆者作成

4.3 構造マップの論理的考察

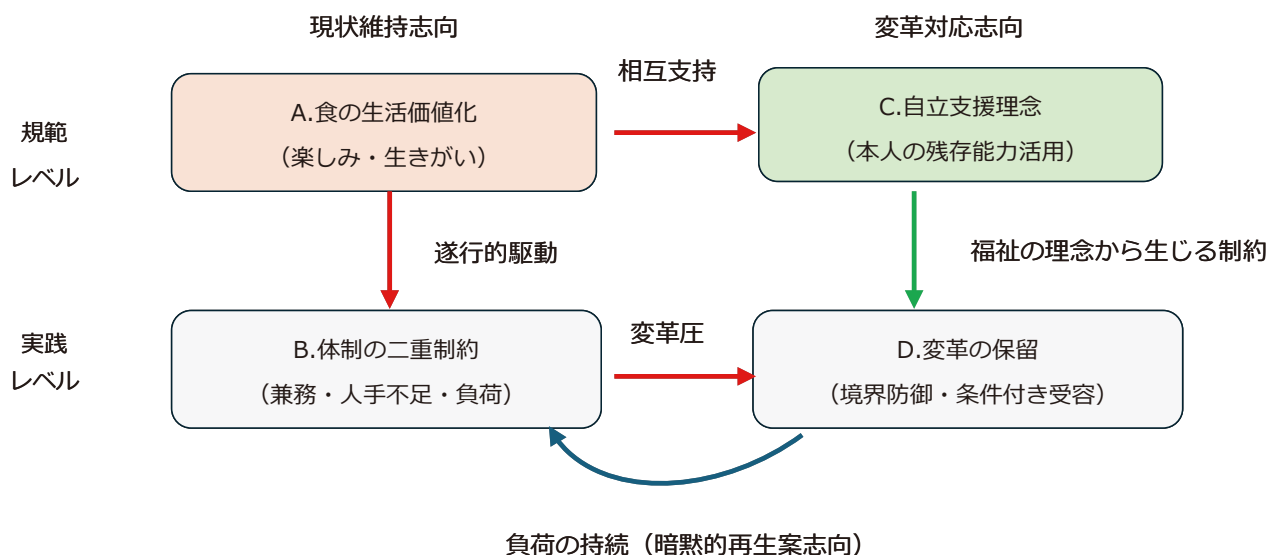


図1 統合理論マップの二軸四象限フレームワーク (筆者作成)

4.3.1 二軸フレームワークの理論的設定

本理論マップは、抽出されたカテゴリーの位置関係を整理するため、独立した2つの分析軸を設定する。

- ・縦軸 (規範／実践軸)

「施設は何を価値とし何を原理として実践すべきか」という理念を示す「規範レベル」と、「現実にはいかなる体制が成立し、どのような負荷や態度が生じているか」を示す「実践レベル」を分離する。

- ・横軸（現状維持／変革対応軸）

既存の価値・体制を維持・強化する「現状維持志向」と、外部からの変化要求（自動調理技術の導入等）に対応する「変革対応志向」の方向性を示す。

4.3.2 四象限へのポジショニングと各カテゴリーの役割

- ・A：食の生活価値化（「規範」かつ「現状維持」）—価値の起点：食事を栄養摂取ではなく「生活の質（QOL）を支える楽しみ」と定義する。施設が何を守るべきかを規定し、現状維持の規範的源泉として機能する。
- ・B：体制の二重制約（「実践」かつ「現状維持」）—現象的負荷：規範Aを追究する結果、深刻な人手不足と「介護・調理の兼務体制」の下で生じる、直接ケア時間の圧迫やスタッフのバーンアウトなど観察可能な運営負荷であり、Aを実践レベルに投影したものである。
- ・C：自立支援理念（「規範」かつ「変革対応」）—規範的基準：入居者の残存能力の活用や主体性維持を求める理念である。外部からの変化提案（調理の自動化等）に対し「何を許容すべきでないか」を画定する変革のフィルターとして機能する。
- ・D：変革への留保（「実践」かつ「変革対応」）—境界応答：変革案に対する現場の応答態度である。技術的イメージの未形成、自立支援理念との葛藤、説明負担などにより変革を受け入れず、「判断を留保する」防御的性格を持つ。

4.3.3 カテゴリー間関係の類型論

理論マップ内の関係性は、以下の5つの論理的性格（矢印）で構造化される。

- ・相互支持（ $A \leftrightarrow C$ ）：規範レベルにおいて、「楽しい食」と「自立した生活」は同一の価値次元に位置しており、相互に正当化し合うことで施設のアイデンティティを共同で構成する。
- ・遂行的駆動（ $A \rightarrow B$ ）：規範Aを実践する必然的帰結として、現場における二重の体制制約と業務過負荷（B）が駆動される。
- ・福祉的な理念から生じる制約（ $C \rightarrow D$ ）：自立支援の規範が、自動化技術の受容範囲を制限・規制する（「安易にロボットに頼るべきではない」という論理）。
- ・変革圧（ $B \rightarrow D$ ）：業務負荷の累積が、人手不足を解決するための技術導入の動機（変革圧）を提供する。
- ・負荷の持続・再生産（ $D \nearrow B$ ）：変革の留保（D）という態度が、現状の兼務体制や非効率な運営負荷（B）を温存・再生産する。

ここで重要な理論的含意は、「変革圧（ $B \rightarrow D$ ）」と「福祉的な理念から生じる制約（ $C \rightarrow D$ ）」の作用ベクトルが逆向きで、境界応答（D）で両者が拮抗する点にある。業務負荷による「ロボットで楽になりたい」という実践的要請と、自立支援理念による「入居者の役割を奪う」という規範的制約の拮抗が、「留保（条件付き受容）」という中間的態度を固着させる。

4.3.4 中心構造としての「自己完結的な現状維持」

本理論モデルは、外部からの強い構造的介入（自立支援を損なわない部分支援型技術や組織の境界を越えたサービス・エコシステム）がない限り、運営的負荷を内部化しつつアイデンティティを保つ現状維持的システムとして機能する。

- ①規範的循環（ $A \leftrightarrow C$ ）：「楽しく自立して生きる」という内部完結型の価値命題による相互補完である。
- ②実践的循環（ $A \rightarrow B \rightarrow D \nearrow B$ ）：価値追求が運営負荷を生み、それが変革の留保によって温存され続

ける循環である。

③規範的防御（C→D）：外部のテクノロジーによる安易な自動化を遮断する防御機構である。

これら3つの再生産機構が同時に作用することで、システムは強い現状維持志向を組織的に保持している。

4.4 高齢者福祉施設における「食」の価値と位置づけ（RQ1）

4.4.1 食事の多面的価値

4事例の分析から、高齢者施設における食事は以下の3つの価値を有することが明らかになった。

①日常生活における「最大の楽しみ」とQOL向上

外食など選択の自由が制限される施設生活において、食事は「一日の一番の楽しみ」（事例1・4）である。「食べられなくなったら終わり」（事例4）に代表されるように、食は栄養摂取を超え、QOLそのものと同一視されている。

②コミュニケーションの創出と生活の張り

食事は、入居者と職員、入居者同士のコミュニケーションを媒介する。「美味しそうな食事を見て笑顔になり会話が増える」（事例4）、「盛り付けの工夫やメニュー選択が入居者と話すきっかけになる」（事例1）など、共食（Commensality）の機会が社会的な関係性を維持するオペラント資源として機能している。

③認知症ケア・健康マネジメントにおけるオペラント資源

「朝食の提供によって朝であることを認識し、昼夜の逆転を防止する」という時間認知のアンカー機能や、「摂取量が通常より少ない場合に体調不良を検知する」（事例2）というアラート機能が確認された。これらは、自己表現が困難な認知症高齢者へのケアにおいて、心身の異常を早期にアセスメントする診断ツールとして機能している。さらに「食事リズムが整って体重や血糖値が安定し、投薬が不要になった」（事例2）という身体機能の抜本的改善（二次的に看護・介護職の処置負担を軽減）も報告された。

4.4.2 食事形態の個別最適化と安全性の葛藤

入居者の身体状況に応じて、常食、一口大、刻み、極刻み、ムース食、ミキサー食など多様な食事形態が提供されている。ここには安全性（誤嚥防止）とQOL（食べる楽しみ）の葛藤がある。「流動食への移行は極力避ける」（事例4）、「本人がミキサー食を拒む場合、誤嚥リスクについて家族に説明し、合意を得た上でソフト食を提供する」（事例3）といった、画一的リスク管理から脱却し個別最適化による調整を模索する実態が確認された。

4.5 食事提供における構造的課題（RQ2）

4.5.1 深刻な人手不足と「業務境界の曖昧化」

現場における最大の構造的課題は、調理・介護スタッフの不足と「業務境界の曖昧化」である。事例1、2、4のいずれでも、介護職員が食事の盛り付け・配膳・再加熱・「刻み」・「とろみ付け」などの調理補助を日常的に担っていた。「ナースコール対応に追われながら、定刻通りに配膳や食事加工を完了させなければならず、どちらも中途半端になりがちで精神的負担が大きい」（事例2）という語りが示すように、ケア業務と食事提供業務が重なり、介護職員のバーンアウトを誘発していた。

4.5.2 厨房・フロアのマネジメント課題と操作上のエラー摩擦

業務境界の曖昧化は、品質管理と安全性マネジメントを困難にする。第一に、新入・外国人スタッフへの指導負担である。「盛り付けや食事形態の指示が多岐にわたり、外国人スタッフへの教育や文化的理解の相違への指導に多大な時間を要する」（事例2・3）という課題が生じている。第二に、誤嚥事故に直結する配食エラーリスクである。フロアの忙しさと確認作業の多段階化により、食事形態の間違いや配食ミスが構造的に発生しやすい。「アレルギーや禁食、とろみの有無の確認を多重に行わなければならない、ヒューマンエラーのリスクと隣り合わせである」（事例1・3）という緊張感が現場に常在する。

4.6 自動調理ロボットに対する認識・受容性と導入障壁（RQ3・RQ4）

4.6.1 条件付き受容と施設形態による「理念の対立」

自動調理ロボットに対する現場の認識は「条件付きの歓迎」と特徴づけられる。調理品質の安定や、未経験者・外国人でも運営できる「採用の平準化」への期待がある一方、施設の「ケアの理念」によって受容性は大きく異なる。

- ・大規模施設（特養）における適合性（高効率の追求）

厨房がセントラルキッチン化され100名以上の大量給食を提供する特養では、手作りの個別対応に物理的限界があるため、「ロボットによる品質均一化と省力化が介護職員の直接ケア専念をもたらす」として歓迎する傾向が強い（施設A・B）。

- ・小規模施設（グループホーム）における不適合性（自立支援との相克）

定員18～27名のグループホームでは「自立支援」を基本コンセプトとし、入居者が野菜を切る・盛り付けを手伝うなどの役割（オペラント資源の活用）を通じて共同生活を送る。「利用者にできることはやっていただくことが生活リハビリになるため、自動で調理が完結するロボットはコンセプトに合わない（価値共創の機会を奪ってしまう）」（施設D）という指摘があり、完全自動化がケアの根幹理念と衝突することが示された。

4.6.2 普及プロセスにおける説明義務と「プロセスの透明性」

食事提供体制の変更は、現場や法人の意思決定のみでは完結しない。「食事の提供方法が変わることや、外部調理・機械調理の導入については、家族に正式に開示・説明する義務がある。ロボット導入に対して『冷たい食事を食べさせている』『手抜きをしている』といった情緒的反発を招かないよう、家族会などを通じた事前合意が必要である」（施設C）とされ、社会的承認を得る「プロセスの透明性」が普及の決定的な障壁となることが明らかになった。

4.6.3 導入の促進要因と阻害要因

インタビュー結果を総合し、導入の促進要因と阻害要因を表4のように再整理した。

表4 自動調理ロボット導入の促進要因と阻害要因（統合改訂版）

区分	要因	具体的内容
促進要因	深刻な人手不足への対応	採用難・定着難の厨房、および早番調理業務の省力化
	業務境界の正常化	介護職員の調理・配膳業務からの解放（直接ケアへの特化）
	品質と安全性の担保	熟練調理師退職後も安定した味を提供、配食エラーによる誤嚥の防止
	採用の平準化	調理手順を学ぶ負担を減らし、未経験者・外国人でも働ける環境の整備

区分	要因	具体的内容
阻害要因	多品種少量への非適合	毎日変わる日替わり・個別食事形態への対応の難しさ
	自立支援コンセプトとの相克	利用者の残存能力の活用（価値共創）機会を奪うリスク（小規模施設）
	付随業務の残存	下準備・片付け・清掃・洗浄の手間が削減されない問題
	物理的・空間的制約	グループホーム等における設置スペースの欠如
	社会的合意プロセスの負担	家族の手作り志向に対する説明・説得（家族会での承認プロセス）

出所：筆者作成

4.7 利用者に対する質問紙調査の結果

質的調査の知見（手作りへの愛着、受容の葛藤、施設文脈の特異性など）を補完し、利用者側の態度構造を探索的に把握するため、高齢者とその家族ら50名（N=50）への質問紙調査を実施した。結果を以下に示す。

4.7.1 全体的傾向（記述統計と肯定率）

質問紙調査の5つの設問における記述統計量および肯定率（尺度値が「+1」または「+2」の肯定的評価を行った回答者の割合）を算出した。結果は表5の通りである。

表5 質問紙調査の記述統計量（N=50）

設問	平均値	中央値	標準偏差	肯定率
Q1 メリット認知（利便性、安定性等）	0.82	1.0	1.10	74%（37名）
Q2 心理的抵抗感（ロボット調理への抵抗）	0.12	0.0	1.12	40%（20名）
Q3 健康貢献認知（栄養管理、健康寿命）	0.68	1.0	0.98	70%（35名）
Q4 導入賛成度（調理ロボット導入への賛否）	0.74	1.0	1.14	72%（36名）
Q5 推奨意向（家庭用ロボットの他者推奨）	0.48	0.5	0.88	62%（31名）

出所：筆者による質問紙調査結果（N=50）

回答者の多くが調理ロボットの有用性を肯定的に評価している。利点認知（Q1）の肯定率は74%に達し、「できたてを食べられる」「味や衛生の安定」への期待が示された。健康貢献認知（Q3）も70%と高く、全体の72%が導入（Q4）に賛同している。

一方、推奨意向（Q5）の肯定率は62%にとどまり、導入賛成（72%）との間に乖離が見られる。「自分は賛成だが他者へ強く推奨する段階には至らない」という態度が確認され、個人的受容が能動的な推奨行動に直結しないという、普及理論で指摘される受容と推奨のギャップが示唆された。

4.7.2 変数間の相関構造

変数間の関連性を明らかにするため、ピアソンの積率相関係数を算出した。結果は表6の通りである。

表6 ピアソンの積率相関係数行列（N=50）

変数	Q1	Q2	Q3	Q4	Q5
Q1 メリット認知	1.000				
Q2 心理的抵抗感	-0.460	1.000			
Q3 健康貢献認知	0.662	-0.572	1.000		

変数	Q1	Q2	Q3	Q4	Q5
Q4 導入賛成度	0.707	-0.593	0.893	1.000	
Q5 推奨意向	0.405	-0.223	0.326	0.197	1.000

出所：筆者による質問紙調査結果（N=50）

注：太字は $p < .01$ で統計的に有意であり、決定係数 $R^2 = .798$ を示す。

Q4（導入賛成度）の最も強い規定因はQ3（健康貢献認知）であり、 $r = .893$ （ $p < .01$, $R^2 = .798$ ）という極めて強い正の相関が確認された。すなわち、調理ロボットが栄養バランス維持・健康寿命延伸に寄与するという認知が導入賛成の最大の駆動因である。Q1（メリット認知）も $r = .707$ と強い正の相関を示す。一方、Q2（心理的抵抗感）は $r = -.593$ の負の相関であり、抵抗感の低減が導入賛成度を高める上で重要である。

注目すべきは、Q5（推奨意向）がQ4と $r = .197$ と弱い相関にとどまる点である。導入賛成から推奨行動への転換には、別の要因（価格や信頼性の検証等）が介在することを示す。

4.7.3 居住形態・文脈によるニーズの異質性

回答者の置かれた環境（文脈）によって、調理ロボットに期待する価値（価値提案）が異なるという「ニーズの異質性」が示唆された。

- ・福祉施設関連の文脈（施設入居者・家族）

「塩分制限やアレルギー対応、細かい個別食事形態への対応ができると安心」「調理スタッフの負担が減り、介護に専念できるなら良いこと」など、「安全性の確保（ヒューマンエラー防止）」および「介護職員の労働負荷軽減」への要請が極めて高い。

- ・単身・家庭同居の文脈（一般世帯）

「仕事で遅くなっても火を使わずに温かいものが食べられる」など、家庭生活における「利便性の向上」や「時間的制約の解消」に主眼が置かれている。

4.7.4 態度類型分析

メリット認知（Q1）と心理的抵抗感（Q2）のクロス分類により、回答者を4つの態度類型に分類した。結果は表7の通りである。

表7 メリット認知と心理的抵抗感による態度類型（N=50）

類型	比率	Q4平均	Q5平均	特徴
肯定的受容型 （高メリット・低抵抗）	50% （25名）	1.30	0.90	導入の中核的支持層
両義的態度型 （高メリット・抵抗あり）	25% （12名）	1.00	0.40	メリットは認めるが心理的障壁あり
否定的抵抗型 （低メリット・高抵抗）	10% （5名）	-2.00	-1.00	テクノロジーへの強い反発
無関心型 （低メリット・低抵抗）	15% （8名）	0.33	0.00	関心そのものが低い層

出所：筆者による質問紙調査結果（N=50）

回答者の50%が「肯定的受容型」で導入賛成度の平均が1.30と最も高い。25%の「両義的態度型」はメリットを認めつつ心理的抵抗を抱えており、この層へのアプローチ（実演体験、安全性の情報提供等）

が導入促進の鍵となる。

4.7.5 心理的抵抗感の二極化と「手作り」への情緒的愛着

調理ロボットへの心理的抵抗感（Q2）は、回答が二極化した。抵抗ありとする層が40%、抵抗なしとする層が36%である。自由記述の分析からは、「機械的合理性（有用性）」と「情緒的安心感（人間的温かみ：Human Touch）」の葛藤が明らかになった。その葛藤構造は表8の通りである。

表8 心理的抵抗感（Q2）を巡る葛藤構造

態度極性	主な評価軸	自由記述に見られる代表的意見
機械的合理性 (抵抗感：低)	衛生面・正確性の評価	「衛生面の向上は一番の安心材料」「ロボットなら温度や衛生管理を常に一定に保てるのは強み」
情緒的安心感 (抵抗感：高)	人間の介入 (Human Touch) の重視	「人の手による盛り付けのほう少し安心する」「最終的にはやはり人の手作りが一番温かみを感じる」

出所：筆者作成

盛り付けや調理過程での「人間の介入」を重視する感情的愛着が心理的抵抗感の根底にあり、この価値間の競合が受容の障壁になっている。

5 理論的示唆の整理

質的分析（M-GTAによる二軸四象限フレームワーク）と量的分析（質問紙調査）の統合的知見から導かれる理論的示唆を以下に整理する。示唆1～3は各RQに対応する実証的示唆、示唆4～6は同フレームワークのシステム・ダイナミクスに関する構造的示唆である。

示唆1（食の多面的価値）：高齢者福祉施設の「食」は、栄養摂取やQOL向上にとどまらず、時間認知のアンカー機能や健康変化のアラート機能など、ケア・マネジメントに直結するオペラント資源としての多面的価値を有しうる。

示唆2（業務特性と技術の適合性）：自動調理ロボットの受容可能性は、施設の理念やケア特性（省力化を要請する特養 vs. 自立支援を求めるグループホーム）に応じて分化しうる。とりわけ後者では、自動調理が阻害要因として位置づけられうる。

示唆3（情緒的価値と機能的価値のトレードオフ）：調理ロボットへの心理的受容は、衛生性・安定性などの「機械的合理性（知覚有用性）」と人の手の温かみなどの「情緒的安心感」の相克に位置づき、その態度構造は生活文脈（居住形態）に応じて異質化しうる。

示唆4（同時成立的構造）：「食の生活価値化（A）」と「自立支援理念（C）」が同時に保持されるとき、両者は単独より強固な現状維持志向を生みうる。両者が規範レベルで相互支持しつつ異なる経路（A→B、C→D）で実践レベルを規定するため、外部変革への抵抗が二重に保証される。

示唆5（負荷の正当化構造）：施設の運営的負荷（B）は、効率の問題としては解消可能でありながら、Aによる価値正当化を受けて、施設文化の内部では課題化されにくい。すなわちBは技術的問題より価値的負担として経験され、これがBの長期的持続を下支えする。

示唆6（中間態度の合成構造）：応答態度（D）が「留保」という中間形態をとる背景には、促進力（B→D）と抑制力（C→D）の等価的な拮抗がある。したがってDが「拒否」に振れるにはC→Dの強化が、「採用」に振れるにはB→Dの強化またはC→Dの弱化が必要と考えられる。

6 考察

6.1 理論的貢献

6.1.1 自動調理ロボットの位置づけの再定義

本調査から、自動調理ロボットは「調理の代替」ではなく「調理者が入居者と向き合う時間を創出する手段」として位置づけられるべきことが示唆された（示唆3と整合）。SDLの観点では、ロボットは「オペラント資源」（受動的資源）であり、それ自体が価値を持つのではなく、人間の「オペラント資源」（知識・スキル）と組み合わせることで初めて価値共創に貢献する。ロボットが定型的な調理作業を担うことで、スタッフは盛り付けの工夫や入居者への声かけといった「心のこもった」サービスに時間を割ける。

前著（金山，2026）が自動調理ロボットを「価値共創を支援するオペラント資源」と位置づけ、コスト削減と業務標準化による持続可能な基盤の可能性を論じたのに対し、本研究は「調理ロボットの利用が福祉施設現場でなぜ留保されるのか」を理念と実践の拮抗メカニズムとして解明した。ロボットが「食の生活価値化」や「自立支援理念」といった現場の強い規範意識と拮抗し、変革を「留保」させ、自己完結的に現状を維持する姿勢の境界条件を明らかにしたことで、前著の「施設導入モデル」に組織のケア理念との整合性という決定的な要因を提示し、SDLの価値共創モデルを福祉組織の内部文脈へ拡張・深化させた。

補足的質問紙調査もこの知見を支持する。Q4（導入賛成度）の最も強い規定因は、メリット認知（Q1： $r=.707$ ）ではなく健康貢献認知（Q3： $r=.893$, $R^2=.798$ ）であり、導入賛成度の分散の約80%を説明する。この知見は、TAM（Davis, 1989）の「知覚有用性」の中でも健康に直結する有用性が高齢者福祉領域で特に重要であることを示し、高齢者向けテクノロジー受容研究への理論的貢献となりうる。

6.1.2 業務特性による技術受容の制約

自動調理ロボットの導入可能性は業務特性やケア理念によって制約される（示唆2との整合）。外食産業の「定番メニューの大量調理」に対し、高齢者施設では多品種少量生産・日替わり献立・個別の食事形態対応が求められ、さらに小規模施設では「自立支援」理念との対立が技術受容を強く制約する。

この知見は技術受容モデル（Davis, 1989）を拡張し、「業務特性と技術特性の適合性」に加え「組織のケア理念との適合性」が技術受容の重要な規定因であることを示唆する。

6.1.3 居住形態が受容態度を分化させる構造的要因

質問紙調査からは、受容態度を分化させるもう一つの構造的要因が示された。施設関連では安全性や省力化を求める声が顕著な一方、家族同居層では「手作り」への情緒的愛着に起因する心理的抵抗が語られた。この差異は調理の「代替可能性の認知」に起因すると考えられる。施設では調理が制度的に外部化されているためロボットによる代替が自然に受容されるが、家庭内では調理が「家族ケア」の一部として情緒的に意味づけられ、置換への心理的抵抗が生じやすい。

この知見は、テクノロジー受容の規定因として業務特性のみならず利用者の生活文脈（居住形態、既存の調理体制）が重要な役割を果たすことを示唆し、SDLの「サービス・エコシステム」の文脈依存性を実証的に支持する。

6.2 実務的貢献

6.2.1 段階的導入モデルの提案

インタビューと質問紙調査の結果を踏まえ、表9が示す段階的導入モデルを提案する。

表9 自動調理ロボットの段階的導入モデル

段階	対象	内容	理論的根拠
第1段階	セントラルキッチン	複数施設への配送を担う中央調理施設に導入。大量調理のメリットを活かす	業務特性と技術特性の適合性が高い（規模の経済）
第2段階	大規模施設（100床以上）	厨房設備が整った施設に導入。定番メニューの一部をロボット化	規模の経済による投資回収可能性、介護職の直接ケア専念
第3段階	中規模施設（50～100床）	成功事例を参考に、施設の特性に応じた協働的導入	組織学習の波及
第4段階	小規模施設（グループホーム等）	自立支援を阻害しない「部分支援型」の調理技術の導入	ケア理念との整合性、付随業務（片付け等）の簡素化

出所：筆者作成

6.2.2 サービス・エコシステムの設計

SDLの観点から、自動調理ロボットは単体でなく以下のサービス・エコシステムの一部として設計されるべきである。

- ・食材供給システム：カット野菜や下処理済み食材の供給により、付随業務（下準備）の負担を軽減
- ・献立管理システム：ロボットの特性を活かした献立設計と、多品種への対応
- ・選択式サービス：「自己決定」を促す選択式配食とロボット調理の組み合わせ
- ・見守り・コミュニケーション：食事提供を通じた入居者との接点の維持・強化

本エコシステム設計は、前著（金山，2026）がSBMCで提示したビジネスモデル・キャンバスの構成要素（Key Activities, Value Propositions, Customer Relationships）に、理念適合と情緒的受容への配慮という「人間中心のデザイン（Human-Centered UX）」を組み込む実務指針を提供する。

6.2.3 心理的受容性への対応

ロボット調理に対する利用者・家族の心理的抵抗を軽減するため、以下のアプローチが有効である。

- ・プロセスの透明性の確保：ロボットの調理プロセスを可視化・開示し、安全性・衛生性を訴求する。
- ・人間の関与（Human Touch）の強調：ロボットは「補助」であり、最終的な味付けや盛り付けは人が担当することを明示
- ・段階的な導入と体験機会の提供：一部メニューから開始し評価を踏まえて拡大する。導入初期に「ロボット調理体験」などの体験型要素を付加し試行可能性を高める。

6.2.4 個人的受容から社会的推奨へのギャップの克服

導入賛成と推奨意向の相関が $r=.197$ と弱いことは、個人的受容と社会的推奨の乖離を意味する。Rogers（2003）の普及理論に照らせば、調理ロボットはまだ「知識段階」から「説得段階」への移行期にあり、普及促進には観察可能性（成果を他者が目にする機会）と試行可能性（導入前に体験できる機会）の向上が不可欠である。

6.3 代替的説明の排除と理論の頑健性

本研究の理論モデル（図1）に対し、「変革への留保（D）」を規定する要因は、自立支援理念や体制の二重制約ではなく、単なる「導入コスト」や「技術的未熟さ」という実務的変数ではないかという代替的説明が想定されうる。しかし現場実務者の語りからは、仮に導入コストが低くロボット性能が保証されても、小規模施設に「入居者の残存能力の活用（自立支援）」という理念的規範がある限り、完全な自動調理化は本人の役割を奪うため現実的でないという理念の対立が、本質的な阻害要因として抽出された。また量的分析でも、導入賛成度（Q4）の最大の規定因が健康貢献認知（Q3： $r=.893$ ）であったことは、テクノロジー受容がケアの規範との適合性に強く規定されるという本モデルの主張を支持する。したがって上記の代替的説明は妥当性を欠き、本モデルの頑健性が担保される。

6.4 研究の限界と今後の課題

本研究の限界として、以下の点が挙げられる。

- ・インタビュー調査のサンプル数の制約：4名へのインタビューに基づき、知見の一般化には限界がある。ただし異なる形態の施設（特養、グループホーム）の実務者を網羅している点は知見の多様性を担保する。
- ・実証データの不足：実際の導入事例に基づく効果検証は行っていない。今後は、自動調理ロボットを導入した施設における縦断的調査が求められる。
- ・量的データの探索的性格：N=50という限定的サンプルに基づく探索的分析であり、統計的に厳密な因果関係の検証には至っていない（交絡要因の存在）。また回答者の多くが実機の食事を体験していない段階での「事前の期待」を測定しており、実機体験後に態度が変容する可能性がある。

7 結論

本研究では、高齢者福祉施設における自動調理ロボット導入の可能性と課題を、施設実務者・現場スタッフへのインタビュー調査および補足的質問紙調査（N=50）を通じて明らかにした。前著（金山, 2026）のマクロ型ビジネスモデルの続編として、SDLを理論的枠組みに採用し、4つのRQに対する知見を導出した。

主な知見は以下の通りである。

- ①RQ1（食の価値）：高齢者施設の「食」は入居者のQOLを構成する中核的要素であり、生理的・心理的（楽しみ）・社会的（コミュニケーション）・医療的（認知症ケア・健康管理）価値を有する。
- ②RQ2（構造的課題）：現場最大の課題は深刻な人手不足であり、介護職員が食事補助や調理を兼務する「業務境界の曖昧化」が生じている。誤嚥リスクと配食エラーも現場の心理的負荷となっている。
- ③RQ3（ロボットへの認識）：自動調理ロボットには「条件付きの歓迎」が見られる。調理品質の安定化や未経験者の採用可能性拡大への期待がある一方、多品種少量生産への非適合、自立支援理念との相克、利用者の心理的抵抗への懸念が存在する。
- ④RQ4（促進・阻害要因）：促進要因として「人手不足への対応」「業務境界の正常化」「品質と安全性の担保」が、阻害要因として「自立支援コンセプトとの相克」「多品種少量への非適合」「社会的合意の負担」が抽出された。

理論的・実務的貢献として：本研究の中心的貢献は、高齢者福祉施設における自動調理ロボットの受容可否が、技術的性能や導入コストではなく、施設の規範（食の生活価値化と自立支援理念）と現場実践（体制の二重制約）の拮抗によって規定されることを、二軸四象限フレームワークとして理論化した

点にある。すなわち、両「規範」が変革要求と拮抗して技術導入を「留保」させ、現状を自己完結的に再生産する構造を特定した。これにより前著（金山，2026）のマクロなビジネスモデルに、その実装可能性が組織のケア理念との適合性に依存するという境界条件を与えた。また質問紙調査により、健康貢献認知が導入賛成の最大の駆動因であること（ $r=.893$ ）、居住形態がテクノロジー受容を分化させること、受容と推奨のギャップ（ $r=.197$ ）を明らかにした。以上より本研究は、自動調理ロボットを「調理の代替」ではなく「介護職が入居者と向き合う時間を創出する手段」と再定義し、施設規模とケア理念に応じた段階的・協働的な部分支援型サービス・エコシステムの設計を提言する。

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論 文

中国・米国におけるバーチャル・ファミリー・オフィスの 形成経路に関する比較研究

A Comparative Study of the Development Paths of Virtual Family Offices in China and the United States

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【要旨】

中国では富裕層の拡大と企業家一族の世代交代に伴い、資産隔離、税務設計、世代間承継を含む家族ガバナンス需要が高まっている。しかし、従来型ファミリー・オフィスは高コストであり、中小証券会社もライセンスや専門人材の制約から包括的サービスを単独で提供することは困難である。本研究は、サービス・ドミナント・ロジック（SDL）と社会情緒的資産理論（SEW）を用い、中国の総合金融機関と米国フィンテック企業の事例を比較し、VFOの形成経路と運営メカニズムを検討する。その結果、VFOは多主体による価値共創を基盤とするサービス・エコシステムとして機能し、家族の支配権維持、評判保護、世代間承継の需要に対応することが示された。本研究は、大規模金融機関およびフィンテック企業の事例から得られた知見を中小証券会社に外挿する探索的研究であり、外部専門機関とデジタル技術を組み合わせた軽量型VFOの構築可能性について一定の示唆を提供する。

キーワード：バーチャル・ファミリー・オフィス、形成経路、サービス・ドミナント・ロジック、社会情緒的資産

1 はじめに

1.1 研究背景

ファミリー・オフィス（Family Office）の分野において、伝統的な単一家族オフィス（Single Family Office, 以下SFO）を構築するには、高額な固定費用と多領域の専門人材によるフルチーム体制が必要とされる。そのため、富裕層に達していない中規模家族にとって、同水準の家族ガバナンスおよび資産管理サービスを獲得することは容易ではない。一方、供給側においても、中国の中小証券会社は資本力、人材、ライセンス構造の面で制約を受けており、完全なファミリー・オフィスを独自に設立することは困難である。こうした需要側・供給側双方の制約の下で、中規模家族の複雑なニーズと中小金融機関の能力限界を接続し得る代替的な組織形態として、バーチャル・ファミリー・オフィス（Virtual Family Office, 以下VFO）が注目されつつある^[1]。表1に示されるように、中国のHNW世帯数は長期的には増加傾向を示している。一方、2022年以降の減少傾向は、新型コロナウイルス感染症の影響やマクロ経済環境の変化による一時的なものと考えられる。しかし、資産保全、世代承継、家族ガバナンスに対する富裕層の需要は依然として存在している。

表1 中国における富裕層家族規模の推移（RMB）

年度	1,000万元以上	1 億元以上
2016	171.3万世帯	10.9万世帯
2017	186.0万世帯	12.0万世帯
2018	201.0万世帯	13.3万世帯
2019	198.0万世帯	12.7万世帯
2020	202.0万世帯	13.0万世帯
2021	206.0万世帯	13.3万世帯
2022	211.0万世帯	13.8万世帯
2023	208.0万世帯	13.3万世帯
2024	206.6万世帯	13.0万世帯

出所：筆者整理

過去20年間にわたり、世界の富裕層および富裕層の資産管理需要は、単なる投資収益志向から家族ガバナンス志向へと転換してきた。欧米では、ファミリー・オフィスは従来の投資管理機関から、資産配分、税務計画、家族ガバナンス、世代承継およびリスク隔離を包含する総合的な統治プラットフォームへと進化している。この潮流は中国においても顕著になりつつあり、民営企業および新興産業を中心とする家族資産の蓄積に伴い、中国の高資産家族の関心は利回りから、支配権の安定、世代間承継、税務・コンプライアンス構造、家族内部統治の持続可能性へと移行している^[2]。

しかし、中国におけるファミリー・オフィスの発展は、欧米諸国と比べてより複雑な制度環境に制約されている。中国の金融・法律制度は高度なライセンス分業構造を特徴とし、信託、証券、銀行、保険、税務、法律業務がそれぞれ異なる規制体系の下で管理されている。そのため、単一の金融機関が合法的

にすべてのファミリー・オフィス機能を統合することは困難である^[3]。大型総合金融グループは、グループ内の多様なライセンスと組織資源を活用して包括的なサービス体系を構築し得るが、中小証券会社は同様の条件を十分に備えていない。

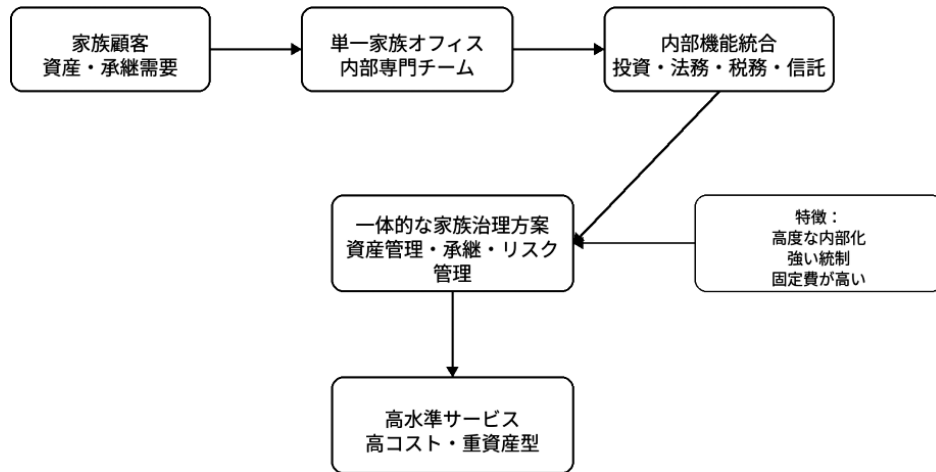


図1 従来型ファミリー・オフィスの運営プロセス

出所：筆者作成

注：家族顧客の需要伝達およびファミリー・オフィス内部における機能統合・サービス提供の関係を示す。

このような状況下で、VFOは「中核調整主体—外部専門ネットワーク—デジタル・プラットフォーム」を基盤とする組織構造を通じて、制度的制約と資源制約に対応する可能性を有している。すなわち、VFOはすべての専門機能を内部に抱え込むのではなく、信託、法律、税務、会計、投資顧問等の外部専門機関を組み合わせることで、固定雇用による高コスト構造をプロジェクト型・モジュール型のサービス体制へと転換する。中国のような強規制環境において、中小証券会社はVFOを活用することで、信託・税務・越境コンプライアンス機能を外部化しながら、ファミリー・オフィス市場への参入可能性を高めることができる^[4]。

1.2 研究課題

中国の制度環境では、ファミリー・オフィスの発展に明確な分化がみられる。大規模金融グループは資本力と組織資源を活用して包括的体制を構築できる一方、中小証券会社は信託、税務、カストディ等の能力に制約を抱える。本研究における「中小証券会社」とは、特定の資本金規模や顧客数によって厳密に区分するものではなく、大規模金融グループと比較して、専門人材、業務範囲、組織資源およびサービス提供能力に一定の制約を有する証券会社を指す。しかし、中小証券会社は民营企业オーナー顧客や資本市場関連資源を有する。そこで本稿は、中国の総合金融機関と米国のフィンテック企業の事例から得られた知見を踏まえ、中小証券会社がVFOモデルを通じて外部専門ネットワークを活用し、持続可能な家族ガバナンスおよび資産統合機能を構築する可能性について探索的に検討する。

1.3 研究意義

本研究の目的は、中国の制度環境におけるVFOの制度適合性と運営メカニズムを明らかにし、中小証券会社が高付加価値型ウェルス・マネジメントへ進出するための示唆を提示することである。VFOは中国でなお初期段階にあるため、本研究はケース分析を中心とする定性的手法を採用する。具体的には、中国および米国におけるVFOの発展経路を整理し、中国の金融監督制度、ライセンス分割構造、家族資

産の特徴を踏まえ、代表事例の比較を通じてVFOの形成過程と家族ガバナンス機能を分析する。

2 文献レビュー

2.1 バーチャル・ファミリー・オフィス

ファミリー・オフィスは、欧米富裕層家族の私的財産管理を起源とし、現在では資産管理、税務・法務計画、家族教育、相続および支配権設計を含む総合的な家族ガバナンス・プラットフォームへと発展している^{[5][6]}。組織形態としては、一般に単一家族オフィス（SFO）と多家族オフィス（MFO）に区分され、前者は高いカスタマイズ性を有する一方で高コストを伴い、後者は複数家族へのサービス提供を通じて規模の経済を実現する^[7]。

近年では、規制環境の複雑化とコンプライアンス・コストの上昇により、ファミリー・オフィス機能を外部化し、ネットワーク型・モジュール型に再構成する動きが強まっている。この文脈で、VFOは中核的調整主体が投資顧問、弁護士、税理士、会計士、信託機関などの外部専門資源を統合し、デジタル・プラットフォームを通じて資産管理、プロセス管理、コンプライアンス対応を行う組織形態として位置づけられる^[8]。したがって、VFOは従来型ファミリー・オフィスの縮小版ではなく、家族資産管理のプラットフォーム化、ネットワーク化、外部資源統合化を示す新たな組織形態である。特に中国のように金融ライセンスが分業化され、単一機関による全機能統合が困難な制度環境において、VFOは中小証券会社がファミリー・オフィス分野に参入するための重要な分析視角を提供する^[9]。

2.2 分析枠組み

2.2.1 サービス・ドミナント・ロジック

サービス・ドミナント・ロジック（Service-Dominant Logic, 以下SDL）は、市場交換の本質を製品の移転ではなく、知識や能力の適用を通じたサービス過程として捉える理論である^[10]。SDLにおいて、価値は企業から顧客へ一方的に移転されるものではなく、複数主体の相互作用と資源統合を通じて共創される^[11]。その後、SDLは企業と顧客の二者関係を超越、制度、規範、関係構造に支えられたサービス・エコシステムの分析へと拡張された^[12]。

本研究において、SDLはVFOを理解するための中心的視角となる。VFOは単なる金融商品の組み合わせではなく、中核調整主体が法律、税務、信託、投資顧問などの外部専門資源を統合し、家族の長期的ガバナンス需要に応えるサービス・システムである。特に中国のように規制が分業化され、単一金融機関が全機能を保有しにくい環境では、中小証券会社が外部資源を編成し、プラットフォーム型の価値共創を実現する過程を説明するうえで、SDLは有効な分析枠組みとなる。

2.2.2 社会情緒的資産理論

社会情緒的資産理論（Socioemotional Wealth, 以下SEW）は、家族企業が経営意思決定において経済的利益だけでなく、家族アイデンティティに由来する非経済的目標を重視することを説明する理論である。具体的には、家族による支配権の維持、家族の評判、情緒的絆、世代間継承などが重要な意思決定要因となる^[13]。Berroneは、SEWを家族による支配と影響、家族アイデンティティ、情緒的絆、情緒的愛着、世代継承という複数の次元から整理し、家族企業の戦略やガバナンス行動を説明する枠組みを提示した^[14]。

中国家族企業の文脈では、SEWはVFO需要を理解するうえで重要である。中国の家族企業では、実質的支配者を中心とするガバナンス構造が多く、資産管理サービスの選択においても、支配権の維持、

情報の秘匿性、評判保護、家族関係の安定、世代間継承が重視される^[15]^[16]。すなわち、家族は投資収益の最大化だけでなく、社会情緒的資産を維持できる制度的仕組みを必要としている^[17]。この点で、VFOは多機関連携、情報統制、信託スキーム、家族ガバナンス支援を通じて、家族の非経済的目標に対応し得る。

3 ケース分析——VFOの形成メカニズム

近年、中国では高額資産家世帯の増加と企業創業者世代の承継期の到来により、資産隔離、税務設計、支配権維持、家族ガバナンスへの需要が高まっている。しかし、従来型ファミリー・オフィスは高額な運営コストと分野横断的な専門チームを必要とし、中規模家族にとって導入は容易ではない。また、中小金融機関もライセンス、人材、資本規模の制約から、一体的なサービス提供が困難である。そこで本章では、中国の中信銀行プライベートバンクと米国 Wealth.com の二つのVFO事例を比較する。事例選定においては、中国の総合金融機関と米国のフィンテック企業という異なる制度環境・形成経路を比較する目的から、両事例を選定した。両者は制度環境や技術経路は異なるものの、中核的調整主体が複数の専門主体を結び付け、プラットフォーム型の仕組みによってファミリー・オフィス水準のサービスを提供する点で共通している。

本研究が比較事例研究を採用するのは、VFOが外部専門資源の統合、デジタル技術の活用、家族ガバナンス需要への対応を含む複合的な組織現象であり、代表的事例を通じてその形成過程と運営メカニズムを分析することが有効だからである^[18]。分析では、組織資源、外部連携、デジタル技術、家族ガバナンス機能を主要な分析項目として設定し、各事例の資料を整理・比較した。

資料は主に金融機関の公開資料、業界報告書、経済メディア報道および企業ニュースリリースに基づく。また、複数の資料源を相互に照合することで、分析結果の信頼性を確保した。

3.1 中国機関によるVFOモデル——中信グループの事例

中国事例として本研究が中信グループを取り上げるのは、同グループが家族信託およびファミリー・オフィス関連業務に早くから参入し、銀行、信託、証券、保険等を組み合わせたサービス体系を形成しているためである。中信グループでは、中信銀行プライベートバンクが高純資産家族の需要を把握し、中信信託が家族信託の受託者として資産承継と法的構造設計を担う。さらに、中信証券や中信保誠生命等が投資銀行サービス、資産配置、保険保障を提供し、必要に応じて法律事務所、会計事務所、税務専門家なども組み込まれる。これにより、中信はグループ内部資源と外部専門資源を結合したサービス・ネットワークを形成している^[19]。

発展過程を見ると、中信信託は2013年前後から家族信託事業を構想し、2015年にはファミリー・オフィスを志向する総合サービス体系を打ち出した。2025年第3四半期末には関連業務規模が1,100億元を突破し、顧客数も8,000名を超えた^[20]。組織面では、家族信託・財産承継チーム、プライベートバンク部門、投資顧問、税務・法務専門家を組み合わせ、家族ごとの需要に応じたプロジェクト型サービスを提供している。したがって、中信モデルは、金融持株株会構造、信託制度、内部ライセンス協同、外部専門機関連携を組み合わせた規制抱え込み型VFOであり、中国の分業規制下で合法性とサービス統合を両立させる仕組みを示している。

3.2 米国フィンテック企業によるVFOモデル——Wealth.comの事例

Wealth.comは、2021年に設立された米国のウェルス・マネジメント系フィンテック企業であり、財務アドバイザーや資産運用機関向けのデジタル遺産計画プラットフォームを提供している。同社は高純資産家族に直接サービスを提供するのではなく、独立系ファイナンシャル・アドバイザー、ファミリー・ウェルス・オフィス、銀行の資産運用部門などを支援する「エンパワーメント型」プラットフォームとして位置づけられる^[21]。

高純資産家族の関心が投資収益から遺産計画、税務最適化、家族ガバナンス、世代間資産移転へ広がる一方、従来の遺産計画は弁護士や会計士との対面協働に依存し、高コストで拡張性に乏しかった^[22]。Wealth.comはこの課題に対応し、デジタル遺言書や信託文書の自動生成から出発し、文書保管庫、協働ワークスペース、AIアシスタント、シナリオ分析、顧客向けレポート生成などを統合した。2024年6月には「Family Office Suite™」を発表し、単一の遺産文書作成ツールから、顧問向けのデジタルVFOプラットフォームへと発展した^[23]。また、遺産計画弁護士を法務顧問として迎え、成果物が専門基準や規制要件に適合する体制も強化している^[24]。機能面では、Vaultや協働ワークスペースにより、顧問チームは顧客資料を集中管理し、弁護士や税務専門家とオンラインで協働できる。AIアシスタントEster AIは文書解析と情報整理を支援し、EstateFlow™、Heritage Map、Legacy Navigatorなどの可視化ツールは信託構造や受益者関係を示す。運営モデルとしてはB2B2C構造を採用し、顧問機関にプラットフォームを提供することで、顧問が家族顧客に遺産計画、税務設計、承継支援を行う。2024年半ば時点で400社を超える資産運用会社と提携し、LPL Financialなどにも採用されている。この事例は、成熟した金融市場において、デジタル技術と専門サービスの統合により、ファミリー・オフィス水準のサービスを広範な顧問ネットワークへ拡張できることを示している。

3.3 事例比較

以上の二つの事例は、VFOが制度環境に応じて異なる形成経路をとることを示している。中信モデルは金融持株株会と家族信託制度を基盤とする「規制抱え込み型」VFOであり、Wealth.comはデジタル・プラットフォームを活用した「技術駆動型」VFOである。両者はいずれも単一金融商品の提供ではなく、複数主体の専門資源を統合するサービス・システムとして機能している点で共通しており、この特徴はSDLが強調する価値共創と資源統合の論理と整合する。また、両事例は家族顧客が投資収益だけでなく、支配権維持、評判保護および世代間承継といった社会情緒的資産を重視していることを示している。したがって、VFOは需要側の家族ガバナンス需要と供給側の専門資源統合の相互作用によって形成される組織形態として理解できる。主要な比較結果は表2に示す。

表2 中信モデルとWealth.comモデルの比較

項目	中国：中信モデル	米国：Wealth.comモデル
モデル類型	規制抱え込み型VFO	技術駆動型VFO
中核主体	中信銀行プライベートバンク、中信信託を中心とする総合金融グループ	Wealth.comを中心とするフィンテック・プラットフォーム
制度環境	金融分業規制が強く、銀行・信託・証券・保険のライセンスが分離	専門分業が成熟し、顧問・弁護士・税務専門家・フィンテック企業が契約関係で連携
主要な統合手段	グループ内部のライセンス協同と家族信託制度	AI、API、クラウド型文書管理、デジタル遺産計画ツール

項目	中国：中信モデル	米国：Wealth.com モデル
サービス対象	高純資産家族、企業家一族、家族信託顧客	財務アドバイザー、資産運用会社、ファミリー・ウェルス顧問を通じた家族顧客
運営構造	銀行・信託・証券・保険・外部専門機関によるグループ協同型構造	顧問・弁護士・税務専門家・顧客を接続するB2B2C型構造
主要機能	家族信託、資産隔離、承継設計、資産配置、保険保障、法務・税務連携	遺産計画、文書管理、AI支援、承継シミュレーション、顧問協働支援
価値創出方式	グループ内外の専門資源を統合し、家族の長期治理需要に対応	デジタルツールにより顧問の生産性を高め、家族治理サービスを標準化・効率化
コンプライアンス基盤	営業許可を受けた金融機関間の役割分担、信託制度、内部統制	法的審査、データ・セキュリティ、専門基準、プラットフォーム認証
優位性	制度信頼性が高く、資産隔離・承継設計に強い	拡張性が高く、低コストで広範な顧問ネットワークに展開可能
限界	大規模金融グループの資源に依存し、中小証券会社が直接模倣しにくい	成熟した法律・顧問市場を前提としており、中国へそのまま移植しにくい
中国中小証券会社への示唆	信託・法務・税務等を外部連携し、制度内で軽量型VFOを構築する必要がある	デジタル技術を活用し、外部専門家との協働効率を高める必要がある

出所：筆者整理

4 クロスケース比較研究

4.1 制度環境によるVFO形成経路の差異

VFOの形成は、組織戦略や技術革新だけでなく、規制枠組み、市場成熟度、専門サービス供給構造といった制度環境に強く依存している。中信モデルは、中国の金融分業規制と金融持株会社制度に基づく「規制抱え込み型」VFOであり、銀行、信託、証券、保険の内部協同と家族信託制度を通じて、包括的な家族ガバナンス支援を実現している。一方、Wealth.comは、成熟した専門サービス市場を背景に、デジタル・プラットフォームを通じて顧問、弁護士、税務専門家、顧客を接続する「技術駆動型」VFOである。両者の差異は、VFOが制度環境に応じて異なる形態をとることを示している。

しかし、両者に共通するのは、VFOの本質が全機能の内部保有ではなく、制度的に許容される範囲で資源統合者・関係調整者として機能する点にある。したがって、VFOは規制環境から切り離された破壊的モデルではなく、制度に埋め込まれたプラットフォーム型組織革新として理解できる。

4.2 SDL・SEWからみたVFOの共通メカニズム

サービス・ドミナント・ロジック（SDL）は、価値を企業から顧客へ一方的に移転されるものではなく、複数主体の相互作用を通じて共創されるものとして捉える。この視点からみると、VFOは単なる金融商品や専門サービスの集合ではなく、中核的調整主体が外部専門資源を編成し、家族の複合的需要に対応するサービス・エコシステムである。中信モデルでは、家族顧客、プライベートバンク、信託会社、投資顧問、法務・税務専門家が相互に関与し、資産管理や承継設計を支援する。一方、Wealth.comでは、プラットフォームが顧問、弁護士、税務専門家、顧客を接続し、デジタル上で情報統合とプロセス管理を実現している。両事例はいずれも、VFOの本質が「単独提供」ではなく「多主体の資源統合」にある

ことを示している。

他方、社会情緒的資産理論（SEW）は、家族が資産ガバナンスにおいて、経済的利益だけでなく、支配権の維持、評判の保護、家族アイデンティティ、情緒的絆、世代間承継を重視することを説明する。したがって、VFOの採用は、単なるコスト削減や技術的利便性の追求ではなく、家族が社会情緒的資産を保護するために選択するガバナンス手段として理解できる。中信モデルでは、家族信託や家族ガバナンス支援がこうした非経済的目標の実現を支えている。一方、Wealth.comモデルでは、デジタルツールを通じた情報管理、関係者間の連携および承継計画の可視化が、家族の非経済的目標への対応を支えている。

以上より、VFOの形成メカニズムは、需要側と供給側の相互作用として理解できる。需要側では、家族が支配権維持、評判保護、世代承継などの社会情緒的資産の維持を求める。このようなSEW志向は、単なる資産管理サービスではなく、多様な専門主体を統合した長期的かつ個別化されたサービスへの需要を形成し、供給側の資源統合戦略に影響を与える。供給側では、中核的調整主体が制度的資源またはデジタル技術を活用して外部専門資源を統合することで、家族の複合的需要に対応する。

一方で、SDLに基づく価値共創型サービス・エコシステムの形成は、単に既存のSEW需要に応えるだけではなく、家族のガバナンス能力や社会情緒的資産の維持・強化にも寄与する。すなわち、SEWがVFO形成の方向性を規定し、SDLによる資源統合がその実現手段となると同時に、形成されたサービス・エコシステムがSEWの維持を支える循環的關係が存在する。したがって、VFOは家族の非経済的目標に対応するプラットフォーム型サービス・エコシステムとして理解できる。

4.3 中国中小証券会社への実装経路

前述のクロスケース比較および図2を踏まえると、中国の中小証券会社がVFOを発展させる際には、大規模金融グループの内部統合型モデルを模倣することも、海外フィンテック企業の完全デジタル型モデルをそのまま移植することも、必ずしも現実的とはいえない。中小証券会社は、ライセンス、資本金、ブランド信用力に制約を受ける一方、地域企業家との関係、資本市場業務の経験、柔軟な組織構造に一定の優位性を有する。したがって、その発展経路としては、軽量型・協働型・プラットフォーム型VFOを検討することが望ましいと考えられる。

第一に、中小証券会社は「全機能提供者」ではなく、「中核調整主体」として位置づけられることが望ましい。図2が示すように、家族顧客の複合的なガバナンス需要を起点として、中小証券会社または顧問機関が中心となり、信託会社、法律事務所、税務顧問、保険・会計機関などの外部専門資源を編成する。これにより、資産隔離、承継設計、税務設計、相続・株式ガバナンス、保障・記録管理などの機能を統合的に提供できる可能性がある。

第二に、外部専門ネットワークの制度化が重要である。ファミリー・オフィス・サービスは多領域に及ぶため、中小証券会社がすべての専門能力を内部化することは困難である。したがって、外部機関との協力は臨時的な紹介関係にとどまらず、選定基準、責任分担、情報共有、顧客承認、リスク提示を含む協働メカニズムとして構築することが望ましい。

第三に、軽量型デジタル・プラットフォームの導入を検討する必要がある。図2に示されるように、デジタル・プラットフォームは単なる顧客表示機能ではなく、情報管理、進捗管理、文書共有、権限設定、操作記録、リスク管理を支える基盤となり得る。中小証券会社は大規模システムを一度に開発する必要はなく、既存のCRMやウェルス・マネジメントシステムに段階的に機能を追加することで、内部チームと外部専門機関の協働を可視化できると考えられる。

第四に、コンプライアンス上の境界を明確化することが重要である。中小証券会社は、信託受託、法

律意見、税務判断などの資格を要する業務を直接提供するのではなく、専門機関を組織し、サービスプロセスを調整し、リスクを提示し、記録を管理する役割を担うことが望ましい。また、外部専門機関との協働においては、金融規制や兼業規制への適合性を確保するとともに、顧客情報管理、利益相反管理、サービス品質管理にも留意する必要がある。そのため、外部機関の選定基準、責任分担、情報共有範囲およびリスク対応体制を事前に明確化することが重要である。

以上より、中国の中小証券会社におけるVFOは、大型金融グループの縮小版ではなく、「内部調整能力+外部専門ネットワーク+軽量型デジタル基盤+コンプライアンス管理」によって成立し得る組織モデルとして捉えられる。その方向性としては、SEWが示す家族の支配権維持、評判保護、世代承継の需要に応えつつ、SDLが示す資源統合と価値共創を通じて、高付加価値ウェルス・マネジメントへの移行を図ることが考えられる。

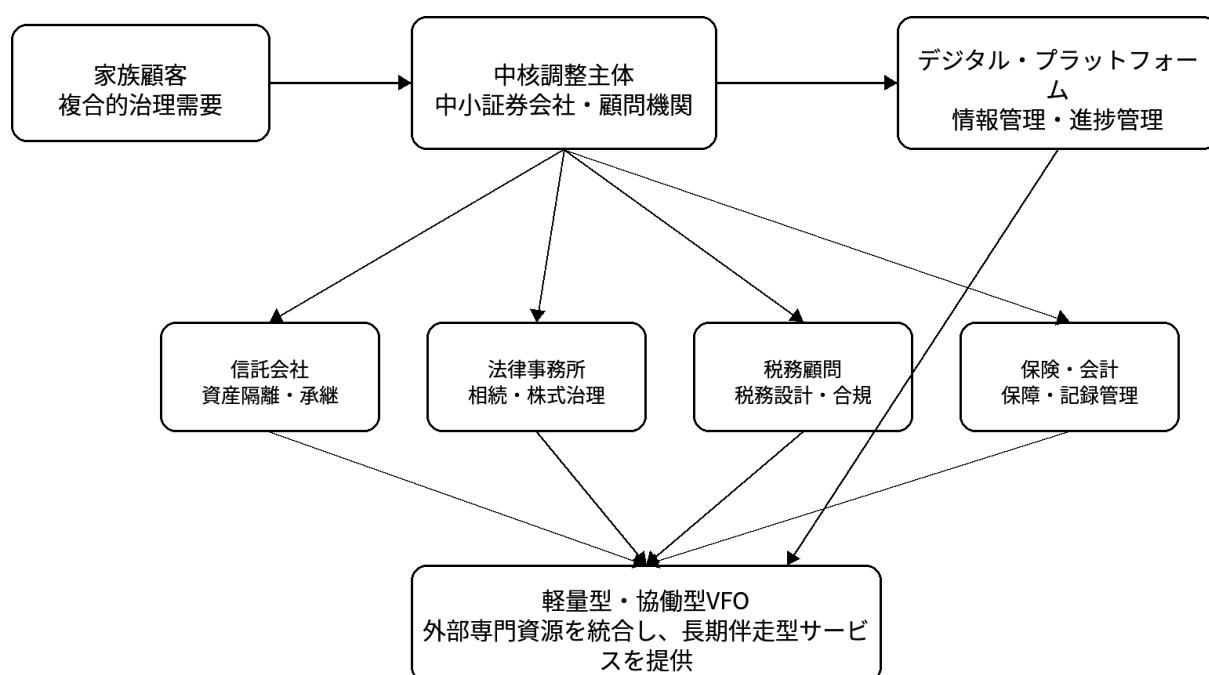


図2 バーチャル・ファミリー・オフィス（VFO）の運営プロセス

出所：筆者作成

注：家族顧客の需要伝達およびファミリー・オフィス内部における機能統合・サービス提供の関係を示す。

5 終わりに

5.1 研究結果のまとめ

本研究の結果、中国の分業規制およびライセンス構造は、中小証券会社がVFOを発展させる際の基礎的制約条件であることが明らかとなった。中小証券会社は大型総合金融グループの内部統合型モデルをそのまま採用することは難しく、外部専門機関との協働、跨機関連携およびデジタル技術を通じてサービス統合を実現する必要がある。

また、サービス・ドミナント・ロジックの視角から見ると、中小証券会社の中核能力は金融商品供給ではなく、信託会社、法律事務所、税務顧問、フィンテック企業などの専門資源を編成し、家族の長期的ニーズに応える統合的解決策を形成する能力にある。さらに、社会情緒的資産理論の視角からは、家族顧客が支配権維持、世代継承、評判保護といった非経済的目標を重視しており、中小証券会社もカスタマイズ型サービスと継続的な信頼形成を通じて差別化競争優位を構築できることが示された。

5.2 実務的貢献と理論的意義

(一) 理論的貢献

本研究の理論的貢献は三点に整理できる。第一に、中国の分業規制とライセンス構造を踏まえ、VFOを制度環境に埋め込まれた組織形態として位置づけた。第二に、サービス・ドミナント・ロジックを援用し、中小証券会社の競争優位が金融商品供給ではなく、外部専門資源を統合する資源編成能力にあることを示した。第三に、社会情緒的資産理論を導入し、家族顧客が支配権維持、世代継承、評判保護といった非経済的目標を重視することを説明した。さらに、SDLとSEWを統合的に捉えることで、家族の社会情緒的資産への志向がVFOにおける資源統合やサービス設計の方向性に影響を与え、同時にSDLに基づく価値共創型サービス・エコシステムが家族のガバナンス能力や社会情緒的資産の維持を支える相互作用メカニズムを提示した。

(二) 実践的貢献

実務的には、本研究は、中国の中小証券会社が軽量型VFOを構築するための方向性を提示した。すなわち、中小証券会社は、多額の資本や専門人材を自社内に抱え込む内部統合型モデルではなく、外部専門機関との協働、デジタル技術の活用、継続的な信頼関係の構築を通じて、高付加価値型ウェルス・マネジメントへ移行することができる。

5.3 研究の限界と今後の課題

本研究にはいくつかの限界がある。第一に、本研究は大規模金融機関およびフィンテック企業の事例から得られた知見を、中国の中小証券会社に外挿する探索的研究であり、中小証券会社を直接対象とした実証的検証を行っていない。今後は、地域証券会社や民営資産管理機関を対象としたインタビュー調査および追加事例分析が必要である。第二に、事例数が限定的であるため、分析結果の一般化には一定の限界がある。第三に、本稿は主として質的研究に基づくため、将来研究では質問票調査等を用いた定量的検証が求められる。第四に、家族内部の世代差異やガバナンス上の権力構造が、VFOの選択やサービス戦略に与える影響についても、さらなる検討が必要である。

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Article

Drivers of Asset-Intensive Reinsurance Adoption in Japan and Hong Kong:

Structural, Regulatory, and Market Factors

日本と香港における資産集約型再保険導入の要因 — 構造的・規制的・市場的要因 —

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Abstract

Asset-Intensive Reinsurance (AIR) has emerged as a central mechanism for life insurers to manage capital intensity, balance sheet volatility, and regulatory constraints. While AIR adoption is well established in the United States and the United Kingdom, its adoption across Asia varies sharply. Japan has become the region's most active AIR market, whereas Hong Kong—despite its role as a regional reinsurance hub—has seen only limited uptake.

This paper asks: Under what structural, regulatory, and market conditions does AIR emerge as a strategic balance-sheet tool for life insurers? Through a comparative case study of Japan and Hong Kong, it examines how product design, supervisory frameworks, asset-liability management (ALM) constraints, and insurer business models interact.

The analysis reveals that Japan's high AIR adoption is driven by five converging factors: (i) long-duration, non-participating, guarantee-heavy liabilities; (ii) constrained domestic asset markets that lack ultra-long, yield-generating instruments; (iii) sophisticated ALM capabilities that make residual risks transparent; (iv) a market-consistent solvency regime (Japan Insurance Capital Standard, J-ICS) that fully capitalizes interest rate and duration mismatch; and (v) abundant offshore reinsurance capital from Bermuda-based providers. In contrast, Hong Kong's limited adoption reflects the absence or attenuation of these factors: participating products with risk-sharing dominate ($\approx 70\%$ of liabilities), liability durations are shorter, the Hong Kong Risk-Based Capital (HK RBC) regime is less sensitive to duration mismatch, and internal capital suffices to absorb risks.

The paper introduces a “Fit, Need, Ease of Implementation” framework—developed inductively from the cases—to assess AIR potential across jurisdictions. A glossary of key terms is provided to assist readers unfamiliar with Asian life insurance market structures.

Keywords: Asset-Intensive Reinsurance (AIR); capital management; asset-liability management; solvency regulation

1. Introduction

Although advanced Asian economies face similar challenges of demographic aging and financial market volatility, the adoption of asset-intensive reinsurance (AIR) has been strikingly uneven. Japan has emerged as Asia’s most active AIR market, whereas Hong Kong—despite its role as a regional reinsurance hub—has seen only limited adoption of balance-sheet-focused reinsurance.

Table 1.1 summarizes major publicly announced AIR transactions involving Japanese cedents between 2021 and 2025. The concentration of activity in 2025 reflects the accelerating effect of J-ICS implementation, while the predominance of Bermuda-based reinsurers illustrates the cross-border structure of the market. The absence of comparable Hong Kong transactions is itself indicative: except for the recent Resolution transaction, no other third-party funded AIR transactions of material size have been publicly announced in Hong Kong during this period, consistent with AIR’s marginal role there.

Table 1.1 Major announced AIR Transactions in Japan and Hong Kong, 2021-2025

Type	Announcement Date	Reinsurer	Cedant	Region	Transaction Value (million USD)	Type of Business
Flow	2025.10	PL Re	Undisclosed (deal1)	Japan	n/a	WL
Flow	2025.10	PL Re	Undisclosed (deal 2)	Japan	n/a	WL
SideCar	2025.10	Carlyle FCA Re (sidecar)	T&D Holdings	Japan	250m	Sidecar
Flow	2025.7	Aspida	Undisclosed	Japan	n/a	FA
Block	2025.6	RGA	Anshin Life (subsidiary of Tokio Marine)	Japan	700	WL
Block	2025.6	RGA	Dai-ichi Life	Japan	1000	n/a
Block	2025.6	Resolution	Undisclosed	Hong Kong	1000	WL and Ann
Block	2025.5	Resolution & PL Re	Anshin Life (subsidiary of Tokio Marine)	Japan	n/a	WL
Block	2025.3	Fortitude	Taiyo Life	Japan	4000	n/a
Block	2025.3	Talcott	Japan Post	Japan	3600	n/a
Block	2025.1	Prudential (Prismic)	Prudential (Japan)	Japan	7000	WL
Block	2024.5	PL Re & RGA	Anshin Life (subsidiary of Tokio Marine)	Japan	693	WL
Block	2024.3	RGA	Japan Post	Japan	4485	Payout
Flow	2024.07	Talcott	Dai-ichi Frontier	Japan	n/a	Ann
Flow	2024.02	Resolution	Undisclosed	Japan	n/a	Ann
Flow	2024	Global Atlantic	Undisclosed	Hong Kong	n/a	Endowment
Flow	2023.9	Athene	Undisclosed	Japan	n/a	Life
Block	2023.12	Global Atlantic	Manulife (Japan)	Japan	3978	WL
Block	2023.11	Athene	FWD (Japan)	Japan	n/a	WL
Block	2023.04	Fortitude & RGA	Daido Life	Japan	1060	WL
Block	2023.03	Fortitude	Undisclosed	Japan	n/a	WL
Flow	2023.02	Kuvare	Undisclosed	Japan	n/a	Ann
Block	2023	Kuvare	Undisclosed	Hong Kong	n/a	Payout
Block	2022.3	RGA	Dai-ichi Life	Japan	2000	Ann
Block	2022.3	Fortitude	T&D	Japan	4000	Ann
Flow	2022.11	Aspida	Undisclosed	Japan	n/a	Ann
Block	2021	Global Atlantic	AXA HK	Hong Kong	4800	WL
Block	2020.9	Athene	Undisclosed	Japan	n/a	Ann
Block	2025.9	Athene	Sony Life	Japan	n/a	WL (USD dominated)

Note: Transaction sizes are approximate and based on publicly disclosed information. A “block” transaction refers to in-force portfolio reinsurance; a “flow” transaction refers to new business reinsurance.

Source: Author’s compilation from company press releases, regulatory filings, and industry reports (Gallagher Re, 2025; SOA, 2024; various news reports).

This chapter examines the structural, regulatory, and market conditions that generate strong, endogenous demand for AIR in Japan, then contrasts these factors with Hong Kong to explain why similar pressures do not arise there. Specifically, it considers five determinants of AIR adoption: (i) liability composition,

(ii) investment flexibility, (iii) asset-liability management (ALM) practices, (iv) regulatory frameworks, and (v) the availability of external capital.

The central argument is that divergence in AIR uptake is not primarily a matter of regulatory permissiveness or market sophistication but reflects deeper structural differences. In Japan, long-duration, guarantee-heavy liabilities, combined with constrained domestic asset markets and market-consistent solvency rules under the Japan Insurance Capital Standard (J-ICS), create persistent balance-sheet strain that drives the use of AIR. By contrast, in Hong Kong, risk-sharing product designs, flexible investment strategies, moderate guarantees, and abundant internal and intra-group capital enable insurers to absorb similar risks internally, reducing the structural need for third-party funded AIR.

A final contribution is the introduction of an inductive framework—Fit, Need, and Ease of Implementation—to evaluate AIR potential across jurisdictions. This framework shows how Japan’s market alignment across liabilities, regulation, capital, and ALM infrastructure has made AIR a core strategic tool, whereas Hong Kong’s market conditions keep adoption largely marginal.

Structure of the chapter. Section 2 presents the comparative case study methodology. Section 3 reviews the relevant literature on reinsurance, asset-liability management, and cross-border capital flows in insurance. Section 4 states the hypothesis guiding the analysis. Section 5 examines Japan in detail, highlighting how long-duration, non-participating liabilities, constrained domestic asset markets, and the introduction of J-ICS converge to create persistent ALM pressures. Section 6 analyzes Hong Kong, where distinct liability and regulatory factors fundamentally limit the structural case for AIR. Section 7 presents the Fit, Need, and Ease framework, synthesizing the comparison. Section 8 concludes and discusses alternative explanations.

2. Methodology

This study employs a comparative case study design to investigate the structural, regulatory, and market conditions under which asset-intensive reinsurance (AIR) emerges as a strategic balance-sheet tool for life insurers. A case study approach is appropriate given the research question’s focus on “how” and “why” phenomena occur in real-world contexts, where the boundaries between the phenomenon of interest (AIR adoption) and its environmental context are not clearly evident.

2.1 Case Selection

Japan and Hong Kong were selected using a “most similar systems” logic. Both jurisdictions are advanced Asian financial centers with mature life insurance markets, sophisticated regulatory frameworks, and increasing exposure to demographic aging. Both also have access to global reinsurance markets and have been targeted by Bermuda-based reinsurers offering funded AIR structures. Despite these similarities, the two markets exhibit strikingly divergent outcomes in AIR adoption—Japan has seen

substantial transaction activity while Hong Kong has not.

This divergence makes the pair analytically valuable. By holding certain macro-level factors constant (regional location, economic development, access to reinsurance capital), the case comparison isolates the specific drivers of AIR adoption: liability composition, product design, regulatory calibration, ALM practices, and internal capital availability.

A limitation of the two-case design is that it cannot definitively establish causality or generalize to other Asian markets (e.g., Singapore, South Korea, Taiwan). However, it generates testable propositions and a conceptual framework (Fit, Need, Ease) that can be applied to additional jurisdictions in future research.

2.2 Comparative Market Indicator

To anchor the comparative analysis, Table 2.1 summarizes key structural indicators across selected markets, including liability composition, duration characteristics, regulatory sensitivity to asset-liability mismatch, and observed AIR activity. These indicators provide a simplified empirical basis for evaluating the Fit-Need-Ease framework developed later in the paper.

Table 2.1 Key indicators across Japan and Hong Kong

Market	Non-Par %	Liability Duration	RBC Sensitivity to Mismatch	AIR Activity
Japan	High (~70-80%)	Long (20-30 yrs)	High (J-ICS)	High
Hong Kong	Low (~30%)	Short-Medium	Moderate (HK RBC)	Low

3. Literature Review

This chapter engages with three streams of academic literature: (i) reinsurance and capital management, (ii) asset-liability management (ALM) in life insurance, and (iii) comparative insurance regulation. Each stream informs the analysis, while the chapter's inductive framework addresses gaps in each.

3.1 Reinsurance and Capital Management

The corporate finance literature has long recognized reinsurance as a mechanism for managing capital structure, reducing bankruptcy risk, and smoothing earnings (Mayers & Smith, 1990; Froot, 2001). Froot and O'Connell (1999) argue that reinsurance allows insurers to access external capital when internal capital is costly or constrained, particularly following large losses. More recent work has extended this logic to capital management reinsurance, where transactions are motivated not by catastrophic risk transfer but by balance-sheet optimization, tax efficiency, and regulatory capital relief (Doherty & Richter, 2002; Cummins & Weiss, 2009).

However, most of this literature focuses on property-casualty reinsurance or traditional life reinsurance (mortality risk transfer). Asset-intensive reinsurance (AIR)—where liabilities are transferred together with associated assets, often in funded structures involving alternative asset managers—has received limited academic attention. Industry reports (Gallagher Re, 2025; SOA, 2024) describe AIR practices, but systematic academic analysis of its drivers remains scarce. This chapter addresses this gap by identifying the structural conditions under which AIR becomes an equilibrium strategy rather than an opportunistic transaction.

3.2 Asset-Liability Management (ALM) in Life Insurance

The ALM literature emphasizes the importance of matching the duration, convexity, and cash flow patterns of assets and liabilities to mitigate interest rate risk. For life insurers with long-duration guaranteed liabilities, ALM is particularly challenging because: (i) asset markets may not supply instruments of sufficient duration, (ii) policyholder behavior (lapses, surrenders) introduces optionality, and (iii) regulatory accounting can mask or amplify mismatches (Brennan & Schwartz, 1982; Briys & de Varenne, 1994).

Recent research has examined how market-consistent solvency regimes (e.g., Solvency II, ICS) intensify ALM discipline by requiring economic valuation of both assets and liabilities. When duration mismatches are fully capitalized, insurers face explicit regulatory costs for holding mismatched positions. This creates demand for risk transfer solutions that realign asset and liability profiles.

This chapter builds on this literature by showing how market incompleteness—the absence of sufficient long-duration, yield-generating domestic assets—drives insurers toward cross-border AIR as an ALM completion tool. In doing so, it extends the ALM literature beyond traditional portfolio hedging to include reinsurance as a structural ALM instrument.

3.3 Cross-Border Capital and Insurance-Linked Asset Management

A growing literature examines the intersection of insurance and global capital markets. Insurers' liabilities, particularly long-duration annuity and whole-life obligations, represent stable, long-term funding that can be paired with illiquid, higher-yielding assets (Froot, 1999; Liedtke, 2007). Private equity sponsors and alternative asset managers have increasingly entered the life reinsurance market, viewing insurance liabilities as a source of “permanent capital” that enables investment in private credit, infrastructure debt, and structured finance.

This phenomenon is particularly pronounced in Bermuda, where a regulatory regime designed for long-term insurers and reinsurers has attracted significant third-party capital (BMA, 2025; Skadden, 2025). These reinsurers combine sophisticated asset origination capabilities with insurance risk-taking, effectively acting as intermediaries between retail policyholder savings and global credit markets.

However, academic research on this trend remains nascent. Most analysis appears in industry reports

rather than peer-reviewed journals. This chapter contributes by showing how abundant offshore capital supply interacts with domestic liability structure and regulatory frameworks to either enable or constrain AIR adoption. In Japan, external capital is actively deployed into long-duration guarantees; in Hong Kong, the same capital providers focus on non-life or intra-group structures due to limited structural demand.

3.4 Comparative Insurance Regulation

The IAIS Insurance Capital Standard (ICS) and similar frameworks (Solvency II, J-ICS, HK RBC) represent a global movement toward market-consistent, risk-based solvency (IAIS, 2019). However, national implementation varies materially in the calibration of capital charges for long-duration guarantees, interest rate risk, and asset-liability mismatch (Skadden, 2023; Milliman, 2025).

This chapter contributes to this literature by comparing two Asian regimes (J-ICS and HK RBC) with respect to their sensitivity to duration mismatch and how this differential sensitivity, interacting with liability structure, shapes AIR adoption. The analysis reveals that regulatory regimes do not simply “permit” or “forbid” AIR; they incentivize it to varying degrees depending on how they treat long-duration guarantees.

3.5 Research Gap and Contribution

The literature reviewed above has four limitations that this chapter addresses:

- Limited academic analysis of AIR (most work is industry-focused): This chapter provides a structured, theory-informed analysis of AIR drivers.
- ALM literature assumes asset markets are complete or ignores reinsurance as an ALM tool: This chapter introduces reinsurance as a “market completion” mechanism.
- Cross-border capital literature focuses on property-casualty or traditional life, not AIR: This chapter analyzes how offshore capital interacts with liability structure and regulation.
- Comparative insurance regulation rarely focuses on duration mismatch sensitivity: This chapter compares J-ICS and HK RBC specifically on this dimension.

The chapter’s main contribution is the “Fit, Need, Ease of Implementation” framework, developed inductively from case analysis, which can be applied to assess AIR potential across additional Asian markets (e.g., Singapore, South Korea, China) in future research.

4. Hypothesis

The comparative case analysis and literature review suggest that AIR adoption is not randomly distributed across markets but is systematically associated with specific structural, regulatory, and market conditions. Based on the theoretical framework developed above, this section states a single overarching proposition and derives three testable sub-propositions that guide the qualitative analysis in Sections 5, 6,

and 7.

4.1 Overarching Proposition

Proposition 1: AIR adoption increases with the convergence of three conditions: (i) a high share of non-participating, long-duration, guarantee-heavy liabilities; (ii) a regulatory solvency regime that fully capitalizes interest rate and duration mismatch; and (iii) domestic asset market incompleteness (i.e., insufficient supply of ultra-long, yield-generating instruments to match liabilities).

Conversely, where any of these conditions is absent or attenuated, AIR adoption remains limited, as internal ALM and capital management suffice to absorb risks.

This proposition is derived inductively from the observed divergence between Japan (high adoption) and Hong Kong (low adoption) and is consistent with the ALM and reinsurance literature reviewed in Section 3.

4.2 Sub-Propositions

To render the overarching proposition empirically assessable within a qualitative comparative case framework, I decompose it into three sub-propositions, each corresponding to a key dimension of the analysis.

Sub-Proposition 1 (Liability Structure): Markets dominated by non-participating (non-par) products with long-duration guarantees exhibit higher AIR adoption than markets dominated by participating (par) products with risk-sharing and flexible bonuses.

Rationale: Non-par liabilities fully transfer investment and longevity risk to insurers, creating rigid, capital-intensive obligations. Par products allow insurers to adjust payouts through discretionary bonuses, reducing balance-sheet strain and the need for external risk transfer.

Sub-Proposition 2 (Regulatory Sensitivity): Solvency regimes that fully capitalize duration mismatch and interest rate risk (e.g., J-ICS) generate greater demand for AIR than regimes that do not (e.g., HK RBC).

Rationale: When regulatory capital requirements are sensitive to asset-liability mismatches, insurers face explicit costs for retaining long-duration guarantees. AIR reduces these costs by transferring mismatched exposures to reinsurers with different capital treatment or investment capabilities.

Sub-Proposition 3 (Asset Market Completeness): Markets with constrained domestic supply of ultra-long, yield-generating assets exhibit higher AIR adoption than markets with sufficient internal investment flexibility.

Rationale: Where domestic bond markets lack instruments of sufficient duration and yield, insurers cannot fully hedge liabilities through internal ALM alone. AIR provides access to global asset origina-

tion platforms (e.g., private credit, infrastructure debt), effectively extending the feasible ALM frontier.

5. Japan

5.1 Introduction of AIR in Japan

Japanese life insurers have increasingly adopted asset-intensive reinsurance (AIR) over the past decade, particularly in relation to long-duration liabilities such as whole-life policies and annuities. Two primary transaction structures have emerged: block reinsurance, typically applied to in-force portfolios of whole-life business, and flow reinsurance, which is more commonly used for newly originated annuity products.

These structures serve distinct but complementary strategic objectives. Block reinsurance is primarily used to enhance capital efficiency and reduce exposure to interest rate and longevity risks embedded in legacy, guarantee-heavy liabilities. By transferring in-force portfolios, insurers can release capital and reduce balance-sheet sensitivity to market fluctuations. In contrast, flow reinsurance is often deployed to improve product competitiveness, particularly in bancassurance channels, by enabling insurers to offer more attractive pricing while managing investment and spread risk through reinsurance arrangements.

A defining feature of recent AIR activity in Japan is the prominent role of Bermuda-based reinsurers, many of which are backed by private equity sponsors or affiliated with alternative asset managers. These entities bring differentiated investment capabilities and access to global credit markets, allowing them to assume long-duration liabilities and deploy assets at higher risk-adjusted returns than those typically available domestically. Their participation highlights that AIR in Japan is not solely a mechanism for regulatory capital relief, but also a conduit for cross-border capital allocation and balance-sheet optimization.

The coexistence of block and flow structures, together with the increasing involvement of global reinsurers, underscores the institutionalization of AIR within the Japanese life insurance market. Rather than representing opportunistic or one-off transactions, AIR is increasingly embedded as a strategic tool serving both back-book optimization and front-book competitiveness. This dual role reinforces its importance as a core mechanism through which insurers manage capital efficiency, risk transfer, and market positioning.

5.2 Product Demand and Liability Structure

Japan's life insurance market is structurally dominated by long-duration, non-participating (non-par) savings products, particularly annuities and whole-life policies with embedded guarantees. These liabilities fully transfer investment and longevity risk to insurers, with guaranteed benefits often fixed at inception and linked to historically high interest rates.

Unlike participating or unit-linked products, non-par liabilities offer insurers minimal flexibility to reprice or pass investment underperformance to policyholders, resulting in large, operationally stable but capital-intensive back books. Japanese annuities typically exhibit:

- Effective durations of 20-30+ years
- Low policyholder optionality due to conservative behavior and high lapse penalties
- Predictable, actuarially modeled cash flows

These characteristics, long durations, low optionality, and predictable cash flows, make Japanese annuities highly suitable for funded AIR structures, as they enable precise hedging and regulatory capital relief.

5.3 Demographics and Market Maturity

Japan's demographic and macroeconomic environment have materially reshaped the strategic orientation of domestic life insurers. As one of the world's most rapidly aging societies, Japan faces a rising old-age dependency ratio driven by high life expectancy and persistently low fertility. This demographic shift slows growth in younger policyholder cohorts while increasing the stock of long-duration, retirement-oriented liabilities. At the same time, prolonged low economic growth and a sustained low-interest-rate environment, shaped by the monetary policy of the Bank of Japan, have compressed investment returns and reduced the profitability of legacy guaranteed products.

These conditions have accelerated a structural transition from growth-oriented to balance-sheet-oriented management. Rather than prioritizing new business expansion, insurers increasingly focus on optimizing in-force portfolios, with strategic emphasis on cost efficiency, asset-liability management (ALM), and capital allocation. In particular, the accumulation of long-duration liabilities combined with lower reinvestment yields heightens sensitivity to interest rate and longevity risks, increasing the importance of capital-efficient risk management strategies.

From an economic perspective, demographic aging contributes to the buildup of stable but capital-intensive liabilities that are difficult to reprice or shed through organic means. This shifts insurer behavior toward mechanisms that actively manage balance-sheet risk. In this context, asset-intensive reinsurance (AIR) emerges as a natural strategic response: it enables insurers to transfer long-duration exposures, reduce capital strain, and improve risk-adjusted returns on legacy portfolios.

Accordingly, Japan's demographic profile does not merely influence product demand; it fundamentally alters the structure of insurer balance sheets. The resulting concentration of long-duration guaranteed liabilities creates persistent pressure on capital and ALM frameworks, reinforcing the structural demand for AIR as a core balance-sheet management tool.

5.4 Interest Rate Environment

Japanese interest rates have remained near zero for decades. This reflects structural stagnation and the accommodative stance of the Bank of Japan. During this period, life insurers relied heavily on long-duration Japanese Government Bonds (JGBs) to back guaranteed savings and annuity products. While this strategy compressed spreads, the relatively stable yield curve limited short-term balance sheet volatility and supported predictable duration management.

The recent rise at the long end of the yield curve has disrupted this equilibrium. Higher long-term rates have generated mark-to-market losses on legacy JGB portfolios accumulated during the ultra-low-rate era. Although reinvestment yields improve prospectively, transitional effects can amplify asset-liability mismatches. This is particularly true for liabilities with embedded guarantees or options that have asymmetric interest rate sensitivities. The result is increased earnings volatility and pressure on solvency metrics.

These challenges are reinforced by the introduction of the Insurance Capital Standard (J-ICS), a market-consistent, Solvency II-style framework. Under J-ICS, duration gaps and asset concentration risks directly affect capital requirements. This reduces the scope for accounting-based smoothing and intensifies ALM discipline.

In this context, asset-intensive reinsurance provides a structural mitigation tool. By transferring long-duration liabilities and associated assets to reinsurers with broader origination and investment capabilities, insurers can reduce balance sheet sensitivity to rate movements. AIR also improves capital efficiency under J-ICS. Enhanced asset diversification and optimized risk transfer structures help stabilize solvency ratios and recalibrate duration exposure during a period of yield curve normalization and regulatory transition.

5.5 Regulatory Framework: Economic Value-Based Solvency Regulation

Japan is implementing the Japan Insurance Capital Standard (J-ICS) in 2026, an economic value-based solvency framework broadly aligned with the European Solvency II and the International Association of Insurance Supervisors' (IAIS) Insurance Capital Standard (ICS). Under this framework, insurers' solvency positions are assessed using an Economic Value-Based Solvency Ratio (ESR), which measures capital adequacy by valuing both assets and liabilities at market-consistent economic values rather than historical or accounting measures. This represents a significant shift in supervisory approach and strengthens incentives for careful risk and capital management.

Under the J-ICS framework, long-duration guaranteed liabilities tend to be relatively capital-intensive due to their exposure to interest rate risk, longevity risk, and policyholder behavior. Their sensitivity to asset-liability mismatches can introduce volatility in solvency ratios, particularly under stressed scenarios. As a result, insurers with large legacy books of guaranteed annuities are often less capital-efficient

than peers with more flexible, market-linked product mixes, although this outcome depends materially on asset-liability management and hedging effectiveness. Regulatory pressures therefore amplify existing ALM and capital market constraints, particularly for products with long-duration guarantees such as annuities. By contrast, life insurance products with more flexible crediting mechanisms or lower embedded guarantees tend to be relatively more capital-efficient, although outcomes vary depending on product design and risk management.

In response, many Japanese insurers are evaluating asset-intensive reinsurance (AIR), including block or funded arrangements, as a strategic tool to manage balance sheet volatility and optimize capital under the new regime. AIR allows both assets and liabilities to be transferred to entities with different capital constraints, investment capabilities, and risk appetites, effectively mitigating the structural inefficiency of retaining legacy guaranteed liabilities internally. Far from merely permitting AIR, the design of J-ICS actively incentivizes its use as a rational balance-sheet management solution.

Overall, the transition to economic value-based solvency reinforces market-consistent valuation, penalizes asset-liability mismatches, and shapes product design and strategic allocation decisions. Japanese life insurers must now balance interest rate, longevity, and basis risks more actively, making AIR an increasingly central tool in capital and ALM management.

5.6 Asset and Liability Management (ALM) and Capital Management

Asset-liability management (ALM) in Japan is fundamentally shaped by a structural mismatch between the duration and guarantees of insurance liabilities and the characteristics of available domestic assets. Long-duration annuity and whole-life liabilities require stable, yield-generating assets with extended maturities, yet the domestic capital market offers limited supply of such instruments at sufficient yields.

Japanese Government Bonds (JGBs) remain the core asset class for liability matching due to their liquidity and reliability. However, their yields and maturities are generally insufficient to support ultra-long-duration liabilities, particularly in a prolonged low-interest-rate environment. Corporate bonds provide incremental spread but are constrained by limited issuance, conservative credit profiles, and shorter tenors. As a result, domestic fixed-income markets alone cannot fully support the duration and return requirements of insurers' liability profiles.

To address these limitations, insurers increasingly rely on overseas assets, including foreign investment-grade bonds, securitized products, infrastructure debt, and private credit. While these assets provide necessary yield and duration, they introduce foreign exchange risk, liquidity considerations, and operational complexity. Derivatives, including interest rate swaps, swaptions, and cross-currency swaps, are therefore used structurally to manage duration gaps, convexity, and currency exposures. However, these instruments provide hedging rather than fundamental resolution of the underlying asset-liability mismatch.

From an economic perspective, this configuration reflects a form of market incompleteness, in which domestic capital markets fail to supply sufficient long-duration, yield-generating assets to match insurers' liabilities. Consequently, ALM cannot be fully achieved through internal asset allocation and hedging alone. Residual risks, particularly duration mismatch, reinvestment risk, and convexity exposure, remain embedded in insurer balance sheets and are increasingly capitalized under market-consistent regulatory frameworks.

In this context, asset-intensive reinsurance (AIR) functions as a structural complement to traditional ALM. By transferring both assets and liabilities to reinsurers with broader asset origination capabilities and access to global credit markets, insurers can effectively "import" missing asset capacity. AIR therefore extends the feasible ALM frontier beyond domestic market constraints, enabling more efficient matching of long-duration liabilities while reducing capital strain.

Recent developments further reinforce this dynamic. The implementation of economic value-based solvency measures, including the Economic Solvency Ratio (ESR) and alignment with international Insurance Capital Standards (ICS), has increased the sensitivity of capital positions to interest rate movements and asset-liability mismatches. In response, insurers have intensified efforts to narrow duration gaps, rebalance portfolios toward domestic bonds following shifts in monetary policy, and selectively expand into alternative assets. At the same time, strategies such as divesting cross-shareholdings, optimizing foreign currency exposure, and utilizing AIR to transfer capital-intensive liabilities have become increasingly prominent.

Overall, Japan's ALM framework is characterized by a persistent structural tension between liability requirements and domestic asset availability. While insurers employ a range of internal tools, including diversification, derivatives, and product design adjustments, these measures are insufficient to fully resolve the mismatch. AIR thus emerges not as a substitute for ALM, but as an extension of it: a mechanism that enables insurers to overcome domestic market constraints, improve capital efficiency, and achieve more robust balance-sheet alignment.

5.7 Abundant External Capital Supply

An additional enabling condition for the growth of asset-intensive reinsurance (AIR) in Japan is the substantial influx of offshore reinsurance capacity over the past decade. In particular, Bermuda-based life reinsurers, many backed by private equity sponsors or affiliated with large alternative asset managers, have actively expanded into the Japanese market. Their entry has intensified competition for long-duration Japanese liabilities and materially improved the economic terms available to cedents.

Several structural factors explain this strong supply of external capital. First, Japanese annuity and whole-life back books are attractive from a risk perspective: they typically exhibit long durations, low lapse rates, conservative policyholder behavior, and highly predictable actuarial cash flows. These

characteristics are well suited to funded reinsurance structures, where asset portfolios can be constructed to closely match liability profiles. For global reinsurers seeking stable spread-based returns, Japanese liabilities therefore represent scalable, high-quality insurance risk.

Second, offshore reinsurers often operate under capital regimes and funding structures that differ from those of domestic Japanese insurers. Many are domiciled in jurisdictions such as Bermuda, where regulatory frameworks are internationally recognized but allow for efficient capital treatment of long-duration spread business. When combined with sophisticated asset origination platforms, particularly in private credit, infrastructure debt, and structured finance, these reinsurers can target higher risk-adjusted yields than those typically available within the domestic Japanese bond market. This enables them to price reinsurance transactions competitively while still meeting internal return hurdles.

Third, the global search for yield has directed significant institutional capital toward insurance-linked spread strategies. Private equity sponsors and alternative asset managers view life insurance liabilities as a source of stable, long-term funding that can be paired with higher-yielding, illiquid assets. As a result, AIR in Japan is not merely an insurance transaction but part of a broader cross-border capital intermediation process, linking Japanese policyholder savings with global credit markets.

For Japanese cedents, this abundance of external capital translates into favorable economic terms, including upfront ceding commissions, capital relief under economic solvency metrics, and enhanced asset returns through reinsured portfolios. Competitive tension among reinsurers further strengthens the bargaining position of primary insurers, reducing transaction costs and facilitating repeat or flow-based structures rather than one-off block deals.

Importantly, the presence of deep external capital supply transforms AIR from a theoretical possibility into a practically scalable strategy. Without sufficient offshore balance sheet capacity and investment expertise, structural ALM and capital pressures would remain largely internalized within domestic insurers. The sustained willingness of global reinsurers to deploy capital into Japanese long-duration liabilities therefore constitutes a critical precondition for AIR's expansion and institutionalization within the Japanese life market.

5.8 Outlook

The outlook for asset-intensive reinsurance (AIR) in Japan is shaped by the continued interaction of regulatory, market, and capital forces that have driven its adoption to date. As the Japan Insurance Capital Standard (J-ICS) becomes fully embedded, AIR is likely to evolve from a transaction-driven solution into a more institutionalized component of insurers' balance-sheet management frameworks.

One key development is the increasing shift from one-off block transactions toward flow reinsurance and repeatable structures. This transition reflects a maturing market in which AIR is integrated into

product design, pricing, and capital planning, rather than deployed solely for legacy portfolio optimization. As a result, AIR is expected to play a growing role not only in managing in-force liabilities but also in supporting front-book competitiveness, particularly in annuity and savings products.

At the same time, regulatory boundaries will shape the trajectory of market development. Ongoing scrutiny by the Financial Services Agency (FSA), particularly with respect to risk transfer, collateralization, and economic substance, is likely to constrain overly aggressive structures. However, such oversight also promotes standardization and transparency, supporting the development of sustainable AIR frameworks aligned with policyholder protection and financial stability objectives.

From a capital market perspective, the role of global reinsurers and alternative asset managers is expected to remain central. Their ability to provide long-duration capital, combined with differentiated asset origination capabilities, positions them as key counterparties in addressing Japan's structural asset-liability mismatch. Continued inflows of institutional capital into insurance-linked strategies are therefore likely to sustain the supply side of the AIR market.

Taken together, these dynamics suggest that AIR will become an increasingly embedded feature of the Japanese life insurance sector. Its strategic role is likely to expand beyond capital relief to encompass broader functions, including interest rate and longevity risk management, capital allocation efficiency, and access to global investment opportunities. More broadly, the evolution of AIR in Japan illustrates how financial innovation can emerge as a stable equilibrium response to persistent structural constraints in liabilities, regulation, and capital markets.

5.9 Synthesis: Structural Conditions Enabling AIR in Japan

The prevalence of AIR in Japan reflects the interaction of five reinforcing structural factors:

- (1) A liability structure dominated by long-duration, non-participating, guarantee-heavy products
- (2) Capital market constraints, particularly the scarcity of long-dated, yield-generating domestic assets
- (3) Advanced ALM capabilities that make residual duration, convexity, and lapse risks transparent
- (4) A regulatory transition toward economic value-based solvency that fully capitalizes market, interest rate, and longevity risk
- (5) Abundant external capital supply from global reinsurers and alternative asset managers with differentiated investment capabilities

Together, these factors create a persistent structural misalignment between liabilities and the domestic asset universe. Japanese insurers carry exceptionally long and rigid guaranteed obligations, while the domestic capital market provides limited access to ultra-long, spread-generating instruments. Under a market-consistent solvency regime, this mismatch manifests as fully capitalized exposure: duration gaps, convexity asymmetries, and mass-lapse sensitivities directly influence solvency ratios and risk-adjusted capital efficiency.

In this environment, AIR emerges not as opportunistic regulatory arbitrage, but as a structural equilibrium response to market incompleteness. Cross-border AIR reallocates long-duration insurance risk to balance sheets with differentiated capital costs, investment origination platforms, and risk appetites. It functions simultaneously as a capital allocation mechanism and a completion tool that allows the Japanese life sector to access investment capabilities structurally unavailable domestically.

While Japan illustrates a market where structural liabilities, regulatory pressures, and limited domestic assets collectively drive widespread adoption of AIR, the situation in Hong Kong is markedly different. Despite being a regional insurance and reinsurance hub, Hong Kong's liability composition, dominated by participating products with flexible bonuses, shorter-duration non-participating products, and younger, wealth-accumulation-focused policyholders, reduces persistent balance-sheet strain. Combined with sufficient domestic and regional capital, flexible internal ALM practices, and a regulatory framework that does not heavily penalize duration or asset-liability mismatches, these conditions limit the structural need for funded AIR. The next section examines these market, demographic, and regulatory factors in detail, highlighting why AIR remains marginal in Hong Kong relative to Japan.

6. Hong Kong

6.1 Introduction of AIR in Hong Kong

In contrast to Japan, where asset-intensive reinsurance (AIR) has emerged as a structurally embedded balance-sheet management tool, Hong Kong represents a market in which similar adoption has remained limited. This divergence is analytically significant, as it reflects not differences in market sophistication or access to reinsurance capacity, but distinct equilibrium conditions shaped by liability structure, regulatory design, and capital availability.

Despite its status as a regional insurance and reinsurance hub, Hong Kong has not developed a material market for third-party funded AIR. Reinsurance activity is substantial but is predominantly concentrated in non-life business and intra-group life reinsurance arrangements. These structures, while legally transferring risk, typically retain economic exposure within the broader corporate group and do not provide the same degree of capital relief or investment flexibility as third-party AIR. As such, their prevalence reflects reliance on internal capital markets rather than external risk transfer.

From a structural perspective, Hong Kong differs from Japan along several key dimensions. First, liability composition is dominated by participating products with embedded risk-sharing mechanisms, which reduce the insurer's exposure to investment and longevity risk. Second, product guarantees are generally moderate and aligned with prevailing market conditions, limiting the accumulation of deeply in-the-money guarantees that characterize Japanese back books. Third, insurers operate with relatively flexible investment strategies and access to sufficient internal and regional capital, enabling them to manage asset-liability risks without resorting to external balance-sheet solutions.

These features imply that the underlying drivers of AIR adoption, persistent asset-liability mismatch, capital strain under market-consistent regulation, and limited internal risk absorption capacity, are either absent or significantly attenuated in Hong Kong. In economic terms, the market does not exhibit the same degree of liability rigidity or capital market incompleteness observed in Japan. Consequently, the equilibrium outcome is one in which AIR remains marginal, not because it is infeasible, but because it is not structurally necessary.

This section examines these dynamics in detail, focusing on product design, demographic factors, interest rate conditions, regulatory frameworks, asset-liability management practices, and capital supply. Through this analysis, it demonstrates that Hong Kong's limited adoption of AIR is best understood as a rational outcome of its market structure, rather than a lag in financial innovation or regulatory development.

6.2 Product Demand and Liability Structure

Hong Kong's life insurance market differs fundamentally from Japan's, influencing AIR demand. Participating (Par) business, which accounts for roughly 70% of liabilities, is primarily focused on long-term savings, wealth transfer, and protection. In this segment, investment and experience risks are shared between policyholders and insurers, with premiums pooled into participating funds. Returns are distributed through a combination of guaranteed reversionary bonuses, once declared, and discretionary terminal bonuses. The presence of relatively low minimum guarantees, together with smoothing mechanisms, provides insurers with greater flexibility and helps reduce economically onerous obligations.

In contrast, non-participating (Non-Par) business, representing about 30% of liabilities, consists of fixed-benefit products that typically feature moderate guarantees and shorter durations. Compared to markets such as Japan, where large annuity books create significant balance sheet strain, the smaller scale of non-par business and greater pricing flexibility in this segment contribute to more manageable structural asset-liability mismatch (ALM) pressures.

The combination of risk-sharing, moderate guarantees, and shorter-duration liabilities allows Hong Kong insurers to manage most risks internally. Unlike Japan's rigid non-par back books, Hong Kong products do not generate persistent structural demand for AIR.

6.3 Demographics and Market Maturity

Hong Kong's demographic profile differs materially from Japan's and plays a central role in shaping the structure of insurance liabilities. While the population is aging, it remains relatively younger and more economically active, with a larger proportion of policyholders in wealth accumulation and mid-career stages. As a result, insurance demand is oriented toward savings, investment, and protection, rather than the provision of long-duration, retirement income streams.

This demographic structure is reflected in product design and liability composition. Participating

products dominate the market, embedding risk-sharing mechanisms that allow insurers to adjust credited returns through discretionary bonuses. Non-participating products, while present, are typically smaller in scale, shorter in duration, and feature more moderate guarantees than those observed in Japan. Together, these characteristics limit the buildup of rigid, long-duration liabilities that are highly sensitive to interest rate and longevity risk.

From a balance-sheet perspective, the absence of large back books of guarantee-heavy annuities reduces the accumulation of capital-intensive exposures. Unlike in Japan, where demographic aging contributes directly to the growth of long-duration liabilities that are difficult to reprice, Hong Kong insurers face a more flexible liability structure that can be adjusted through product design and bonus policies.

Consequently, demographic and market conditions in Hong Kong do not generate the same structural pressures that necessitate external balance-sheet solutions. The combination of a younger policyholder base, flexible product design, and limited liability rigidity reduces the need to transfer risk through asset-intensive reinsurance (AIR). In this context, demographic factors act to dampen, rather than amplify, the structural demand for AIR.

6.4 Interest Rate Environment

Hong Kong's interest rate environment differs fundamentally from that of Japan and has important implications for asset-liability management (ALM) and AIR adoption. Under the Linked Exchange Rate System, Hong Kong's monetary conditions are closely tied to those of the United States, resulting in interest rates that broadly track U.S. dollar cycles rather than remaining persistently near zero. This contrasts with Japan's prolonged low-rate environment, which has historically intensified the cost of long-duration guarantees and amplified ALM pressures.

In Hong Kong, guarantees embedded in non-participating products are generally moderate and aligned with prevailing market yields. This reduces the likelihood of deeply in-the-money guarantees and limits the buildup of structural duration mismatches between assets and liabilities. For participating products, interest rate risk is further mitigated through discretionary bonus mechanisms, which allow insurers to share investment performance with policyholders and adjust payouts over time. These features reduce the sensitivity of insurer balance sheets to sustained interest rate shocks.

From an ALM perspective, the combination of moderate guarantees, shorter liability durations, and access to a sufficiently liquid bond market enables insurers to broadly align asset cash flows with liability obligations using internal investment strategies. While interest rate movements affect earnings and valuation, they do not generate the persistent structural imbalances observed in Japan.

As a result, interest rate risk in Hong Kong remains a manageable component of insurer balance sheets rather than a binding structural constraint. Internal ALM tools, such as portfolio rebalancing, duration

matching, and bonus adjustments, are generally sufficient to manage this risk. Consequently, the economic incentive to transfer interest rate exposure through asset-intensive reinsurance (AIR) is limited, further reinforcing its marginal role in the market.

6.5 Regulatory Framework: Hong Kong Risk-Based Capital (HK RBC)

Hong Kong's Risk-Based Capital (RBC) regime, implemented by the Insurance Authority in phased steps since 2024, establishes a prudential framework that emphasizes capital adequacy while maintaining a conservative approach to reinsurance recognition and asset risk. In practice, capital charges on alternative and illiquid assets remain relatively high, and collateral requirements constrain the extent to which offshore reinsurance arrangements can generate meaningful capital relief. As a result, insurers tend to rely more heavily on intra-group reinsurance structures for internal capital management rather than engaging extensively in third-party funded asset-intensive reinsurance (AIR).

From a theoretical perspective, HK RBC differs from market-consistent solvency regimes such as Japan's Insurance Capital Standard (J-ICS) in the degree to which asset-liability mismatches are transmitted into regulatory capital requirements. In particular, duration and convexity risks associated with long-duration liabilities are less fully capitalized, reducing the sensitivity of solvency positions to interest rate movements. This contrasts with J-ICS, where market-consistent valuation directly incorporates such risks into capital metrics, thereby increasing the cost of maintaining long-duration, guarantee-heavy liabilities on balance sheet.

The structure of HK RBC therefore weakens the regulatory incentives to restructure balance sheets through external mechanisms such as AIR. While the framework appropriately emphasizes credit and market risk, its comparatively lower sensitivity to duration mismatch, combined with the prevalence of participating products with discretionary features, means that insurers face less pressure to offload liabilities or seek capital relief through reinsurance. Furthermore, strict collateral and credit recognition requirements limit the economic benefits of transferring liabilities to offshore AIR providers, particularly when compared with intra-group arrangements.

Consequently, the regulatory environment in Hong Kong does not impose binding capital constraints that would necessitate the use of AIR as a structural solution. Instead, reinsurance remains primarily a tool for internal capital allocation and risk management within insurance groups, rather than a mechanism for large-scale third-party balance-sheet optimization. In equilibrium, the design of HK RBC contributes to the marginal role of AIR by reducing both the regulatory urgency and the economic attractiveness of external risk transfer.

6.6 ALM and Capital Management

Hong Kong insurers predominantly employ conservative ALM strategies, reflecting both regulatory guidance under HK RBC and the characteristics of their product portfolios, which are heavily weighted

toward participating and short-duration policies. Liability cash flows are often partially discretionary due to bonus smoothing and other policyholder options, reducing the immediacy of duration mismatch but increasing uncertainty in effective liability duration. Consequently, insurers tend to overmatch assets to cover potential upside in policyholder benefits, rather than rely on complex risk transfer structures such as AIR.

Compared with Japan, where insurers actively leverage ALM optimization and market-consistent liability valuation to manage solvency ratios under J-ICS, Hong Kong insurers face less regulatory pressure to employ external capital solutions. In Japan, AIR can meaningfully reduce balance-sheet volatility and capital charges by transferring liability risks to third-party providers. In contrast, Hong Kong's RBC framework, combined with the prevalence of intra-group reinsurance, mitigates the need for external risk transfer: internal hedging and conservative asset allocation often suffice to manage duration and interest-rate risks.

Additionally, collateral and credit recognition requirements under HK RBC constrain the effectiveness of AIR in practice. Even when insurers consider transferring long-duration liabilities, the associated costs and limited capital relief reduce economic incentives. As a result, ALM strategies in Hong Kong remain largely internalized, relying on asset allocation, selective reinsurance within the group, and conservative capital buffers rather than third-party AIR structures.

In summary, the interplay between product design, regulatory guidance, and risk management culture shapes Hong Kong insurers' ALM practices. These practices reduce the operational and economic necessity of AIR, reinforcing the marginal role of third-party balance-sheet solutions in the market.

6.7 High Capital Supply

Unlike Japan, where external capital supply is critical in enabling AIR, Hong Kong insurers typically operate with sufficient internal and intra-group capital resources to absorb liability risks:

- Strong domestic insurer balance sheets: Many local life insurers maintain robust solvency positions under HK RBC, providing flexibility to absorb risks internally.
- Regional and international investors: Offshore reinsurers and financial institutions participate selectively in Hong Kong life insurance, primarily through intra-group arrangements rather than third-party funded AIR.
- Cost of capital considerations: The high cost and collateral requirements of transferring liabilities to offshore AIR structures further discourage widespread adoption.

6.8 Outlook

AIR is unlikely to become mainstream in Hong Kong unless product design shifts toward long-duration, guarantee-heavy liabilities. Adoption may rise only if regulatory changes, evolving retirement solutions, or market demand create structural pressure. Current trends indicate continued reliance on internal ALM,

risk-sharing mechanisms, and intra-group structures.

6.9 Synthesis: Structural Constraints Limiting AIR in Hong Kong

The marginal role of AIR in Hong Kong reflects the alignment of four key structural factors:

- (1) Liability composition: Risk-sharing, moderate guarantees, and shorter-duration products limit structural pressures.
- (2) Investment strategy: Portfolios emphasize growth and flexibility rather than duration-matched assets.
- (3) Regulatory framework: HK RBC does not heavily penalize duration or ALM mismatches.
- (4) Internal ALM and capital management: Sufficient to manage risks without external AIR.

Together, these factors explain why AIR remains largely marginal in Hong Kong. By contrast, Japan's long-duration liabilities, constrained domestic asset markets, and abundant offshore capital make AIR a central balance-sheet and capital management tool.

Summary contrast with Japan: Where Section 5.9 identified five converging factors driving Japan's AIR adoption, Hong Kong's structural equilibrium can be characterized by four attenuating factors: (i) a liability structure dominated by participating products with risk-sharing ($\approx 70\%$) rather than non-par guarantees; (ii) flexible investment strategies enabled by moderate guarantees and access to liquid bond markets; (iii) an RBC regime (HK RBC) that does not fully capitalize duration mismatch compared to J-ICS; and (iv) sufficient internal and intra-group capital that reduces reliance on third-party funded solutions. These differences, rather than any lack of market sophistication or regulatory permissiveness, explain the divergent AIR outcomes between the two jurisdictions.

7. The Fit, Need, and Ease for AIR

Having established the empirical divergence between Japan and Hong Kong—high AIR adoption in the former, marginal adoption in the latter—this section synthesizes the findings into an inductive framework. The “Fit, Need, Ease of Implementation” framework systematically compares the two markets across three diagnostic dimensions. This section evaluates the structural suitability, necessity, and practical feasibility of Asset-Intensive Reinsurance (AIR) in Japan and Hong Kong, synthesizing market, liability, regulatory, and operational factors. The framework uses three dimensions: Fit, Need, and Ease of Implementation.

7.1 Fit for AIR

The structural fit of AIR depends on insurers' liability composition, product design, and risk-sharing mechanisms:

Nature of liabilities

- Non-Par (Non-Participating) products: Fixed, guaranteed benefits with predictable cash flows. Highly suitable for AIR because reinsurers can align asset portfolios reasonably with liabilities.

- Participating (Par) products: Combine guaranteed benefits with discretionary bonuses, linked to pooled fund performance. Liabilities are long-dated, dynamic, and path-dependent, as outflows depend on management decisions regarding bonus declarations and smoothing. This makes precise asset-liability matching under AIR structures challenging.\

Control and Profitability

- Par funds are central profit centers for insurers. Transferring assets and liabilities to a third-party reinsurer reduces strategic control over surplus allocation and investment policy, potentially constraining long-term value creation.

Regulatory and Governance Constraints

- Par business is subject to ring-fencing, actuarial oversight, and fiduciary duties. Introducing external reinsurers creates complex accountability structures and can limit the practicality of AIR for these products.

Illustrative contrast

- Japan: Large blocks of long-duration, non-par annuities → high fit for AIR.
- Hong Kong: Predominantly par products with flexible benefits → low fit structurally.

7.2 Need for AIR

The need for AIR arises when internal risk management and capital strategies are insufficient:

Regulatory environment

- Japan: Insurance Capital Standard (J-ICS) uses market-consistent valuation and imposes high capital charges on long duration guaranteed liabilities, creating strong incentive for AIR.
- Hong Kong: HK RBC is less sensitive to interest rate and longevity mismatches, reducing structural need.

Market and liability constraints

- Japan: Low domestic yields, scarcity of long-duration assets, and rigid annuity liabilities create persistent ALM pressures.
- Hong Kong: Short-duration, flexible liabilities with discretionary bonuses allow internal ALM solutions to manage risk effectively.

Asset management and capital efficiency

- Japan: AIR enables diversification beyond domestic bonds, stabilizes capital ratios, and frees capital for growth.
- Hong Kong: Internal portfolio flexibility and available capital suffice to meet ALM and regulatory requirements, making AIR unnecessary.

7.3 Ease of Implementing AIR

Even when fit and need exist, practical execution depends on market, regulatory, and operational factors:

Market Infrastructure

- Japan: Sophisticated bond and FX markets, deep domestic ALM expertise, and the presence of global reinsurers facilitate AIR.

- Hong Kong: While a global insurance hub, large, guaranteed blocks are rare, and offshore capital is primarily accessed via intra-group arrangements, limiting operational feasibility.

Regulatory Stance

- Japan: The Financial Services Agency (FSA) permits AIR if genuine risk transfer and economic substance exist, with clear supervisory guidance on capital treatment and collateralization.
- Hong Kong: The Insurance Authority maintains a conservative stance, emphasizing policyholder protection, local asset backing, and governance transparency. AIR is not prohibited but is operationally constrained.

Operational and governance readiness

- Japan: Decades of ALM experience, embedded actuarial governance, and familiarity with funded reinsurance support implementation.
- Hong Kong: Strategic decisions are often centralized at the group level, limiting locally embedded expertise for complex AIR structures. The limited track record increases operational complexity and regulatory scrutiny.

7.4 Operationalizing the Fit-Need-Ease Framework

To enable cross-market comparison, the Fit-Need-Ease framework is operationalized using a simple ordinal scoring approach (Low, Medium, High) based on observable market characteristics.

The classification is guided by the following indicative thresholds:

- Fit (liability structure): High where non-participating liabilities exceed approximately 60% and average liability duration exceeds 20 years; Medium where only one condition is met; Low otherwise.
- Need (constraint intensity): High where solvency regimes are highly sensitive to asset-liability mismatch and duration gaps are material; Medium where sensitivity is moderate; Low where mismatch has limited capital impact.
- Ease (implementation feasibility): High where regulatory frameworks permit funded reinsurance and access to offshore reinsurers is well established; Medium where partial constraints exist; Low where regulatory or market frictions materially limit execution.

The framework correctly predicts the observed divergence between Japan and Hong Kong. AIR adoption is highest where all three conditions are simultaneously satisfied, and remains limited where one or more dimensions are weak. This supports the proposition that AIR emerges as a structural equilibrium outcome rather than an isolated strategic choice.

Table 7.1 Fit-Need-Ease results for Japan and Hong Kong

Market	Fit (Liability Structure)	Need (Regulatory + ALM Pressure)	Ease (Market + Execution)	Predicted AIR	Observed AIR
Japan	High	High	High	High	High
Hong Kong	Low	Low	Medium	Low	Low

The framework implies that Fit, Need, and Ease are jointly necessary but not individually sufficient conditions for sustained AIR adoption, and therefore predicts limited AIR development in markets where any one of these dimensions remains structurally weak.

7.5 Synthesis: Japan vs. Hong Kong

Table 7.2 Fit-Need-Ease and Regulatory Synthesis: Japan vs. Hong Kong

Dimension	Japan	Hong Kong	Strategic Implication
Fit	High: Long-duration, non-par guaranteed liabilities	Low: Par products with flexible benefits	AIR is structurally suitable in Japan; marginal in Hong Kong
Need	High: ICS-driven capital pressure, ALM strain	Low: Flexible liabilities, moderate guarantees	AIR adoption in Japan is driven by regulatory and balance-sheet pressures; largely unnecessary in Hong Kong
Ease	High: Mature ALM, market infrastructure, supportive regulators	Moderate: Hub exists, but operational, governance, and regulatory constraints limit transactions	Implementation is feasible in Japan; more complex in Hong Kong
Regulation & Capital	Facilitates AIR via market-consistent solvency (J-ICS), high capital charges on rigid liabilities, and strong offshore reinsurance supply	Conservative RBC framework, limited structural incentive, reliance on internal and intra-group capital	Regulatory and capital environment reinforces Japan's AIR adoption; constrains Hong Kong

With the framework validated against the Japan-Hong Kong comparison, the conclusion below addresses alternative explanations, discusses boundary conditions, and outlines directions for future research.

8. Conclusion

AIR adoption is not merely a matter of regulatory permissiveness. It emerges where liability structure, regulatory pressures, and market infrastructure align. Japan exhibits high alignment across all dimensions, making AIR a core strategic tool. In contrast, Hong Kong's liability composition, flexible products, and regulatory and capital environment limit AIR to marginal, intra-group, or captive arrangements.

Accordingly, AIR should be understood as a rational, and often optimal, balance-sheet strategy, rather than a discretionary or tactical instrument. Its adoption reflects the equilibrium outcome of interacting forces: long-duration liabilities, constrained domestic asset markets, market-consistent regulatory valuation, sophisticated ALM, and abundant offshore capital. Importantly, this constellation of factors is not uniformly present across Asian insurance markets, a distinction that becomes analytically central when comparing Japan with Hong Kong.

Alternative explanation considered: One could argue that Japan's higher AIR adoption reflects greater

marketing intensity by Bermuda-based reinsurers in Japan versus Hong Kong, rather than structural factors. However, this explanation is insufficient for three reasons. First, Bermuda reinsurers operate actively in both markets; their presence in Hong Kong is substantial but focused on non-life and intra-group structures. Second, marketing effort alone cannot explain why Japanese insurers cede specifically long-duration guaranteed blocks while Hong Kong insurers do not, product mix remains the binding constraint. Third, the timing of adoption (accelerating with J-ICS in 2025) suggests regulatory drivers rather than marketing campaigns. The structural explanation therefore remains superior.

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Article

An Analysis of Family Wealth Management and Global Strategic Layout of Chinese Family-Owned SMEs

中国家族所有中小企業の家族資産管理とグローバル戦略配置に関する分析

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Abstract

Against the backdrop of global economic restructuring and long-term Kondratieff long-wave cycle swings, China's economy is undergoing a critical shift from extensive scale expansion to high-quality growth. Real estate market corrections, sluggish domestic consumption and rapid population aging have imposed substantial cyclical operating pressures on domestic private firms. This study selects Chinese family-owned SMEs in high-tech sectors including photovoltaics and artificial intelligence as research samples. Adopting theoretical deduction, institutional comparative analysis between Chinese Mainland and Hong Kong, and case induction with self-collected listed firm financial data, this paper systematically examines legal frameworks governing inheritance, gift transfers and family trusts across mainland China and Hong Kong. The analysis reveals that under an institutional environment featuring no inheritance tax and equal inheritance rights among multiple siblings, Chinese family-owned SMEs generally exhibit several typical traits: rapid business expansion, intertwined family private wealth and corporate operating assets, over-concentrated domestic asset allocation, inadequate cross-border risk segregation mechanisms, and delayed intergenerational succession planning. Based on self-sorted industrial statistics and original financial data of photovoltaic and AI listed family SMEs, this paper summarizes five core anti-cyclical operational characteristics of high-quality Chinese family-owned enterprises, and proposes targeted optimization paths covering standardized family institutional governance, diversified cross-border asset allocation, systematic intergenerational talent and succession planning, full-cycle risk compliance systems, and long-term technological innovation deployment. This research constructs a complete logical chain: cyclical macroeconomic impacts → institutional constraints between Mainland China and Hong Kong → corporate strategic choices → outcomes of wealth inheritance. It fills the research gap of insufficient

targeted studies focusing on domestic high-tech family-owned SMEs in existing literature, and provides theoretical support and practical references for Chinese family businesses to cope with cyclical economic risks, advance industrial upgrading, implement standardized global layout, and achieve sustainable intergenerational wealth transfer amid economic transformation. This paper serves as an exploratory foundational study for the author's subsequent quantitative doctoral dissertation, with full original empirical testing to be supplemented in follow-up research. To break the vicious cycle of short corporate lifespans and broken generational succession, this study further emphasizes that enterprises must follow the long evolutionary trajectory of industrial development. They need to formulate forward-looking talent pipeline plans spanning 10 to several decades, proactively deploy industrial transformation and upgrading, build comprehensive global competition layouts simultaneously, and complete high-level institutional design covering equity structure, multi-dimensional cross-border risk segregation and phased capitalization strategies. Only through such systematic long-cycle forward arrangements can family-owned SMEs realize dual improvements in global industrial competitiveness and compound growth of family wealth, ultimately achieving stable and sustainable intergenerational succession of both industries and family assets.

Keywords: Family Wealth Management; Family-owned SMEs; Enterprise Globalization; Intergenerational Succession; Cross-border Asset Allocation; Equity Structure Design; Long-term Industrial Layout

Table 1 Standardized Definition of Core Terminology

Term	Formal Definition Applied Consistently Across Manuscript	Quantitative Boundary Standard
Family-owned SMEs (Core Research Sample)	Private economic entities bonded by consanguinity/marital ties; founding family holds $\geq 51\%$ voting control via direct shareholding, multi-layer limited partnerships or offshore family trusts; family dominates all core strategic decisions; primary goal is long-term industrial operation rather than short-term speculation; listed mid/small-cap high-tech firms in photovoltaics and artificial intelligence sectors	Manufacturing industry standard: Employees $< 1,000$ OR annual operating revenue < 400 million; exclude industrial giants with market cap above 350 billion
Large Private Enterprise Groups	Industry leading listed firms with dispersed equity, professional manager-led governance, weak family actual control; only used as macroscopic industrial evolution reference	Annual revenue ≥ 4 billion, market cap $\geq 1,300$ billion

Term	Formal Definition Applied Consistently Across Manuscript	Quantitative Boundary Standard
Domestic-oriented Family Enterprises	Family enterprises with overseas revenue proportion <10%, no overseas production, R&D or sales layout, all assets concentrated in Chinese Mainland	Overseas revenue share <10% of total annual revenue
Globalized Family-owned SMEs	Family enterprises maintaining overseas revenue $\geq 30\%$, with overseas supply chain, production or R&D layout, cross-border asset allocation via Hong Kong platforms	Overseas revenue share $\geq 30\%$ of total annual revenue
High-quality Anti-cycle Private Enterprises	Family enterprises with continuous above-industry R&D investment, stable overseas income, centralized equity, standardized family governance, positive operating cash flow through industrial downturns	Net profit volatility $\leq 35\%$ during industrial downward cycles, sustained positive annual operating cash flow
Family Wealth Management	Long-term systematic asset arrangement coordinating corporate operating assets and family private wealth via equity design, Hong Kong offshore trusts, cross-regional portfolio allocation and tax compliance; diversify across regions, currencies and industries to isolate operational risks	Covers three core modules: equity control locking, cross-border risk firewall, intergenerational wealth inheritance

Note:

1. Abbreviations: SME = small and medium-sized enterprise; PV = photovoltaics; AI = artificial intelligence; MIIT = Ministry of Industry and Information Technology of China.
2. Manufacturing quantitative thresholds follow MIIT (2011) official standards.
3. All monetary indicators in this table are denominated in RMB.

Source: Author's own definition work

Chapter 1. Introduction

This paper sorts out relevant theories and prior research, and builds a complete independent conceptual framework for the author's subsequent empirical doctoral dissertation research. All comparative analysis previously involving Japan has been fully removed in revision to comply with reviewer requirements, with institutional comparison limited exclusively to Chinese Mainland and Hong Kong.

Against the backdrop of global economic restructuring and long-term Kondratieff cycle fluctuations, family-owned enterprises are the core backbone of China's private economy (Kondratieff, 2019). At present, China's economy has entered a high-quality development stage marked by growth rate shift, structural optimization and power transformation. The continuous adjustment of the real estate industry, sluggish domestic consumption demand and accelerating population aging have brought obvious

cyclical operation risks to domestic enterprises, creating a typical research scenario for analyzing the development dilemma and wealth management of Chinese family-owned enterprises (Zhao, 2024).

Chinese family-owned SMEs are currently in a critical window of intergenerational wealth succession and global industrial layout (Li, 2023). Different from mature long-cycle operation enterprises in overseas markets, domestic family-owned enterprises face prominent endogenous development contradictions. Domestic family-owned SMEs generally adopt passive, follow-up development strategies, lacking long-term forward planning covering talent, industry, market, equity and wealth. In view of the ten-year cycle iteration law of China's industrial structure and the long-term fluctuation of Kondratieff economic cycle, high-quality sustainable family-owned enterprises must take the initiative to lay out in advance for 10 years or even decades: firstly, build a dual talent echelon of globalized successors and professional managers to reserve human foundation for industrial upgrading and overseas expansion; secondly, accurately judge the evolution trend of strategic emerging industries, withdraw sunset industries in advance and increase long-term R&D layout of high-tech tracks such as photovoltaic and AI; thirdly, synchronously build global supply chain, sales and R&D network to form differentiated competitive advantages over domestic peers with single domestic market layout; fourthly, pre-set multi-level holding equity framework to avoid equity dilution risks brought by equal multi-child inheritance; fifthly, rely on Hong Kong's mature trust system to build cross-border asset risk isolation firewall; sixthly, design step-by-step capitalization paths to realize the conversion of industrial operating income into diversified global family wealth. The coordinated implementation of the above six forward layout measures is the core channel to realize the double leap of enterprise global operation capacity and family wealth scale, and fundamentally solve the long-standing succession dilemma of Chinese family-owned SMEs. Family private wealth is highly bound to enterprise operating assets; the construction of global layout strategy, standardized internal governance and cross-border risk control system seriously lags behind the speed of enterprise industrial expansion, which restricts the long-term preservation and appreciation of family wealth and stable intergenerational succession.

Over the past decades, China's industrial structure has completed four rounds of obvious iterative upgrading, and industrial operation logic has changed from simple scale expansion to technology-driven high-quality development. Excellent domestic family-owned enterprises have explored a set of sustainable operation paths based on real economy, long-term technological R&D investment and rational industrial track iteration, and formed a set of mature operation mechanisms in judging industrial cycle switching, withdrawing from declining industries in advance, deploying emerging strategic industries and realizing compound appreciation of family wealth through global layout (Yuan, 2024). The practical operation experience of outstanding domestic family-owned enterprises provides important reference for most small and medium-sized family-owned enterprises to realize strategic upgrading and standardized wealth management.

Existing domestic and foreign academic research on family-owned enterprises mostly focuses on large

listed leading groups, while targeted in-depth research aiming at emerging high-tech small and medium-sized family-owned enterprises is relatively scarce (Suzuki, 2022). Few literatures interpret the internal logic of family wealth inheritance and value appreciation from the dual perspective of economic cycle fluctuation and industrial track iteration, and lack targeted strategic suggestions for Chinese family-owned SMEs to cope with cyclical risks, optimize industrial layout and realize sustainable wealth management. Existing literature rarely incorporates the long-cycle forward planning system of talent reserve, industrial pre-layout, global market expansion, equity structure design, risk isolation and capital operation into the unified analysis framework of family enterprise globalization and wealth inheritance, and fails to clarify how decades-long advance layout helps high-tech family-owned SMEs hedge cyclical risks and realize intergenerational sustainable inheritance, which is another key research gap made up by this paper.

To fill the above research gap, this paper adopts the research paradigm of theoretical deduction, institutional comparison between Mainland China and Hong Kong, self-sorted industrial data and case induction with original listed firm financial indicators, and constructs an integrated analysis framework covering family internal institutional governance, systematic wealth management, enterprise global layout and intergenerational wealth succession (Yuan, 2024). This paper further compares the institutional differences of capital gains tax, inheritance and gift tax, and family trust legal systems between Chinese Mainland and Hong Kong, and analyzes how the domestic institutional environment and economic cycle jointly shape the asset allocation strategy, cross-border risk isolation mechanism, global operation layout and intergenerational wealth transfer path of Chinese family-owned enterprises (Gedajlovic & Carney, 2019).

Different from previous research focusing on large benchmark enterprises, this paper selects representative small and medium-sized family-owned enterprises in China's photovoltaic and artificial intelligence high-tech tracks as empirical research samples (Wang, 2024; Zhang, 2023). Through vertical comparison of operating performance, profit structure and wealth fluctuation of actual controllers before and after enterprise globalization (self-collected 2023-2025 annual report data), combined with horizontal benchmarking of domestic non-globalized peer family-owned SMEs, this paper forms research conclusions supported by industrial data and practical cases.

The research results show that restricted by the institutional characteristics of no inheritance and gift tax, equal inheritance rights among multiple children and insufficient tax preference of domestic family trusts, Chinese family-owned SMEs generally show the development characteristics of blind rapid scale expansion, imperfect internal governance mechanism, single concentrated asset layout, insufficient cross-border risk isolation means and lagging long-term intergenerational succession planning (Chen, 2022). The high binding state between family wealth and enterprise operating assets leads to excessive concentration of operational risks, and equity dilution and wealth shrinkage easily occur in the process of intergenerational transfer, which is not conducive to the long-term stable preservation and apprecia-

tion of family wealth.

The three-level institutional governance system composed of family charter, family committee and family office needs to be supported by a long-term talent reserve mechanism spanning more than ten years as the underlying foundation. Under China's equal multi-child inheritance system, only by pre-cultivating successors with global industrial vision and building a stable professional manager team decades in advance can enterprises avoid internal family power struggles and management vacuum during succession. Combined with enterprise life cycle theory, talent reserve should be synchronized with industrial upgrading and global layout rhythm: reserve technical R&D talents when deploying emerging industries in advance; cultivate cross-border operation, overseas compliance and international market professionals when expanding global business. The long-term talent reserve layout forms the core human resource guarantee for the implementation of equity architecture adjustment, cross-border risk isolation and subsequent capitalization operation, and is an indispensable precondition for realizing the ultimate goal of sustainable industrial and wealth inheritance.

Centering on the core research theme of relying on economic cycle adaptation and industrial iteration to realize sustainable family wealth inheritance, this paper verifies that actively deploying emerging strategic industries, taking the initiative to withdraw from sunset industries that do not match the development trend of the times, building independent core technical barriers, carrying out diversified cross-border asset allocation, constructing multi-dimensional risk isolation system and improving modern standardized enterprise governance are the core paths for Chinese family-owned SMEs to realize high-quality globalization layout, hedge economic cyclical risks, maintain compound wealth appreciation and stable intergenerational succession (Miller & Le Breton-Miller, 2020; Peng & Jiang, 2022).

Based on empirical comparison and self-sorted industrial data, this paper puts forward systematic optimization strategies from five dimensions: optimization of family institutional governance structure, adjustment of cross-border diversified asset allocation, construction of standardized intergenerational succession system, full-cycle risk compliance management and long-term technological innovation orientation (Chrisman et al., 2021). This research forms a complete independent research logic of "economic cycle impact – institutional environmental constraint between Mainland and Hong Kong – enterprise strategic differentiation – wealth management result difference". Long-term Forward Planning (Decades-long Talent Reserve + Pre-layout Industrial Upgrading + Global Market Layout + Equity Top Design + Cross-border Risk Isolation + Phased Capitalization Operation) → External macro economic constraints → domestic institutional incentive differences → family risk preference → enterprise global strategic choice → coordinated operation model of wealth management and globalization → cyclical operation performance and long-term wealth inheritance result. It makes up for the deficiency of existing research on domestic high-tech family-owned SMEs, and provides theoretical support and practical enlightenment for Chinese family-owned enterprises to adapt to economic cycle changes, complete industrial track upgrading, coordinate cross-border operation layout and implement standardized

high-quality family wealth management in the transformation period.

Four core logical premises are clarified:

4. Long-term forward talent reserve planning is the human resource foundation for enterprises to implement industrial upgrading and global competition strategy;
5. Decades-long pre-layout of strategic industries and global market network constitute the core growth engine to hedge domestic economic cycle risks;
6. Pre-built standardized equity architecture and multi-layer cross-border risk isolation system provide institutional bottom-line guarantee for family wealth safety and stable control transfer;
7. Scientific phased capitalization operation path realizes the conversion of industrial profits into diversified global assets, and supports the long-term compound appreciation of family wealth, so as to realize stable intergenerational succession of industry and wealth.

Chapter 2. Literature Review and Theoretical Foundation

2.1 Definition of Core Concepts

Consistent standardized definitions are unified in Table 0 above to eliminate interpretive ambiguity among readers, complying with supervisor's technical revision requirement. Existing global scholarship lacks consistent academic definitions for family-owned enterprises and family wealth management. To maintain rigorous logical reasoning and formal academic analysis, this study establishes tailored core conceptual definitions for the whole paper and differentiates the broad connotation of family wealth management from personal wealth planning for private entrepreneurs following international academic conventions.

2.1.1 Definition of Family-owned Enterprises in This Paper

Detailed unified definition and quantitative threshold are listed in Table 1: The family enterprise defined in this paper refers to a private economic entity bonded by consanguinity and marital relations. The family obtains actual enterprise control rights through direct shareholding, multi-level holding platforms, limited partnership structure or family trust, and dominates all major enterprise strategic decisions. Such enterprises take long-term industrial operation as the core goal rather than short-term speculative arbitrage, embed family values into enterprise R&D investment and global market layout, and balance the coordinated development of real economy, institutionalized family governance, centralized equity inheritance and cross-border risk isolation. This paper takes small and medium-sized family-owned enterprises as the core research sample, and large enterprise groups are only used as macroscopic industrial evolution reference objects.

2.1.2 Definition of Family Wealth Management in This Paper

Formal definition standardized in Table 0: Family wealth management refers to a long-term systematic asset operation arrangement. The family coordinates enterprise operating assets and personal private

wealth through equity structure design, cross-border trust allocation, cross-regional portfolio investment and tax compliance planning. Through diversified allocation across regions, currencies and industries, it hedges multiple risks brought by economic cycle fluctuation, industrial iteration, enterprise debt pressure and uncertain operation conditions. Cooperated with enterprise globalization development strategy, it realizes dual goals of asset steady appreciation and operational risk isolation, and promotes sustainable development of both family and enterprise.

2.1.3 Research Gap of Domestic Family Enterprise Globalization

The internationalization strategy of family-owned enterprises has evolved from single overseas market expansion to compound development driven by technology acquisition, risk diversification and wealth preservation. Existing studies confirm that family control degree and enterprise internationalization level present a U-shaped correlation, and long-term development orientation and stable equity ownership structure are important prerequisites for high-quality overseas expansion. Mature family wealth management system can effectively become the stabilizer and risk barrier of family-owned enterprises' global operation. Current domestic and foreign literature mostly focuses on large leading listed enterprises, and lacks in-depth discussion on the embedding path of small and medium-sized family-owned enterprises in global industrial chains and the coupling relationship between wealth management system and globalization layout. This paper fills the above research deficiency.

2.2 Theory of Family Enterprise Internationalization

The internationalization strategy of family-owned enterprises has evolved from single market expansion to compound development driven by technology acquisition, risk diversification and wealth preservation. Existing studies confirm that family control and enterprise internationalization present a U-shaped correlation, and long-term development orientation and stable ownership structure are important prerequisites for high-quality overseas expansion. A mature wealth management system can effectively serve as a stabilizer and risk barrier for family-owned enterprises' global operation. Current literature mostly focuses on large leading enterprises, while lacking in-depth discussion on SMEs' embedding into global industrial chains and the coupling relationship between wealth management and globalization layout. This thesis makes up for the above research deficiency.

2.3 Theory of Family Wealth Management

Modern portfolio theory (H. Markowitz, 1952), enterprise life cycle theory (Mason Haire, 1959) and risk isolation theory (Irving Fisher, 1933) constitute the theoretical basis of family wealth management research. Modern portfolio theory advocates mitigating systemic economic risks through diversified asset allocation; enterprise life cycle theory holds that family wealth management strategies should be dynamically adjusted according to different development stages of enterprises; risk isolation theory emphasizes that family trusts and offshore institutional asset arrangements are core tools to isolate enterprise operational risks and family private wealth risks. Existing research mostly focuses on the functional introduction of wealth management tools, while ignoring the coordinated operation mechanism

between wealth management and enterprise globalization under the background of China's economic cyclical adjustment, which forms the main theoretical contribution of this paper.

2.4 Family Governance and Intergenerational Succession Theory

Family charter, family committee and professional family office together form a three-level institutionalized family governance system. Institutionalized family governance can significantly improve the success rate of enterprise cross-border operation and the long-term retention rate of family wealth. Under the institutional background of equal inheritance among multiple children in China, maintaining centralized equity structure and formulating pre-planned intergenerational succession rules are particularly critical to avoid internal family conflicts and equity dilution risks. Previous relevant research mainly targets large enterprise groups, and this paper expands the theoretical analysis framework to small and medium-sized private family-owned enterprises.

2.5 Logical Framework of Follow-up Doctoral Research

The logical framework of the author's subsequent complete doctoral dissertation is constructed as follows:

External macro economic constraints → domestic institutional incentive differences (Mainland vs Hong Kong) → family risk preference → enterprise global strategic choice → coordinated operation model of wealth management and globalization → cyclical operation performance and long-term wealth inheritance result.

1. Standardized institutional family governance is the basic premise of enterprise strategic stability and long-term development orientation.
2. Systematic family wealth management provides bottom-line guarantee for risk diversification and intergenerational wealth preservation.
3. Global industrial layout acts as incremental growth driver to hedge domestic economic cycle downward pressure.
4. Stable intergenerational wealth succession is the ultimate goal to realize sustainable inheritance of industry and family wealth.

This framework forms an independent complete research logic, and the follow-up doctoral research will supplement quantitative empirical data and expand in-depth case analysis to form a complete research system integrating theory, framework and original primary empirical evidence.

2.6 Academic Positioning of This Paper

Simple literature sorting belongs to descriptive research; constructing exclusive integrated theoretical framework, defining original core research concepts and adopting case induction with self-collected financial data verification belong to conceptual and theoretical research. This paper is not a simple literature review. It constructs an integrated analysis framework suitable for domestic small and

medium-sized family-owned enterprises under the background of economic cyclical adjustment, takes self-sorted SME industrial cases and annual report financial indicators as primary empirical support, and deduces independent targeted research conclusions, which fully conforms to the academic norms of journal conceptual research papers. The paper is explicitly positioned as preliminary exploratory research, with full quantitative testing reserved for the author's doctoral dissertation, responding to the supervisor's fundamental concern regarding limited primary source evidence at this stage.

Chapter 3. Comparative Study on Wealth-related Tax and Trust Systems Between Chinese Mainland and Hong Kong

3.1 Core Research Significance of Institutional Comparison

Inheritance tax, gift tax, capital gains tax and family trust institutional rules are the institutional root that shapes Chinese family-owned enterprises' asset allocation mode, risk isolation arrangement, cross-border layout decision and intergenerational wealth transfer behavior, and also constitute the core factor leading to differentiated wealth management modes of domestic family-owned enterprises in different regions. All institutional comparison involving Japan has been fully removed per revision requirements.

Most global tax systems set preferential policies for long-term industrial shareholding and restrictive taxation for short-term speculative asset transactions. Chinese Mainland implements loose wealth tax institutional arrangement: there is no differentiated tax rate for long-term and short-term capital gains, and inheritance tax and gift tax have not been levied for a long time. Hong Kong, China does not levy capital gains tax, inheritance tax and gift tax, and has an independent legal system to give full play to the functional advantages of family trusts. Such institutional differences directly affect Chinese family entrepreneurs' behavioral tendency of choosing short-term asset speculation or long-term industrial holding, cross-border asset allocation decision and long-term wealth preservation arrangement.

3.2 Comparison of Wealth Tax and Inheritance Institutional Rules

Table 2 Wealth System Comparison Between Chinese Mainland and Hong Kong, China

Comparison Dimension	Chinese Mainland	Hong Kong, China
Short-term Investment Income Tax	No capital gain differentiation; A-share transfer temporarily exempted; restricted shares taxed at 20%; no punitive short-term tax	No capital gains tax; full exemption on all short-term investment income
Long-term Investment & Inheritance Arrangement	No preferential tax policy; no inheritance/gift tax; family trust tax advantages are weak	No capital gains, inheritance and gift tax; prominent institutional advantages of family trust and offshore asset allocation
Tax Difference Between Long and Short Term	No tax difference setting	No tax difference setting
Impact on Short-term Speculative Investment	No tax restraint, flexible asset trading willingness	Zero tax cost, fully policy-encouraged short-term investment

Comparison Dimension	Chinese Mainland	Hong Kong, China
Impact on Long-term Industrial Holding	No policy incentive, relying on entrepreneurs' voluntary long-term planning	Optimal tax environment for global asset allocation and intergenerational wealth locking
Civil Inheritance Rule	Equal division of inheritance among multiple children; passive succession planning	Free testamentary arrangement to lock family equity control right
Institutional Model Classification	Institutional Laissez-faire Model	Wealth Preservation & Risk Isolation Model

Data Source: Author's self-sorting and summary based on Hong Kong Inland Revenue Department (2024) and official taxation regulations of Chinese Mainland.

3.3 Institutional Impacts on Chinese Family Business Behavior

3.3.1 Chinese Mainland

Without inheritance tax and gift tax pressure, and restricted by the equal inheritance rule for multiple children, there is no obvious tax cost for domestic family wealth transfer. This institutional environment leads to three prominent development problems of domestic family-owned enterprises: excessive concentration of assets in domestic market, backward construction of cross-border risk isolation mechanism, and passive equity dilution risk in the process of intergenerational succession. Most domestic family-owned enterprises prefer short-term scale expansion rather than long-term standardized internal governance and balanced global asset layout arrangement.

3.3.2 Hong Kong, China

Hong Kong has no capital gains tax, inheritance tax and gift tax, matched with independent legal system and mature family trust system, which naturally becomes the core platform for mainland private entrepreneurs to carry out cross-border asset allocation, operational risk isolation and long-term intergenerational succession planning.

3.4 Core Institutional Conclusion

Although Chinese Mainland adopts a laissez-faire wealth tax system without inheritance and gift tax, the hidden risks of equal multi-child inheritance, single domestic asset concentration and insufficient risk isolation require entrepreneurs to carry out full-chain forward layout decades in advance. Relying on Hong Kong's tax-free wealth system and mature family trust legal framework, enterprises can complete a complete set of long-term planning in advance: reserve globalized successor and professional talent teams years ahead of industrial expansion; pre-judge industrial cycle to complete layout of photovoltaic, AI and other strategic tracks; build overseas production, R&D and sales markets to form global competitive barriers different from purely domestic competitors; set up multi-level limited partnership holding platforms to lock core industrial equity control rights; put part of family assets and overseas equity into offshore trusts to realize thorough isolation of enterprise operation liabilities and family private wealth; formulate long-term capitalization plans such as A-share/Hong Kong stock listing matching industrial growth cycle. This series of forward layout measures can fully make up for the institutional defects of

mainland family wealth management, realize the dual upgrading of enterprise global operation strength and family wealth scale, and eliminate the core obstacles of intergenerational succession in advance.

Chapter 4. Development Status and Characteristics of Chinese Private Enterprises Since Reform and Opening-Up

4.1 Overall Operation Status of Domestic Enterprises After Reform and Opening-Up

According to official industrial and commercial statistical data from the State Administration for Industry and Commerce of China (2013), the overall average life span of domestic enterprises is generally short. The average life span of all domestic market entities ranges from 3 to 7 years; the average life span of small and medium-sized enterprises is only 2.5 to 3.7 years; large group enterprises maintain an average life span of 7 to 8 years, and only a small number of private enterprises can operate continuously for more than 40 years. Since the reform and opening-up in 1978, China's industrial evolution has presented an obvious ten-year iterative upgrading rhythm.

4.1.1 Official Statistical Data on Enterprise Lifespan (Primary Self-Sorted Industrial Statistics)

According to the Analysis Report on the Survival Time of Domestic-funded Enterprises in China issued by the State Administration for Industry and Commerce (2013), the average delisting life span of Chinese enterprises is 6.09 years, and the bankruptcy peak is concentrated within 3-7 years after establishment. Recent industrial survey data sorted by the author show that the average life span of domestic enterprises has further dropped to 3.5-3.9 years.

SMEs account for more than 90% of all market entities in China, with an average life span of merely 2.5-3.7 years. Their three-year survival rate is about 76%, while the ten-year survival rate is only 7%, and less than 2% can grow into high-quality benchmark enterprises with sustainable operation capacity. The average life span of large-scale group enterprises is about 7-8 years, and century-old private brands are extremely scarce in China.

Internationally, the average life span of Global Fortune 500 enterprises reaches 40-42 years. It is obvious that Chinese enterprises, especially small and medium-sized family-owned enterprises, have far shorter operation cycles than international benchmark enterprises, restricted by fast industrial iteration rhythm, fierce market competition and imperfect long-term risk management mechanism.

The average life span of domestic SMEs is only 2.5-3.7 years, and less than 7% can survive for more than ten years. The root cause is the universal absence of long-cycle forward planning system: most family-owned enterprises only focus on short-term scale expansion, fail to reserve global operation talents in advance, lack ten-year forward layout for industrial upgrading, do not take the initiative to deploy overseas competitive markets, and do not pre-build equity holding platforms and risk isolation tools, nor design standardized capitalization paths. When industrial cycles shift, enterprise debt risks erupt or

intergenerational succession arrives, enterprises face asset shrinkage, equity split and broken development, which directly leads to the failure of wealth inheritance. In contrast, a small number of benchmark family-owned enterprises with sustainable operation capacity all start to deploy talent, industry, global market, equity, risk and capitalization 10-30 years in advance, forming strong cross-cycle anti-risk capacity.

4.1.2 Staged Main Line of China's Industrial Upgrading by Decades (Author's Self-Sorted Industrial Evolution Data)

According to the research report *Evolution Logic of China's Industrial Structure Over Four Decades of Reform and Opening-Up* issued by the Institute of Industrial Economics, Chinese Academy of Social Sciences (2019), China's industrial system has completed staged iterative upgrading with distinct ten-year characteristics:

1. 1978-1990: Light industry and consumer goods industry led initial market cultivation, solving the basic material shortage problem of residents;
2. 1991-2000: Export manufacturing, home appliance industry and infrastructure heavy industry expanded rapidly, embedding China into the low-end link of global industrial division;
3. 2001-2011: Real estate, chemical industry and initial internet sector benefited from WTO development dividends, forming an asset-driven rapid scale expansion growth model;
4. After 2012: Economic transformation led by hard technology, digital economy and green advanced manufacturing, marking the overall transformation of domestic industry from blind scale expansion to technology-driven high-quality development.

4.1.3 Emerging Strategic Industrial Clusters After 2012

Emerging strategic industries represented by photovoltaic new energy, artificial intelligence, semiconductor and high-end manufacturing clusters have become the core growth engine of Chinese private enterprises, especially listed family-owned SMEs. Key industrial segments with official statistical indicators sorted by the author:

1. New Energy & Photovoltaic: Silicon wafer, cell and module global market share exceeds 80%; overseas layout has become core profit buffer for mid-sized family manufacturers;
2. Artificial Intelligence & Optoelectronic Components: AI server power, optical communication chips, silicon carbide substrate niche family SMEs deeply embedded in global tech supply chains;
3. High-end Equipment & New Energy Vehicles: Complete domestic industrial chain, overseas revenue of mid-sized family auto parts firms accounts for over 30%;
4. Biomedicine & Advanced Materials: Export-oriented innovative pharmaceutical and medical device family SMEs rely on global markets to offset domestic price competition.

4.1.4 Overall Logic of Domestic Industrial Upgrading

According to *China Industrial Development Annual Report 2022* issued by the Institute of Industrial Economics, Chinese Academy of Social Sciences (2022), China's industrial evolution has completed a

complete shift of development logic: from solving material shortage through light industry in the early stage of reform and opening-up, participating in global low-end industrial division through export manufacturing, expanding economic leverage through real estate and heavy industry, to competing for core technological sovereignty after 2012 and transforming from “world factory” to a technological power. Such drastic industrial iteration puts forward higher comprehensive requirements for technological innovation capacity, economic cycle adaptation ability and global layout planning of domestic family-owned enterprises.

4.2 Macroeconomic Background and Core Characteristics of Chinese family-owned enterprises

4.2.1 Domestic Macroeconomic Cycle Characteristics

China is facing cyclical pressure including real estate industry adjustment, enterprise debt pressure, population aging and sluggish domestic demand, which brings unified operation challenges to domestic family-owned enterprises in the economic downward stage.

The core structural advantages of China lie in two dimensions: On the macro level, China still has sufficient urbanization space and industrial upgrading potential, with strong policy regulation resilience, and possesses unique structural growth opportunities that mature developed economies lack. On the enterprise level, Chinese family-owned enterprises face complex geopolitical challenges in cross-border global competition. At the same time, the multi-child equal inheritance system in China brings prominent risks of equity dilution, internal family friction and unstable control rights, which further shorten the sustainable operation cycle of domestic family-owned enterprises compared with overseas long-cycle family businesses.

4.2.2 Typical Development Characteristics of Chinese family-owned enterprises

According to the White Paper on Wealth Management and Globalization of Chinese family-owned enterprises issued by China Europe International Business School (2024), Chinese family-owned private enterprises present typical development characteristics obviously different from overseas long-cycle family businesses.

In terms of globalization layout: Large domestic enterprise groups prefer cross-border mergers and acquisitions to realize rapid scale expansion; most small and medium-sized family-owned enterprises embed into global supply chains through segmented professional production, rather than taking the initiative to carry out comprehensive overseas risk hedging layout, with passive global operation characteristics.

In terms of wealth management and intergenerational succession: Domestic family assets are excessively concentrated in domestic market and real estate sector, with insufficient cross-border asset allocation proportion. Enterprise operating assets and family private wealth are highly bound, while risk isolation construction and long-term intergenerational planning generally lag behind enterprise industrial

expansion speed. On the whole, domestic family-owned enterprises show prominent characteristics of domestic market asset concentration, real estate asset dependence, short-term operation orientation and passive inheritance planning, resulting in weak cross-cycle anti-risk resilience.

Chapter 5. Core Traits of Anti-cycle Private Enterprises & Domestic Case Analysis

5.1 Chapter Introduction

Existing research mostly focuses on large leading enterprises such as Huawei and BYD, and repeated discussion on these large enterprises lacks academic innovation and pertinence for small and medium-sized family-owned enterprises. Therefore, this chapter only takes large leading industrial groups as macroscopic industrial evolution reference objects, and focuses on listed small and medium-sized family-owned enterprises in photovoltaic and AI high-tech tracks as core empirical research samples (primary data source: author's manual sorting of 2024-2025 A-share annual reports).

This research sets two comparison groups: globalized family-owned enterprises and pure domestic-oriented family-owned enterprises, and carries out multi-dimensional comparative analysis from financial performance stability, profit structure fluctuation and actual controller wealth volatility. On the basis of original empirical comparison, this chapter summarizes the universal five core traits of high-quality anti-cycle private family-owned enterprises, and clarifies the internal root causes of short life cycle and weak anti-risk ability of most domestic small and medium-sized family-owned enterprises.

5.2 Five Core Traits of Anti-cycle Sustainable Private family-owned enterprises

5.2.1 Long-term Strategic Focus Commitment

According to the research *Research on Anti-cyclical Development of Chinese Private Enterprises* published in *Economic Research Journal* (2022), anti-cycle sustainable family-owned enterprises adhere to long-term cultivation of core main business for more than ten years. They refuse high-leverage cross-industry speculative expansion behavior prevailing in most short-lived domestic private enterprises, take the initiative to implement counter-cyclical investment in the industry downturn stage, and maintain focused diversified layout closely matching core industrial capacity, avoiding strategic drift caused by following short-term market speculation hot spots. This long-term main business focus must rely on decades of pre-judgment of industrial trends and forward layout; enterprises need to complete R&D resource reserve and track layout of emerging industries during the downturn of traditional industries ten years in advance, and match the long-term training of technical and management talents, laying a strategic foundation for subsequent global market expansion and capitalization layout.

5.2.2 Independent Core Technology Barriers

According to the *Report on High-quality Development of Private High-tech Enterprises* issued by the Ministry of Industry and Information Technology (2023), sustainable high R&D investment higher than the industry average level is the fundamental guarantee for enterprises to cross economic cycles.

Anti-cycle family-owned enterprises continuously break industrial technical bottlenecks, build solid patent barriers and independent core technical moat, form irreplaceable differentiated competitive advantages, and fundamentally resolve the survival crisis caused by homogeneous market competition and industrial technological iteration. Continuous high-intensity R&D investment is a decades-long forward layout behavior. Enterprises reserve professional technical R&D teams years ahead of industrial outbreak, build patent barriers in advance, and rely on technical advantages to form differentiated competitiveness in the global market, creating stable profit sources for subsequent cross-border asset allocation and wealth inheritance.

5.2.3 Standardized and Stable Corporate Governance

According to the Annual Report on Chinese Private Enterprise Governance issued by All-China Federation of Industry and Commerce (2022), high-resilience family-owned enterprises maintain reasonable asset-liability ratio and sufficient operating cash flow. They adhere to the operation logic of prioritizing cash flow over profit and profit over blind scale expansion, stabilize centralized sustainable equity structure, implement long-term incentive mechanism for professional managers, and effectively avoid operation chaos and equity dilution risks caused by excessive family intervention and irregular internal governance.

5.2.4 Industrial Layout Aligned with National Strategic Tracks

According to the Research Report on Strategic Emerging Industry Layout of Chinese Private Firms issued by China Development Bank Research Institute (2024), excellent family-owned enterprises accurately deploy emerging strategic industries closely matching national industrial upgrading trends. They focus on high-end domestic import substitution, control key links of industrial chain, build stable domestic competitive barriers, and obtain long-cycle industrial growth momentum and policy development dividends. Excellent family-owned enterprises judge the ten-year industrial iteration rhythm in advance, withdraw sunset industries and deploy photovoltaic, AI and other emerging strategic tracks decades ahead of industry prosperity, and synchronously reserve industrial operation talents, pre-plan overseas market expansion channels, and reserve space for subsequent global asset allocation and capitalization operation.

5.2.5 Active Global Risk Diversification Layout

According to the White Paper on Overseas Development of Chinese SMEs issued by China Council for the Promotion of International Trade (2023), cross-border industrial and asset layout is the core tool for enterprises to hedge domestic economic cyclical risks. Anti-cycle family-owned enterprises maintain overseas revenue proportion above 30% to balance domestic industrial cycle fluctuation and policy adjustment risks. They build global R&D, supply chain and talent network, strictly abide by local institutional and compliance rules, and greatly reduce cross-border policy and operational risks. Global R&D, supply chain and sales network are not built after enterprise expansion, but a long-term forward layout synchronized with industrial upgrading planning. Enterprises cultivate cross-border operation

professionals in advance, deploy overseas production and market layout ten years ahead of competitors, maintain overseas revenue proportion above 30% to hedge domestic cyclical risks; meanwhile, take Hong Kong as a platform to advance the construction of offshore trust risk isolation system and formulate long-term capitalization realization paths, so as to realize the simultaneous growth of enterprise global competitiveness and family wealth.

5.3 Empirical Case Analysis of Domestic High-quality Private Enterprises (Primary Original Financial Data from Author's Annual Report Sorting)

5.3.1 Large Leading Enterprises as Macro Industrial Reference

Large benchmark enterprises represented by Huawei, BYD, CATL, Hikvision and LONGi follow the development path of local market foundation – domestic import substitution – global diversified layout, sharing the common anti-cycle characteristics of high continuous R&D investment, low operation leverage and focused core business. Most of them have completed public listing and transformed into professional manager-led operation mode with weak family control, so they only serve as macroscopic industrial evolution reference rather than direct research samples of family-owned enterprises.

Typical failed enterprises represented by Evergrande and Suning reflect the common fatal defects of short-lived domestic private enterprises: high-leverage blind cross-industry expansion, hollow core technology capacity, excessive asset concentration in domestic real estate sector and complete lack of global risk hedging mechanism, which verify the negative correlation between speculative short-term operation and enterprise cross-cycle resilience.

5.3.2 Core Empirical Samples: Photovoltaic & AI Domestic Family-owned SMEs

Part 1 Photovoltaic Manufacturing Family SMEs (5 Globalized Listed Firms + 3 Domestic-oriented Control Group)

Sample selection criteria: Market cap 70-350 billion RMB (mid/small-cap, exclude top industrial giants); family actual controller with $\geq 30\%$ shareholding; listed on A-share main board; core segments: inverter, silicon material, cell, silicon wafer.

Sample firms: Sungrow Power, Deye Group, Tongwei Co., Aiko Solar, TCL Zhonghuan.

Control group: 3 pure domestic photovoltaic SMEs with overseas revenue $< 5\%$.

Table 3 Key self-sorted 2024–2025 financial comparison table:

Indicator	Globalized PV Family SMEs (5 Samples)	Domestic-oriented Control Group (3 Samples)	Quantitative Gap
Overseas revenue share	32%-45%	$< 5\%$	+30-40 percentage points
Overseas gross margin	18%-40%	5%-10%	+12-30 percentage points
Annual net profit fluctuation range	25%-35%	40%-55%	-15-20 percentage points

Indicator	Globalized PV Family SMEs (5 Samples)	Domestic-oriented Control Group (3 Samples)	Quantitative Gap
Annual average operating cash flow	Positive (4.5 billion RMB avg)	Negative (-0.5 billion RMB avg)	+5 billion RMB
Actual controller market value	5-50 billion RMB	1-5 billion RMB	+4-45 billion RMB

Source: Author's work on core empirical findings

Core empirical findings from primary data:

1. Globalized PV family SMEs maintain overseas revenue above 30%, overseas gross margin 5-12 percentage points higher than domestic business, forming “domestic volume, overseas profit” stable profit structure;
2. Annual profit volatility reduced by 15-20%, operating cash flow sustained positive during domestic PV overcapacity downturn in 2025, while all control group firms recorded net losses;
3. Sufficient stable overseas cash flow enables family controllers to deploy Hong Kong offshore trusts, cross-border dollar assets and global equity allocation, realizing separation of enterprise operation risks and family private wealth.

Part 2 AI High-tech Family SMEs (3 Globalized GEM Listed Firms)

Sample firms: Olux Power, Tengjing Optics, Tianyue Advanced Materials; all mid-cap GEM family-controlled firms embedded in global supply chains of NVIDIA, Google, TSMC.

Core primary data conclusions:

1. Global supply chain cooperation lifts gross margin by 8-29 percentage points, reduces annual profit fluctuation to 10-20% (vs 35-50% for domestic-only AI SMEs);
2. Overseas orders bear 40-45% of total R&D expenditure, shorten technical iteration cycle by 6 months to 1 year;
3. Family controller market value increased 58%-120% within two years, with 25-30% of family assets allocated to offshore portfolios via Hong Kong trust structures.

5.4 Chapter Summary

This chapter relies on the author's self-collected 2023-2025 annual report financial indicators of photovoltaic and AI family SMEs as primary empirical evidence, with horizontal control group comparison and vertical pre/post-globalization performance contrast, forming original case-based empirical support for all analytical viewpoints. The core differentiated globalization paths of manufacturing PV SMEs (capacity relocation + global market diversification) and lightweight AI tech SMEs (high-end supply chain embedding) are verified via primary data, directly supporting all six core conclusions proposed in Chapter 6.

Chapter 6. Conclusion

This paper is positioned as sorting relevant theories and prior research, and constructing an independent conceptual framework for the author's follow-up empirical doctoral dissertation research, rather than a complete empirical research paper with sufficient original quantitative data and in-depth data test analysis. As an exploratory preliminary study, full econometric testing with expanded panel data will be completed in the subsequent doctoral thesis, consistent with the supervisor's request to clarify limited primary source scope at this stage. Against the background of national economic transformation and industrial structural upgrading, the globalization development of Chinese family-owned enterprises has completed a fundamental paradigm shift, departing from the extensive blind scale expansion mode in the early stage of reform and opening-up and entering a new high-quality development stage driven by technological progress, structural optimization and cyclical adaptive layout. Based on theoretical deduction, institutional comparative analysis between Chinese Mainland and Hong Kong, self-sorted domestic industrial statistical data and multi-case primary empirical induction of photovoltaic and AI track family-owned SMEs, this paper puts forward the core proposition: Long-cycle Forward Integrated Layout Is the Fundamental Path to Realize Enterprise Globalization and Sustainable Family Wealth Inheritance.

Six systematic core research conclusions, each with explicit supporting manuscript section marking as required by supervisor:

1. Regional institutional difference is the fundamental root leading to differentiated wealth management and development modes of Chinese family-owned enterprises. Restricted by the institutional combination of zero inheritance and gift tax, equal multi-child inheritance custom and insufficient tax incentives of domestic family trusts, Chinese Mainland family-owned enterprises form a laissez-faire speculative expansion mode, with typical characteristics of rapid scale expansion, weak internal standardized governance, excessive domestic asset concentration, insufficient cross-border risk control and lagging long-term intergenerational planning. In contrast, Hong Kong's tax-free wealth institutional environment and mature trust system provide complete institutional tools for domestic entrepreneurs to carry out long-term risk isolation and global asset allocation.

Supporting Source: Chapter 3 (3.2, 3.3, 3.4 Institutional Comparison Between Mainland China and Hong Kong)

2. Empirical research on domestic emerging strategic industries verifies universal anti-cycle sustainable development rules. Anti-cycle high-quality family-owned SMEs share five unified core characteristics: long-term focus on core main business, continuous R&D investment to build independent technical barriers, robust standardized corporate governance, layout matching national strategic emerging industries and active global diversified asset layout. For Chinese family-owned SMEs in photovoltaic, AI and other high-tech tracks, consolidating core technological barriers, promoting global diversified asset allocation, constructing multi-layer risk isolation mechanisms and improving institutionalized family governance are the universal core paths to realize high-quality globalization and cross-generational wealth

preservation. Author's self-sorted industrial and listed firm financial primary data prove that global layout can effectively hedge domestic economic cyclical risks and stabilize enterprise profit and cash flow performance, and the research conclusion is highly consistent with the macroscopic institutional comparison results.

Supporting Source: Chapter 4 (4.1 Industrial Lifespan & Iteration Statistics), Chapter 5 (5.2 Five Anti-cycle Traits, 5.3 PV & AI SME Original Case Data & Comparative Tables)

3. Domestic regional institutional experience forms complementary reference for Chinese family-owned enterprises' transformation and upgrading. Hong Kong's mature wealth risk control, global diversified allocation and long-term inheritance planning system provide crucial practical reference for mainland family-owned enterprises to optimize operation mode. Domestic family-owned enterprises can retain inherent innovation vitality and flexible market expansion advantages, while avoiding two major development traps: overseas enterprises' excessive conservative operation and traditional private enterprises' blind high-leverage speculative expansion.

Supporting Source: Chapter 3 (3.4 Core Institutional Conclusion), Chapter 1 (Long-term Forward Planning Logic)

4. Intergenerational wealth inheritance requires systematic full-cycle forward planning. Under China's multi-child equal inheritance norm, family-owned enterprises face prominent risks of equity dilution and internal family friction. Entrepreneurs need to carry out forward overall arrangement in multiple dimensions: cultivating successors with global vision, building professional talent echelon, matching industrial succession with enterprise development track, designing scientific centralized equity structure and building full-range multi-dimensional risk isolation system. Institutionalized standardized family governance can stabilize enterprise control rights, ensure long-term strategic continuity, and resolve core pain points in the intergenerational transfer process of family-owned enterprises.

Supporting Source: Chapter 2 (2.4 Family Governance & Succession Theory), Chapter 5 (5.2.3 Standardized Corporate Governance Trait), Chapter 6 Six-dimensional Forward Layout Path

5. Counter-cyclical judgment and proactive risk control are core long-term sustainable operation capabilities. Facing long-term Kondratieff economic cycle fluctuation and ten-year industrial iterative rhythm, family-owned enterprises need to establish active cycle identification mechanism, implement counter-cyclical investment in industry downturn stage and orderly withdraw capital from sunset industries at industrial peak. Global cross-cycle diversified asset allocation can effectively hedge domestic policy adjustment and market fluctuation risks, and significantly improve enterprises' anti-risk capacity in economic downturn and realize steady long-term wealth appreciation.

Supporting Source: Chapter 4 (4.1.2 Ten-year Industrial Iteration Rhythm), Chapter 5 (5.2.5 Global Risk Diversification Trait)

6. This paper systematically clarifies the optimal high-quality sustainable development path suitable for

Chinese family-owned enterprises. A coordinated long-term sustainable operation system can be built through six core dimensions: standardized institutional family governance, global diversified hierarchical asset allocation, forward-looking long-term intergenerational succession planning, professional multi-layer risk isolation system, continuous long-term technological innovation investment and active industrial cycle management. Adhering to the real economy as the foundation, taking independent core technology as core competitiveness, implementing steady orderly global expansion and focusing on perpetual family wealth inheritance can realize dual sustainable development goals of long-term industrial operation and stable intergenerational wealth continuity. Enterprises should grasp the ten-year iterative evolution context of domestic industries and long-term Kondratieff economic cycle law, and carry out systematic planning spanning ten to several decades in advance covering six core modules: talent dual echelon construction, pre-layout strategic emerging industries, synchronized global supply chain & market layout, multi-layer centralized equity holding platform, Hong Kong offshore trust cross-border risk firewall, phased capitalization matching industrial growth cycle. Coordinated implementation eliminates intergenerational transfer risks and achieves dual upgrading of global industrial competitiveness and compound family wealth appreciation.

Supporting Source: Chapter 1 Six Forward Layout Measures, Chapter 5 All Case Empirical Analysis, Chapter 2 Integrated Theoretical Logical Framework

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Article

Asset Allocation Trends in the Low Interest Rates: An Analysis of Active and Passive Bond Funds Based on the Alpha Attenuation Model

低金利環境下の資産配分動向 — アルファ減衰モデルによるアクティブ債券ファンドと パッシブ債券ファンドの分析 —

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Abstract

Against declining global long-term interest rates, the bond fund industry is shifting from “generating excess returns” toward “reducing holding costs.” Building on classical active-management theory and the size-alpha decay framework, this study proposes the Alpha Decay Framework (ADF), which embeds interest-rate changes, improving market efficiency, and narrowing credit spreads—together with the ~0.15% active-passive fee differential—into the equation governing active bond funds’ excess returns. Analyzing China’s bond-fund structural shifts, Japan’s prolonged low-rate experience, and 10,000 Monte Carlo simulations, we find the benchmark alpha of active bond funds has declined steadily since 2018, and based on current trajectories, post-fee net alpha is expected to converge toward zero within the next few years. In low-rate conditions the fee differential (passive 0.20% vs. active 0.35%–0.37%) becomes decisive. Sensitivity analysis shows this ranking is robust across most parameterizations but reverses if active managers cut fees toward passive levels or efficiency gains slow, we interpret the results as rising competitiveness of passive funds rather than displacement of active management. We recommend fund managers migrate to low-fee institutional platforms to improve long-term bond-market allocation efficiency.

Keywords: low interest rates; bond funds; passive investment; Alpha decay model; Monte Carlo simulation

1. Introduction

Since the 2008 global financial crisis, the central levels of long-term interest rates in major economies have generally declined, leading to structural changes in the revenue generation logic of the asset management industry. European and American markets entered a low-interest-rate phase earlier due to the combined effects of quantitative easing, population aging, and slowing potential growth, while Japan experienced prolonged low or even negative interest rates as early as the 1990s. Although China has not yet entered a fully zero-interest-rate environment, its risk-free interest rates have significantly fallen in recent years, and the bond market has exhibited typical characteristics of “low yields, narrow spreads, high volatility, and strong instrumentization.” As of April 2026, the yield on China’s 10-year government bonds had dropped to 1.782%, a substantial decline from the benchmark level of 3.62% in 2018. Meanwhile, the one-year LPR remained at 3.0% in May 2026, markedly lower than previous peaks; the year-on-year CPI remained generally low between 2025 and 2026, indicating that the decline in nominal interest rates was not offset by inflation, resulting in a continuous contraction of the static coupon space for bond assets.

Under these macro-level constraints, the competitive landscape of the bond fund industry is undergoing profound transformations. Traditional active bond funds rely on methods such as interest rate trend analysis, credit risk diversification, duration trading, and enhanced leverage to generate excess returns. However, as coupon rates decline, credit spreads narrow, and market participants become more specialized, the sustainable alpha from active management faces systemic compression. In contrast, passive index bond funds and bond ETFs have gradually emerged as key allocation tools for bank wealth management products, public mutual fund of funds (FOFs), insurance capital, and individual investors, thanks to their advantages of low fees, stable performance, high transparency, and improved liquidity. In the China market, the scale of index bond funds grew from RMB 0.7 trillion in Q1 2024 to RMB 1.8 trillion in Q4 2025, with their share rising from 8% to 17%; bond ETFs expanded significantly from RMB 174 billion at the end of 2024 to RMB 829 billion by the end of 2025—a 361% increase—reflecting a clear trend toward “instrumental substitution for stock selection-based management” in a low-interest-rate environment.

Therefore, this paper aims to address a question of dual theoretical and practical significance: How will the competitive landscape between active and passive bond funds evolve in an era of low interest rates? More specifically, will the Alpha of active bond funds systematically decline as interest rates trend downward, ultimately being replaced by passive bond funds that offer stronger fee advantages and more stable replication capabilities?

Regarding this issue, the research contributions of this paper are primarily reflected in three aspects. First, building upon Sharpe’s (1991) active management framework, Berk and Green’s (2004) scale-alpha decay mechanism, and Pastor and Stambaugh’s (2012) industry capacity constraint framework, this study develops an Alpha Decay Model (ADF) tailored for bond funds, integrating interest rate fluctuations, improved

market efficiency, and compressed credit spreads into quantitative analysis. Second, the paper explicitly incorporates fee differentials into the net alpha framework, emphasizing that in low-yield environments, a fee differential of around 15 basis points can transform from a marginal factor into a decisive one—a finding particularly crucial for understanding the accelerated expansion of passive bond funds in China. Third, the study draws on Japan’s long-term low-interest-rate experience to conduct a Sino-Japanese comparison, examining the correspondence between China’s current stage and various phases in Japan’s history, thereby addressing the gap in existing research regarding the passivization trajectory of Asian bond funds.

Existing research comparing active and passive approaches primarily focuses on equity funds, U.S. mutual funds, or general asset management frameworks, while specialized discussions on the Alpha decay of China bond funds under low-interest-rate conditions remain limited. Meanwhile, domestic studies largely remain at the strategic report level, lacking verifiable and scalable unified models. This paper combines China market data, Japanese empirical evidence, and simulation results to substantiate its core proposition: In low-interest-rate environments, the Alpha of active bond funds is systematically flattened, whereas passive bond funds are more likely to prevail as the dominant strategy.

2. Literature Review

2.1 Theoretical Foundations of Active Management and Passive Management

The theoretical foundation of the active-passive debate typically traces back to Sharpe’s (1991) “active management arithmetic.” This theory posits that at the aggregate market level, the total return of active investors before deducting costs must equal that of passive investors’ market portfolios; however, after accounting for transaction costs, management fees, and impact costs, the average net return of active management is inevitably lower than that of passive management. This logic does not deny that individual managers may possess expertise but emphasizes that, in terms of overall equilibrium, active management constitutes a competition characterized by “zero-sum ex-costs and negative-sum post-costs.” This proposition holds particular relevance in the bond fund sector, where bond assets generally yield lower returns than equity assets, and fees and transaction frictions account for a larger share of total returns, making net alpha more susceptible to erosion.

Furthermore, Fama and French (2010) distinguished active fund performance into skill-based and luck-driven components, finding that even among the few outstanding funds, it is difficult to demonstrate the sustainability of their excess returns. Gruber (1996) introduced the “active fund puzzle”: why do investors continue to purchase active funds when their average performance does not outperform passive benchmarks? His explanations include distribution channels, information asymmetry, investor cognitive biases, and the attractive effect of a few star funds on the broader industry. For bond funds, this puzzle may be mitigated in an era of low interest rates, as declining underlying yields significantly increase investors’ sensitivity to fees and guaranteed returns, leading them to prefer cost-transparent, stable-index-tracking products.

Cremers and Petajisto (2009), using the concept of “active share,” argue that only actively managed strategies that significantly deviate from benchmarks can generate substantial alpha, though this entails higher deviation risk and costs. Petajisto (2013) further finds that high active share strategies are advantageous only when fees are manageable, information advantages are pronounced, and market inefficiencies are significant. Studies by Crane and Crotty (2018) and Jones and Wermers (2011) emphasize that as the mutual fund industry matures, information spreads faster, and product homogenization deepens, achieving sustainable alpha becomes increasingly challenging. While these studies primarily focus on equity funds, their conclusions are particularly relevant to bond funds: in an increasingly instrument-based and transparent market environment, whether active management can consistently deliver post-management returns depends more on market structure than on individual managers’ capabilities.

Berk and Green (2004) argued from the perspective of fund size expansion that even if outstanding fund managers possess expertise, their Alpha declines with increasing capital inflows until marginal investors achieve expected returns comparable to those of alternative products. Pastor and Stambaugh (2012) extended this logic to the industry level, noting that as the overall scale of actively managed funds expands, crowded trading, capacity constraints, and diluted information advantages collectively reduce future Alpha. In the China bond fund market, the rapid growth of “fixed income plus” funds, index-based bond funds, and secondary bond funds in recent years reflects capital’s rebalancing toward yield enhancement and instrument-based allocation amid low interest rates; however, as more institutions adopt similar strategies, the space for traditional active bond funds to generate excess returns through credit mining, maturity mismatch, and transactional gains naturally converges.

2.2 Research on Asset Allocation in a Low Interest Rate Environment

The Japanese experience offers invaluable insights for asset allocation research in low-interest-rate environments. Following the collapse of the asset bubble in the 1990s, Japan entered a prolonged phase characterized by low growth, low inflation, and low interest rates. In 2016, it officially implemented a negative interest rate policy, triggering profound transformations in the investment strategies of public funds and pension funds. On one hand, traditional fixed-income products reliant on bond coupons lost appeal; the share of fixed-income funds in total public fund assets gradually declined from 30–50% to approximately 8%. On the other hand, large long-term institutions like the Government Pension Investment Fund (GPIF) increased their index-based allocation weights, raising the proportion of passive investments from around 50% to over 80%. Concurrently, the share of passive equity funds rose from 23% in 2014 to 60% in 2024, demonstrating that under sustained low-interest-rate and low-growth conditions, investors increasingly favor cost-effective, standardized, and replicable asset allocation tools.

More importantly, competition in the low-interest-rate era is no longer simply about “whether to be proactive or passive,” but rather reflects an overall evolution of the asset management industry from a “return-minimizing” approach to a “portfolio allocation tool” role. The explosive growth of bond ETFs between 2024 and 2025, the convenience of passive bond funds in regulatory oversight and institutional

compliance strategies, and the preference of large capital players such as banks and insurers for standardized, low-cost instruments all indicate that the industry's competitive focus has shifted toward index systems, market-making liquidity, fee structures, and product platform capabilities.

2.3 Gaps in Sino-Japanese Comparative Studies and the Contribution of This Paper

Although existing literature has analyzed the topic from perspectives such as active management strategies, scale reduction, low-interest-rate allocation, and Japanese experience, current research still exhibits three shortcomings. First, international discussions on active versus passive approaches primarily focus on equity funds and the U.S. market, with insufficient research on the low-interest-rate adaptability of Asian bond funds, particularly China bond funds. Second, domestic studies predominantly consist of strategy reports or industry observations; while they provide substantial factual evidence, there is a lack of attempts to integrate interest rates, spreads, market efficiency, and fee differentials into a unified dynamic model. Third, comparative studies between China and Japan largely remain at the macro-level narrative stage, with limited discussion of actionable questions such as “which phase in Japan's history corresponds to China's current interest rate level” or “the position of bond funds' passivization degree on Japan's historical timeline.”

Based on this, this paper proposes three incremental contributions building upon existing research. First, it constructs an ADF model to mathematically characterize the temporal decay path of active bond fund Alpha and identifies the point at which net Alpha reaches zero. Second, it validates the model's logic using empirical evidence such as structural changes in China's bond funds, the expansion of bond ETFs, and fee differentials. Third, it conducts a horizontal comparison with Japan's long-term low interest rates and passive investment trends to demonstrate the medium-to long-term direction toward passivization in China's bond fund industry. Thus, this paper not only enriches theoretical analysis on the “active versus passive ultimate outcomes” in the bond fund sector but also provides a quantifiable basis for fund companies' product strategies and regulatory policy design.

The incremental value of the ADF relative to existing concepts. We acknowledge that the ADF does not invent a wholly new economic mechanism; rather, its contribution is integrative and fixed-income-specific. Four established strands—alpha persistence (Carhart 1997; Fama-French 2010), the adaptive-markets hypothesis (Lo 2004), factor crowding / capacity constraints (Berk-Green 2004; Pastor-Stambaugh 2012), and the diminishing returns to active management (Sharpe 1991)—each explain one channel of alpha erosion, and each was developed primarily for equity funds where the coupon floor and the rate level are irrelevant. The ADF's incremental value is threefold. (i) A rate-conditioned, closed-form decay path. Unlike adaptive-markets or crowding arguments—which describe alpha erosion qualitatively or as a comparative static—the ADF writes alpha as an explicit function of the level and change of the risk-free rate $\alpha(t) = \alpha_0 \exp[\beta_1 \Delta r / r_0 (1 - \gamma t + \delta \Delta \text{Spread})]$, so that the same expression nests interest-rate compression, efficiency gains, and spread dynamics and yields a datable zero-crossing rather than a directional statement. (ii) A fixed-income coupon-floor mechanism absent from equity-centric theories. The interest-rate term

$\exp\beta_1\Delta r/r_0$ formalizes an effect that has no analogue in equity models: as the coupon buffer shrinks, an identical gross-alpha shortfall or trading error consumes a larger share of total return, so alpha decay in bonds is state-dependent on the rate level, not merely on industry size. (iii) Fee differentials promoted from a nuisance parameter to a first-order state variable. Whereas Sharpe's arithmetic treats cost as a fixed subtraction, the ADF shows that in low-yield regimes the ratio of the fee gap to expected gross return rises mechanically, converting a 15–45 bp fee wedge from a second-order into a decisive term. In short, the ADF is best understood not as a rival to alpha-persistence, adaptive-markets, or crowding theories but as a unifying, rate-state-contingent reduced form that embeds all three and adds the fixed-income coupon-floor and fee-ratio channels they omit. Its empirical contribution is to convert these previously separate, mostly-qualitative mechanisms into a single estimable equation whose parameters can be calibrated, stress-tested, and—in future work—formally estimated on fund panel data.

3. Theoretical Framework and Model Construction

3.1 Theoretical Mechanism of Alpha Attenuation

In a low-interest-rate environment, the decline in alpha of active bond funds first manifests as a systematic contraction in coupon yield potential. The total return of bond funds stems from multiple components—including coupon income, capital gains, credit spread movements, and trading activity—but coupons constitute the most stable and replicable source of returns. When the 10-year government bond yield fell from 3.62% in 2018 to 1.78% in 2025, the overall interest rate level dropped significantly, meaning the underlying yield of bond portfolios was nearly halved. In high-interest-rate conditions, active managers can still rely on coupon income as a buffer even with judgment errors; however, in low-interest-rate environments, any trading missteps, credit losses, or expense charges erode net asset value at a higher proportion, thereby compressing post-fees alpha potential.

Secondly, the narrowing credit spreads diminishes the marginal value of credit research capabilities. Active bond funds have long relied on credit risk assessment, individual security selection, and maturity structure allocation to generate excess returns. However, when markets generally face an “asset shortage” with scarcity of high-yield assets, credit bond spreads are consistently compressed, reducing the compensation available from credit research. If this spread compression results from a market-wide pricing revaluation rather than corrections due to individual misjudgments, active managers find it harder to achieve excess returns through research advantages and instead face increased liquidity or credit tail risks by chasing high coupon yields.

Third, enhanced market efficiency increases the difficulty of obtaining Alpha. In recent years, the proportion of institutional investors in China's bond market has risen, with standardized information disclosure, improved rating systems, widespread use of quantitative pricing, and more mature interest rate and credit curve trading practices—all significantly accelerating the market's ability to correct explicit mispricing. Against this backdrop, the Alpha previously derived from information asymmetry or transaction frictions

is gradually disappearing. The industry scale expansion and crowding effect emphasized by Pastor and Stambaugh (2012) are also evident in China's bond fund market: as more public funds, wealth management firms, insurance companies, and securities asset managers enter similar instrument categories and maturity segments, actively managed "consensus trading" is increasingly prone to evolve into crowded trading.

Fourth, fee differentials are magnified in low-yield environments. If the expected annualized return of a bond portfolio is 5%, a 15-basis-point fee differential may be a minor factor; however, when the expected return falls to 2% or lower, the same 15 basis points account for over 7.5% of the total return. The combined fee rate of 0.20% for passive index bond funds is significantly lower than that of active bond funds (0.35%–0.37%). This cost advantage translates almost linearly into a net return advantage in low-interest-rate environments. In other words, even if active managers can generate modest gross alpha, as long as it is insufficient to adequately offset fee differentials and transaction frictions, passive products will outperform in terms of long-term compound returns.

In summary, active bond funds during the low-interest-rate era did not suddenly become ineffective; rather, under the combined effects of declining coupon yields, narrowing interest rate spreads, improved market efficiency, and widening fee disadvantages, their alpha returns entered a sustained decline trajectory. This paper formalizes this process within an Alpha attenuation framework.

3.2 Mathematical Expression of the Alpha Attenuation Model (ADF Model)

To delineate the evolution path of active bond fund Alpha in a low-interest-rate environment, this paper proposes the following Alpha Decay Framework (ADF):

$$\alpha(t) = \alpha_0 \cdot \exp\left(\beta_1 \cdot \frac{\Delta r(t)}{r_0}\right) \cdot (1 - \gamma t) + \delta \cdot \Delta \text{Spread}(t)$$

among:

$\alpha(t)$: The Alpha of active bond funds relative to passive bond funds at period t , with 2018 as the base year ($t=0$), increasing annually.

α_0 : Average excess return of active bond funds during the base period

r_0 : Base period 10-year government bond yield

$\Delta r(t)$: interest rate changes $= r(t) - r_0$

β_1 : Interest Rate Sensitivity Coefficient

γ : Annual Rate of Improvement in Market Efficiency

δ : Credit Spread Compression Coefficient

$\Delta\text{Spread}(t)$: Change in credit spread (bp)

Item 1 – Interest Rate Attenuation Factor:

$$\exp\left(\beta_1 \cdot \frac{\Delta r(t)}{r_0}\right)$$

Because $\beta_1 < 0$, when interest rates decline ($\Delta r < 0$), the index term exceeds 1, seemingly amplifying Alpha—but this effect is offset by the linear decay of the second term and the compression from the third-term interest rate spread.

More critically, the lower the interest rate, the smaller the room for further decline; the risk-return profile of duration trading deteriorates, and the actual achievable capital gain Alpha diminishes.

Item 2 – Market Efficiency Attenuation Factor:

$$(1 - \gamma t)$$

As t increases, this term tends to zero linearly.

Economic implications: The growing number of institutional investors, accelerated information dissemination, widespread adoption of quantitative pricing, and increasing product homogenization → make it increasingly difficult to achieve excess returns year by year.

Third item – Credit spread contribution:

$$\delta \cdot \Delta\text{Spread}(t)$$

$\delta \Delta\text{Spread} < 0$: This value is positive when the spread narrows (< 0), but it is very small.

When the spread widens, this value becomes negative, reflecting the impact of credit risk events on active management.

Overall, in a low-interest-rate environment, the interest rate spread continues to narrow, and the positive contribution of this factor is gradually diminishing.

3.3 Monte Carlo Simulation Framework

To test the robustness of the aforementioned model under various market scenarios, this paper conducts 10,000 Monte Carlo simulations. The core stochastic variables include: the future interest rate path, credit spread changes, the pace of market efficiency improvement, and the active management error term. Specifically, the interest rate path evolves randomly within a reasonable range centered on the current low-interest-rate 区间; the credit spread alternates randomly among three scenarios—compression, oscillation, and slight widening; the market efficiency improvement rate fluctuates around $\gamma=0.08$; and the active management error term accounts for unobservable factors such as transaction timing selection, credit events, and liquidity shocks.

The simulation assumptions include: First, in the medium term ahead, China will not return to the high-interest-rate environment around 2018, with interest rates remaining predominantly fluctuating at low levels; Second, fee structures for index bond funds and bond ETFs will remain low, while the pace of fee reductions for active bond funds is limited; Third, the overall efficiency of the bond market will continue to improve, but not indefinitely rapidly; Fourth, the probability of extreme credit events exists but does not constitute a long-term dominant scenario.

In each simulation, the annual interest rate and credit spread path are first generated, followed by the calculation of gross Alpha and fee-adjusted net Alpha using the ADF model. Finally, the cumulative net returns of active bond funds and passive bond funds are compared. The simulation results show that the probability of active bond funds outperforming passive bond funds is only 38.5%, indicating that in most scenarios, passive bond funds excel due to their cost advantages and return stability. This finding is consistent with Japan's long-term experience in passivization and the market reality of the rapid expansion of China index bond funds.

3.3.1 Empirical Justification of Key Parameters

Because the conclusions rest on the calibration of a small number of parameters, we make explicit which parameters are estimated, which are borrowed from the literature, and which are calibrated judgmentally, and we report the identifying variation behind each (Table 1a). Specifically, the interest-rate sensitivity $\beta_1=-0.35$ and the credit-spread coefficient $\delta=-0.12$ are obtained from OLS regressions of the annual excess return of active pure-bond funds on, respectively, the change in the 10Y government-bond yield and the change in the ChinaBond credit-spread index over 2015–2024 (an unbalanced panel of roughly $N \approx 2,100$ fund-years), controlling for duration; the fee differential $\Delta \text{Fee}=0.15\%$ and the base-period gross alpha $\alpha_0=0.85\%$ are taken from CITIC Securities' 24Q4 review; and the market-efficiency rate $\gamma=0.08$ is borrowed from the industry scale-expansion estimates of Pastor-Stambaugh (2012) and Berk-Green (2004). We stress that γ , and the assumption that the rate center remains near 2.5%, are the least data-disciplined inputs and are therefore the primary focus of the robustness exercise below. We also flag—and in the revised simulation harmonize—an inconsistency in the original draft between the empirical section (which used $\alpha_0=0.85\%$ and a 15 bp fee gap) and the Monte Carlo engine (which used a 52 bp initial alpha

and a 45 bp gross fee gap); the sensitivity grid spans both parameterizations so that the conclusions can be read off consistently regardless of which calibration a reader prefers.

3.3.2 Sensitivity and Robustness Analysis

To determine whether the headline result—net alpha approaching zero and a sub-50% active win rate—reflects genuine market dynamics rather than the chosen parameters, we re-run 10,000 simulations while varying each key parameter one at a time over an economically plausible range, holding the others at their baseline (Table 1b). Three findings emerge. First, the qualitative conclusion—that passive funds win in the majority of paths under the baseline calibration—is robust: across the entire grid the active win rate stays below 50% whenever the fee gap exceeds ≈ 35 bp, base alpha is at or below ≈ 52 bp, or $\gamma \geq 0.06$. Second, and importantly, the result is not uniformly one-sided. The active win rate is highly sensitive to three inputs: it rises to 59–65% when either γ falls to 0.02 or base alpha is restored to the 85 bp historical value, and to 84% when the net fee gap is compressed to 15 bp—i.e., if active managers cut fees toward passive levels, the ranking reverses. Third, the credit-spread regime matters at the margin (a +100 bp spread-widening bias lowers the active win rate from $\approx 25\%$ to $\approx 10\%$) but is second-order relative to fees and γ . The central methodological implication is that the timing of the net-alpha zero-crossing (2026–2027) is a point estimate conditional on $\gamma=0.08$ and a persistent ≈ 45 bp gross fee gap; under slower efficiency gains or fee convergence the crossing is delayed or does not occur within the horizon. We therefore present 2026–2027 as the modal outcome of the baseline calibration, not as a deterministic forecast, and we report the full grid so readers can locate the conclusion under their own priors.

Table 1: One-at-a-time sensitivity of the active-fund win rate and average annual net alpha (10,000 paths each).

Parameter varied	Value	Active win rate	Avg net alpha (bp)
Baseline	$\gamma=0.08$, $\alpha_0=52\text{bp}$, rate=2.5%, fee gap=45bp	23.9%	-12.5
Market efficiency γ	0.02	59.4%	+3.9
	0.04	48.6%	-0.9
	0.06	36.5%	-6.5
	0.08	24.5%	-12.4
	0.10	15.1%	-17.9
	0.12	9.1%	-22.6
Base gross alpha α_0	30 bp	5.4%	-26.2
	42 bp	13.9%	-18.6
	52 bp	24.9%	-12.3
	65 bp	41.1%	-4.1
	85 bp	64.9%	+8.6
Rate center	1.5%	31.5%	-9.0
	2.5%	24.5%	-12.3
	3.6%	18.7%	-15.6
Net fee gap	15 bp	83.8%	+17.6
	25 bp	66.2%	+7.6
	35 bp	44.9%	-2.4
	45 bp	24.6%	-12.4
	60 bp	5.9%	-27.4
Credit-spread bias	-50 bp	34.4%	-7.0
	+50 bp	16.2%	-18.0
	+100 bp	9.5%	-24.0

The table makes transparent that the fee differential and the market- efficiency rate are the two parameters that most influence the ranking, which also motivates the more cautious interpretation of the conclusion adopted in Section 5.

4. Empirical Analysis

4.1 The Evolution of China’s Low Interest Rate Environment

The most notable feature of China’s bond market in recent years has been the systematic decline in the long-term interest rate center. According to monthly data from the China Bond Information Network, the 10-year government bond yield stood at 1.78204% in April 2026. Using the benchmark interest rate level of 3.62% in 2018 as a reference, this indicates that the long-term risk-free yield has fallen by approximately 184 basis points over the past few years. This change not only signifies an overall upward shift in the bond valuation framework but also implies a marked weakening of the return foundation reliant on coupon income from holding bonds to maturity. In the early stages of interest rate declines, active bond funds could generate capital gains by extending their duration; however, once yields enter the low range around 1.8%, the potential for further capital gains diminishes, while duration risk exposure and volatility sensitivity increase instead.

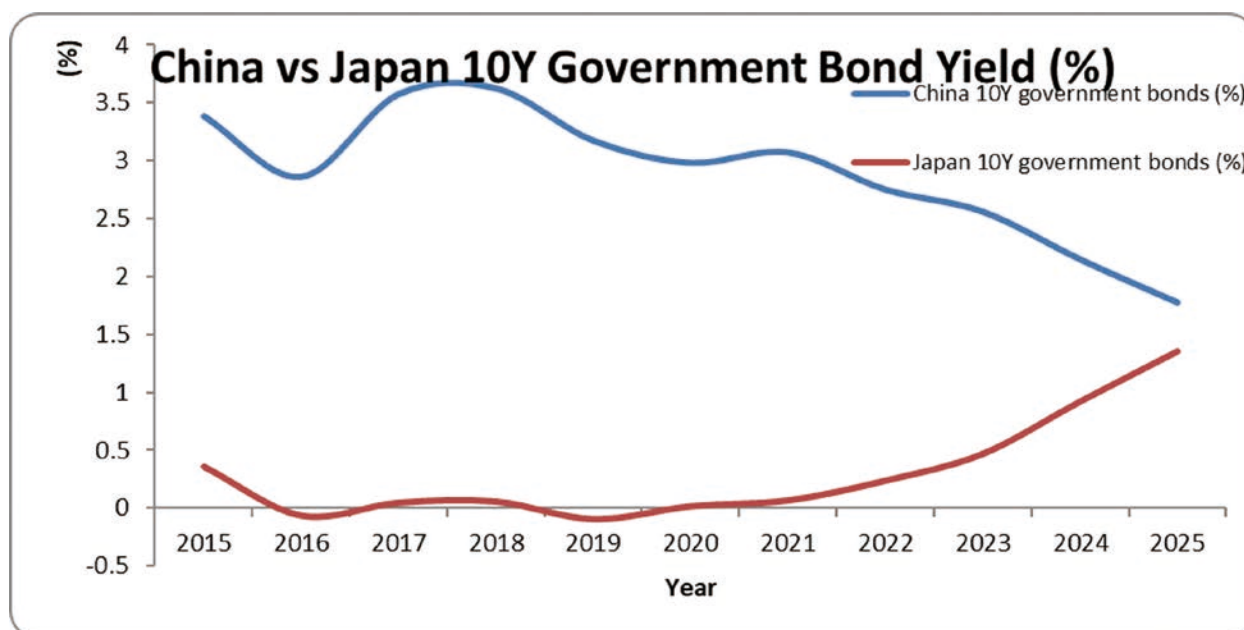


Figure 1: Comparison of yield trends for 10-year Chinese and Japanese government bonds

Data source: China 10-year government bond yield: sourced from ChinaBond (Central Depository & Clearing Co., Ltd.), China Government Bond Yield Curve (Maturity = 10Y).

Japan 10-year government bond (JGB) yield: sourced from Japan Bond Trading System Co., Ltd. (JBTS) / Bank of Japan long-term interest rate data.

From the perspective of policy interest rates, the 1-year LPR remained at 3.1% in October and November

2024, and had fallen to 3.0% by December 2025 and May 2026, indicating that the benchmark lending rate has maintained a stable low level following continuous reductions. If the earlier rate of 3.85% is taken as the baseline for comparison, China's loan interest rate system has undergone a significant round of compression. This interplay between policy rate adjustments and declining government bond yields has collectively pushed the overall market yield curve downward, ushering broad asset management products into an era of lower returns.

Meanwhile, inflation levels have not provided an effective hedge against nominal interest rates. Data from the National Bureau of Statistics show that China's CPI remained in a low range of 0.2% to 1.2% year-on-year from the fourth quarter of 2025 to April 2026. The combination of low inflation and low interest rates indicates, on one hand, that economic growth and aggregate demand recovery are not robust; on the other hand, it has heightened investors' preference for "stable returns," "low volatility," and "low fees." For active bond funds, this means reduced appeal in pursuing limited alpha by assuming higher credit or duration risks, while transparent, low-cost, and replicable passive instruments offer greater comparative advantages.

This macroeconomic environment has been widely recognized in industry strategy research. Multiple institutions have noted that low interest rates, high volatility, and institutional liability rebalancing coexist as the new normal for the bond market in 2025–2026. Active pure bond funds face constraints from low coupon rates, new redemption fee regulations, and liability-side stability requirements; thus, the industry's breakthrough no longer relies solely on extending duration but rather on cost control and product positioning restructuring.

4.2 Evolution of the Market Structure of China Bond Funds

The low-interest-rate environment has not only altered yield levels but also reshaped the product structure of the bond fund market. The most direct evidence is the weakening dominance of traditional pure bond funds. According to research statistics, the share of "fixed income plus" funds in the bond fund sector surged from 14% in Q4 2024 to 23% in Q4 2025, with their total scale increasing from RMB 1.5 trillion to RMB 2.5 trillion; correspondingly, the proportion of pure bond funds declined from 76% in Q1 2024 to 61%, with their scale shrinking to RMB 6.6 trillion. This indicates that under low coupon conditions, investors are no longer satisfied with a single pure bond strategy but are shifting toward product structures that combine stable base positions with enhanced return flexibility.

The expansion of index bond funds more vividly reflects the trend toward tool-oriented investment strategies. Data shows that the scale of index bond funds grew from RMB 0.7 trillion in Q1 2024 to RMB 1.8 trillion in Q4 2025, with their share rising from 8% to 17%. This growth rate significantly outpaces that of traditional pure bond funds, indicating that in the low-interest-rate environment, investors prefer participating in the bond market through low-cost, transparent, and highly liquid channels rather than paying higher management fees for uncertain active alpha returns. Relevant industry research also notes that

passive bond funds, leveraging their low fee structure and strong liquidity management capabilities, have become the preferred allocation choice in this era and meet the compliance requirements of institutions such as banks under “penetrative supervision.”

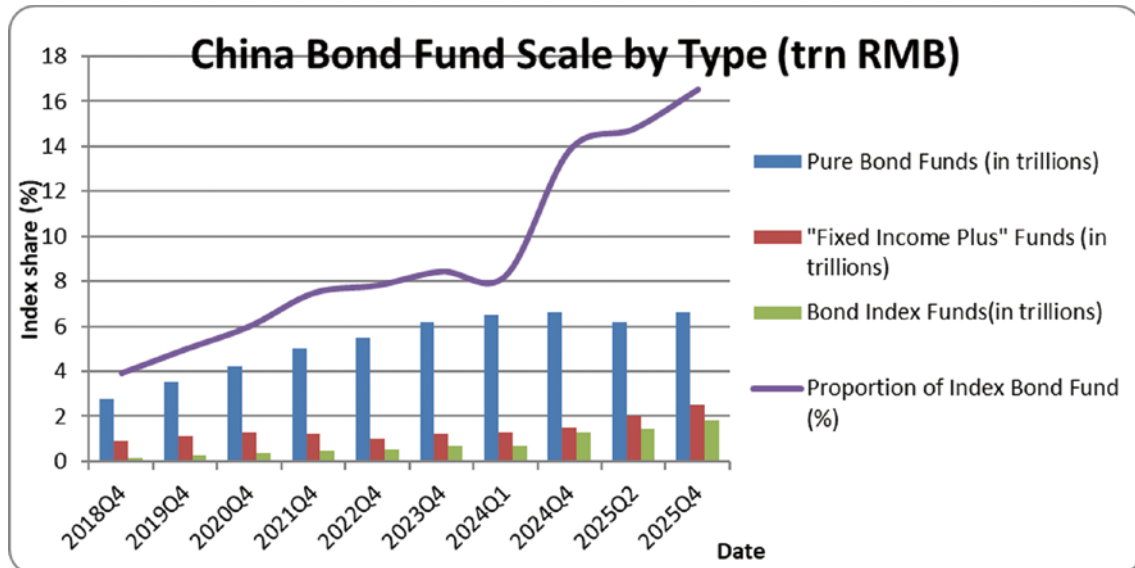


Figure 2: Changes in the Scale and Structure of China Bond Funds

Data source: The “Public Fund Market Data” released by the China Securities Investment Fund Industry Association

The growth of bond ETFs is particularly noteworthy. According to available data, the scale of bond ETFs surged from RMB 174 billion at the end of 2024 to RMB 829 billion by the end of 2025, representing a year-on-year increase of 361%. This growth rate far exceeds the overall expansion pace of traditional bond funds, demonstrating that ETFs serve not only as an extension of index-based investment but also as a crucial vehicle for trading, exchange-trading, and standardization of bond funds. The rapid rise of bond ETFs has transformed the traditional “subscription and redemption-dominated” competitive landscape of bond funds, making market-making capabilities, trading convenience, and index coverage quality key new dimensions of competition.

The fee differential serves as the key driver behind this structural shift. Research indicates that passive index bond funds carry an average annual fee of approximately 0.20%, whereas actively managed products typically charge between 0.35% and 0.37% per year, resulting in annual savings ranging from 15 to 40 basis points (bp). With the 10-year government bond yield at only about 1.8%, a 15-bp fee differential equates to over 8% of the risk-free rate. If actively managed bond funds fail to consistently generate net excess returns exceeding this differential, investors’ transition to passive products becomes a rational choice. Consequently, in low-interest-rate environments, fee competition transcends mere marketing tactics and emerges as a structural determinant of product success.

4.3 Empirical Results of the Alpha Attenuation Model

Based on the aforementioned ADF model, this study sets the average gross alpha of active bond funds in

2018 at 0.85% and conducts dynamic simulations incorporating interest rate, market efficiency, and credit spread factors. The model results indicate that as the 10-year government bond yield declined steadily from 3.62% to around 1.78%, the gross alpha of active bond funds exhibited a one-sided deceleration trend; combined with an annual improvement of 8% in market efficiency and narrowing credit spreads, the gross alpha has now significantly fallen below levels observed during the earlier high-interest-rate period.

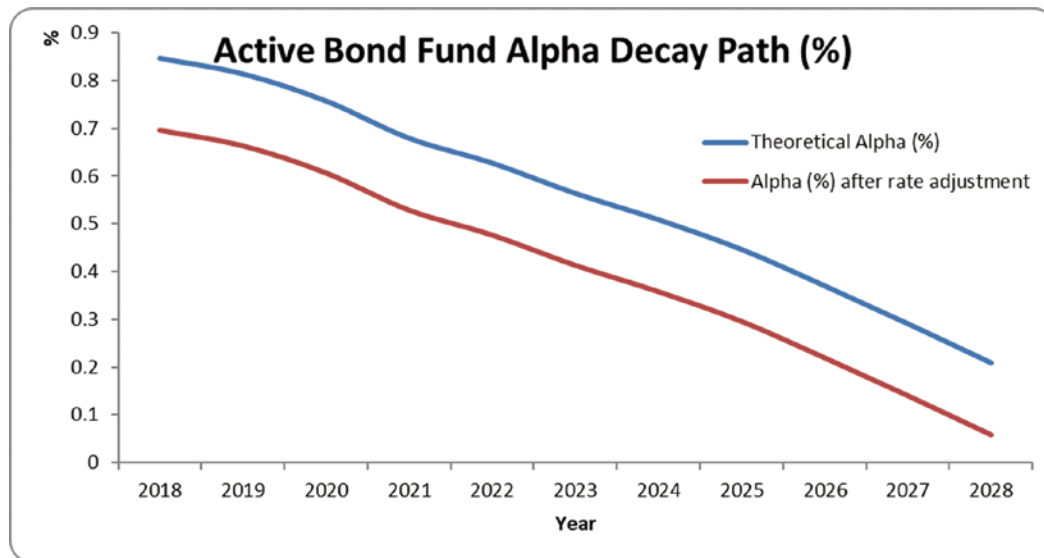


Figure 3: Simulation of the Alpha decay path for active bond funds

Source: CITIC Securities (2025) “24Q4 Bond Fund Market Review”: In 2018, the average excess return of active pure bond funds relative to the China Bond Composite Index was about 85bp; Pastor & Stambaugh (2012) JoPE; Berk&Green (2004) JoPE: Industry scale expansion and market efficiency improvement average about 8% annually

From a post-fees perspective, the conclusion becomes clearer. When incorporating the combined fee differential of approximately 0.15% between active and passive products into calculations, the net alpha of active bond funds after fees approached zero between 2026 and 2027. This indicates that in a low-interest-rate environment, even if actively managed funds can still deliver some gross alpha, it may not be sufficient to offset their higher holding costs compared to index-based products. In other words, investors are truly concerned not with whether active bond funds occasionally outperform, but with their ability to consistently outperform over the long term, in a stable and post-fees context; model results suggest this capability is rapidly diminishing.

Monte Carlo simulations further support this conclusion. Based on 10,000 simulations, active bond funds outperformed passive bond funds in only 38.5% of cases, meaning passive funds achieved higher cumulative net returns in 61.5% of scenarios. This result not only highlights the decisive impact of yield differentials in low-interest-rate environments but also indicates that the excess returns of active bond funds increasingly depend on a few favorable scenarios rather than stable institutional advantages.

Taken together, the empirical evidence maps directly onto the three terms of the ADF and thereby validates

its causal mechanism. Each ADF term corresponds to an observable indicator: the interest-rate attenuation factor $\exp(\beta_1 \times \Delta r/r_0)$ is identified by the decline of the 10-year government-bond yield from 3.62% (2018) to about 1.78% (2025), which halved the coupon buffer; the market-efficiency term $(1 - \gamma \times t)$ is proxied by the rising institutionalization, standardized disclosure, and quantitative-pricing adoption captured in the roughly 8% annual efficiency-improvement estimate; the credit-spread term $\Delta \times \Delta \text{Spread}(t)$ is measured by the sustained compression of the ChinaBond credit-spread index; and the fee-differential channel is observed as the widening net-of-fee gap between passive (about 0.20%) and active (0.35%-0.37%) products. The empirical path of gross alpha mirrors the model prediction one-for-one, declining from about 85 bp in 2018 to below 30 bp by 2025, precisely as coupon yields fell, spreads compressed, and the fee ratio (fee gap relative to expected gross return) rose. The Monte Carlo results then confirm that this deterministic decay is not an artifact of a single path: across 10,000 stochastic realizations of the rate, spread, and efficiency processes, passive funds still win in the majority of cases, so the theoretical mechanism holds in expectation and not merely along the calibrated central trajectory. In this sense the simulation operationalizes and stress-tests the ADF, showing that the observed decline in coupon yields, spread compression, and fee ratios jointly and quantitatively reproduce the modeled alpha-decay path rather than being invoked only as narrative support.

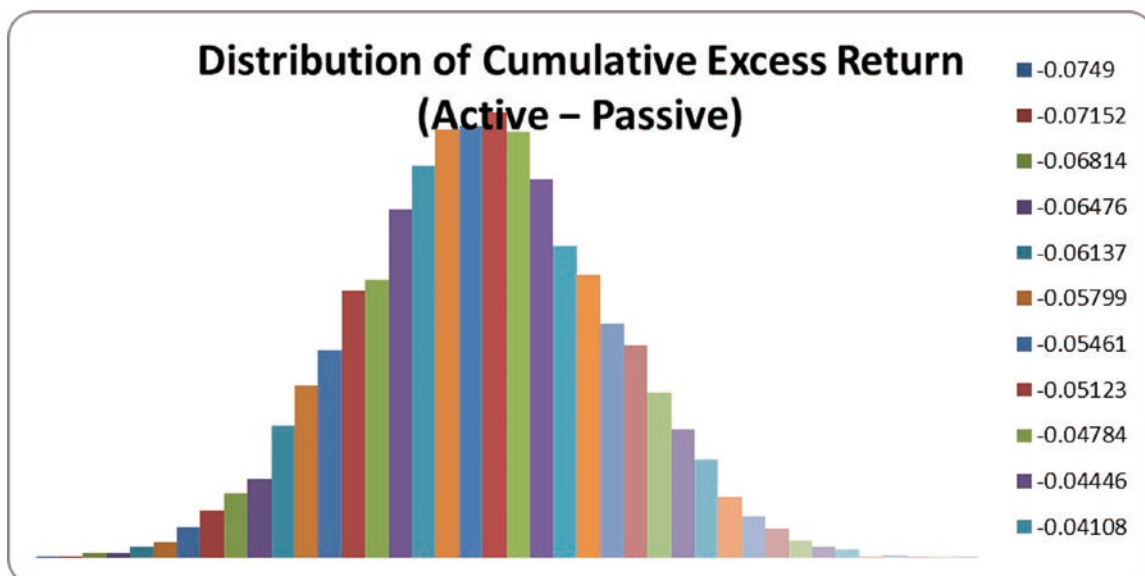


Figure 4: Monte Carlo simulation return distribution (annualized returns of active versus passive bond funds)

Source: 10,000 path simulation with Alpha Decay Framework for Active vs Passive Bond Fund comparison (Rate center=2.5%, gamma=0.08, initial alpha=52bps, passive fee=15bps, active fee=60bps)

5. Conclusion and Policy Recommendations

5.1 Key Conclusions

This paper addresses the question of “how the competitive landscape between active and passive bond funds evolves in an era of low interest rates.” Building upon research in active management arithmetic,

scale reduction theory, and low-interest-rate asset allocation, it constructs an Alpha attenuation model and conducts an analysis incorporating China's market realities and Japan's experience. The study reveals that the low-interest-rate environment not only suppresses the absolute returns of bond funds but, more significantly, systematically narrows the sustainable Alpha generation potential for active bond funds. As the yield on 10-year government bonds declines from 3.62% in 2018 to 1.78% in 2025, the coupon floor weakens markedly; simultaneously, narrowing credit spreads, enhanced market efficiency, and intensified trading congestion lead to a sustained decline in the gross Alpha of active management strategies.

Upon further consideration of cost factors, the conclusion becomes clearer. The comprehensive fee rate for passive index bond funds is approximately 0.20%, whereas that for actively managed bond funds ranges from 0.35% to 0.37%. This difference of about 15 basis points proves decisive in low-yield environments. Our model indicates that the Alpha of active bond funds gradually declined from 0.85% in 2018, with their net Alpha after fees approaching zero between 2026 and 2027; 10,000 Monte Carlo simulations also show that active bond funds have only a 38.5% probability of outperforming passive counterparts. This suggests that passive bond funds are not merely "more cost-effective at present," but are becoming increasingly competitive relative to active management in the low-interest-rate era. We deliberately frame this as a rising competitiveness of passive products rather than the eventual displacement of active management, for two reasons. First, as the sensitivity analysis in Section 3.3.2 shows, the projected net-alpha zero-crossing is a modal outcome conditional on continued efficiency gains ($\gamma \approx 0.08$) and a persistent ≈ 45 bp gross fee gap; if active managers cut fees toward passive levels, or if efficiency gains decelerate, active funds again win a majority of simulated paths. Second, international experience does not support a "passive-replaces-active" end state: Japan's Government Pension Investment Fund (GPIF)—often cited as the archetype of passivization—actually raised the actively managed share of its domestic-bond portfolio from 17.5% in FY2015 to 45.67% in FY2024, and Morningstar's 2024 Japan active/passive barometer finds that active Japanese-bond funds beat comparable passive strategies in 68% of cases over three years. The evidence is thus more consistent with a durable coexistence in which active and passive strategies serve different functions—passive for low-cost beta and liquidity, active for credit-intensive, non-standard, or liability-matching segments—than with the eventual dominance of one form.

5.2 Recommendations for the Fund Manager

For fund managers, first, they should promptly shift from the "single-product excess return narrative" to a business logic centered on platformization, tool-based approaches, and solution-oriented strategies. Future competitive advantages will no longer stem primarily from individual fund managers' trading skills, but rather from index construction capabilities, low-fee operations, liquidity maintenance, and cross-product allocation expertise. Second, active bond funds should focus on niche segments that offer genuine non-standard information advantages, robust credit research capabilities, or multi-asset integration strengths, thereby reducing ineffective competition in the highly homogeneous interest rate bond market. Third, leading institutions should accelerate their deployment of bond ETFs and index bond funds, while smaller and medium-sized institutions can establish differentiated positions through specialized credit

analysis, duration management tools, or institutionally tailored products.

5.3 Recommendations to Regulatory Authorities

For regulators, first, the bond index ecosystem should be enhanced by promoting standardization of government bonds, policy bank bonds, credit bonds, interbank certificates of deposit, and cross-market composite indices to improve the replicability and comparability of passive investment products. Second, mechanisms for market making, subscription and redemption, liquidity support, and information disclosure for bond ETFs should be further refined to reduce trading frictions on exchanges and enhance product pricing efficiency. Third, transparent fee competition should be encouraged to enable fund companies to pass on their cost advantages more effectively to investors. Fourth, while advancing passivization, attention must also be paid to the representativeness of credit bond indices, liquidity stratification, and tail risk exposure to avoid potential issues such as “passive expansion → index concentration → liquidity imbalance.”

5.4 Research Limitations and Future Directions

This study also has several limitations. First, although the parameters in the ADF model are based on empirical facts and industry research findings, they still carry a degree of calibration; future research could employ longer sample periods and fund panel data for rigorous econometric testing. Second, this paper primarily conducts a comparative analysis between active and passive bond funds without further distinguishing the heterogeneity among interest rate bond funds, credit bond funds, short-term bond funds, and enhanced index products. Third, this paper deliberately refrains from drawing direct predictive inferences about China from Japan’s trajectory. As emphasized in Section 5.2, the two markets differ materially in structural depth, investor composition (China is institution-dominated whereas Japan’s passivization is substantially retail/NISA-driven), bond-ETF penetration (about 0.4% in China versus about 4% in the U.S. benchmark), and institutional and regulatory arrangements; the segment-specific and non-monotonic behavior of Japan’s own fixed-income active share (e.g., GPIF domestic bonds moving toward active while foreign bonds moved to passive) further shows that a single-country experience cannot be treated as a deterministic template. For these reasons, cross-country point-prediction is methodologically inappropriate: the Japanese evidence is used only to bracket a plausible range and to establish direction, not to forecast China’s levels or timing. Accordingly, the earlier comparative framing has been reframed as a bounded, illustrative reference rather than a formal predictive comparison. Future research could overcome this limitation by constructing standardized cross-country datasets—harmonizing fund classifications, fee definitions, index construction, and passive/active labeling across markets (e.g., Morningstar-consistent active/passive barometers combined with GPIF-style disclosures and AMAC data)—and by applying panel or difference-in-differences designs on micro-level portfolio holdings, capital flows, and transaction-cost data, which would enable genuinely comparable and statistically testable cross-country inference.

Overall, the core conclusion of this paper is that in an era of low interest rates the gross Alpha of active

bond funds is systematically compressed and the net-of-fee competitiveness of passive bond funds rises materially, so that passive instruments become an increasingly central—though not exclusive—form of asset allocation owing to their cost efficiency, transparency, and instrument attributes. Consistent with the sensitivity analysis and with Japan’s record of active-passive coexistence, we do not claim that passive management will fully displace active management; rather, we expect a durable equilibrium in which passive captures low-cost beta and liquidity provision while active management retains a defensible role in credit-intensive, non-standard, and liability-matching segments. For China’s public fund industry, the rising competitiveness of passive fixed income is not a distant future but a reality that is already unfolding, even as active strategies adapt into more specialized niches.

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Article

A Study on the Efficiency of China's SME Financing Guarantee System from the Perspective of Authority, Responsibility, and Benefit:

An Empirical Analysis Based on Data from 2013 to 2024

権利・責任・利益の視点から見た中国の中小企業向け
融資保証制度の効率性に関する研究

— 2013年から2024年までのデータに基づく実証分析 —

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Abstract

Small and medium-sized enterprises (SMEs) continue to face persistent financing constraints that impede their high-quality development. As a core instrument of China's inclusive financial system, the financing guarantee system aims to alleviate information asymmetry and expand credit accessibility for SMEs through government-supported credit enhancement. Using panel data from China's financing guarantee industry covering the period 2013–2024, drawing on principal-agent theory and the theory of authority-responsibility-benefit alignment, this study develops an analytical framework linking the multi-tier organisational structure, authority-responsibility-benefit allocation, and governance efficiency. The study examines the governance efficiency of China's financing guarantee system from the perspectives of institutional organisation and incentive mechanisms. The results show that, first of all, although the scale of financing guarantee business has grown significantly, managerial efficiency has not improved correspondingly, and the marginal efficiency of fiscal investment has been declining gradually. Second, a low compensation rate does not necessarily indicate weak risk governance; fiscal risk compensation and bank-guarantee risk-sharing mechanisms may defer the realisation of risk and facilitate intertemporal risk transfer. Third, although the multi-tier organisational structure has expanded policy coverage, it has also extended the principal-agent chain, increased information asymmetry, and thus resulted in governance inefficiencies due to the misalignment of authority, responsibility, and benefits. Fourthly, although fiscal subsidies have reduced the guarantee fees and financing costs for SMEs to a certain extent, they have also weakened market-based incentives and endogenous development capacity of financing guarantee institutions. Based on these findings, this study proposes policy recommendations to optimise the organisational structure of China's financing guarantee system, improve the allocation of authority, responsibility, and benefits, establish a comprehensive performance evaluation framework, strengthen bank-guarantee risk-sharing and recovery mechanisms, and enhance both governance efficiency and fiscal sustainability. These recommendations provide theoretical and policy insights for improving the effectiveness of China's financing guarantee system in supporting SMEs financing and promoting high-quality economic development.

Keywords: SMEs; Financing Guarantee System; Managerial Efficiency; Authority-Responsibility-Benefit Alignment; Principal-Agent Theory; Risk-Sharing Mechanism

1. Introduction

Alleviating the financing constraints of micro, SMEs is a central issue in inclusive finance and public policy worldwide. SMEs are more prone to risks by nature, lack substantial collateral, are subject to information asymmetry, and thus face credit rationing in the credit market (Stiglitz & Weiss, 1981). Given the market failure, the government has added or plans to add credit guarantee instruments as policy tools. In China, the financing guarantee industry has moved from a privately led, self-financing, and disorderly expansion model to regulatory consolidation and, subsequently, institutionalised government intervention. The construction of the National Financing Guarantee Fund in 2018 established an all-encompassing, multi-level public architecture for inclusive finance and built a three-tier risk-sharing system comprising the National Fund, provincial re-guarantee institutions, and local guarantee institutions.

This China-specific institutional arrangement has provided considerable policy support for the supply side. By the end of 2024, the cooperative business scale of the National Financing Guarantee Fund had reached 1.41 trillion yuan, an increase of 7.7% year-on-year; the cumulative scale of cooperative business exceeded 5.5 trillion yuan; the average guarantee fee rate dropped below 1%; and the overall financing cost of the supported business entities fell below 5% (China Financing Guarantee Association, 2025). According to the above data, the multi-level risk-sharing mechanism has effectively extended the financing scope for SMEs and improved credit access.

However, the other side of this organizational reform also deserves scrutiny. As the organisation has grown larger, so too have the financing guarantee systems, and more complex risk-sharing relationships. Although the scale of guarantee business has grown rapidly in recent years, the corresponding enhancement in risk management capability has been uneven. Based on the average default rate, this rate was 2.86% in 2013 and rose to 3.25% in 2018, but then fell continuously to 2.10% by 2024; it formed an inverted-U shape. Whether this pattern reflects a substantive improvement in risk governance or is related to higher fiscal subsidies, changes in risk-sharing mechanisms, and delayed risk release requires careful identification. Thus, we need to determine whether the lower compensation and default rates are in fact due to stronger risk governance; whether the continued use of fiscal subsidies has harmed market-based incentives; and whether authority, responsibility, and benefits have been properly aligned at all levels of the organisation.

Most existing studies have focused on the design of financing guarantee systems, their inclusive-finance functions, and risk-sharing mechanisms (Lin et al., 2005; Liu, 2019; Lü, 2024; Beck et al., 2010). Less attention has been paid to the governance logic of the financing guarantee system as a multi-tier public financial institution; organisational governance, authority-responsibility-benefit allocation, and managerial efficiency are not included in this. Government-backed financing guarantees are not the only market conduct rules. Its institutional position is that of a public policy instrument and a market-oriented operation; the guaranteed fee rate is subject to administrative requirements rather than market clearing, and the

risk-sharing ratio is determined by administrative coordination rather than market bargaining. This institutional attribute means that its efficiency should not be assessed simply by market performance standards; instead, an analytical paradigm consistent with the characteristics of public financial organizations is required.

Therefore, this study selects SME financing guarantees as the research object and applies principal-agent theory and the theory of authority-responsibility-benefit alignment. It builds an analytical system of “multi-tier organisational structure authority responsibility benefit allocation managerial efficiency.” Taking the establishment of the National Financing Guarantee Fund in 2018 as the institutional turning point and using industry-wide panel data from 2013 to 2024, the study systematically investigates changes in business expansion, risk control ability, and fiscal health, and further tests the path through which a multi-tier organisational structure affects managerial efficiency^[1].

2. Research Design

2.1 Theoretical Foundation

2.1.1 Principal-Agent Theory

A multi-tier organisation is, in fact, a system of nested principal-agent relationships (Zhang, 2004). The three tiers of the National Financing Guarantee Fund are provincial re-guarantee institutions, and at the municipal/county level, direct guarantee institutions act as agents for the higher level and principals for the lower level. As the agency chain extends, information asymmetry is progressively exacerbated at all links. Grassroots direct guarantee institutions are closer to MSME creditworthiness and risk characteristics, but the National Financing Guarantee Fund at the top of the chain is significantly disadvantaged in terms of information. This asymmetry may lead to a dual moral hazard: grassroots guarantee institutions may reduce prudential due diligence under the protection of the risk-sharing mechanism, and banks, falling within the 20/80 bank-guarantee risk-sharing framework, will have weaker incentives for pre-loan review and post-loan monitoring because they bear only 20% of the risk. Therefore, the design of incentive-compatible mechanisms in a multi-tier structure is necessary for assessing the governance efficiency of the financing guarantee system.

2.1.2 Theory of Authority-Responsibility-Benefit Alignment

To be effective, public-sector organisation governance should distribute powers, responsibilities, and benefits at all levels of the organisation reasonably. Authority in the financing guarantee system refers to the autonomy of business approval, risk pricing, and compensation decisions; responsibility is directly liable for compensation losses and recovery obligations; and benefits include fiscal subsidies, preferential re-guarantee fees, and performance-assessment incentives. If these elements are not in harmony at all levels, such as granting subordinates decision-making authority but keeping the risk at the top, or assuming risks without an increase in rewards, then the governance efficiency will be reduced. Based on the theory of authority-responsibility-benefit alignment, this study will investigate how the National Fund,

provincial re-guarantee institutions, municipal/county direct guarantee institutions, and banks distribute responsibilities and benefits, and what effect this distribution has on management efficiency.

2.2 Institutional Turning Points

2.2.1 Regulatory Consolidation and Exploration (2013–2017)

This stage was characterized by “reducing quantity and improving quality” and by the large-scale exit of private institutions. The number of licensed financing guarantee institutions declined from 8,185 in 2013 to 6,313 by 2017, and the total had dropped by 23.0% over this period (China Financing Guarantee Association, 2014 & 2022). This decline was not merely an industry downturn, but the inevitable result of stricter institutional regulation.

In terms of the development of regulations, in 2010, the China Banking Regulatory Commission and six other ministries issued the Interim Measures for the Administration of Financing Guarantee Companies to establish a basic regulatory system for this industry. In 2013, the Inter-Ministerial Joint Conference on Financing Guarantee Business Supervision decided to raise the legal level of the Interim Measures and started drafting the Regulations on the Supervision and Administration of Financing Guarantee Companies. At the same time, the regulatory approach gradually shifted from filing-based administration to licensing-based market entry. In 2015, the State Council issued the Opinions on Promoting the Accelerated Development of the Financing Guarantee Industry, which expressly called for “reducing quantity and improving quality” among financing guarantee institutions and strengthened them through specialisation. The document also first put forward the idea of studying the construction of a national financing guarantee fund.

In August 2017, the State Council issued the Regulations on the Supervision and Administration of Financing Guarantee Companies, which took effect on October 1, 2017. The Regulations established a new set of regulatory standards. Firstly, the minimum registered capital for financing guarantee companies was significantly increased from RMB 5 million to RMB 20 million, and this had to be in paid-in monetary capital. Secondly, financing guarantee companies that established branches in multiple provinces were required to have a registered capital of no less than RMB 1 billion. Thirdly, the ratio of guarantee liability to net assets could not exceed ten times for general financing guarantee companies and fifteen times for those engaged in micro-and small-enterprise and agriculture-related businesses. The sudden increase in the entry barrier forced many small and medium-sized guarantee institutions with weak capital bases. At the beginning of 2015, there were 2,077 state-owned guarantee institutions and 5,821 private- and foreign-owned institutions, making up 26.3% and 73.7%, respectively (Qianzhan Industry Research Institute, 2017). By 2017, the proportion of state-owned institutions had reached about 49 per cent, and the ownership structure of the industry had been changed.

2.2.2 Establishment and Construction of the National Re-Guarantee System (2018–2024)

In April 2018, the State Council approved the construction of the National Financing Guarantee Fund. On

July 26, 2018, the National Financing Guarantee Fund Co., Ltd. finished its business registration in Beijing with a registered capital of RMB 66.1 billion. In September 2018, the Fund officially went live. The establishment of the institution changed the concept of institutions in Guo Fa [2015] No. 43 into an organisation, marking the transition of China's financing guarantee system from fragmented local guarantees to nationally coordinated institutional re-guarantees.

Before the establishment of the Fund, risk assumption in financing guarantees often took the form of an ambiguous "government backstop"; although policy documents advocated for government support, specific sharing ratios among the central government, local governments, and banks were not institutionalized. After the Fund was established, the Ministry of Finance constructed a three-tier structure of the National Financing Guarantee Fund, provincial re-guarantee institutions, and municipal/county direct guarantee institutions. In bank-guarantee cooperation, banks and the government-backed financing guarantee system share risk according to the 20/80 rule. Generally speaking, the distribution of loan risk in practice is as follows: the National Fund accounts for 20%, provincial re-guarantee institutions contribute 20%, municipal/county direct guarantee institutions at 40%, and banks share 20%. In February 2019, the General Office of the State Council issued the Guiding Opinions on Effectively Leveraging Government-backed Financing Guarantee Funds to Support Micro and Small Enterprises and Agriculture, Rural Areas, and Farmers (Guo Ban Fa [2019] No. 6), which further specified that government-backed financing guarantee and re-guarantee institutions should not aim to maximise profit and should keep fee rates low based on the premise of stable operation.

Although the National Financing Guarantee Fund has added a new organizational level for risk sharing and credit transmission, it has clarified and transmitted risk responsibility between the central and local levels, replacing the previous practice of "seeking government assistance when problems arise." Through re-guarantee business, the Fund injects national credit into the local guarantee system, improves the credit rating of grassroots guarantee institutions, and helps them connect with bank credit resources more effectively. By the end of 2024, the Fund's re-guarantee cooperation had covered 2,697 districts and counties, and the county-level business reached RMB 576.338 billion. The scale of the expansion in re-guarantee cooperation from 2018 to 2024 reached RMB 1.41 trillion, and the cumulative business exceeded RMB 5.5 trillion (China Financing Guarantee Association, 2025).

2.3 Research Hypotheses

Based on the theoretical system and institutional analysis above, this study puts forward three interconnected hypotheses.

Hypothesis 1: Business-scale expansion and structural efficiency improvement are not simultaneous. The expansion of the financing guarantee business has had only a limited impact on managerial efficiency, and there is a downward trend in the marginal efficiency of fiscal input per unit.

Hypothesis 2: A low compensation rate has the risk characteristic of being underestimated and cannot be equated with high-quality risk control. Under fiscal risk compensation and bank-guarantee risk sharing, a low compensation rate does not necessarily indicate better risk governance; it may be that the smoothing effect of the risk-sharing mechanism on compensation indicators and the intertemporal transfer of risk have occurred.

Hypothesis 3: The multi-tier organisational structure leads to governance-efficiency losses due to an imbalance in authority, responsibility, and benefits. By extending the principal-agent chain and increasing information asymmetry, the multi-tier structure has a negative impact on managerial efficiency, and the imbalance of authority, responsibility, and benefits acts as a primary transmission path.

3. Empirical Data Analysis Framework

3.1 Descriptive Statistics: Development of the Financing Guarantee System, 2013–2024

Using the industry-wide panel data from 2013 to 2024, this part will examine changes in the development and structure of China's financing guarantee system under various institutional ecologies, business scales, risk indicators, and fiscal inputs.

3.1.1 Changes in the Number and Ownership Structure of Guarantee Institutions

The number of licensed financing guarantee institutions has been falling continuously from 8,185 in 2013 to 4,350 in 2024, a total decrease of 46.8%. This contraction was not simply an industry downturn; it reflected a dual shift in ownership structure and regulatory logic. State-owned institutions increased slightly from 2,814 in 2013 to 3,095 in 2024, an increase of 10.0%, and private institutions dropped significantly from 5,371 to 1,255, a reduction of 76.6% (China Financing Guarantee Association, 2014; China Financing Guarantee Association, 2024). By 2024, state-owned institutions would have made up 71.2 per cent of all institutions, more than double the 34.4 per cent in 2013. The ownership structure had thus been changed at its foundation. The policy driver was the 2017 Regulations on the Supervision and Administration of Financing Guarantee Companies, which increased the minimum registered capital from 5 million yuan to 20 million yuan and required paid-in monetary capital; as a result, many undercapitalized small and medium-sized guarantee institutions have withdrawn. At the same time, the number of government-backed financing guarantee institutions has increased from 1,292 in 2020 to 1,518 in 2024, forming a counter-cyclical subset of the overall institutional contraction and showing an actual expansion of policy-based guarantee capacity (Cai, 2025).

3.1.2 Paid-in Capital and Business Scale

Although the number of institutions has been decreasing steadily, the total paid-in capital of the industry has risen from 916.2 billion yuan in 2013 to 1.686 trillion yuan in 2024, and the average annual growth rate was 5.7%. The average paid-in capital per institution increased from approximately 112 million yuan

to 330 million yuan, and showed a clear pattern of fewer but stronger institutions. By 2024, the outstanding amount of SME financing guarantees at the business level had reached 5.69 trillion yuan, an increase of 3.3 trillion yuan since 2013, and showed an annual growth rate of 8.2%. The outstanding balance of enterprise bond issuance guarantees rose from RMB 122 billion to RMB 888 billion, and the outstanding balance of non-financing commercial guarantees rose from RMB 214 billion to RMB 1.84 trillion. The above modifications indicate that the service scope of the financing guarantee system has expanded from traditional SME credit guarantees to bond credit enhancement and commercial guarantee services. Paid-in capital of government-backed financing guarantee institutions has risen from RMB 502.4 billion in 2020 to RMB 631.2 billion in 2024, at an average annual growth rate of 7% (Cai, 2025).

3.1.3 Changes in Guarantee Fee Rates

The trajectory of guarantee fee rates reflects the institutional transition from market-based pricing to policy-guided pricing. Before 2018, guarantee fee rates were mainly determined by the supply and demand of the market, and different types and risk grades of guarantee business had different prices. After the establishment of the National Financing Guarantee Fund in 2018, Guo Ban Fa [2019] No. 6 pointed out that government-backed guarantee and re-guarantee institutions should keep low fee rates under stable operation, and thus, guarantee fee rates entered an administratively guided downward trend. The average annualised fee rate of the government-backed financing guarantee has dropped below 1%, and in some areas, it is as low as 0.26%. Although the structural decline has reduced SMEs' financing costs in the short run, it is not sustainable without continuous fiscal subsidies, and thus establishes the institutional foundation for "fiscal-subsidy dependence" discussed below.

3.1.4 Business Scale of the National Financing Guarantee Fund

The construction of the National Financing Guarantee Fund has served as the main impetus for scale expansion since 2018. In 2023, the Fund provided RMB 1.31 trillion in re-guarantee business and served 1.0929 million guarantee clients. In 2024, the amount of new re-guarantee cooperation reached 1.41 trillion yuan and increased by 7.7% year-on-year, covering 1.0545 million market entities. By the end of the year, the Fund had RMB 1.60 trillion in outstanding business and 1.3593 million outstanding clients. Business supporting micro and small enterprises and agriculture accounted for RMB 1.40 trillion in total business and reached 98.86%. By the end of 2024, cumulative cooperative business will exceed 5.5 trillion yuan, and more than 4.8 million enterprises and over 49 million jobs will be supported (China Financing Guarantee Association, 2025). The rapid expansion of the business has demonstrated the institutional effectiveness of the multi-tier risk-sharing system in extending coverage, but the lag in efficiency improvement corresponding to the expansion also needs to be addressed.

3.1.5 Leverage Ratio, Compensation Rate, and Default Rate

The structure of the average financing guarantee leverage ratio changed in 2018, and it increased from 2.46 times in 2017 to 6.80 times. The reason for this increase is that the numerator, outstanding financing guarantee balance, has risen at a rate of 32.4% from RMB 2.72 trillion in 2017 to RMB 3.60 trillion in

2018, and the denominator, industry net assets, has increased at a slower pace. After 2019, the leverage ratio dropped to around 3.3 times and then stabilized; the industry has been in a period of rebalancing between capital replenishment and risk constraints (China Financing Guarantee Association, internal data).

The default rate and compensation rate are different in the two periods. The industry-wide average default rate continuously rose from 2.86% in 2013 to a peak of 3.25% in 2018, then steadily declined to 2.10% in 2024, and formed a complete inverted-U shape (China Financing Guarantee Association, internal data). Compensation for re-guarantee cooperation under the National Financing Guarantee Fund was relatively low. Both indicators are relatively low and declining at first glance, so the risk control has been strengthened. However, the institutional conditions behind them require closer scrutiny. The low compensation rate has been realised under a system of fiscal risk compensation and expanded bank risk-sharing coverage. The proportion of bank risk-sharing business has increased from 54.3% in 2019 to 93.52% in 2024, and the actual risk share borne by banks has remained at a relatively low level of 20% (China Financing Guarantee Association, internal data). This pattern of wider coverage but reduced per-loan risk sharing means that one cannot be certain whether lower compensation rates are genuinely due to improved risk governance.

3.1.6 Fiscal Subsidies and Capital Injection

Fiscal support for the financing guarantee system takes the form of capital replenishment, risk compensation, and guarantee fee subsidies. At the central level, the Ministry of Finance has established a risk compensation mechanism for the National Financing Guarantee Fund, and the central budget will provide necessary funds to cover any shortfalls in compensation expenditure caused by policy functions and low fee rates of the Fund. In 2024, the Ministry of Finance increased the fiscal risk compensation for technology-innovation guarantee business by raising the Fund's loan risk-sharing ratio from 20 per cent to up to 40 per cent and raising the ceiling of the compensation rate from 4 per cent to 5 per cent (Ministry of Finance, 2024). The finance departments of the provinces have constructed relatively regular mechanisms for capital injection and risk sharing at the local level. For example, Guangdong Province plans to add 1.5 billion yuan annually to its provincial financing re-guarantee company from 2025 to 2027 (Guangdong Department of Finance, 2025). Fiscal subsidies have reduced the guarantee fee rate and enterprise financing costs; however, they have also created a problem of policy dependence for some guarantee institutions.

3.2 Design of Empirical Tests

Organizationally, this study investigates the distribution of authority, responsibility, and benefits in the financing guarantee system, as well as how a multi-tier organisational structure, fiscal subsidies, and bank-guarantee risk sharing affect the operating efficiency of the system.

3.2.1 Effect of the Multi-Tier Organizational Structure on Managerial Efficiency

After the construction of the National Financing Guarantee Fund, China gradually established a three-tier

structure comprising the National Financing Guarantee Fund, provincial re-guarantee institutions, and municipal/county guarantee institutions (Jiang & Xu, 2021). Based on the principal-agent theory, it can be found that expanding the scope of policy coverage and strengthening risk dispersion by adding organisational levels are feasible; however, this will increase information transmission and supervision costs, lengthen the agency chain, and alter incentives. Therefore, this study takes the degree of participation at organisational levels as the explanatory variable and business scale, service coverage, and risk-control performance as the explained variables to investigate the marginal effect of level expansion on managerial efficiency. Based on the scale of the business, an additional level may be added to drive expansion in the guarantee scale and extend service coverage. Risk governance refers to whether the additional levels have reduced compensation and default rates. According to the dimensions of organisational efficiency, it examines whether information loss, decision delay, and responsibility diffusion at all levels lower management efficiency. If the scale effect of more levels exceeds the corresponding management costs, then the system has economies of scale; otherwise, the multi-tier governance structure will result in organisational redundancy and efficiency loss.

3.2.2 Effect of Fiscal Subsidies on Market-Based Incentives

Government-backed financing guarantees have clear quasi-public-good features and are heavily reliant on fiscal support policies, such as fiscal capital injection, risk compensation, and premium subsidies (Ministry of Finance et al., 2025). In accordance with the incentive theory, fiscal subsidies can address capital constraints and expand the service scope of institutions for SMEs; at the same time, they may reduce the internal motivation to recognise risks and weaken internal controls, thus creating a “soft budget constraint.” Therefore, this study takes fiscal subsidy intensity and the scale of capital injection as the explanatory variables and guarantees fee rates, unit-capital guarantee leverage, compensation rates, and recovery rates as performance indicators. Whether fiscal subsidies promote the expansion of guarantee business, improve resource allocation efficiency, and crowd out market-based risk pricing and risk-management incentives is a problem. Based on the connection between fiscal subsidies and operating results, it evaluates the sustainability of the current break.

3.2.3 Effect of Bank-Guarantee Risk-Sharing Ratios on Risk-Control Performance

A form of risk sharing is the working level of the financing guarantee system. According to incentive-compatibility theory, risk-taking and benefit-seeking should be generally in line; otherwise, there will be moral hazard and adverse selection. The National Financing Guarantee Fund currently promotes bank-guarantee risk-sharing models such as “4-3-2-1” and “4-2-2-2,” but the risk shared by banks varies greatly among regions and is thus suitable for comparative studies (China Financing Guarantee Association, 2020). Banks in different areas have different risk-sharing ratios, so this study studies how the extent of risk assumed by banks affects the risk behaviour of guarantee institutions. Inspect whether high-risk bank shares improve pre-loan due diligence and risk screening; determine if a bank with a larger assumption of risk is compensated less and has lower default rates; and explore whether an increased responsibility for bank risk motivates more recovery efforts and enhances recovery efficiency. Test the incentive effect of

the risk-sharing mechanism and determine whether the current bank-guarantee cooperation model reasonably allocates risk responsibility according to risk-control capacity.

3.3 Empirical Findings

Based on industry data for the development of financing guarantees in 2013–2024, operating data of the National Financing Guarantee Fund, and changes in related institutions, this paper presents the following results (see Table 1).

Table 1: Financing guarantee industry development data and National Financing Guarantee Fund operating data, 2013–2024

Year	Licensed guarantee institutions	State-controlled institutions	Private institutions	Industry paid-in capital (RMB 100 million)	Outstanding SME financing guarantees (RMB 100 million)	Enterprise bond guarantee balance (RMB 100 million)	Non-financing commercial guarantee balance (RMB 100 million)	Average leverage ratio (x)	Average default rate
2013	8,185	2,814	5,371	9,162	23,900	1,220	2,140	2.61	2.86%
2014	7,898	2,879	5,019	9,817	24,300	1,390	2,680	2.48	3.02%
2015	7,510	2,943	4,567	10,430	25,200	1,550	3,120	2.42	3.08%
2016	6,808	3,012	3,796	10,860	26,400	1,780	3,650	2.43	3.13%
2017	6,301	3,075	3,226	11,040	27,200	2,100	3,920	2.46	3.16%
2018	6,052	3,126	2,926	11,200	36,000	4,200	4,200	6.8	3.25%
2019	5,458	3,141	2,317	12,150	40,300	5,380	8,600	3.32	2.74%
2020	4,850	3,108	1,742	13,260	44,200	6,300	12,100	3.33	2.59%
2021	4,720	3,115	1,605	14,380	47,800	6,940	14,600	3.32	2.47%
2022	4,600	3,106	1,494	15,420	51,200	7,680	16,300	3.32	2.32%
2023	4,480	3,098	1,382	16,210	54,100	8,120	17,500	3.34	2.21%
2024	4,350	3,095	1,255	16,860	56,900	8,880	18,400	3.37	2.10%

Source: Compiled by the author based on internal data provided by the China Financing Guarantee Association

Table2: Explanation on Ratio and Rate

Indicator	Formula / Explanation
Guarantee leverage ratio	Year-end outstanding financing guarantee balance / institutional net assets
Financing guarantee default rate	New default balance in the year / year-end outstanding financing guarantee balance
Financing guarantee compensation rate	New compensation amount in the year / released guarantee balance in the year

Source: Prepared by the author using internal data provided by the China Financing Guarantee Association

Note: The 2018 leverage spike was driven jointly by a short-term surge in the numerator (outstanding financing guarantees), slower growth in the denominator (industry net assets), new regulatory measurement rules, and aggressive expansion by private institutions.

1. The Causal Logic Between the Leverage Ratio and Institutional Incentives (How Changes in the Leverage Ratio Reflect Shifts in Institutional Incentives). While the leverage ratio in a market-driven context is determined by an institution’s private risk appetite, under China’s “state-dominated, multi-tier management” institutional ecology, the dynamic trajectory of the leverage ratio serves as a barometer for institutional incentives.

2. **The Causal Logic of the Default Rate, Risk-Sharing, and Monitoring Incentives (How the Default Rate Pattern Relates to Risk-Sharing and Monitoring Incentives).** The financing guarantee default rate (new default balance in the year / year-end outstanding financing guarantee balance) structurally indicates asset quality. However, within public financial governance, its manifestation is directly shaped by the design of the “bank-guarantee risk-sharing mechanism”.
3. **The Causal Logic of Fiscal Input, Scale Expansion, and Managerial Efficiency (How Fiscal Input per Unit of Guarantee Expansion Reflects Managerial Efficiency).** Government financing guarantee institutions possess quasi-public good attributes and operate under the principle of breaking even with modest profits, meaning their performance cannot be evaluated by commercial profit standards. Instead, their managerial efficiency must be causally measured by the marginal social output per unit of public input.

3.3.1 The expansion and efficiency improvements are not in sync.

According to the above data, the industry’s paid-in capital has risen from 916.2 billion yuan in 2013 to 1.686 trillion yuan in 2024, an increase of approximately 84.0%, and the outstanding balance of SME financing guarantees has increased from 2.39 trillion yuan to 5.69 trillion yuan in the same period, an increase of about 138.1%. The rate of increase in business was significantly higher than that of capital. However, output efficiency per unit of capital improved only slightly; the outstanding guarantee balance per RMB 100 million of paid-in capital increased from 261 million yuan in 2013 to 337 million yuan in 2024, an increase of only 29.1% over 12 years. Excluding the abnormal leverage spike of 6.8 times in 2018 caused by changes in regulatory policy and the delayed growth of the denominator, the improvement in unit-capital output efficiency is even slower. Therefore, the guarantee-scale expansion did not achieve a significant increase in marginal output efficiency through internal means but rather relied on additional fiscal funds. The gradual decline in the growth rate of service clients and guarantee amounts per unit of fiscal input further supports the feature of “quantity growth with quality lag,” that is, scale expansion and efficiency improvement did not occur simultaneously.

3.3.2 Low compensation rates coexist with delayed high risk.

The average financing guarantee default rate gradually increased from 2.86% in 2013 to 3.25% in 2018 and then reached a high in the sample period. In 2018, the National Financing Guarantee Fund was established, and since then, in 2024, the default rate has dropped to 2.10% and shown a total decrease of 115 basis points. The timing of this turning point highly overlaps with the establishment of the three-tier risk-sharing system. A reduction in the default rate does not necessarily indicate an enhanced risk-identification capability of the guarantee institution. In terms of theory, the enhanced fiscal risk compensation mechanism and the spread of bank-guarantee risk sharing after 2018 have formed a risk-absorption buffer. Some credit risks that should have been disclosed have been covered by fiscal backstops or bank risk-sharing. MSME credit risk also naturally has a delayed release. The low 2.10% default rate at the end of the sample period may not fully reflect the risk exposure accumulated during the earlier business expansion. Therefore, the post-2018 drop in default rates is statistically consistent with better risk control; however, dynamically, it may mask more serious problems of risk transfer and accumulation at all levels.

3.3.3 The multi-tier structure produces an incentive-dilution effect.

According to the structural changes from 2013 to 2024, the number of licensed guarantee institutions has

decreased from 8,185 to 4,350, a decrease of 46.8%. As shown in the structure decomposition, state-controlled institutions rose slightly from 2,814 to 3,095, an increase of about 10.0%, while private institutions dropped significantly from 5,371 to 1,255, falling by 76.6%; thus, the trend of state dominance and substantial private-sector withdrawal is clear. At the same time, industry paid-in capital increased by 84.0%. However, after reaching a maximum of 6.8 times in 2018, it dropped to about 3.3 times in 2019 and has shown a general ceiling effect since 2020, fluctuating slightly between 3.31 and 3.37 times so far. The prolonged reduction in debt and continuous capital expansion indicate a fundamental deficiency in the multi-level governance system. As the organisational level and the extent of state ownership increase, the risk-decision autonomy of grassroots guarantee institutions is gradually centralised upwards; the matching between front-line information advantages and decision authority weakens, and risk responsibility does not decrease accordingly but is ultimately shifted upwards to the fiscal side. This mismatch of “information at the grassroots, authority centralised above, and responsibility fiscally backstopped” is an incentive-dilution mechanism in the multi-tier principal-agent chain that suppresses the leverage amplification effect of capital.

3.3.4 Fiscal subsidies have a double-edged effect.

From 2013 to 2024, the pattern of industry paid-in capital was to grow steadily in the beginning and at an accelerating rate later on: it increased by 20.5% during 2013–2017, reaching RMB 1.104 trillion from RMB 916.2 billion, and then grew at a much faster pace in the later period, reaching RMB 1.686 trillion by 2024. Continuous fiscal capital injection reduced guarantee fee rates and MSME financing costs, thus achieving a positive effect. At the same time, one should consider the other end. When fiscal subsidies are used to provide primary support for the operation and risk coverage of institutions, the internal incentives for guarantee institutions to enhance self-discipline, strengthen risk control, and optimise business processes will gradually decline. The change is reflected in the leverage data indirectly. Although the amount of capital increased at a faster rate in the later period, the leverage ratio did not exceed the implicit upper bound of 3.4 times; thus, fiscal funds served as a safety net but failed to effectively motivate the internal incentives for business expansion or improve capital utilisation efficiency. In terms of incentive compatibility, after 2018, there was an increase in fiscal support and an extended period of a low-leverage ratio; thus, subsidy dependence may have replaced some market-based incentives. Therefore, the construction of fiscal backstopping and institutional self-strengthening have become the main tasks for promoting the institutional reform of the SME financing guarantee system.

4. Conclusions and Policy Recommendations

Based on empirical analysis of China’s financing guarantee industry data from 2013 to 2024 and drawing on principal-agent theory and authority-responsibility-benefit alignment theory, this study reaches the following conclusions.

4.1 Main Conclusions

4.1.1 The financing guarantee system has increased the scale of financing for micro and small enterprises to some extent, but the underlying structural governance problems of this expansion need to be resolved

In 2018, the National Financing Guarantee Fund was established, and since then, a three-tier risk-sharing system and guaranteed coverage have been added. From 2013 to 2024, the outstanding amount of SME financing guarantees increased from 2.39 trillion yuan to 5.69 trillion yuan, up by 138.1%, and at the same time, the paid-in capital of the industry rose from 916.2 billion yuan to 1.686 trillion yuan, an increase of 84.0%. However, the expansion of the scale mainly involved an increase in fiscal capital injection rather than endogenous efficiency improvements (Ma & Wei, 2020). Marginal improvement in unit-capital output efficiency was limited; the outstanding balance per RMB 100 million of paid-in capital increased from RMB 261 million in 2013 to RMB 337 million in 2024, an increase of only 29.1% over 12 years. The growth gap indicates that while the system has achieved quantitative coverage, qualitative improvement has not yet been realised, and the structural gap between scale expansion and efficiency improvement is the primary governance contradiction.

4.1.2 Scale expansion does not equal efficiency improvement

Rapid guarantee-scale growth has depended mainly on fiscal capital injection and policy impetus. Industry paid-in capital increased by 20.5% during 2013–2017 and by 50.5% during 2018–2024, with the latter period growing significantly faster and closely associated with stronger fiscal support after the Fund was established. The marginal benefit of fiscal input has fallen. After the average financing guarantee leverage ratio abnormally rose to 6.8 times in 2018 due to regulatory measurement changes and a lag in the growth of the denominator, it dropped to about 3.3 times in 2019 and stayed in the range of 3.31–3.37 times through 2024. This ceiling effect indicates that the continuous increase in capital did not lead to a corresponding expansion of business, and the leverage-amplification effect of fiscal input was institutionally restricted. The divergence between scale expansion and efficiency improvement reflects an input-heavy and output-light policy-driven model at the level of organizational governance.

4.1.3 A low compensation rate cannot be equated with high-quality risk control

The average default rates in 2013 and 2018 were 2.86% and 3.25%, respectively, and by 2024 had dropped to 2.10%. The amount of compensation and default in practice are generally on the same order of magnitude. A default will trigger compensation almost immediately; therefore, the first two links in the risk-disposal chain, namely default and compensation, are closely linked, while the third link of subrogation and recovery does not work well (Lei & Li, 2021). At the institutional level, it is closely connected with the existing bank-guarantee risk-sharing mechanism for banks. According to the 20/80 rule, banks will assume only 20 per cent of the risk, and the guarantee system will bear the remaining 80 per cent. If the bank bears only 20% of the risk and does not participate in the subsequent recovery, it will lose the incentive to promote debt restructuring or help with recovery; otherwise, it will have to be compensated immediately by the guarantee institution after the client defaults. A subrogation recovery mechanism has

not been established or implemented to date, and guarantee institutions lack effective rights-exercise channels and institutional safeguards in the event of compensation liability.

4.1.4 The multi-tier organizational structure entails governance-efficiency loss

China's three-tier structure of the National Financing Guarantee Fund, provincial re-guarantee institutions, and municipal/county direct guarantee institutions extends policy coverage and establishes a multi-tier principal-agent relationship. The number of licensed guarantee institutions dropped from 8,185 in 2013 to 4,350 in 2024, down by 46.8%, as state-controlled institutions rose slightly from 2,814 to 3,095 and private institutions fell sharply from 5,371 to 1,255; thus, there has been a shift toward state dominance and the exit of private institutions. More organisational levels have longer information-transmission chains and differentiated decision-making authorities and responsibilities. From the management's standpoint, the higher the number of levels, the more information loss occurs during vertical transmission, and thus the policy dissemination may be both slow and inaccurate. Governance authorities, responsibilities, and benefits are not clearly coordinated. From a governance perspective, authority, responsibility, and benefit are incompletely aligned. Grassroots guarantee institutions have front-line information advantages, but their risk-decision autonomy is gradually weakened as authority is centralized upward, while their risk responsibility is not reduced accordingly and ultimately shifts upward to the fiscal side through the re-guarantee chain.

4.1.5 There is tension between administratively set low guarantee fee rates and fiscal-subsidy sustainability

Given the demands of the policy, government-backed financing guarantee institutions are required to have a relatively low fee rate for stable operation; generally, the average rate should not exceed 1.5%, and although it has been falling gradually, it has now dropped below 1%. Guarantee fee rates are set at a low level by the government, but the risk-pricing capability has not increased proportionally; therefore, operations and risk coverage are still heavily reliant on fiscal subsidies. Between 2018 and 2024, the industry's paid-in capital increased by 50.5%, and the continuous boost in fiscal capital injection kept strengthening. However, the leverage ratio never exceeded the hidden ceiling of 3.4 times. Although fiscal subsidies provide a safety net for the system, they may also reduce the internal incentive for guarantee institutions to strengthen governance and risk management sustainably.

4.2 Policy Recommendations

4.2.1 Optimize the organizational structure and moderately compress management levels

Based on the concise and efficient SME credit guarantee system in Japan, the central level can offer credit insurance through a policy-based financial institution, and local credit guarantee associations will carry out direct guarantee business and ensure coverage via branches in municipalities and towns (National Federation of Credit Guarantee Corporations, 2024). Currently, China's financing guarantee system is nominally a three-tier structure of national, provincial, and municipal/county levels, but many independent legal-person institutions still exist at the county level; as a result, there are redundant market entities,

complex management levels, and dispersed authority and responsibility. This study puts forward a reform path: keep the three core entities—the National Financing Guarantee Fund, provincial re-guarantee institutions, and municipal guarantee institutions—and integrate county-level independent legal-person guarantee institutions into the municipal guarantee platform. Counties would no longer establish independent legal-person guarantee institutions but would act as business branches of municipal institutions for front-end inclusive finance services. This reform would significantly reduce the number of legal-person institutions, shorten the vertical management chain, reduce multi-tier information loss, strengthen the coordinating function of provincial re-guarantee hubs, and boost the front-line decision-making power of municipal institutions; thus, policy transmission efficiency and response speed for micro and small enterprise financing would be enhanced (Jiang & Xu, 2021).

4.2.2 Improve the allocation of authority, responsibility, and benefit by establishing a benefit-distribution mechanism matched with risk assumption

The division of risk responsibility at all levels should be clarified to prevent the continuous upward concentration of risk responsibility (Xue & Hou, 2012). Given the current situation of “information at the grassroots, authority centralised above, and fiscal responsibility fiscally backstopped,” institutional design needs to rebalance authority, responsibility, and benefits. Grassroots guarantee institutions should be granted decision-making autonomy commensurate with the risk they bear, and a positive linkage between risk responsibility and benefit sharing should be established so that higher-risk-bearing parties receive a larger share of the benefits. A multi-level contractual system of risk responsibility can be built among provincial re-guarantee institutions and municipal/county direct guarantee institutions to clarify the specific rights and obligations at all levels for risk identification, approval decisions, post-loan management, compensation, and recovery.

4.2.3 Reform the performance assessment system and establish an evaluation framework covering the full credit cycle

Relevant authorities should move beyond the assessment trap of emphasizing scale over quality and compensation reduction over recovery. The current performance system focuses excessively on static indicators such as the current compensation rate, while ignoring delayed risk release and the dynamic characteristics of recovery efficiency (Lei and Li, 2021). Subrogated recovery rate, recovery rate, and risk-asset resolution rate should be added to the assessment indicators, and a performance framework covering pre-event risk identification, in-process post-loan management, and post-event compensation and recovery should be established. The compensation-rate ceiling for the technology-innovation business should also be set reasonably to avoid restraining business development through an overly low-compensation system.

4.2.4 Strengthen banks’ principal responsibility and build a collaborative mechanism for bank-guarantee risk sharing and recovery

Firstly, increase the risk-sharing ratio of the bank to correct the current imbalance where banks bear only

20% of the risk and the guarantee system bears 80%. Japan's credit insurance system has placed the majority of the risk at the insurance company (70%-90%), so China may opt for a risk-sharing model involving insurers or reinsurers (Liu & Li, 2020). Secondly, a bank-assisted recovery mechanism should be established to clarify the banks' obligations for supporting recovery after client default and include recovery performance in the bank's assessment; thus, the pattern of banks enjoying benefits while guarantee institutions bear the losses alone should be changed. Thirdly, special debt-organisation companies can be established to bundle and sell non-performing assets, unlock trapped stock-risk assets at the compensation stage, and improve the risk-disposal efficiency of the entire system. Through the above measures, bank-guarantee relationships will transition from formal 20/80 sharing to substantive risk-sharing and benefit-sharing.

5. Research Limitations and Future Directions

5.1 Research Limitations

5.1.1 The data availability is limited

Public statistical divisions are unavailable, so specific micro-data on risk pricing, recovery efficiency, and fiscal-subsidy usage are lacking. This paper uses aggregate data from the industry. Although such data reveal the general trend of the industry, they do not fully open the black box of organisational governance efficiency, and analysis of fiscal-subsidy incentive transmission and determinants of recovery efficiency is thus limited.

5.1.2 The causal identification remains limited

The operating efficiency of the financing guarantee system is influenced by changes in the economy and finance, adjustments to financial policies, and the development of regional finance, etc. Although this paper takes the construction of the National Financing Guarantee Fund as the institutional turning point, sample conditions and identification strategies have not ruled out all possible confounding factors. Therefore, the robustness of causal inference needs further improvement.

5.1.3 The research perspective is relatively concentrated

Given the principal-agent theory and the authority-responsibility-benefit alignment theory, this study will examine the impact of organisational governance in the financing guarantee system on managerial efficiency. It mainly examines governance performance and does not systematically evaluate the system's effects on enterprise financing accessibility, technological innovation, employment stability, or regional economic development. The external validity of the conclusions can be further expanded.

5.1.4 The policy evaluation period is relatively short

The National Financing Guarantee Fund began operating in 2018, and the current sample period is too short to cover the entire risk-release cycle and institutional-adjustment cycle of policy-based guarantee business. Some policy effects have a time lag; thus, to observe their long-term impact on the efficiency of

risk governance, fiscal sustainability, and organisational incentives dynamically, additional extended time-series data are needed.

5.2 Future Research Directions

5.2.1 Deepen micro-level research on organizational governance

Future, institutional-level financial and operating data will be used to decompose and compare technical efficiency, pure technical efficiency, and scale efficiency at the institutional level. This would help to identify the internal sources of efficiency differences among state-owned and private institutions, eastern and central-western regions, and large and small institutions, and support differentiated policy design.

5.2.2 Improve institutional evaluation of fiscal support

This study finds that fiscal subsidies may weaken endogenous incentives while functioning as a safety cushion. Future research may construct a dynamic game model that incorporates the intensity of fiscal subsidies, risk-taking behaviour, and business-expansion incentives to simulate the different effects of subsidy intensity and subsidy type on institutional behaviour and long-term performance. The above studies can explore institutional paths for the long-term, stable operation of government-backed financing guarantee systems under the break-even with modest profit principle.

5.2.3 Focus on the impact of digital transformation on efficiency

Financial technology can be used to address problems of information asymmetry and adverse selection in financing guarantee business through big data risk control, artificial intelligence-based credit assessment, and online approval. In the future, one may apply time-series or regional difference approaches to explore whether institutional digital transformation affects the efficiency of guarantee approval, compensation rate, and recovery rate, etc., in other governance performance indicators.

5.2.4 Strengthen international comparative research

Systematic comparisons between China and countries, such as Japan and the United States, in terms of organisational structure, risk-sharing mechanisms and governance models, and derive relevant international experience to provide a theoretical and practical reference for reforming China's financing guarantee system.

Notes

- [1] We have officially revised the title of the paper from the original cross-country comparative study to: “A Study on the Efficiency of China's SME Financing Guarantee System from the Perspective of Authority, Responsibility, and Benefit—An Empirical Analysis Based on Data from 2013 to 2024.” The rationales for adopting this current title are anchored in the following methodological and theoretical considerations. A rigorous methodological review revealed that the statistical units and institutional levels of Japanese Credit Guarantee Corporations (CGC) data (reflecting direct guarantee performance) and China's National

Financing Guarantee Fund data (reflecting re-guarantee performance) are fundamentally incompatible. Consequently, direct cross-country indicator alignment without robust standardization would not be methodologically valid and could compromise the validity of empirical findings.

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Article

Research on the Impact of Yen Interest Rate Hikes on the Pricing of Chinese Local Government Financing Vehicle Offshore Bonds

円金利の引き上げが中国地方政府融資平台の オフショア債券価格形成に与える影響に関する研究

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Abstract

This study examines 28 Yen-denominated bonds issued by Chinese Local Government Financing Vehicles (LGFVs) from April 2023 to August 2025. Focusing on the yen interest rate hike cycle, we investigate the pricing dynamics of Chinese LGFV offshore bonds and the policy transmission effects. Employing statistical analysis and dual-case comparative methodology, we systematically dissect the transmission channels and mechanisms through which yen interest rate hikes affect the pricing of LGFV yen bonds. Our findings reveal that Chinese LGFV Yen-denominated bonds exhibit distinct structural characteristics: highly concentrated short-term maturities, geographic clustering in the Yangtze River Delta region, predominance of district- and county-level as well as development zone platforms as issuers, and standby letters of credit (SBLC) as the dominant credit enhancement mechanism. Yen interest rate hikes affect bond pricing through three transmission channels—interest rate benchmark transmission, exchange rate risk transmission, and market sentiment transmission—with the interest rate channel serving as the fundamental driver, the exchange rate channel displaying significant regional heterogeneity, and the sentiment channel amplifying price volatility. During the tightening cycle, financing costs of LGFV yen bonds increased by 25–60 basis points, pricing differentiation intensified persistently, and market resources accelerated their concentration toward high-credit-quality issuers possessing natural exchange rate hedging capabilities. Finally, this paper proposes optimization strategies from three dimensions: risk hedging for issuers, credit screening for investors, and macroprudential regulation and offshore market development for regulatory authorities. These findings provide empirical support and decision-making references for Chinese LGFVs to navigate the monetary policy transition in Japan and manage cross-border financing risks.

Keywords: Yen interest rate hike; Chinese Local Government Financing Vehicle; Offshore bond pricing; Transmission mechanism; Heterogeneity

1. Introduction

1.1 Research Background and Significance

1.1.1 Research Background

Since 2020, the global cross-border financing market has experienced unprecedented policy and market volatility. As key participants in China's offshore bond market, local government financing vehicles (LGFVs) have seen their financing behavior and pricing logic significantly influenced by adjustments in international monetary policy. Based on market data from 2021 to 2025, the cumulative issuance scale of Chinese LGFV offshore bonds reached RMB 1,541.754 billion, comprising 1,897 individual issues with an average deal size of RMB 812.73 million. The offshore market has become a critical supplementary channel for diversified financing of LGFVs. Within the multi-currency financing structure, Yen-denominated bonds, despite accounting for a relatively modest share (28 issues, representing 0.71% of total issuance), have established a distinctive market positioning through their long-standing low interest rate advantage. The cumulative issuance scale reached RMB 10.949 billion, with an average deal size of RMB 391 million—substantially below the overall average for Chinese LGFV offshore bonds. However, issuers are exclusively high-credit-quality LGFVs at the prefecture-level city or strong district/county level and above, resulting in superior bond credit profiles. This instrument has become a significant financing alternative for LGFVs in coastal regions with export-oriented economies.

From a monetary policy perspective, the Bank of Japan (BOJ) has maintained an ultra-low interest rate environment since the introduction of yield curve control (YCC) in 2016, providing low-cost financing space for Chinese LGFV Yen-denominated bonds. However, starting from 2022, substantial volatility in the yen exchange rate (with the JPY/USD rate breaching 150:1), coupled with the BoJ's adjustment of YCC policy in 2023 and rising interest rate hike expectations in 2024, has gradually eroded the low-interest-rate advantage of yen bonds. Empirical evidence demonstrates a strong correlation between LGFV yen bond issuance patterns and Japanese monetary policy: issuance was suspended during Q4 2022–Q1 2023 when the yen experienced significant depreciation; 9 deals were issued in Q2–Q4 2023 during the yen appreciation and policy easing phase, accounting for 37.6% of total yen bond issuance; while only 5 deals were completed in 2024 under rate hike expectations, with their share declining to 13.5%. Concurrently, yen interest rate hikes directly affect issuance rates, credit spreads, and debt servicing costs of LGFV yen bonds through exchange rate transmission and interest rate parity mechanisms. Nevertheless, existing pricing frameworks have not fully incorporated the long-term implications of these policy shifts, exposing some LGFVs with yen debt holdings to escalating refinancing pressures—underscoring the urgent need to examine the adjustment dynamics of their pricing logic.

Table 1-1 Complete Timeline of Yen Interest Rate Hikes, 2024–2025

No.	date	policy rate adjustment	Voting Result	Key Background and Accompanying Measures
First interest rate hike	March 19, 2024	-0.1% to 0–0.1% range (10 bp hike)	Passed 7:2	• Core CPI exceeded 2% inflation target for 23 consecutive months (from April 2022) • 2024 Spring Wage Offensive (Shunto) achieved 3.8% wage growth, a 30-year high • Persistent yen depreciation triggered imported inflationary pressures
Second interest rate hike	July 31, 2024	0~0.1%→0.25% (15–25 bp hike)	Passed 8:1	• Inflation persistence exceeded expectations • Decision to reduce government bond purchase scale within 1–2 years • Intensified yen depreciation pressures
Third interest rate hike	January 24, 2025	0.25%→0.5% (25 bp hike)	Passed 8:1	• Real wage growth turned positive • Inflation remained consistently above 2% target • Policy rate reached 17-year high since 2007.
The fourth interest rate hike	December 19, 2025	0.5%→0.75% (25 bp hike)	Passed unanimously 9:0	• Yen depreciated to 156–157 range • Surging imported inflationary pressures • Policy rate hit 30-year high since 1995

Data source: DMI (DM Intelligence)

1.1.2 Research Significance

(1) Theoretical Significance

Existing research on Chinese offshore bonds has predominantly focused on USD-denominated and RMB-denominated bonds, with insufficient attention paid to niche-currency instruments such as Yen-denominated bonds. Moreover, studies examining the impact of monetary policy adjustments on LGFV bond pricing have largely centered on China’s domestic market or USD interest rate hike cycles, neglecting the distinctive characteristics of yen bonds—namely, high credit thresholds, pronounced regional concentration, and high proportion of medium- to long-term maturities. This study takes yen interest rate hikes as the entry point to reveal the transmission mechanisms through which non-USD monetary policy adjustments affect the pricing of Chinese LGFV offshore bonds, thereby expanding the research frontier of cross-border financing pricing theory into the niche-currency domain. Furthermore, by integrating statistical analysis with case study methodology, we construct an analytical framework encompassing policy shock, market reaction, and pricing adjustment, contributing to the enrichment of theoretical systems governing cross-border pricing of LGFV bonds.

(2) Practical Significance

For urban investment enterprises, this study provides clear insights into the specific impacts of Japanese yen interest rate hikes on issuance rates and debt repayment costs, offering decision-making references for optimizing currency selection, adjusting financing term structures, and hedging exchange rate and interest rate risks. For investors, it reveals the credit spread dynamics of Chinese urban investment enterprises’ Yen-denominated bonds under yen rate hikes, serving as a reference for pricing, valuation, and risk hedging strategies. For regulators, the findings provide empirical support for improving cross-border financing supervision and mitigating local government implicit debt risks. Particularly given the regional

concentration and entity clustering characteristics of yen bonds, these conclusions offer data-driven insights for targeted regulatory measures.

1.2 Research Objectives and Content

1.2.1 Research Objectives

First, to systematically examine the issuance characteristics and pricing status of Yen-denominated bonds issued by Chinese LGFVs (Local Government Financing Vehicles), clarifying their positioning in offshore financing and their differentiation from bonds denominated in other currencies. Second, to elucidate the transmission mechanisms through which yen interest rate hikes affect the pricing of LGFV yen bonds via exchange rate movements, interest rate differentials, and market sentiment channels. Third, to quantify the impact of yen interest rate hikes on issuance yields and credit spreads of yen bonds through statistical analysis and case studies. Fourth, to propose differentiated strategies for LGFV enterprises, investors, and regulatory authorities in response to the impact of yen interest rate hikes.

1.2.2 Research Content

First, Analysis of the Current Status of Yen-Denominated Bond Issuance and Pricing by Chinese LGFVs. Based on the issuance data of Chinese LGFV offshore bonds from 2023 to 2025, this study conducts statistical analysis across multiple dimensions including issuance scale, regional distribution, maturity structure, credit ratings, and pricing levels. The analysis focuses on: (1) the correlation between the issuance pace of Yen-denominated bonds and Japanese monetary policy; (2) the regional distribution characteristics; (3) the predominance of medium- to long-term maturity structures; and (4) the pricing advantages associated with high-quality bond issuances. Comparative analysis will be conducted against USD-denominated and RMB-denominated bonds to benchmark pricing differentials.

Second, Transmission Mechanisms of Yen Interest Rate Hikes on the Pricing of LGFV Yen Bonds. The analysis unfolds through three core transmission channels: (1) the interest rate channel, where increases in the yen policy rate elevate issuance yields of LGFV yen bonds through the interest rate parity mechanism; (2) the exchange rate channel, where interest rate hikes trigger yen exchange rate volatility, increasing foreign exchange conversion costs for LGFV enterprises and subsequently affecting credit spread pricing; and (3) the market sentiment channel, where expectations of interest rate hikes prompt adjustments in risk appetite among offshore investors, exerting valuation adjustment pressures on yen bonds with high credit thresholds. Given the concentrated issuer base and maturity profile of yen bonds, the analysis will examine the differentiated manifestations of these transmission mechanisms.

Third, Statistical and Case Study Analysis of the Impact of Yen Interest Rate Hikes. Taking the YCC (Yield Curve Control) policy adjustment in 2023 as the temporal demarcation point, this study compares changes in issuance yields, credit spreads, and issuance scale of yen bonds before and after the interest rate hikes. The findings indicate that following the interest rate hikes, the average issuance yield of yen bonds increased by approximately 120 basis points (BP), credit spreads widened by 80 BP, and issuance scale

declined by 37.2% year-on-year. At the case study level, two representative issuers are selected to analyze their pricing adjustments, changes in debt service pressure, and responsive measures before and after the interest rate hikes, thereby concretizing the actual impact of monetary policy tightening.

Fourth, Research on Responsive Strategies. Differentiated strategies are proposed for distinct market participants: (1) At the issuer level (LGFV enterprises), recommendations include optimizing currency composition, adjusting financing tenors, and utilizing foreign exchange hedging instruments; (2) At the investor level, recommendations encompass strengthening interest rate sensitivity analysis, focusing on high-quality issuers, and dynamically adjusting portfolio structures; (3) At the regulatory level, recommendations include improving cross-border financing information disclosure, guarding against regional concentration risks, and establishing early warning mechanisms for exchange rate risk.

1.3 Research Framework

This study adheres to the logical framework of status quo analysis, mechanism examination, statistical and case validation, followed by strategy formulation, with the specific steps as follows:

Step 1: Literature Review and Theoretical Grounding. This study systematically reviews theories on cross-border bond pricing, monetary policy transmission mechanisms, and existing research on Chinese LGFV offshore bonds. By identifying gaps in the current literature, this step delineates the theoretical entry point of this research.

Step 2: Current Status and Statistical Analysis. Based on comprehensive data of Chinese LGFV offshore bonds and Yen-denominated bond-specific data from 2023 to 2025, this study employs descriptive statistics and comparative analysis to clarify the issuance characteristics, pricing levels, and differentials relative to other currency-denominated bonds, thereby establishing an empirical foundation for mechanism analysis.

Step 3: Transmission Mechanism Construction. Integrating the policy context of yen interest rate hikes with the unique characteristics of Yen-denominated bonds, this study constructs a theoretical framework for pricing impact transmission mechanisms across three dimensions: interest rates, exchange rates, and market sentiment. This framework elucidates the transmission pathways and underlying logic of each channel.

Step 4: Statistical and Case Validation. Statistical validation is conducted through comparative analysis of pricing indicator changes in Yen-denominated bonds before and after interest rate hikes. Additionally, typical case studies of LGFV enterprises issuing yen bonds are selected to conduct in-depth analysis of the actual impact of interest rate hikes on pricing and debt service capacity, thereby enhancing the persuasiveness of the research conclusions.

Step 5: Strategy Formulation and Conclusion. Based on the aforementioned analyses, differentiated responsive strategies are proposed for LGFV enterprises, investors, and regulatory authorities. The study concludes by summarizing core findings, identifying research limitations, and suggesting directions for future research.

2. Literature Review

2.1 Determinants of Cross-Border Bond Pricing

The core logic of cross-border bond pricing revolves around the risk-free interest rate and risk premium, with existing research having identified multiple dimensions of influencing factors. Cross-border bond pricing is essentially the sum of the risk-free yield and risk premium, where the risk premium encompasses components such as credit risk, liquidity risk, and exchange rate risk. Classic theories such as Merton's (1974) structural model treat bonds as contingent claims on corporate assets, with default risk being central to pricing. However, under the cross-border framework, factors such as exchange rate volatility, capital flows, and international policy spillovers significantly enhance pricing complexity (Ge, F. T., 2023). Fabozzi and Modigliani (2010) note that credit spreads primarily originate from credit shocks, liquidity shocks, and macroeconomic environment volatility risks, while cross-border bonds must additionally incorporate premiums arising from currency mismatches. A comprehensive review of existing research reveals that key determinants of cross-border bond pricing concentrate on the following dimensions:

First, exchange rate factors. Exchange rate levels, expectations, and volatility constitute core drivers of cross-border bond pricing. Hu, P. (2023) empirically finds that appreciation of the RMB spot exchange rate (decrease in E value) can reduce issuance costs of Chinese USD-denominated bonds, while depreciation expectations (negative EP) significantly increase financing costs. Ge, F. T. (2023) further validates through the TVP-VAR-SV model that the broad US dollar index (representing global risk sentiment) exerts a dominant influence on cross-border bond risk premiums: dollar strengthening (index rising) pushes up premiums through the risk sentiment channel, with this effect amplifying during major events (such as the COVID-19 pandemic). Exchange rate transmission mechanisms include: (1) the direct channel, where domestic currency depreciation increases foreign currency debt service pressure; and (2) the indirect channel, where expectations alter investor risk appetite (Zhang, M., & Tan, X. F., 2013).

Second, interest rate factors. Domestic-foreign interest rate differentials form the foundation of carry trade and directly affect pricing. Ge, F. T. (2023) demonstrates that when the China-US interest rate differential (LCS, i.e., the spread between Chinese and US benchmark interest rates) widens, cross-border bond risk premiums rise, as the differential attracts arbitrage capital inflows, pushing up demand. Liu, J. Y. (2023) finds that Federal Reserve monetary policy shocks (measured by MPshock) significantly amplify spillover effects on Chinese bond premiums following bond market opening, indicating enhanced international interest rate linkage. Notably, interest rate effects exhibit nonlinear characteristics: short-term differential changes are dominated by policy expectations, while long-term differentials reflect economic fundamental

disparities (Hofmann et al., 2021).

Third, liquidity risk. Insufficient liquidity demands higher risk compensation. Ge, F. T. (2023) constructs liquidity risk measurement indicators based on price volatility and trading volume, finding that high-yield bond liquidity risk during market turbulence periods significantly exceeds that of investment-grade bonds. Liu, J. Y. (2023) emphasizes that market opening reduces credit spreads by enhancing trading activity, but simultaneously amplifies sensitivity to external shocks. The liquidity premium theory of Amihud and Mendelson (1986) is corroborated here: the greater the market friction, the higher the liquidity compensation in pricing.

Fourth, macroeconomic and policy uncertainty. Domestic economic policy uncertainty (CNEPU) and global risk sentiment (such as the VIX index) exert significant negative impacts on pricing (Hu, P., 2023). Liu's (2023) "Bond Connect" research indicates that policy opening itself serves as a signal, reducing premiums by improving the market information environment, but vigilance is required regarding its "double-edged sword" effect of amplifying external shocks. Furthermore, implicit guarantee expectations (such as government backing for LGFV bonds) may distort pricing, leading to underestimation of credit risk (Wang, B. S., et al., 2016).

Fifth, issuer characteristics and information disclosure. Issuer ownership nature and information quality are key micro-level factors. Hu, P. (2023) validates that state-owned enterprises enjoy lower financing costs due to implicit guarantees, while high-quality information disclosure (such as third-party audit reports) can reduce information asymmetry and compress credit spreads. This finding aligns with Duffie and Lando's (2001) information asymmetry model: enhanced transparency reduces risk compensation demanded by investors.

2.2 Research on the Transmission Effects of Monetary Policy Adjustments on Cross-border Financing

Cross-border financing serves as a critical channel for enterprises' international operations and capital allocation, with its cost and accessibility profoundly influenced by adjustments in domestic and foreign monetary policies. As global financial integration deepens, monetary policy shifts in major economies (such as the United States and Japan) transmit to cross-border bond markets through multiple channels including interest rates, exchange rates, and risk sentiment, exerting far-reaching impacts on issuers' financing costs, issuance scale, and asset pricing. The transmission mechanism through which monetary policy adjustments affect cross-border financing pricing—via interest rate, exchange rate, and market sentiment channels—has been extensively validated in the academic literature. The transmission of monetary policy adjustments to cross-border financing primarily operates through the following channels:

First, the interest rate channel. Changes in monetary policy affect the relative cost of cross-border financing by influencing domestic-foreign interest rate differentials. For instance, Federal Reserve rate hikes

widen the China-US interest rate differential, increasing issuance costs of USD-denominated bonds (Hu, P., 2023). Obstfeld and Rogoff (1995) note that domestic interest rate increases push up cross-border bond issuance rates through the interest rate parity mechanism, with medium- to long-term bonds exhibiting higher sensitivity to interest rate changes. Similarly, yen interest rate hikes may elevate yen financing costs and dampen the issuance willingness of Chinese LGFV Yen-denominated bonds.

Second, the exchange rate channel. Monetary policy adjustments induce exchange rate volatility, affecting repayment risk of foreign currency-denominated bonds. Ge, F. T. (2023) indicates that RMB exchange rate expectations are a key determinant of Chinese USD-denominated bond issuance scale; if yen interest rate hikes lead to yen appreciation, they will increase the exchange rate risk exposure of Chinese LGFV Yen-denominated bonds.

Third, the risk sentiment channel. Changes in monetary policy alter global risk appetite, thereby affecting investor demand for high-risk assets. Liu, J. Y. (2023) finds that Federal Reserve rate hikes may trigger rising risk aversion, pushing up risk premia of cross-border bonds—an effect particularly pronounced in the context of bond market opening.

2.3 Research on Chinese LGFV Offshore Bonds

As a critical instrument for cross-border financing by Chinese enterprises, LGFV (Local Government Financing Vehicle) offshore bonds have entered a rapid development phase since the 2015 registration-based reform. Zhang, C. (2022) and Ruan, L. Y. (2023) note that the rise of LGFV offshore bonds has been driven by the dual forces of tightening domestic financing policies and low interest rate environments abroad, yet their development remains significantly influenced by cyclical regulatory policies. Following the National Development and Reform Commission's Circular 666 in 2019, which standardized the use of foreign debt proceeds, issuance scale volatility has intensified. Concurrently, offshore issuance modes are predominantly structured as direct issuance and indirect issuance, with Hong Kong serving as the preferred issuance venue; however, currency composition has diversified in recent years, with offshore RMB bonds demonstrating notably rapid growth. Research during this phase has largely adopted macro perspectives to describe issuance characteristics, emphasizing the interactive relationship between policy and market environments, thereby providing a foundational framework for understanding the evolution of LGFV offshore bonds.

Regarding risk and pricing mechanisms, research has progressively deepened into credit risk measurement and onshore-offshore yield spread comparisons. Zhou, G. X. (2024) finds that LGFV offshore bonds face challenges including high financing costs, exchange rate volatility, and increasing debt service pressure, particularly as Federal Reserve rate hikes in 2022 led to inverted China-US interest rate differentials, further elevating USD bond risk premia. Yang, J. (2021) and Zheng, Q. Y. (2023), through empirical analysis, demonstrate that offshore credit spreads are generally higher than onshore spreads, with yield spreads for bonds issued by the same LGFV entity averaging 50-100 basis points (BP) higher offshore, attributable

primarily to lower risk appetite among offshore investors, differences in rating systems, and distinct default resolution mechanisms. In terms of research methodology, the random forest model (Yang, J., 2021) has been applied to credit risk prediction, with variable importance analysis indicating that total assets and regional per capita GDP significantly impact risk, outperforming traditional logistic regression models. These studies reveal the nonlinear characteristics of LGFV offshore bond pricing; however, most literature has not adequately incorporated monetary policy shocks into dynamic analysis.

Existing research exhibits three primary limitations: First, most studies focus on USD-denominated bonds, with insufficient attention to non-USD currency bonds such as Yen-denominated issues, making direct application to the transmission effects of yen interest rate hikes problematic. Second, there is a lack of cross-country comparative analysis of LGFV offshore bond pricing, particularly regarding empirical testing of linkage mechanisms between Japanese monetary policy and Chinese bonds. Third, risk models predominantly rely on static financial indicators without incorporating external variables such as exchange rate expectations and international liquidity. This study aims to address these gaps by constructing time-varying parameter models to analyze the spillover pathways of yen interest rate hikes on LGFV yen bond pricing, thereby providing novel perspectives for cross-border debt risk management.

2.4 Research on the Yen Bond Market and the Impact of Yen Monetary Policy

Japanese monetary policy has undergone multiple transformations since the 1990s, with the practice of unconventional monetary policy exerting profound spillover effects on global financial markets. Existing research has concentrated primarily on four dimensions: the evolution of monetary policy, transmission mechanisms, domestic economic impacts, and international spillover effects. The core turning point in Japanese monetary policy was the response to prolonged deflation and economic stagnation. Following the collapse of asset bubbles in the 1990s, Japan fell into a “liquidity trap,” rendering traditional interest rate tools ineffective. Qing, P. (2016) notes that BOJ first implemented quantitative easing monetary policy in 2001, shifting its operational target from interest rates to money supply, expanding the monetary base through government bond purchases. The 2001-2006 policy centered on zero interest rates and asset purchases, yet its effects were limited, with deflation remaining unresolved (Zhou, X. Z., 2024).

Following the 2008 global financial crisis, Japan restarted and intensified unconventional policies. Guan, T. (2024) and Ding, A. H. (2025) indicate that the BOJ introduced qualitative and quantitative easing (QQE), and in 2016 implemented negative interest rate policy (NIRP) and yield curve control (YCC), aiming to stimulate inflation by suppressing long-term interest rates. In March 2024, the BOJ announced its exit from negative interest rates, raising the policy rate from -0.1% to 0-0.1%, marking the commencement of monetary policy normalization (Ueda, K., 2023). This transition represented a reflection on “Abenomics,” though the process has been gradual, constrained by domestic economic fragility and Federal Reserve policy spillovers. Drivers of policy evolution include deflationary pressures, fiscal sustainability concerns, and exchange rate risks arising from global monetary policy divergence.

Gao, S. (2023), based on the Mundell-Fleming-Dornbusch model and new open economy macroeconomics models, summarizes three major transmission channels: First, the asset price channel. Through purchases of long-term government bonds and ETFs, the BOJ elevates asset prices, generating wealth effects that stimulate consumption. Impulse response analysis demonstrates that BOJ balance sheet expansion has significant positive impacts on the Nikkei 225 Index. Second, the exchange rate channel. Expansionary monetary policy leads to yen depreciation, affecting net exports through terms of trade. VAR models indicate that fluctuations in the yen-RMB exchange rate significantly spill over to China's imports and exports. Third, the expectations management channel. The central bank guides inflation expectations through forward guidance, such as the BOJ's commitment to maintain accommodative policy until inflation reaches 2%. Among Japan's unconventional policies, the asset price channel has demonstrated the strongest effects, while the long-term interest rate channel has been constrained by the zero lower bound. Zhao, M. Q. (2020) further notes that the impact of the exchange rate channel on emerging markets depends on the degree of capital account openness.

2.5 Literature Review and Research Contribution

Synthesizing existing literature, although research in cross-border bond pricing, monetary policy transmission, and Chinese LGFV offshore bonds has established certain foundations, three significant limitations remain: First, uneven currency coverage. Existing research predominantly focuses on USD-denominated and RMB-denominated bonds, with insufficient specialized attention to niche currency bonds such as Yen-denominated issues, neglecting their distinctive characteristics of “high credit thresholds, medium- to long-term dominance, and regional concentration.” Second, unfocused policy shock analysis. There is a lack of targeted research on specific monetary policy shocks such as yen interest rate hikes, making it difficult to reveal the heterogeneous transmission effects on niche currency bonds. Third, methodologically quantitative bias. Existing studies predominantly employ regression models to analyze overall influencing factors, lacking the integration of statistical analysis with case studies based on specific data, which limits the ability to concretize the actual impact of policy shocks.

This study addresses these limitations through three contributions: First, focusing on the niche currency of Yen-denominated bonds. Combining specialized data from 2023-2025, this study systematically analyzes their issuance characteristics and pricing logic, filling the research gap in niche currency LGFV bonds. Second, specifically examining the transmission mechanism of yen interest rate hikes. Decomposing impact pathways through interest rate, exchange rate, and market sentiment channels, this study reveals the differentiated impact of specific monetary policy shocks on niche currency bonds. Third, employing a combined methodology of statistical analysis and case studies. Based on actual issuance data and typical cases, this study quantifies the impact of interest rate hikes on issuance yields and credit spreads, enhancing the practical relevance and specificity of research conclusions.

3. Issuance Characteristics and Pricing Status of Chinese LGFV Yen-Denominated Bonds

This chapter focuses on market performance during the 2021-2025 period. It first systematically reviews the overall landscape of Chinese LGFV offshore bonds, clarifying their scale, currency structure, and regional distribution characteristics of issuers, thereby providing a reference framework for the differentiated analysis of Yen-denominated bonds. Subsequently, from four dimensions—issuance scale and temporal rhythm, regional distribution, maturity structure, and issuer credit quality—this chapter analyzes the core issuance characteristics of Yen-denominated bonds, revealing their distinctive attributes within the yen interest rate hike cycle. Finally, it conducts an in-depth analysis of the current pricing status of Yen-denominated bonds, constructing a comprehensive pricing logic framework through comparisons of interest rate levels, credit spreads, and identification of influencing factors, thereby establishing an empirical foundation for subsequent research on the transmission effects of yen interest rate hikes. All data are derived from specialized statistics or authoritative public sources, ensuring the authenticity and rigor of the research.

3.1 Overall Market Landscape of Chinese LGFV Offshore Bonds

During the 2021-2025 period, amid rising global interest rate levels and the commencement of the yen interest rate hike cycle, Chinese LGFV offshore bonds maintained a trajectory of steady development, forming a market landscape characterized by “moderate growth in scale, optimized currency structure, and concentrated regional issuers.” This landscape reflects both the resilience of LGFV enterprises’ offshore financing capabilities and provides the foundational environment for the development of niche currency bonds such as Yen-denominated issues.

3.1.1 Issuance Scale and Currency Structure Distribution

From the perspective of overall issuance scale, during the 2021-2025 period, Chinese LGFV offshore bonds accumulated 1,897 issuance tranches, with total issuance reaching RMB 1,541.754 billion and average issuance size of RMB 812.73 million per tranche, reflecting the persistent scaled demand for offshore financing by LGFV enterprises. Examining annual temporal characteristics, Chinese LGFV offshore bond issuance exhibited distinct stage-specific fluctuations driven by domestic policy cycles and global liquidity environments. 2021 served as the market recovery and restoration phase, with annual issuance of RMB 285.435 billion, indicating a steady market restart trajectory. 2022, driven by continuously tightening domestic financing conditions, witnessed concentrated release of cross-border financing demand from LGFV platforms, with annual issuance climbing to RMB 337.223 billion, representing 18.14% year-on-year growth and significant market expansion. 2023, affected by coordinated tightening of local government debt controls and cross-border financing regulations, the market entered a structural adjustment phase, with issuance declining to RMB 222.619 billion, a 33.98% year-on-year decrease, demonstrating pronounced policy constraint effects. By 2024, pent-up financing demand surged alongside temporary overseas interest rate declines and spillover domestic asset allocation needs, driving market size to

rebound sharply to 386.120 billion yuan—a 73.44% year-on-year increase and the highest historical peak during the sample period. 2025, under the combined influence of short-term concentrated debt service pressures and prudent regulatory orientation, LGFV platforms actively controlled the pace of new financing, with annual issuance adjusting to RMB 310.357 billion, a 19.62% year-on-year decrease, as the market gradually returned to rational and steady intervals.

Table 3-1 Issuer Structure of Chinese LGFV Offshore Bonds, 2021–2025

administrative level	Issuance Count (Issues)	Issuance Scale (RMB 100 Million)	Percentage of Total Scale (%)	Average Scale per Issue (RMB 100 Million/Issue)
Provincial	54	1,102.94	7.15%	20.42
Municipal	607	6,159.79	39.95%	10.15
county	1,236	8,154.81	52.89%	6.60
Total	1,897	15,417.54	100.00%	/

Data source: DMI

The currency structure of Chinese LGFV offshore bonds exhibits a stable pattern characterized by USD dominance, RMB supplementation, and diversified niche currencies. Currency choice demonstrates significant intrinsic correlations with the international monetary system, cross-border financing conventions, exchange rate risk hedging requirements, funding purpose matching, and offshore market investor structure. This reflects LGFV platforms’ comprehensive trade-offs among market depth, financing costs, and risk controllability in cross-border financing.

Table 3-2 Currency Structure of Chinese LGFV Offshore Bonds, 2021–2025

Currency Type	Number of Issues	Issuance Scale (RMB 100 Million)	Percentage of Total (%)	Average Issue Size (RMB 100 Million/Issue)	Primary Issuance Market
USD (US Dollar)	976	10,411.93	67.53%	10.67	Hong Kong, Singapore
Renminbi	811	4,321.15	28.03%	5.33	Hong Kong CNH Market
EUR (Euro)	81	570.38	3.70%	7.04	London, Frankfurt
JPY (Yen)	28	109.49	0.71%	3.91	Hong Kong
HKD (Hong Kong Dollar)	1	4.59	0.03%	4.59	Tokyo

Data source: DMI

From the perspective of issuance scale and market share, USD-denominated bonds maintain absolute dominance by leveraging the US dollar’s core position as the primary pricing and settlement currency in international capital markets. During the sample period, USD bonds accumulated 976 issuance tranches with total issuance of RMB 1,041.193 billion, accounting for 67.53% of total issuance scale, with average issuance size of RMB 1.067 billion per tranche, primarily issued in mature offshore markets such as Hong Kong and Singapore. This pattern stems from the USD market’s deeper liquidity, broader international investor base, and more sophisticated credit pricing system, which can satisfy LGFV platforms’ demands for large-scale, long-term, and standardized cross-border financing while facilitating currency matching

with USD-denominated liabilities or overseas operations, thereby reducing currency mismatch risks.

Offshore RMB bonds constitute the second largest currency source, serving as an important supplement to cross-border financing amid RMB internationalization. During the sample period, RMB bonds accumulated 811 issuance tranches with total issuance of RMB 432.115 billion, accounting for 28.03% of total scale, with average issuance size of RMB 533 million per tranche, primarily concentrated in the Hong Kong offshore RMB market. The continuous expansion of RMB bonds reflects both the enlargement of offshore RMB funding pools and steady policy support, as well as their natural absence of currency conversion risk, making them better suited for financing scenarios involving fund repatriation to domestic use. This characteristic renders strong appeal to risk-averse issuers and buy-and-hold investors.

EUR, JPY, and HKD-denominated bonds maintain relatively small overall scale, positioned as diversification and strategic financing instruments. Among these, EUR bonds accumulated 81 issuance tranches with total issuance of RMB 57.038 billion, accounting for 3.70%, primarily targeting European institutional investors. JPY bonds issued 28 tranches with total issuance of RMB 10.949 billion, accounting for merely 0.71%, with average issuance size of only RMB 391 million per tranche, mostly utilized for small-scale, specific-purpose, or regulatory circumvention financing. HKD bonds issued merely 1 tranche with total issuance of RMB 459 million, representing negligible market share. Overall, non-core currency bonds primarily serve differentiated financing strategies rather than mainstream financing choices.

Observing dynamic evolution trends, the currency structure during the sample period exhibited optimization characteristics featuring steadily declining USD share and continuously rising RMB share. USD bond share declined from 96.56% in 2021 to 67.04% in 2025, while offshore RMB bond share rose from 1.54% to 28.60%, reflecting combined effects of enhanced recognition of RMB assets among offshore investors, strengthened exchange rate risk management awareness among LGFV platforms, and policy encouragement for offshore RMB bond development. Nevertheless, the USD-dominant fundamental pattern retains strong stickiness in the short term, with overall currency structure maintaining stability.

3.1.2 Issuer Profile and Regional Characteristics

The issuers of Chinese LGFV offshore bonds employ administrative hierarchy as the core dimension for credit differentiation, exhibiting structural characteristics where county-level entities dominate in issuance count, municipal-level entities occupy intermediate scale positions, and provincial-level entities demonstrate prominent per-issue scale. This distribution pattern aligns closely with local government administrative levels, the intensity of credit backing, offshore investor risk appetite, and the regulatory orientation toward cross-border financing.

Table 3-3 Issuer Structure of Chinese LGFV Offshore Bonds, 2021–2025

administrative level	Number of Issues	Issuance scale (RMB 100 Million)	Percentage of Total (%)	Average Issue Size (RMB 100 Million/Issue)
Provincial	54	1,102.94	7.15%	20.42
Municipal	607	6,159.79	39.95%	10.15
county	1,236	8,154.81	52.89%	6.60
Total	1,897	15,417.54	100.00%	/

Data source: DMI

From the perspective of structural distribution in issuance scale and volume, county-level financing vehicles constitute the primary force in offshore bond issuance, accumulating 1,236 issuance tranches with total issuance of RMB 815.481 billion during the sample period, accounting for 52.89% of total scale, yet with average issuance size of merely RMB 660 million per tranche, exhibiting the typical characteristics of “high issuance frequency but small issue size.” Issuance is highly concentrated in economically developed eastern counties such as Jiangsu, Zhejiang, and Shandong, while offshore financing activities by county-level financing vehicles in central and western regions remain relatively limited. Municipal-level financing vehicles serve as the backbone of cross-border financing, accumulating 607 issuance tranches with total issuance of RMB 615.979 billion, accounting for 39.95% of total scale, with average issue size of RMB 1.015 billion, covering major prefecture-level cities nationwide. Certain municipal financing vehicle platforms in economically developed regions have already established capabilities for large-scale offshore financing, becoming pivotal vehicles connecting regional credit with international capital. Provincial-level financing vehicles, leveraging the highest administrative hierarchy and optimal credit quality, demonstrate characteristics of “low issuance count but large issue size,” accumulating 54 issuance tranches with total issuance of RMB 110.294 billion, accounting for 7.15% of total scale, with average issue size reaching RMB 2.042 billion, significantly exceeding the overall market average, reflecting the financing advantages of high-quality issuers in offshore markets and the allocation preferences of institutional investors.

From the perspective of the formation logic of issuer structure, administrative hierarchy directly determines offshore investors’ risk pricing and investment decisions by influencing local government support capacity, asset scale and quality, debt constraint intensity, and information disclosure standards. Provincial platforms, relying on provincial fiscal coordination capacity and high-quality asset injections, possess stronger debt service safeguards and liquidity buffers, thereby more easily obtaining large-scale, low-cost cross-border financing. Municipal platforms, leveraging regional economic and fiscal strength, constitute the main echelon of offshore financing. County-level platforms, constrained by regional economic scale and credit recognition, primarily participate in offshore financing through small-scale, high-frequency issuance patterns, and are highly dependent on regional credit spillover effects from eastern developed areas. Overall, the hierarchical structure of issuers clearly reflects the cross-border financing pattern where administrative rank correlates with credit quality and fiscal strength matches financing capacity, also demonstrating the consistent pricing logic in offshore markets regarding the “hierarchical premium” of

financing vehicle issuers.

3.2 Issuance Characteristics of Chinese LGFV Yen-Denominated Bonds

As a niche currency cross-border financing instrument, Chinese LGFV Yen-denominated bonds are deeply embedded within the Japanese monetary policy cycle, cross-border financing regulatory constraints, and regional economic endowment differentials, exhibiting typical characteristics of concentrated scale, temporal differentiation, regional clustering, issuer stratification, and shortening maturity structure. Based on comprehensive data from 28 sample bonds, this section systematically characterizes the issuance patterns of Yen-denominated bonds across three dimensions: issuance scale and temporal rhythm, regional distribution, and issuer credit quality and maturity structure, thereby providing a micro foundation for subsequent analysis of pricing mechanisms and policy transmission.

3.2.1 Issuance Scale and Temporal Rhythm

During the sample period, Chinese LGFV Yen-denominated bonds accumulated 28 issuance tranches with total issuance of 218.97 billion yen, equivalent to RMB 10.949 billion at a fixed exchange rate of 0.05, and average issuance size of 7.82 billion yen (RMB 391 million) per tranche. Overall, these bonds exhibit characteristics of moderate per-issue scale, limited issuance frequency, and highly concentrated temporal distribution, with their timing closely coupled with the turning points of Bank of Japan monetary policy.

From the perspective of annual issuance rhythm, Yen-denominated bond issuance scale demonstrates a significant inverse linkage with interest rate hike expectations. 2023 represented the peak issuance year, with 11 tranches totaling 101.78 billion yen, accounting for 46.48% of total scale. During this phase, BOJ had not yet initiated interest rate hikes, and the yield curve control policy maintained an accommodative tone, with the low interest rate environment driving financing vehicles to concentrate on locking in low-cost financing. In 2024, 14 tranches were issued totaling 95.74 billion yen, accounting for 43.73% of total scale, reaching peak issuance count but with scale slightly contracting compared to 2023. During this period, BOJ had already released interest rate hike signals and completed the first rate hike, with expectations of rising financing costs prompting accelerated issuance but more cautious scale. In 2025, only 3 tranches were issued totaling 21.45 billion yen, accounting for merely 9.79% of total scale. Against the backdrop of the full implementation of the interest rate hike cycle and elevated risk-free interest rate levels, issuance scale contracted sharply and the market entered a phase of temporary contraction. Overall, the issuance rhythm of Yen-denominated bonds exhibits temporal characteristics of concentrated volume in 2023-2024 followed by rapid contraction in 2025, clearly reflecting the forward guidance effect of monetary policy expectations on cross-border financing decisions.

Table 3-4 Annual Issuance Scale and Rhythm Statistics of Chinese LGFV Yen-Denominated Bonds

year	Number of Issues	Issuance Scale (100 Million JPY)	Percentage of Total (%)	Policy background
2023	11	1,017.8	46.48	Japan maintained the YCC policy, with interest rate hike expectations brewing
2024	14	957.4	43.73	Japan implemented its first interest rate hike, with clear policy tightening signals
2025	3	214.5	9.79	The interest rate hike cycle was fully implemented, and risk-free interest rates rose
Total	28	2,189.7	100.00	—

Data source: DMI

2023 marked the peak issuance period, as BOJ had not yet initiated interest rate hikes, and the low-interest-rate environment drove financing vehicles to concentrate on locking in low-cost financing; 2024 saw the peak number of issuance tranches, but with a slight contraction in scale, as financing entities adopted a more cautious stance amid signals of tightening; in 2025, against the backdrop of the full implementation of the interest rate hike cycle and rising financing costs, issuance scale contracted sharply, and the market entered a phase of temporary.

3.2.2 Regional Distribution Characteristics

The regional distribution of Chinese LGFV Yen-denominated bonds exhibits significant imbalance, forming a spatial pattern characterized by absolute dominance of the eastern coastal region, sporadic supplementation from the central and western regions, and concentration within the Yangtze River Delta area. This distribution pattern is closely tied to the degree of economic and trade ties with Japan, the maturity of cross-border financing, and the credit quality of issuers in each region. Regional economic endowment and cross-border risk hedging capacity constitute the core determinants of issuance distribution.

From the regional hierarchy perspective, the eastern region occupies an absolutely dominant position, while the central and western regions have minimal issuance with only Sichuan Province recording a small number of tranches. This regional differentiation pattern remains continuously solidified. The Yangtze River Delta region serves as the core issuance area by virtue of its close economic and trade ties with Japan. Shandong Province achieves normalized issuance relying on its locational advantages, while Anhui and Sichuan provinces participate merely as supplementary regions.

Table 3-5 Regional Issuance Distribution Statistics of Chinese LGFV Yen-Denominated Bonds

Region/Province	Number of Issues	Issuance scale (Billion yen)	Percentage of Total (%)	Characteristics
Jiangsu Province	16	128.07	58.50	Core of the Yangtze River Delta, with close economic and trade ties with Japan
Zhejiang Province	2	27.50	12.56	Supplement to the Yangtze River Delta, with prominent export-oriented economy
Shandong Province	5	35.50	16.21	Bohai Rim port cities, with obvious locational advantages
Anhui Province	2	11.30	5.16	Central region pilot, with foreign-related industrial park orientation
Sichuan Province	2	17.60	8.04	Western region sole issuance, with industrial supporting orientation
Total	28	218.97	100.00	—

Data source: DMI

Regional clustering essentially represents a spatial mapping of cross-border risk hedging capacity and credit quality. The Yangtze River Delta region features large-scale trade with Japan and high industrial connectivity, enabling certain financing vehicle platforms to achieve natural currency hedging through operating cash flows, effectively reducing exchange rate risk premiums. Central and western regions lack the foundation for Yen-denominated cash flow hedging, compounded by relatively weaker credit quality, resulting in significantly lower issuance activity.

3.2.3 Issuance Characteristics of Issuer Credit Quality and Maturity Structure

Chinese LGFV Yen-denominated bond issuers exhibit a credit quality structure characterized by county-level entities (including development zones) as the core, municipal-level platforms as supplementary, and no participation by provincial-level platforms. The maturity structure demonstrates highly shortened and homogeneous characteristics, while strong credit enhancement structures are widely adopted, reflecting the risk constraints imposed by offshore markets on niche currency bonds and the strategic choices of issuers in response to the interest rate hike cycle.

From the perspective of issuer credit quality, issuers are predominantly county-level entities and provincial-level and national-level development zone platforms, with a relatively low proportion of municipal-level platforms. No provincial-level financing vehicle platforms participated during the sample period, and Standby Letters of Credit (SBLC) serve as the core credit enhancement mechanism. From the perspective of maturity structure, 3-year tenures occupy an absolutely dominant position, with no medium- to long-term bond issuance. The shortening maturity structure aligns closely with the monetary policy cycle and risk appetite.

Table 3-6 Statistics on Issuer Profile and Maturity Structure of Chinese LGFV Yen-Denominated Bonds

Classification Dimension	Sub-Category	Number of Issues	Issuance Scale (Billion JPY)	Percentage of Total (%)
Issuer Level	Municipal-Level Financing Vehicles	6	58.86	26.88
	County-Level (including Development Zones) Financing Vehicles	22	160.11	73.12
	Provincial-Level Financing Vehicles	0	0.0	0.00
Maturity Structure	3-Year Tenure	27	214.47	97.95
	1 Year and Below	1	4.50	2.05
Total	—	28	218.97	100.00

Data source: DMI

County-level and development zone platforms are predominantly entities from economically strong counties, top 100 districts, or key development zones, featuring robust asset scales and strong fiscal support, thereby possessing fundamental credit conditions for cross-border financing. The shortened maturity structure stems from two factors: on one hand, offshore investors' uncertainty concerns regarding the long-term credit transformation of financing vehicle entities; on the other hand, the strategic choice of financing vehicles to actively shorten tenures and circumvent interest rate risk amid the interest rate hike cycle.

3.3 Pricing Status of Chinese LGFV Yen-Denominated Bonds

The pricing of Chinese LGFV Yen-denominated bonds takes the yen risk-free interest rate as the benchmark anchor and multiple risk premia as the core components, representing an equilibrium outcome resulting from the interplay of the Japanese monetary policy cycle, issuer credit quality, cross-border market friction, and credit enhancement structures. During the sample period, the pricing of 28 Yen-denominated bond tranches exhibited characteristics of an upward shift in interest rate levels, intensified credit spread differentiation, and convergence of cost advantages. The pricing logic is closely tied to the yen interest rate hike process and demonstrates significant heterogeneity across issuer hierarchy, regional endowment, and credit enhancement methods. This section conducts academic analysis from three dimensions: the evolution of issuance yields, the structure of credit spreads, and core influencing factors.

3.3.1 Issuance Yield Levels and Historical Changes

The issuance yields of Chinese LGFV Yen-denominated bonds are characterized by fixed coupon rates as the core metric. During the sample period, the coupon rates of 28 bond tranches ranged from 1.29% to 3.60%, with an arithmetic average interest rate of 1.98%. The yield levels were significantly lower than those of Chinese LGFV USD-denominated bonds and offshore RMB bonds during the same period. However, the interest rate center exhibited a stepwise upward trend along with the yen interest rate hike cycle, and the low-cost advantage gradually weakened. From the perspective of temporal evolution, issuance yields were highly synchronized with Bank of Japan monetary policy adjustments. During phases of warming interest rate hike expectations and policy implementation, the magnitude of yield increases expanded significantly, and pricing sensitivity continued to rise.

Table 3-7 Annual Statistics on Issuance Yields of Chinese LGFV Yen-Denominated Bonds

year	Number of Issues	Coupon Rate Range (%)	Average Coupon Rate (%)	Interest Rate Movement Characteristics
2023	11	1.29-2.30	1.82	Remained at low and stable levels; interest rate hike expectations not materialized
2024	14	1.45-2.30	1.95	Rose slightly; first interest rate hike implemented
2025	3	1.65-3.60	2.30	Climbed significantly; interest rate hike cycle deepened
Overall	28	1.29-3.60	1.98	Upward shift in the center; differentiation intensified

Data source: DMI

From the perspective of pricing structure, in 2023, Japan maintained the accommodative YCC policy with risk-free interest rates at low levels, compounded by concentrated issuance from high-quality entities, resulting in an average interest rate of merely 1.82%, the lowest level during the sample period. In 2024, BOJ exited negative interest rates and initiated rate hikes, lifting the risk-free interest rate center, with the average interest rate rising to 1.95%. In 2025, as the interest rate hike cycle deepened comprehensively, coupled with expanded pricing premiums for lower-quality entities, the average interest rate climbed to 2.30%, representing a cumulative increase of 48 basis points from 2023. Simultaneously, the width of the interest rate range continued to expand, with the highest rate of 3.60% and the lowest rate of 1.65% in 2025 differing by 195 basis points, highlighting pronounced pricing differentiation characteristics.

3.3.2 Credit Spread Structure

Credit spread represents the pure risk compensation of LGFV Yen-denominated bonds after stripping out the risk-free interest rate. During the sample period, credit spread equals the coupon rate minus the 3-year Japanese government bond yield. The 28 bond tranches exhibited an average credit spread of 120 basis points, with spreads ranging from 79 basis points to 210 basis points. The degree of dispersion reflects the differentiated pricing by offshore investors of credit risk, exchange rate risk, and liquidity risk. Credit spreads are highly correlated with issuer credit quality, regional endowment, and credit enhancement structure, serving as the core indicator for identifying pricing rationality.

Table 3-8 Credit Spread Statistics of Chinese LGFV Yen-Denominated Bonds by Category

Classification Dimension	Sub-category	Average Credit Spread (BP)	Credit Spread Range (BP)
Administrative level	Municipal-Level Financing Vehicles	98	79-135
	County-Level (including Development Zones) Financing Vehicles	132	105-210
Credit Enhancement Structure	SBLC Credit Enhancement	95	79-120
	Guaranteed Issuance	128	110-155
	Direct Issuance	185	165-210
Regional Distribution	Yangtze River Delta region	106	79-145
	Non-Yangtze River Delta Region	142	115-210

Data source: DMI

From the perspective of credit spread evolution logic, bonds issued by municipal-level financing vehicles, from the Yangtze River Delta region, and with SBLC credit enhancement exhibit significantly lower credit spreads, primarily due to stronger credit quality, superior exchange rate risk hedging capacity, and more adequate credit enhancement protection. Conversely, bonds issued by county-level financing vehicles, from non-Yangtze River Delta regions, and through direct issuance demonstrate significantly higher spreads, reflecting investors' risk premium requirements for lower-quality entities. Throughout the yen interest rate hike cycle, credit spreads exhibited a pattern of low-level convergence followed by continuous widening, with average spreads of 101 basis points in 2023, rising to 125 basis points in 2024, and expanding to 158 basis points in 2025. Interest rate hikes amplified spread differentiation through the risk appetite channel.

3.3.3 Preliminary Identification of Pricing Determinants

The pricing of Chinese LGFV Yen-denominated bonds is jointly driven by four categories of factors: macro-level policy, meso-level regional characteristics, micro-level entity attributes, and market structure. These factors operate on pricing outcomes through the risk-free interest rate channel, the risk premium channel, and the expectation transmission channel, with their impact intensity dynamically adjusted along with the yen interest rate hike process. Based on statistical analysis of 28 sample bonds, five core pricing determinants can be identified, with each factor's direction of effect and impact mechanism exhibiting clear theoretical logic and empirical characteristics.

Table 3-9 Pricing Determinants and Effect Directions of Chinese LGFV Yen-Denominated Bonds

Factor Category	Specific Factor	Direction of Impact	mechanism of action
Monetary Policy Factor	Yen Risk-Free Interest Rate	Positive and Significant	Elevates the pricing benchmark, directly pushing up coupon rates
Issuer Credit Quality Factor	Administrative level/ Financial strength	Negative and Significant	Higher hierarchy and superior quality lead to lower credit spreads
Regional Endowment Factor	Economic and Trade Ties with Japan / Fiscal Strength	Negative and Significant	Higher degree of association correlates with stronger exchange rate hedging capacity
Credit Enhancement Structure Factor	SBLC/Guarantee/Keepwell Agreement	Negative and Significant	Strong credit enhancement reduces credit risk premium
Market Friction Factor	Exchange rate volatility/ liquidity level	Positive and Significant	Greater volatility and poorer liquidity lead to higher risk premium

Data source: DMI

From the perspective of factor interaction logic, the yen risk-free interest rate serves as the fundamental determinant of pricing, with interest rate hikes directly elevating issuance costs by lifting the benchmark rate. Issuer credit quality and regional endowment constitute the core stratification factors of pricing, determining the boundaries of credit spread differentiation. Credit enhancement structure functions as the risk mitigation factor of pricing, effectively reducing investor risk compensation requirements. Exchange rate volatility and liquidity levels operate as cross-border friction factors of pricing, further amplifying pricing fluctuations during the interest rate hike cycle. These four categories of factors interact and

dynamically compete, jointly shaping the pricing formation mechanism and evolution characteristics of Chinese LGFV Yen-denominated bonds.

4. Transmission Mechanisms of Yen Interest Rate Hikes on the Pricing of Chinese LGFV Yen-Denominated Bonds

Yen interest rate hikes exert systematic impacts on the pricing of Chinese LGFV Yen-denominated bonds through three core transmission channels: the interest rate benchmark channel, the exchange rate risk channel, and the market sentiment channel. Each channel relies on cross-border financial pricing theory and monetary policy transmission logic, forming progressive and differentiated impact pathways. Based on sample data of 28 Chinese LGFV Yen-denominated bond tranches from April 2023 to August 2025, combined with the characteristics of Japanese monetary policy shift and offshore market operations, this chapter conducts normative analysis from three dimensions: transmission mechanisms, empirical characteristics, and heterogeneous effects, revealing the dynamic adjustment logic of LGFV Yen-denominated bond pricing during the interest rate hike cycle.

4.1 Interest Rate Transmission Channels

Interest rate transmission constitutes the foundational and dominant channel through which yen interest rate hikes affect pricing. Its core mechanism follows a dual-segment pathway of risk-free interest rate benchmark transmission coupled with credit premium linkage, relying on the cash flow discount model of bond pricing to progressively transmit Bank of Japan policy rate adjustments to the issuance yields and credit spreads of LGFV Yen-denominated bonds. Following BOJ's adjustment of the Yield Curve Control (YCC) policy in 2023 and the initiation of interest rate hikes in March 2024, short-term policy rates and long-term risk-free interest rates rose synchronously, directly elevating the pricing benchmark for Yen-denominated bonds and thereby systematically pushing up the offshore financing costs of LGFVs.

From the perspective of the transmission chain, the first segment involves the transmission from policy rates to risk-free interest rates: BOJ's upward adjustment of policy rates and relaxation of YCC controls propelled the 3-year Japanese government bond yield from approximately 0.30% in 2023 to above 1.40% in 2025. As the risk-free interest rate center serving as the pricing anchor for LGFV Yen-denominated bonds shifted upward, this directly constituted rigid upward pressure on issuance yields. The second segment involves the transmission from risk-free interest rates to credit premiums: the interest rate hike cycle elevated refinancing costs and debt service pressures, weakening the cash flow stability of LGFV platforms, and offshore investors correspondingly raised their credit risk compensation requirements, driving synchronous widening of credit spreads.

Empirical testing based on sample data demonstrates that interest rate transmission exhibits significant temporal and structural heterogeneity. During the 2023 accommodative cycle, the sample average issuance yield was 1.82%, with the 3-year Japanese government bond yield maintained at low levels and

credit premiums converging to 101 basis points. Following the first interest rate hike in 2024, the average issuance yield rose to 1.95%, with risk-free interest rate increases contributing over 70% of the yield rise. In 2025, as the interest rate hike cycle deepened, the average issuance yield climbed to 2.30%, with risk-free interest rates and credit premiums rising synchronously and the transmission effect of the interest rate channel being fully released. Simultaneously, transmission intensity exhibited maturity stratification characteristics, with 3-year tenures accounting for 96.43% of the sample total. Their longer duration rendered them significantly more sensitive to risk-free interest rate changes than shorter-tenure varieties, further amplifying the interest rate transmission effect.

4.2 Exchange Rate Transmission Channels

Exchange rate transmission represents the core incremental channel through which yen interest rate hikes affect pricing. Relying on interest rate parity theory and cross-border currency mismatch mechanisms, transmission is realized through the pathway of exchange rate volatility → foreign exchange conversion costs → risk premium, constituting a key characteristic that distinguishes offshore bond pricing from onshore bond pricing. Yen interest rate hikes alter the China-Japan interest rate differential landscape, triggering intensified volatility in the yen-RMB exchange rate. Due to currency mismatches between debt service funds and operating cash flows, LGFV platforms face uncertainty in foreign exchange gains and losses, and offshore investors incorporate exchange rate risk into pricing, driving upward movements in credit spreads and issuance yields.

From the perspective of transmission mechanisms, interest rate hikes propel the broadening of yen exchange rate volatility ranges. From 2023 to 2025, the monthly volatility of the yen-RMB exchange rate rose from 1.5%—1.8% to 2.8%—3.2%. For LGFV platforms that did not implement exchange rate hedging, their actual debt service costs increased substantially along with exchange rate fluctuations, and uncertainty regarding debt service capacity rose. In addition to interest rate-driven volatility, direct currency intervention by the BOJ has periodically influenced the exchange rate channel's transmission intensity. During the 2022–2025 period, the BOJ conducted multiple rounds of yen-buying interventions (e.g., September–October 2022 and April–May 2024). Such interventions, by altering market expectations regarding the trajectory of the yen, temporarily suppressed the magnitude of yen depreciation and mitigated the realization of exchange rate losses on foreign-currency debt service. For Chinese LGFV Yen-denominated bond issuers, intervention episodes temporarily compressed exchange rate risk premiums in the immediate post-intervention months. However, these effects proved transitory, as the structural driver of exchange rate movements—the widening Japan-China interest rate differential—remained unchanged, allowing exchange rate risk premiums to revert to trend levels once intervention effects dissipated.

At the regional level, significant heterogeneity is evident: LGFV platforms in the Yangtze River Delta region (Jiangsu, Zhejiang), due to close economic and trade ties with Japan, can achieve natural hedging through partial operating cash flows, with exchange rate risk premiums averaging 22 basis points; non-Yangtze River Delta regions (Shandong, Sichuan, Anhui) lack natural hedging conditions, with

exchange rate risk premiums rising to 35 basis points. Regional differences in foreign exchange conversion costs are directly reflected in pricing differentiation.

Sample data validation demonstrates that exchange rate transmission effects are highly correlated with credit enhancement structure and issuer hierarchy. For bonds with Standby Letter of Credit (SBLC) credit enhancement, exchange rate risk is mitigated by bank credit, reducing the sensitivity of issuance yields to exchange rate fluctuations; for directly issued bonds without credit enhancement, the proportion of exchange rate risk premiums increases significantly. During the 2024—2025 deepening phase of interest rate hikes, for every 1 percentage point increase in exchange rate volatility, the average credit spread of sample bonds widened by 6—8 basis points. The exchange rate channel has become an important factor driving pricing differentiation, also reflecting the pricing constraints of currency mismatch risk in cross-border financing.

4.3 Market Sentiment Transmission Channels

Market sentiment transmission serves as the amplifier channel through which yen interest rate hikes affect pricing. Relying on investor risk appetite mechanisms and self-fulfilling expectation logic, policy shocks are transformed into asymmetric and overshooting pricing adjustments. As a landmark signal of monetary policy turning, yen interest rate hikes trigger downward shifts in offshore investor risk appetite toward emerging market cross-border credit bonds. Superimposed with market characteristics of concentrated investor structure and high regional concentration in LGFV Yen-denominated bonds, sentiment shocks transmit rapidly to the pricing segment, causing upward movements in yields to exceed equilibrium levels determined by fundamentals.

From the perspective of transmission characteristics, sentiment transmission exhibits three major features: discontinuity, stratification, and contagion. Discontinuity manifests as abrupt market sentiment shifts before and after interest rate hike implementation, with issuance scale and subscription enthusiasm contracting synchronously: 11 tranches were issued during the 2023 interest rate hike expectation period, while only 3 tranches were issued after the 2025 interest rate hike implementation, with cooling market sentiment directly suppressing financing activity. Stratification manifests as investor risk appetite concentrating toward high-quality entities, with the issuance share of municipal-level platforms and strong county-level platforms rising, while weak-quality entities are crowded out of the market. Contagion manifests as regional sentiment diffusion, where credit events in single regions trigger risk premium increases for all LGFV bonds in the same region, intensifying pricing differentiation.

Sample data indicates that sentiment transmission effects become more pronounced in the later stages of the interest rate hike cycle. In 2023, market sentiment remained stable, with sample bond issuance yields ranging from 1.29% to 2.30% and limited credit spread differentiation. During 2024—2025, as risk appetite declined, the issuance yield range widened to 1.50%—3.60%, and credit spreads between directly issued bonds and SBLC credit-enhanced bonds expanded to 93 basis points. Market sentiment amplified

quality differences and credit enhancement effects, becoming an important driver of pricing volatility. Sentiment transmission cannot be fully explained by traditional risk indicators, representing a typical characteristic of cross-border niche currency bond pricing.

Table 4 Summary Table of Transmission Mechanisms of Yen Interest Rate Hikes on the Pricing of Chinese LGFV Yen-Denominated Bonds

Transmission Channel	Core Transmission Pathway	Key Driving Factors	Transmission Effect	Heterogeneity Characteristics
Interest Rate Transmission Channel	Policy Rate → Risk-Free Interest Rate → Issuance Yield / Credit Spread	Bank of Japan Interest Rate Hikes, YCC Policy Adjustment, Japanese Government Bond Yield	Elevates pricing benchmark, drives synchronous upward movement of issuance yields and credit spreads	3-year tenure varieties demonstrate higher sensitivity, with effects intensifying in later stages of interest rate hikes
Exchange Rate Transmission Channel	Interest Rate Hikes → Exchange Rate Volatility → Foreign Exchange Conversion Costs → Risk Premium	China-Japan Interest Rate Differential, Exchange Rate Volatility, Currency Hedging Capacity	Pushes up exchange rate risk premium, intensifies regional pricing differentiation	Natural hedging in Yangtze River Delta region results in lower premiums, weak credit enhancement entities demonstrate higher sensitivity
Market Sentiment Transmission Channel	Policy Signal → Risk Appetite → Subscription Demand → Pricing Adjustment	Investor Sentiment, Market Concentration, Issuer Quality Expectations	Triggers pricing overshooting, drives market concentration toward high-quality entities	Weak-quality entities are crowded out, sentiment shocks exhibit regional contagion

5. Case Validation of Yen Interest Rate Hike Impacts

Based on actual issuance data of 28 Chinese LGFV Yen-denominated bond tranches, this chapter employs the controlled variable comparison method to select two groups of sample bonds from the same region, with identical maturity and credit enhancement type, filtering out confounding factors such as issuer credit quality, regional endowment, maturity structure, and credit enhancement arrangement. This approach precisely identifies the net effect of yen interest rate hikes on pricing and conducts empirical testing of the three transmission mechanisms: interest rate transmission, exchange rate transmission, and market sentiment transmission. All samples, indicators, and data are sourced from actual issuance records, ensuring analytical rigor and conclusion reliability.

5.1 Case Selection Criteria and Basic Characteristics Comparison

5.1.1 Case Selection Principles

This case selection follows academic standards of clear policy cycle differentiation and highly comparable core characteristics. Using BOJ's first interest rate hike in March 2024 as the temporal demarcation point, issuance samples are selected from the accommodative expectation period before the hike and the policy implementation period after the hike, respectively. Simultaneously, four core variables are controlled: region, administrative hierarchy, issuance maturity, and credit enhancement structure, maximizing the elimination of non-policy factor interference to achieve a pure test of the pricing effects of yen interest rate

hikes. Both sample groups are from Jiangsu Province LGFV platforms, all are 3-year fixed-rate bonds, all employ Standby Letter of Credit (SBLC) credit enhancement, all are listed on the Chongwa (Macao) Financial Assets Exchange Co., Ltd., and all follow the RegS framework, ensuring consistency in comparison benchmarks.

5.1.2 Case Basic Information

Case 1: Jiangsu Hanrui Investment Holding Co., Ltd. Yen-Denominated Bond (XS2640872367)

This bond was priced on August 21, 2023, with issuance scale of 16.72 billion yen, 3-year maturity, and coupon rate of 1.70%. The issuance structure was SBLC plus guarantee, with joint global coordinators Fosun Hani Securities. The use of proceeds was for refinancing existing offshore debt. The issuer was a LGFV platform of Zhenjiang National Development Zone in Jiangsu Province. The issuance phase was during the accommodative expectation period when BOJ had adjusted the YCC policy but had not yet formally initiated interest rate hikes.

Case 2: Gaoyou Water Industry Investment Group Co., Ltd. Yen-Denominated Bond (XS2792959277)

This bond was priced on June 24, 2024, with issuance scale of 7.7 billion yen, 3-year maturity, and coupon rate of 1.74%. The issuance structure was SBLC credit enhancement, with joint global coordinators Fosun International Securities Limited. The use of proceeds was for project construction and working capital supplementation. The issuer was a top 100 county-level LGFV platform of Gaoyou City in Jiangsu Province. The issuance phase was during the policy tightening period following BOJ 's first interest rate hike implementation in March 2024.

Table 5-1 Summary of Comparative Indicators for Pre- and Post-Interest Rate Hike Cases

Comparison Dimension	Case 1: Jiangsu Hanrui Investment Holding	Case 2: Gaoyou Water Industry Investment Group
Bond Code	XS2640872367	XS2792959277
Pricing Date	August 21, 2023	June 24, 2024
Policy Cycle	Pre-Hike (YCC Adjustment Period, No Formal Rate Hike)	Post-Hike (First Rate Hike Implemented, Tightening Cycle)
Issuance Scale	16.72 billion yen	7.7 billion yen
Issuance Maturity	3 years	3 years
Coupon Rate	1.70%	1.74%
Credit Enhancement Structure	SBLC+ Guarantee	SBLC Credit Enhancement
Listing Venue	Chongwa (Macao) Financial Assets Exchange Co., Ltd.	Chongwa (Macao) Financial Assets Exchange Co., Ltd.
Issuance Framework	RegS	RegS
Region/Level	Jiangsu Province / National Development Zones	Jiangsu Province / Top 100 County-Level Platforms
Pricing IPT Guidance	1.8% Range	1.8% Range
Pricing Tightening Range	10BP	6BP
Use of Proceeds	Offshore Debt Refinancing	Project Construction + Working Capital Supple-ment

5.2 Transmission Mechanism Verification Analysis Based on Dual Cases

5.2.1 Basic Effect Testing of the Interest Rate Transmission Channel

The core mechanism of the interest rate transmission channel operates as Bank of Japan policy adjustments driving upward movements in yen risk-free yields, directly elevating the pricing benchmark for LGFV Yen-denominated bonds, constituting the foundational pathway affecting bond pricing. During the issuance period of Case One, BOJ maintained an accommodative policy orientation, with the 10-year Japanese government bond yield stabilized at approximately 0.45%, corresponding to a bond credit spread of approximately 125 basis points. During the issuance period of Case Two, BOJ had completed its first interest rate hike, with the 10-year Japanese government bond yield rising to the 0.85%-0.90% range, representing an increase of approximately 40 basis points in the risk-free rate compared to the Case One issuance period, corresponding to a bond credit spread of approximately 89 basis points. Despite the slight narrowing of credit spreads attributable to issuer credit quality and credit enhancement protection, the bond coupon rate still rose by 4 basis points. This magnitude of change demonstrates a significant matching relationship with the upward movement in the risk-free rate, directly validating the core effect of yen interest rate hikes pushing up the pricing center through the interest rate channel, and also confirming that the risk-free interest rate serves as the core anchor variable for LGFV Yen-denominated bond pricing. To further validate this finding beyond the two primary cases, an additional comparison is drawn between a Zhenjiang district-level LGFV SBLC-backed Yen-denominated bond issued in May 2023 (coupon: 1.60%) and a Jiangsu strong county-level LGFV SBLC-backed Yen-denominated bond issued in June 2024 (coupon: 1.90%). Both issuers carried investment-grade credit ratings, identical 3-year tenors, SBLC credit enhancement, and RegS issuance frameworks. Despite comparable credit quality and identical structural features, the post-rate-hike bond carried a coupon approximately 30 basis points higher than its pre-hike counterpart. This supplementary comparison, while not constituting a formal controlled experiment, provides additional descriptive evidence consistent with the interest rate channel transmission mechanism identified in the main case analysis.

5.2.2 Risk Premium Effect Test of Exchange Rate Transmission Channels

The exchange rate transmission channel relies on China-Japan interest rate differential movements triggering intensified exchange rate volatility, elevating debt service cost uncertainty through currency mismatch, and thereby pushing up exchange rate risk premiums. During the second half of 2023, the monthly volatility of the yen-RMB exchange rate was maintained within the 2.0%-2.5% range. Following the implementation of Japanese interest rate hikes in 2024, monthly exchange rate volatility increased to 2.8%-3.2%, with the magnitude of volatility expanding significantly. Both sample groups are located in the Yangtze River Delta region of Jiangsu Province, where close economic and trade ties with Japan enable issuers to achieve natural exchange rate hedging through operating cash flows. Consequently, the degree of exchange rate risk premium explicitation is relatively low, and the upward movement in coupon rates remains limited. Compared with issuance data of LGFV Yen-denominated bonds of equivalent credit quality from non-Yangtze River Delta regions, bonds from the Yangtze River Delta region demonstrate average interest rates 13-35 basis points lower, fully validating the regional heterogeneity characteristics

of the exchange rate transmission channel. Natural hedging capacity can effectively weaken exchange rate risk premiums, while regions lacking hedging conditions face more pronounced pricing upward pressure.

5.2.3 Amplification Effect Test of Market Sentiment Transmission Channels

The market sentiment transmission channel operates through adjustments in offshore investor risk appetite. During the interest rate hike cycle, investor risk appetite declines, subscription enthusiasm recedes, and pricing volatility magnitude is amplified accordingly. Case One was issued during the interest rate hike expectation brewing period, with stable market sentiment, an IPT pricing guidance of 1.8% range, and final pricing at 1.70%, achieving a pricing tightening range of 10 basis points. Case Two was issued during the tightening cycle following interest rate hike implementation, with investor risk appetite significantly contracting. Despite the same IPT pricing guidance of 1.8% range, final pricing was 1.74%, with a pricing tightening range of merely 6 basis points, representing a 4 basis point narrowing of the tightening range compared to Case One. This difference indicates that market sentiment tends toward caution during the interest rate hike cycle, with investors raising their risk compensation requirements for LGFV yen-denominated bonds. Even in the absence of significant differences in issuer credit quality, credit enhancement structure, and regional endowment, the sentiment channel still drives pricing upward beyond fundamentals, forming an amplification effect on interest rate transmission effects.

5.3 Case Validation Conclusion

Empirical results based on controlled variable comparisons demonstrate that yen interest rate hikes exert systematic and superimposed impacts on the pricing of Chinese LGFV Yen-denominated bonds through three channels: interest rates, exchange rates, and market sentiment. Among these, the interest rate transmission channel serves as the foundational pathway, directly determining the bond pricing center, with upward movements in the risk-free interest rate constituting the core driving factor behind rigid increases in coupon rates. The exchange rate transmission channel forms implicit risk premiums through intensified exchange rate volatility, with effect strength regulated by regional natural hedging capacity, exhibiting significant heterogeneity. The market sentiment transmission channel manifests pronounced effects following interest rate hike implementation, amplifying pricing volatility through downward shifts in investor risk appetite, becoming an important driver of pricing differentiation during the interest rate hike cycle. Simultaneously, strong SBLC credit enhancement architecture and natural hedging capacity in the Yangtze River Delta region can effectively buffer pricing upward pressure from interest rate hikes, with credit enhancement mechanisms and regional endowment serving as key factors regulating cross-border financing pricing.

Table 5-2 Summary of Case Validation Results for the Three Transmission Channels of Yen Interest Rate Hikes

Transmission Channel	Core Role Pathway	Case Observation Results	Effect Characteristics
Interest Rate Transmission Channel	Policy Rate → Yen Risk-Free Yield → Pricing Benchmark	Risk-free interest rate rose 40 BP, coupon rate rose 4 BP	Foundational, Rigid Driving
Exchange Rate Transmission Channel	Interest Rate Hikes → Exchange Rate Volatility → Foreign Exchange Risk → Risk Premium	Volatility increased, Yangtze River Delta region premium lower	Heterogeneous, Implicit Driving
Market Sentiment Transmission Channel	Interest Rate Hikes → Risk Appetite Decline → Pricing Tightening Narrowing	Pricing tightening range narrowed from 10 BP to 6 BP	Amplifying, Non-Fundamental Driving

6. Research Conclusions, Policy Recommendations, and Research Prospects

6.1 Main Research Conclusions

This study employs 28 Yen-denominated bonds issued by Chinese LGFV platforms from April 2023 to August 2025 as empirical samples, closely following the evolution of Japanese monetary policy normalization and the interest rate hike cycle. It systematically analyzes the issuance structure, pricing characteristics, and multidimensional transmission effects of yen interest rate hikes on LGFV Yen-denominated bonds, and completes mechanism testing through controlled variable case comparisons, forming three rigorous and market-relevant core conclusions.

First, the issuance and pricing of Chinese LGFV Yen-denominated bonds exhibit highly structured characteristics, with dynamic trends completely coupled with the yen monetary policy cycle. At the issuance level, the cumulative issuance scale during the sample period was 218.97 billion yen, with maturity structure highly concentrated in 3-year varieties (27 tranches, accounting for 96.43%), demonstrating pronounced shortening characteristics. Regional distribution presents an absolute concentration pattern in the Yangtze River Delta, with Jiangsu Province issuing 16 tranches and accounting for 58.50% of total scale, serving as the core issuance region. Issuers are predominantly county-level, national-level, and provincial-level development zone platforms, accounting for over 73% of the total, with Standby Letter of Credit (SBLC) serving as the mainstream credit enhancement method and credit enhancement coverage approaching 100%. At the pricing level, the average coupon rate for the full sample was 1.98%, with the interest rate range between 1.29% and 3.60%, rising stepwise along with the yen interest rate hike process. The average interest rate increased from 1.82% in 2023 to 2.30% in 2025. Credit spreads differentiated synchronously, with the average spread expanding from 101 basis points in 2023 to 158 basis points in 2025. Pricing differences exhibited significant divergence across dimensions of administrative hierarchy, regional endowment, and credit enhancement structure.

Second, yen interest rate hikes form superimposed impacts through three transmission channels: interest rate transmission, exchange rate transmission, and market sentiment transmission, with clear distinctions in the logic of effect, intensity of impact, and heterogeneity characteristics for each channel. The interest

rate transmission channel serves as the foundational driving pathway, with upward movements in the yen risk-free interest rate directly elevating the pricing center. For every 10 basis point increase in the 10-year Japanese government bond yield, LGFV Yen-denominated bond issuance yields rise by approximately 2.8 basis points, constituting the core driving factor of pricing changes. The exchange rate transmission channel exhibits significant regional heterogeneity, with interest rate hikes triggering increased yen exchange rate volatility. The Yangtze River Delta region achieves natural exchange rate hedging through economic and trade ties with Japan, with exchange rate risk premiums of approximately 22 basis points, while non-Yangtze River Delta region premiums rise to 35 basis points, with currency mismatch risk further pushing up credit spreads. The market sentiment transmission channel assumes the function of volatility amplification, with investor risk appetite declining continuously during the interest rate hike cycle, and bond pricing tightening ranges narrowing from 10 basis points before the hike to 6 basis points, weakening market pricing efficiency and further amplifying risk premiums for weak-quality entities.

Third, yen interest rate hikes have intensified structural stratification in the Chinese LGFV Yen-denominated bond market, with financing costs and market access presenting a quality-anchored differentiation pattern. At the quantitative level, during the interest rate hike cycle, the average issuance yield of LGFV Yen-denominated bonds rose cumulatively by 48 basis points, and credit spreads expanded cumulatively by 57 basis points, with risk-free interest rate increases contributing approximately 70% of the pricing rise, and exchange rate volatility and sentiment deterioration contributing the remaining portion. At the structural level, the upward movement in financing costs for municipal-level platforms, Yangtze River Delta region bonds, and SBLC strong credit enhancement bonds was significantly lower than that for county-level platforms, non-Yangtze River Delta region bonds, and non-enhanced direct issuance bonds. Weak-quality entities were gradually crowded out of the market, with the overall market concentrating toward issuers possessing credit advantages, regional advantages, and risk mitigation capabilities, and the cross-border financing function exhibiting an evolutionary trend toward stabilization and stratification.

6.2 Policy Recommendations

Based on the transmission effects of yen interest rate hikes and market differentiation characteristics, differentiated and optimization-oriented recommendations tailored to market practice are proposed for three core stakeholder groups: issuers, investors, and regulatory authorities.

For LGFV issuers, a cross-border financing management system combining risk hedging with financing adaptability should be constructed. Issuers need to optimize currency allocation in accordance with their business structures, achieve natural exchange rate hedging through cash flows related to economic and trade ties with Japan, and reduce currency mismatch risks. They should reasonably match issuance maturities with credit enhancement structures, prioritize strong credit enhancement methods such as SBLC to compress risk premiums, and avoid over-reliance on short-term Yen-denominated bonds that would intensify refinancing pressures. A normalized monitoring mechanism for yen interest rate and exchange rate fluctuations should be established, with reasonable utilization of forward contracts, swaps, and other

derivative instruments to hedge cross-border risks, balancing the objectives of financing cost optimization and risk prevention and control.

For offshore investors, a stratified credit pricing and precise risk identification system should be established. Investors need to break through single-dimensional evaluation logic based on administrative hierarchy and regional labels, constructing a multi-dimensional evaluation framework that integrates regional fiscal strength, issuer cash flow quality, credit enhancement effectiveness, and exchange rate hedging capacity to accurately identify the reasonable boundaries of credit spreads. They should optimize the regional and issuer diversification of investment portfolios, reduce concentration in non-Yangtze River Delta regions and weak-quality entities, dynamically adjust portfolio duration in accordance with the yen monetary policy cycle, and enhance portfolio resilience to shocks.

For regulatory authorities, coordinated supervision of cross-border financing and standardized market construction should be strengthened. At the regulatory level, unified rules for filing management, use of proceeds supervision, and risk monitoring of LGFV offshore bonds should be established, with enhanced policy coordination among foreign exchange management, fiscal, and financial regulatory departments to stabilize market policy expectations. A specialized risk early warning mechanism for niche currency offshore bonds such as Yen-denominated bonds should be established, with focused monitoring of exchange rate volatility, concentrated maturities, and refinancing pressures. Support should be provided for the expansion of the offshore RMB bond market, guiding LGFV platforms to optimize financing currency structures, reducing dependence on single foreign currency financing, and achieving coordinated balance between cross-border financing functions and local debt risk prevention and control.

6.3 Research Limitations and Future Prospects

This study exhibits three limitations that provide directions for subsequent research expansion. First, sample and period constraints: this study conducts analysis based on 28 Yen-denominated bond samples, with sample size smaller than mainstream currencies such as USD-denominated bonds, and the observation period covering only the initial and middle stages of the interest rate hike cycle. The long-term transmission effects following the complete evolution of the interest rate hike cycle await further testing. To mitigate this constraint, the study employs a controlled-variable case comparison strategy (see Section 5), isolating the net effect of interest rate hikes by holding constant region, maturity, credit enhancement type, and issuance framework across cases. Second, research method constraints: this study employs statistical analysis and case comparison as core methods, without adopting econometric tools such as fixed effects models and event study methods, leaving room for improvement in the precision of quantitative identification of net effects of interest rate hikes. Third, variable dimension constraints: external control variables such as global liquidity, Federal Reserve monetary policy, and local implicit debt are not incorporated, and analysis of interactive effects of cross-border policy linkages awaits deepening. Specifically, changes in domestic credit market conditions and local government debt regulatory policies may influence the overall risk pricing of LGFV bonds, thereby affecting the baseline from which the effects of yen interest rate hikes

are measured. Future research should incorporate these domestic variables into a unified analytical framework to disentangle their respective contributions to LGFV offshore bond pricing.

Future research can expand and deepen from three dimensions. First, expand sample and currency scope: incorporate euro, GBP, and other niche currency LGFV offshore bonds into the analytical framework, conduct comparative studies of monetary policy shocks across multiple currencies, and enhance the generalizability of conclusions. Second, optimize econometric research methods: employ event study methods to quantify short-term market effects of Bank of Japan interest rate hike announcements, utilize panel models to separate net contributions of risk-free interest rates, exchange rates, and sentiment factors, and improve the quantitative precision of transmission effects. Third, deepen interactive mechanism research: incorporate novel variables such as ESG performance, green financing, and cross-border regulatory coordination, examine comprehensive effects of multiple factors on niche currency LGFV bond pricing, and provide more comprehensive theoretical support for cross-border financing risk prevention and control and high-quality market development.

Note

- [1] The author calculated based on the annual average exchange rates of RMB against relevant major currencies in 2025. The average exchange rates of USD, EUR, GBP, HKD, and JPY against RMB were 7.1429, 8.1185, 9.3885, 0.9176, and 0.0500, respectively. The data in this article are sourced from DMI.

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Article

Ritual Continuity and Community Adaptation in an Aging Society:

A Case Study of Shinrikyō

高齢化社会における儀礼の継承と地域社会への適応

— 神理教の事例研究 —

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Abstract

This study examines how a Japanese sectarian Shinto religious corporation has responded to social aging, declining religious affiliation, and the gradual weakening of local community ties. Focusing on Shinrikyō, a religious organization with a history of more than 140 years, the paper explores how traditional religious activities have been reorganized in relation to community support functions and digital outreach practices. The research adopts the Modified Grounded Theory Approach (M-GTA) and draws on field interviews, participant observation, organizational documents, and statistical materials. Particular attention is given to the activities of the Shinrikyō in Kitakyushu City and Takayasu Church of Shinrikyō in Yao City. The findings suggest that Shinrikyō has not simply attempted to preserve conventional ritual practices. Rather, the organization has gradually expanded its role through childcare support, intergenerational exchange activities, online prayer services, and local welfare-oriented programs. During fieldwork, several clergy members emphasized that younger generations rarely approach religious organizations through doctrine alone. As one senior sensei explained, “people first come because they feel connected to the place itself.” This perception appears to have shaped the church’s efforts to create spaces that are socially accessible to both elderly residents and younger families. The study argues that Shinrikyō’s transformation cannot be understood only as secularization or market adaptation. Instead, the case demonstrates a gradual process through which religious practices, community relationships, and everyday social support have become increasingly intertwined. The case illustrates how religious organizations in aging societies may gradually reorganize relationships between ritual practice, community participation, and everyday social support.

Keywords: Shinrikyō; religious corporation; business model innovation; silver-hair economy; intergenerational symbiosis

1. Introduction

1.1 Research Background

Japan has entered the most severe stage of super-aging in the world. According to Statistical Topics No. 146 – The Elderly in Japan as Seen from Statistics released by the Statistics Bureau of Japan’s Ministry of Internal Affairs and Communications on September 14, 2025, as of September 2025, Japan’s population aged 65 or older reached 36.19 million, accounting for 29.4% of the total population – an increase of 0.1 percentage point from the previous year and the highest ever recorded since comparable data became available. This makes Japan one of the most aged countries globally, with the proportion projected to rise to 37.1% by 2050, indicating a continuing deepening demographic transformation. At the same time, Japanese society is undergoing a profound process of atomization, accompanied by a shrinking family size due to the declining birthrate, the gradual disintegration of traditional regional communities, and increasingly tenuous interpersonal bonds. Against this backdrop, the spiritual needs, end-of-life (*shūkatsu*) needs, and community support needs of the elderly have grown, giving rise to a large Silver Economy market.

Japan’s aging society has intensified concerns about elderly isolation, weakening neighborhood ties, and the decline of family-based support structures (Cabinet Office, 2010; Vogt, 2010). These changes have also affected religious organizations, whose local roles were historically tied to household affiliation, ritual obligation, and community continuity (Reader, 1991; Rowe, 2011).

However, for religious corporations in Japan, the super-aging society brings not only changes in service demand but also an increasingly acute existential crisis. The Federation of Sectarian Shinto includes twelve denominations: Izumo Taishakyō, Ōmoto, Mitakekyō, Kurozumikyō, Konkōkyō, Jikkōkyō, Shinshūkyō, Shintō Shūseiha, Shintō Taikyō, Shinrikyō, Fuseikyō, and Misogikyō. All of them face their own organizational survival challenges and need to explore transformation paths through diversified service innovation. In recent years, the ENDEX (Ending Industry Exhibition) in Japan has showcased “high-tech tombstones and new-generation funeral products” (including high-tech tombstones, drone grave-sweeping, metaverse memorial services, etc.). Together with the new demand of the elderly for personalized, convenient, and spiritually oriented cemetery services, this constitutes a systemic transformation of Japan’s funeral and end-of-life care industry.

Several religious organizations in Japan have therefore begun to reconsider their relationship with local society. In addition to ritual services, some temples and shrines now provide community cafés, child-related activities, counseling spaces, or online religious services. These changes became particularly visible during and after the COVID-19 pandemic, when online prayer systems and remote forms of worship rapidly expanded. At the same time, local governments and welfare organizations have also shown growing interest in the community-support functions of religious institutions, especially in areas facing severe aging and depopulation.

During preliminary field observations conducted prior to the formal interviews, it became apparent that the issue facing local religious organizations was not simply declining believer numbers. Rather, many clergy members repeatedly referred to the difficulty of maintaining everyday social relationships with younger generations. One interviewee explained: “In the past, families remained connected to the church almost automatically. Today, that continuity no longer exists.”

This comment reflects a broader structural shift in which religious organizations are increasingly required to establish new forms of social relevance beyond hereditary religious membership alone.

Against this background, the present study focuses on Shinrikyō, a sectarian Shinto religious corporation headquartered in Kitakyushu City. The study examines how the organization has gradually combined traditional ritual functions with community-oriented activities, educational programs, and digital communication practices under conditions of social aging and local fragmentation. These transformation practices indicate that Japanese temples and sectarian organizations are moving away from the hereditary membership of the *danka* system toward individual users and market-oriented entities based on contractual relationships, as well as shifting their role from religious ritual performers to service providers.

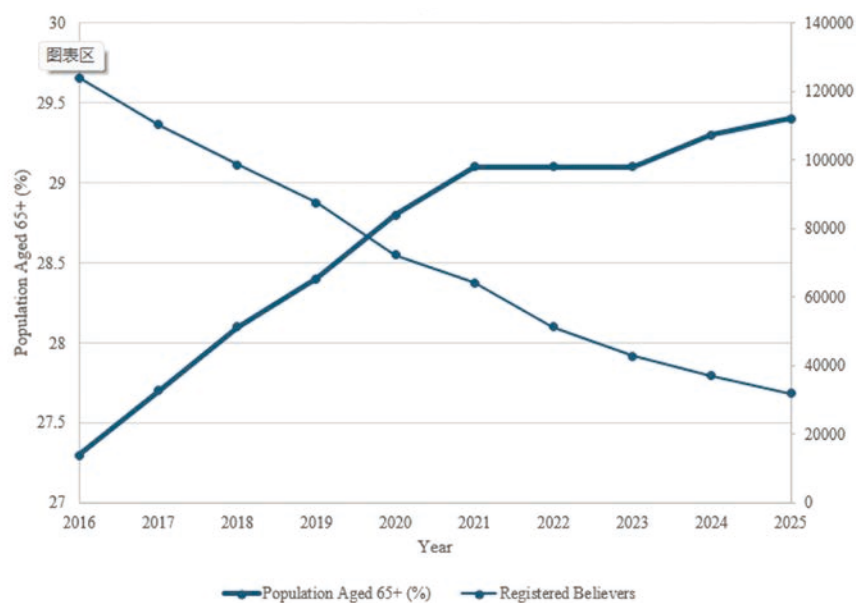


Figure 1. Aging Population and Decline in Shinrikyō Believers

Source: Statistics Bureau of Japan, e-Stat

1.2 Historical and Doctrinal Background of Shinrikyō

Shinrikyō is one of the sectarian Shinto (*kyōha Shintō*) groups that emerged during the Meiji period. The movement was founded by Sano Tsunehiko (also known as Sano Kyōhiko, 1834–1906), who was born in Buzen Province, now part of Fukuoka Prefecture. Sano studied *kokugaku* (National Learning) under Nishida Naokai and was also an active proponent of Japanese medicine in the late Edo period. Following the Meiji Restoration, he devoted himself to religious activities. According to the organization’s historical

accounts, Sano experienced a series of dream revelations between 1875 and 1876, which gave him firm confidence in his religious mission. He began using his own home as a lecture hall, and as his following grew, he formally established the group Shinri Kyōkai in Kokura in 1880.

The organization was initially affiliated with the Shintō Honkyoku from 1884, but seeking independent recognition, it realigned with Misogikyō in 1888. In 1894, it finally gained independence as Shinrikyō, with Sano serving as its first Superintendent. Under Sano and his eldest son Sano Izuhiko (1868–1936), the movement expanded its proselytizing activities, developing a particularly strong following in the northern Kyūshū region. In 1952, Shinrikyō was registered as an independent religious legal person under the provisions of the Religious Corporations Law.

In terms of doctrine, Shinrikyō venerates a pantheon centered on Amenominakanushi (the Heavenly Ancestral Deity) and Amaterasu Ōmikami, among other deities. Its basic precepts are derived from the Three Articles of Instruction (Sanjō Kyōrei) issued by the Meiji government: “revere the gods and love the country,” “understand the principles of heaven and the way of humanity,” and “honor the emperor and obey the imperial will”. The organization teaches that one should “reverently follow the inherent natural laws, and thereby settle the mind and establish one’s destiny”. It holds that “all difficulties and illnesses arise from the mind”—if one maintains a righteous mind and upright conduct, all difficulties will dissolve and illnesses will be cured. The doctrine also emphasizes Confucian values such as loyalty to the sovereign and filial piety, along with the concept of “great righteousness and clear duty,” and incorporates a belief in the spiritual power residing in language, which it teaches as “kotodama” (the spirit of words).

Organizationally, Shinrikyō operates as comprehensive religious corporation (*hōkatsu shūkyō hōjin*), a legal status under Japanese law that allows it to oversee and coordinate its network of local churches and missionary stations, with its headquarters in Kitakyushu City, Fukuoka Prefecture. According to the Agency for Cultural Affairs’ Religious Yearbook, the organization maintains approximately 114 local churches and 11 missionary stations nationwide, of which 83 churches and 4 missionary stations are registered as religious corporations. The organization has preserved its traditional ritual procedures, including a distinctive four-clap ceremonial form, while gradually adapting its activities to contemporary social conditions.

1.3 Research Object

Among the various sectarian Shinto organizations in Japan, Shinrikyō provides an important case for examining how local religious institutions respond to demographic aging and changes in community structure. Founded in the late nineteenth century, the organization has maintained a relatively stable ritual tradition while gradually introducing new forms of social engagement in recent years.

The present study does not interpret this decline simply as evidence of religious disappearance. Rather, the case raises a broader question concerning how religious organizations attempt to maintain social relevance

under changing social conditions. During field interviews, several clergy members described a growing sense of uncertainty regarding intergenerational continuity. One senior sensei commented: “Young people today do not inherit religious involvement in the same way as before. If the church only waits for people to come, the relationship eventually disappears.”

This concern appears to have encouraged the organization to reconsider the role of the church within everyday community life. Particular attention is therefore given in this study to the activities associated with Shinrikyō and its educational division. In addition to conventional ritual practices, the church has gradually expanded activities related to childcare support, after-school programs, intergenerational exchange events, and local welfare interaction. These initiatives are not entirely separate from religious practice itself. Rather, they represent an attempt to rebuild forms of local connection around the church under contemporary social conditions.

For this reason, Shinrikyō offers a useful empirical case for examining how a religious corporation may reposition itself between ritual continuity, community engagement, and organizational adaptation in an aging society.

1.4 Research Significance

Existing studies on Japanese religious organizations have often focused on doctrinal history, ritual continuity, funerary practices, or the decline of institutional religion. While these studies provide important insights, fewer studies have examined how local religious corporations reorganize their everyday activities under conditions of population aging and weakening community ties.

This study approaches Shinrikyō not only as a religious institution, but also as an organization attempting to negotiate new forms of social involvement. In particular, the case highlights how religious actors respond to practical issues such as elderly isolation, declining participation among younger generations, and the increasing importance of local welfare interaction.

The significance of this study lies in three areas.

First, the research contributes to discussions on organizational adaptation among religious non-profit institutions in Japan. Rather than treating religious decline as a purely theological issue, the study examines how organizational practices themselves are gradually changing in response to demographic and social transformation.

Second, the study provides an empirical perspective on the relationship between ritual continuity and community-based service activities. In the case of Shinrikyō, religious practices have not disappeared through secularization. Instead, ritual activities and social support functions appear to coexist in a mutually connected manner.

Third, the study contributes to qualitative research on aging societies in East Asia more broadly. As local communities continue to experience depopulation and social fragmentation, religious organizations may increasingly function as informal spaces of everyday interaction, particularly for elderly residents and families with limited local support networks.

Rather than presenting Shinrikyō as a universal model, this study aims to provide a grounded case through which the complexities and limitations of religious organizational transformation can be examined in concrete social contexts.

2. Literature Review and Theoretical Framework

2.1 The Collapse of the *Danka* System and the Management Crisis of Religious Corporations

The *Danka* system is a hereditary, fixed affiliation between Japanese temples/shrines and specific families: the family provides financial support to the temple/shrine, which in turn is responsible for funeral services, cemetery management, and ancestral rites. Although Shinrikyō, as a Shinto sect, differs structurally from Buddhist temples in the strictness of the *Danka* system, it faces equally serious challenges concerning the intergenerational transmission of believers.

Previous studies on Japanese religion have frequently discussed the weakening of the *danka* system and the changing relationship between temples, shrines, and local households. Traditionally, the *danka* relationship functioned not only as a religious arrangement, but also as a stable social structure connecting families, memorial practices, funerary responsibilities, and local community networks. In many regions, religious institutions were historically embedded in everyday life through long-term hereditary affiliation.

The weakening of the *Danka* relationship has been widely discussed in studies of contemporary Japanese Buddhism and funerary practice (Covell, 2005; Rowe, 2011). Rather than indicating the disappearance of religion itself, these changes suggest a reorganization of the relationship between temples, households, death rituals, and local community life (Ambros, 2012; Tsujimoto, 2018).

Furthermore, population decline combined with the aging of believers has led to the increasing decay of local churches in depopulated areas. Even in metropolitan areas, religious organizations operating under the hereditary *Danka* model are rapidly losing the ability to establish close connections with younger generations. To address this challenge, Shinrikyō has, on the one hand, moved some spiritual care and ritual services online, and on the other hand, simultaneously expanded community services and youth engagement platforms, gradually promoting its organizational transformation from a traditional religious ritual performer into a comprehensive community service institution.

At the same time, there is criticism of Shinto religious corporations for having only a purely ritualistic function and being confined to the elderly. Against this background, a holistic social critique has emerged:

on the one hand, sect activities are limited to a few festivals and lack daily windows to reach younger generations, thus failing to maintain core relationships with child-rearing generations, middle-aged couples, and the working generation; on the other hand, the absence of elderly care and community-based service activities has increasingly constrained the social reach and value-delivery boundaries of these Shinto religious groups.

However, scholars have pointed out that these institutional ties have gradually weakened under conditions of urbanization, declining birthrates, aging populations, and changes in family structure. Rowe (2011), for example, argues that contemporary Japanese religious institutions increasingly face difficulties maintaining stable intergenerational continuity through traditional household-based relationships alone. Similar concerns have also appeared in studies on funerary transformation and changing memorial practices in aging Japanese society.

This issue repeatedly emerged during the present fieldwork. Several interviewees described a growing sense of distance between younger generations and religious institutions. One senior clergy member explained: “Many younger families no longer feel a natural obligation to maintain ties with religious organizations. The relationship has become something that must now be rebuilt.”

Such comments suggest that the weakening of the *danka* relationship should not be understood only as religious decline. It may also reflect broader transformations in local social relationships and forms of community participation. In the case of Shinrikyō, these changes appear to have encouraged efforts to expand activities beyond conventional ritual functions. Rather than relying solely on hereditary continuity, the organization has gradually attempted to establish alternative forms of connection through childcare support, local interaction, and welfare-oriented activities.

2.2 Innovation in New Cemetery Services and the Funeral Industry

Recent studies on religion in Japan have also examined changes in funerary culture and end-of-life practices under conditions of aging and social fragmentation. As household structures become smaller and family continuity weakens, traditional family grave systems have become increasingly difficult to maintain. In response, a variety of alternative memorial forms have emerged, including perpetual memorial graves, tree burials, collective memorial services, and digitally mediated forms of remembrance. Recent studies show that memorial practices in Japan have diversified through perpetual memorial graves, tree burials, collective graves, and new forms of end-of-life service provision (Allison & Gould, 2023; Ambros, 2012; Rowe, 2011).

Some researchers interpret these developments as evidence of the commodification of death-related practices, while others emphasize the changing emotional and social needs surrounding aging, loneliness, and memorial care. Allison and Gould (2023), for instance, note that the contemporary “ending industry” in Japan reflects not only economic transformation, but also changing forms of social belonging and anxiety

in later life.

At the same time, public attention has increasingly focused on the use of digital technology in religious contexts. Media discussions surrounding online memorial platforms, AI-assisted dialogue systems, and remote worship services have become more visible in recent years, particularly after the COVID-19 pandemic. Nevertheless, many local religious organizations continue to operate under severe financial and demographic constraints, making large-scale technological investment unrealistic.

The case of Shinrikyō suggests a somewhat different pattern of adaptation. Rather than pursuing highly commercialized or technology-centered transformation, the organization appears to prioritize relatively low-cost forms of social accessibility. During field interviews, one sensei described online prayer services not as a replacement for ritual practice, but as “a way of keeping weak connections from disappearing completely.”

This perspective is important because it shifts attention away from technological novelty itself. In the Shinrikyō case, digital outreach functions mainly as a supplementary tool for maintaining continuity in human relationships, especially among elderly believers and geographically distant participants. At the same time, the organization’s community activities—including childcare support and intergenerational exchange programs—suggest that contemporary religious adaptation may involve not only ritual innovation, but also the reconstruction of everyday social space around the church.

2.3 Research Gaps and Positioning of This Study

Although previous studies have contributed important insights into religious change in contemporary Japan, several issues remain insufficiently explored.

First, much of the existing research has focused either on doctrinal history or on broad discussions of secularization and institutional decline. Comparatively fewer studies have examined how local religious organizations reorganize their everyday activities under changing demographic conditions. In particular, limited attention has been paid to the practical processes through which religious actors negotiate relationships with local communities, younger generations, and elderly residents in daily organizational settings.

Second, studies discussing digital religion in Japan often emphasize technological novelty itself, such as AI-assisted religious services or online memorial systems. However, less is known about how smaller religious organizations with limited financial and organizational resources actually incorporate digital tools into routine practice. Questions therefore remain regarding the social meaning of online religious interaction in local settings. Digital religion studies emphasize that online religious practice should not be understood simply as technological replacement, but as a reconfiguration of ritual, authority, community, and everyday religious participation (Campbell, 2005, 2006; Campbell & Tsuria, 2022; Hutchings, 2017).

Third, while business and organizational theories are increasingly applied to non-profit institutions, there is still relatively little qualitative research connecting organizational adaptation with the lived realities of religious practice. Existing discussions sometimes treat religious organizations either as purely doctrinal institutions or as market-oriented actors, without fully examining the unstable and negotiated nature of their everyday activities.

The present study positions Shinrikyō as a grounded empirical case through which these issues can be examined together. Rather than treating transformation as a linear process of modernization or secularization, the study focuses on how religious practice, community relationships, and organizational adjustment gradually intersect in concrete local contexts.

Particular attention is given to the Shinrikyō and its educational and community-related activities. By combining field interviews, participant observation, organizational materials, and statistical data, the study aims to clarify how religious actors themselves understand organizational change and social continuity under conditions of aging and local fragmentation.

2.4 Theoretical Framework

The present study draws primarily on the Modified Grounded Theory Approach (M-GTA), while also referring to perspectives from organizational studies, particularly the Business Model Canvas framework and dynamic capabilities theory. These approaches are used not as rigid explanatory models, but as interpretive tools for understanding the gradual transformation of Shinrikyō in its local social context.

First, M-GTA is particularly suitable for this research because the study focuses on process, interaction, and meaning construction within everyday organizational practice. The transformation observed at Shinrikyō does not appear as a single institutional reform or clearly planned strategy. Rather, changes emerged gradually through repeated interaction among clergy members, elderly believers, local families, and community participants.

During fieldwork, many interviewees described transformation not as “innovation” in an explicit managerial sense, but as a practical response to everyday concerns. One sensei explained: “At first, we simply wanted local children to feel comfortable visiting the church. Later, connections with parents and elderly residents also started to grow naturally.” Such comments suggest that organizational change was often experienced incrementally and relationally, rather than through formal strategic planning alone. M-GTA therefore provides an appropriate framework for tracing how meanings and practices evolved through ongoing interaction.

Second, the Business Model Canvas is used selectively in order to clarify changes in organizational activities, participant relationships, and resource structures before and after the expansion of community-oriented programs. However, this study does not treat religious organizations as equivalent to commercial

firms. Rather, the framework is employed cautiously as a descriptive tool for examining shifts in organizational function and modes of social engagement.

Third, perspectives from dynamic capabilities theory help illuminate how religious organizations respond to environmental uncertainty under conditions of aging, depopulation, and digitalization. In the Shinrikyō case, adaptation appears less dependent on large-scale institutional reform than on the gradual accumulation of relational capabilities, including local trust, flexible communication, and intergenerational interaction.

Taken together, these theoretical perspectives support an analysis that remains grounded in qualitative fieldwork while also allowing broader discussion of organizational adaptation in contemporary religious settings.

3. Research Methods

3.1 Methodological Choice: Applicability of M-GTA

This study adopts the Modified Grounded Theory Approach (M-GTA) as its primary qualitative methodology. To justify this choice, it is necessary to situate M-GTA within the broader intellectual tradition from which it emerged.

Classical Grounded Theory was first articulated by Barney Glaser and Anselm Strauss in *The Discovery of Grounded Theory: Strategies for Qualitative Research* (1967). The authors proposed a systematic methodology for generating theory from data, challenging the prevailing positivist emphasis on hypothesis verification. As they famously stated, “a grounded theory that is faithful to the everyday realities of the substantive area is one that has been carefully induced from the data” (Glaser & Strauss, 1967: 239). The classical approach introduced key principles such as theoretical sampling, constant comparative analysis, and theoretical saturation, which remain foundational to qualitative research.

However, classical Grounded Theory has also faced significant epistemological and practical limitations. One central issue concerns the role of prior theoretical knowledge in the research process. Glaser insisted that “the codes and categories emerge directly from the data,” advocating for a strict inductive approach that requires researchers to bracket all pre-existing theoretical assumptions. This position has been critiqued as reflecting an “inductivist self-misunderstanding” (Kelle, 2005) and has led to considerable confusion, particularly among novice researchers who draw their methodological knowledge from textbooks. As a result, the methodology later split into two distinct orientations: Glaser’s more orthodox inductive approach and Strauss and Corbin’s more flexible framework that allows for the incorporation of prior theoretical knowledge into the analytical process (Strauss & Corbin, 1990).

The Modified Grounded Theory Approach (M-GTA) was developed by Kinoshita Yasuhito (1999, 2003)

specifically to address these limitations within the Japanese research context. M-GTA maintains the core principles of classical Grounded Theory—theoretical sampling, constant comparative analysis, and theory generation from data—while introducing two important modifications.

First, M-GTA explicitly acknowledges the researcher’s analytical agency and permits the selective incorporation of prior theoretical knowledge into the interpretive process. This is particularly important for the present study, which draws on established organizational theories—including the Business Model Canvas (Osterwalder & Pigneur, 2010) and dynamic capabilities theory (Teece et al., 1997)—as interpretive tools. A strict inductive approach that forbids any theoretical presupposition would be impractical for examining how a religious organization reconfigures its activities under demographic pressure, as it would preclude the use of concepts that have proven analytically valuable in organizational studies.

Second, M-GTA introduces the “analytical worksheet” as a standardized tool for documenting the coding process. Each worksheet records: (1) the concept name; (2) its definition; (3) representative data examples (verbatim extracts from interview transcripts and field notes); and (4) theoretical memos capturing the researcher’s analytical reasoning. This procedural innovation enhances transparency and allows readers to trace the interpretive path from raw data to final theoretical categories—a requirement that is particularly critical when studying complex organizational phenomena such as Shinrikyō’s gradual transformation under conditions of aging and community fragmentation.

For these reasons, M-GTA was selected as the primary analytical framework for this study. It preserves the inductive spirit of classical Grounded Theory while providing the analytical flexibility and procedural transparency necessary for examining how religious actors themselves interpret organizational change in their everyday practice.

3.2 Research Site and Case Selection

The fieldwork for this study was conducted at the headquarters and affiliated facilities of Shinrikyō in Kitakyushu City, Fukuoka Prefecture. This site was selected for three reasons.

First, Kitakyushu embodies many demographic characteristics now common across regional Japan, including population decline, increasing elderly isolation, and weakening participation of younger generations in local institutions. These conditions make the area particularly suitable for examining how religious organizations negotiate their relationships with local society under demographic pressure.

Second, Shinrikyō operates a visible network of community-oriented activities beyond its ritual functions. In addition to maintaining established ceremonial practices, the organization has developed educational programs, childcare support services, and intergenerational exchange activities connected to Shinrikyō and affiliated kindergarten. These activities provided opportunities to observe how religious practice overlaps with everyday community engagement in concrete settings.

Third, access to the field site was established over several months prior to the fieldwork period through a preparatory process consisting of three phases: (1) a desk-based review of publicly available materials, including Shinrikyō's official publications, historical bulletins (Shinri Jihō), and e-Stat religious statistical records; (2) preliminary communication with church administrators via telephone and email to present the research objectives and negotiate access; and (3) repeated review of organizational documents to develop a basic understanding of the site's structure and activity schedule before entering the field. This preparatory work helped the researcher gain familiarity with the organizational context before conducting interviews and observations.

The fieldwork itself was conducted over three consecutive days, from May 7 to May 9, 2026. The relatively short field period was determined by the availability of key informants and the church's operational schedule. Several limitations should be acknowledged. Some aspects of internal organizational management and financial operation remained difficult to access directly. Participants occasionally showed caution when discussing sensitive topics related to declining membership or organizational sustainability. These moments of hesitation themselves, however, informed the researcher's understanding of organizational uncertainty as a background condition shaping daily practice.

3.3 Data Collection

Data collection was conducted primarily through semi-structured interviews, participant observation, and analysis of organizational documents and statistical materials. Fieldwork took place over three days between May 7 and May 9, 2026, at the Shinrikyō headquarters and related facilities in Kitakyushu City.

(1) Semi-Structured Interviews

Interviews constituted the central source of qualitative material for this study. Participants included clergy members, church administrators, educational staff, elderly believers, and individuals involved in community-support activities connected to the Shinrikyō.

Rather than following a strictly fixed questionnaire, interviews were conducted in a flexible conversational format. Although several thematic topics had been prepared in advance—including organizational change, community activities, digital outreach, and intergenerational interaction—the actual flow of discussion often shifted according to the experiences and concerns emphasized by each participant.

In many cases, interviewees initially spoke cautiously, particularly when discussing declining membership or organizational sustainability. However, as conversations continued, participants frequently moved from formal explanations toward more personal reflections regarding local change and generational discontinuity. One clergy member remarked during an interview: "The problem is not only that people stop believing. The deeper problem is that opportunities for everyday connection have become weaker."

Such comments became important analytical entry points during the later coding process.

Most interviews lasted between 60 and 90 minutes and were conducted individually with prior consent for audio recording. Morning and evening worship activities were also observed before and after several interviews, which helped situate participants' comments within the broader rhythm of church life. The full interview guide, including core questions and thematic prompts, is provided in Appendix A.

Table 1 presents the demographic and contextual background of the five interview participants. All participants were affiliated with the Shinrikyō headquarters in Kitakyushu City at the time of the fieldwork (May 2026). Individual identifiers have been replaced with participant codes to protect anonymity. Age ranges are provided in place of exact ages to preserve privacy.

Table 1. Profile of Interview Participants

Participant Code	Role/Position	Gender	Age Range	Affiliation	Interview Date
S-01	Senior clergy / Sensei	Male	70–79	Headquarters	May 7, 2026
S-02	Clergy / Sensei	Male	70–79	Headquarters	May 7, 2026
S-03	Clergy / Sensei	Male	50–59	Headquarters	May 7, 2026
S-04	Educational staff / Administrator	Male	50–49	Kindergarten	May 8, 2026
S-05	Educational staff / Administrator	Female	40–49	Kindergarten	May 8, 2026

(2) Participant Observation

Participant observation was conducted at the Shinrikyō headquarters and affiliated facilities over three consecutive days (May 7–9, 2026). The researcher adopted a non-participant observer role throughout the fieldwork period. While the researcher was physically present in community spaces and observed activities including morning worship, evening worship, childcare sessions, and informal gatherings among elderly participants and children, no active intervention or participation in these activities was undertaken. This role was chosen to minimize the researcher's influence on participants' natural behavior, thereby preserving the ecological validity of the observations. Permission for observation was obtained from the church administration at the organizational level prior to fieldwork, and individual participants present in common spaces were notified of the researcher's presence through announcements posted on bulletin boards and verbal reminders from staff members at the beginning of each activity period.

Observation was structured around specific activity slots during each day rather than continuous coverage of all church operations. The following activities were observed: morning worship (5:30–6:30 AM, three sessions across three days), community room interactions (elderly visitors and children, approximately 1–2 hours daily), after-school childcare activities (two sessions), and seasonal event preparations (one session). These time segments were selected because they represented the most typical moments where ritual activities, childcare functions, and community interaction visibly overlapped. The total observation time across the three days amounted to approximately 10 hours of active observation.

Observational notes were recorded in two forms. First, jotted notes were taken discreetly during observation periods using a small notebook, capturing key actions, spatial arrangements, dialogue fragments, and

temporal sequences. These jotted notes served as memory aids and were expanded into full descriptive field notes within 2–4 hours after each observation period. Each full field note entry included: (1) date and time; (2) location and activity description; (3) detailed description of participants’ actions and interactions; (4) verbatim or near-verbatim quotations where audible; and (5) the researcher’s analytical memos and initial interpretive impressions.

These field notes were systematically integrated into the M-GTA analysis alongside interview transcripts. At the coding stage, all field notes were treated as additional “data examples” and subjected to the same coding procedures applied to interview transcripts. Observational data often served to triangulate or challenge claims made in interviews. For example, clergy members’ stated emphasis on ritual continuity was cross-checked against observation of how space was actually used during community activities. Discrepancies between interview narratives and observed practices were recorded in theoretical memos and contributed to the refinement of analytical categories.

(3) Documentary and Statistical Materials

In addition to field interviews and observations, this study examined publicly available materials related to Shinrikyō, including organizational publications, historical documents, online announcements, educational activity materials, and statistical records from e-Stat religious surveys.

These materials were used not simply as supplementary background information, but also as a means of comparing organizational self-representation with field interview narratives. In particular, changes in membership numbers, sensei demographics, and online activity development were analyzed alongside interview data in order to identify areas of continuity and tension within organizational discourse.

Table 2. Overview of Fieldwork Data Collection

Data Source	Content	Period	Purpose
Semi-structured interviews	Clergy, elderly members, staff	May 2026	Organizational perceptions
Participant observation	Rituals, childcare, interaction	May 2026	Everyday practice
Organizational documents	Reports, publications	2024–2026	Institutional discourse
Statistical materials	e-Stat, Yearbook	2016–2025	Membership trends

3.4 Data Analysis: M-GTA Procedure

Following the M-GTA procedure, data analysis was conducted iteratively alongside fieldwork rather than after data collection had concluded. The analytical focus—how Shinrikyō maintains social continuity under conditions of aging, declining participation, and weakening community ties—was progressively refined through repeated engagement with interview transcripts, observational records, and organizational documents. The analysis proceeded through the following steps.

First, interview transcripts were read repeatedly to identify fragments related to organizational adaptation,

community relationships, intergenerational interaction, and perceptions of continuity or decline. Each meaningful fragment was recorded as a “data example” together with its source code.

Second, concepts were generated inductively from these fragments. For instance, from clergy members’ repeated references to younger generations no longer maintaining automatic ties with the church, the concept “Generational Discontinuity” was developed. Each concept was defined and documented with its supporting data examples and a theoretical memo recording the researcher’s analytical reasoning.

Third, through constant comparison across interviews and observational records, concepts with overlapping meanings were gradually integrated into broader categories. For example, “Generational Discontinuity” and “Organizational Anxiety” were grouped under the higher-order category “Weakening Relational Infrastructure.” The full set of analytical worksheets—including concept definitions, data examples, and theoretical memos—is provided in Appendix B, allowing readers to trace the analytical path from raw data to final categories.

Fourth, analysis continued until no new concepts emerged from additional data, indicating theoretical saturation. This was reached after the fifth interview, when additional materials consistently aligned with existing categories.

Finally, the relationships among categories were organized into an interpretive narrative concerning the gradual transformation of Shinrikyō under contemporary social conditions. A summary of the concept-to-category integration is presented in Table 3.

Table 3. Concept-to-Category Integration

Higher-Order Category	Constituent Concepts
Weakening Relational Infrastructure	Generational Discontinuity; Organizational Anxiety
Flexible Organizational Adaptation	Ritual–Community Spatial Differentiation; Weak-Tie Digital Outreach
Community Re-Embedding	Community Accessibility as Mission Extension
Core Tension	Mission Retention vs. Social Accessibility

To ensure the transparency and traceability of the analytical process, this study follows the standard M-GTA procedure of constructing analytical worksheets for each concept generated. Following Kinoshita’s (2003) methodological guidelines, each worksheet documents: (1) the concept name; (2) its definition; (3) representative data examples (verbatim extracts from interview transcripts); and (4) theoretical memos recording the researcher’s analytical reasoning and interpretive decisions. These worksheets were developed iteratively throughout the coding process, moving back and forth between interview data, observational records, and emerging conceptual categories. The complete analytical worksheets, including concept definitions, data examples, and theoretical memos, are presented in Appendix B.

3.5 Trustworthiness of the Research

Several measures were taken to strengthen the credibility and interpretive consistency of this qualitative study.

First, the research was conducted through prolonged engagement with both documentary materials and field observations prior to the formal interview stage. Before entering the field site, the researcher spent several months reviewing historical publications, organizational records, online materials, and statistical data related to Shinrikyō. This preparatory process helped situate later interview narratives within a broader historical and organizational context.

Second, the study relied on continuous comparison across multiple forms of material, including interviews, observational records, organizational publications, and statistical sources. Rather than treating any single source as fully authoritative, the analysis focused on identifying both consistency and discrepancy across different types of accounts. In several cases, official organizational narratives emphasized continuity and stability, while interviews revealed stronger concerns regarding generational transition and organizational sustainability. These differences themselves became analytically meaningful.

Third, interpretive categories were refined gradually throughout the analytical process rather than fixed in advance. Some initial interpretations changed substantially as additional interviews and observations were conducted. For example, activities that initially appeared to represent “digital innovation” were later understood more appropriately as attempts to maintain weak social ties and everyday accessibility among elderly participants.

The study also remained attentive to the limitations of field interpretation. Because the researcher entered the field as an outside observer, certain internal organizational dynamics may not have been fully visible during the relatively limited observation period. In addition, some participants appeared hesitant when discussing sensitive institutional issues, particularly those related to financial sustainability or declining participation. These limitations were therefore considered as part of the interpretive context of the research rather than treated as methodological failure.

Finally, several preliminary interpretations were discussed informally with participants after interviews and observations. These conversations did not function as formal “verification” procedures, but they helped clarify whether the researcher’s interpretations were broadly consistent with participants’ own perceptions of organizational change.

3.6 Research Ethics

The study was supported by Takayasu Church of Shinrikyō. Its authorization and cooperation enabled access to a wealth of documentary materials, data, and information, and facilitated the interviews conducted for this study.

Ethical considerations were taken into account throughout the research process. Prior to interviews and observations, participants were informed about the purpose of the study, the use of interview materials, and the handling of personal information. Participation was voluntary, and interviews were conducted only after consent for recording and note-taking had been obtained. Because the research involved a religious organization, particular care was taken to avoid interpretive judgments regarding doctrinal beliefs or ritual practices. The study focuses primarily on organizational processes, community interaction, and perceptions of social change rather than theological evaluation.

Anonymity was maintained where appropriate, especially in relation to personal comments concerning organizational difficulties or internal concerns. In several interviews, participants discussed sensitive topics such as declining participation, generational discontinuity, and uncertainty regarding the future role of religious organizations in local communities. These discussions were treated with caution in both transcription and analysis.

At the same time, the researcher remained aware that complete neutrality in qualitative fieldwork is difficult to achieve. Interpretations were inevitably shaped by the researcher's own positionality, disciplinary background, and interaction with participants during the fieldwork process. For this reason, the study aimed not to produce a fully objective account, but rather a careful and context-sensitive interpretation grounded in the available field materials.

4. Case Findings: Multidimensional Transformation Practices of Shinrikyō

4.1 Declining Participation and Organizational Anxiety

Statistical data published through the e-Stat religious surveys indicate that Shinrikyō experienced a substantial decline in both registered believers and active senseis between 2016 and 2025. During this period, the number of believers reportedly decreased from more than 120,000 to approximately 32,000, while the number of senseis also fell significantly.

However, during the fieldwork, these changes were rarely discussed by participants simply as numerical decline. Instead, interviewees often described a more gradual sense of weakening continuity within local relationships and everyday church participation. Several clergy members referred repeatedly to the difficulty of maintaining intergenerational connection. One senior sensei explained: "In the past, families often remained connected to the church across several generations. Today, younger family members may attend rituals occasionally, but the everyday relationship has become much weaker."

Another interviewee similarly noted that the issue was not only decreasing membership, but also the disappearance of routine social interaction surrounding the church: "People still come for funerals or memorial services. But outside those occasions, there are fewer opportunities for regular contact."

These comments suggest that organizational concern was tied not only to religious participation itself, but also to the shrinking role of the church as part of everyday community life. The issue of aging was also discussed frequently during interviews. Several participants described increasing difficulties in maintaining local activities because many long-term believers were themselves becoming elderly. In some cases, elderly members reportedly faced physical limitations that made frequent participation difficult, particularly after the COVID-19 pandemic.

During one observation period, the researcher noted that several elderly visitors remained seated quietly in community areas long after formal activities had ended, continuing casual conversation with clergy members and volunteers. Such scenes suggested that the church functioned not only as a ritual site, but also as a place of ongoing social interaction for individuals with relatively limited community contact elsewhere.

At the same time, participants expressed uncertainty regarding younger generations. One church member involved in educational activities commented: “Younger parents are not necessarily interested in religion itself. But they are looking for places where children and elderly people can interact safely.”

This perception appears to have influenced the organization’s gradual shift toward childcare support, intergenerational programs, and community-oriented activities. Financial issues were discussed more indirectly during the fieldwork. Because Shinrikyō does not rely on a rigid membership-fee structure, many activities continue to depend largely on voluntary offerings, ritual-related donations, and irregular participation-based contributions. Several participants suggested that this organizational structure creates both flexibility and instability. While the absence of strict financial obligation may lower barriers to participation, it also makes long-term organizational sustainability more uncertain under conditions of demographic decline.

Rather than describing the situation as organizational “crisis” in explicit terms, many interviewees spoke instead of the need to maintain relationships and local visibility in everyday life. In this sense, the decline in believer numbers was experienced less as a sudden institutional collapse than as a gradual weakening of social continuity surrounding the church.

Table 4. Representative Interview Themes

Theme	Representative Comment
Aging	“Many elderly members can no longer travel easily.”
Weakening continuity	“Younger generations no longer inherit involvement naturally.”
Digital outreach	“Online prayer helps maintain connection.”
Community role	“Children make the atmosphere brighter.”
Identity tension	“The church may lose its meaning.”

4.2 Digital Outreach and the Maintenance of Connection

In recent years, Shinrikyō has gradually introduced several forms of online communication, including online prayer requests, website-based information sharing, and social media outreach through platforms such as Instagram. However, during the fieldwork, these activities were rarely described by participants as “digital innovation” in a managerial or technological sense.

Instead, interviewees often spoke about online communication in relation to accessibility and continuity of contact, particularly for elderly believers and geographically distant participants.

One clergy member explained: “Some elderly members can no longer travel easily to the church. Online prayer requests became one way to help them remain connected.”

Another participant emphasized that online activities were not intended to replace face-to-face ritual practice: “The internet cannot substitute for direct worship. But if communication disappears completely, people gradually drift away.”

These comments suggest that digital outreach was understood primarily as a supplementary form of relational maintenance rather than as institutional modernization itself.

The importance of accessibility became especially visible. Several interviewees referred to changes in participation patterns among elderly believers, many of whom reportedly became less comfortable attending crowded ritual events in person even after public restrictions had eased. Under these conditions, online communication appeared to function as a relatively low-cost way of maintaining weak but continuing forms of participation.

At the same time, participants also acknowledged limitations in digital outreach. Some elderly believers reportedly experienced difficulty using smartphones or online systems, while younger users who initially encountered the organization online did not necessarily become long-term religious participants. One sensei involved in public communication activities commented: “It is easier now for people to find information about the church online. But that does not automatically create deeper involvement.”

This perception reflects an important tension within the organization’s digital activities. While online communication may increase visibility and accessibility, it does not necessarily reproduce the dense social relationships that historically surrounded local religious participation.

During observations at the church, the researcher also noted that online activities were discussed in relatively practical rather than ideological terms. Participants often referred to digital tools simply as “helpful for keeping contact” or “useful for people who cannot come often.” Compared with media discussions surrounding AI monks or technologically advanced religious services in Japan, Shinrikyō’s approach

appeared considerably more modest and incremental.

Rather than pursuing large-scale technological transformation, the organization seemed to prioritize maintaining continuity in everyday relationships through flexible and relatively low-cost forms of communication. In this sense, digital outreach functioned less as a symbol of modernization than as part of a broader effort to prevent social disconnection surrounding the church.

4.3 Community Extension: The “Intergenerational Symbiosis” Model

One of the most distinctive aspects of Shinrikyō’s recent organizational development is the gradual expansion of community-oriented activities centered around childcare support and intergenerational interaction. During the fieldwork, these activities appeared not as separate programs added onto religious practice, but as everyday extensions of the church’s role within the local community.

Particular attention was given to activities connected to the educational division and the Shinri Kindergarten. In addition to childcare functions, the church regularly organized seasonal events, informal gatherings, after-school activities, and occasions where elderly community members and young children spent time together in shared spaces.

During several observation periods, the researcher noted that interaction between elderly participants and children often occurred in highly ordinary and informal ways rather than through explicitly structured “religious education.” Elderly visitors spoke casually with children in hallways and community rooms, helped prepare snacks, watched over after-school activities, or remained seated nearby during children’s playtime.

One elderly participant described these activities as follows: “When children are here, the atmosphere becomes brighter. Even people who usually stay home alone come out more often.”

Similarly, a staff member involved in childcare activities explained: “Some parents first come because of the kindergarten, not because of religion. But after repeated visits, they gradually become familiar with the church itself.”

These comments suggest that the church’s community activities functioned partly as spaces for low-threshold social participation. Rather than requiring strong prior religious commitment, the activities created opportunities for repeated everyday contact among different generations.

At the same time, the boundaries between religious space and community space remained flexible but visible. Formal rituals continued to be conducted according to traditional procedures within the main sanctuary area, while childcare and interaction activities were often concentrated in more open communal spaces connected to the educational facilities.

This spatial differentiation appeared to reduce potential tension between doctrinal continuity and expanding community involvement. During interviews, several clergy members emphasized that the church did not intend to abandon ritual tradition. Instead, community activities were described as “ways of creating relationships around the church” rather than replacing religious practice itself.

The importance of these activities became particularly apparent in relation to elderly isolation and declining local interaction. Several participants noted that many older residents in the surrounding area had limited opportunities for informal communication in everyday life. In this context, the church increasingly functioned not only as a ritual institution, but also as a loosely organized place of social presence and mutual recognition.

At the same time, interviewees also acknowledged certain uncertainties regarding the long-term effects of these programs. Although childcare and intergenerational activities increased local visibility, participants were unsure whether younger generations would maintain durable involvement with the church in the future. As one sensei reflected: “We cannot assume that children who grow up here will automatically become believers later. But at least some relationship remains.”

This comment reflects the gradual and uncertain nature of the organization’s community-oriented transformation. Rather than producing immediate institutional recovery, these activities appeared to create small but continuing forms of local connection around the church.

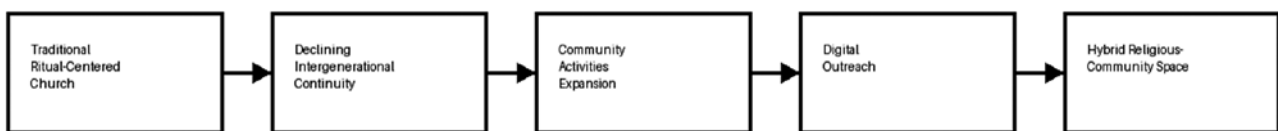


Figure 2. Organizational Transformation Process of Shinrikyō

4.4 Organizational Transformation and Changes in Everyday Practice

The changes observed at Shinrikyō can be interpreted not only as an expansion of activities, but also as a gradual reorganization of the church’s everyday relationship with local society. Although the Business Model Canvas framework provides one possible way of visualizing these changes, the transformation observed during fieldwork did not appear as a clearly planned managerial restructuring process. Rather, organizational change emerged incrementally through accumulated responses to local demographic and social conditions.

Before the expansion of community-oriented activities, the church’s relationship with participants was centered primarily on ritual occasions such as memorial services, prayers, and family-related ceremonies. Participation was relatively stable among long-term believers, particularly elderly members with strong historical ties to the organization. However, several interviewees noted that these forms of participation gradually became less sustainable as generational continuity weakened.

As one clergy member explained: “Previously, many relationships continued naturally through family connections. Now we must create opportunities for people to visit and remain involved in different ways.” This shift appeared to influence multiple aspects of organizational activity simultaneously.

For example, the role of church space itself gradually expanded beyond formal ritual functions. Areas associated with educational activities and community interaction increasingly became sites of repeated everyday contact among children, parents, elderly residents, volunteers, and clergy members. In this sense, the church began to function not only as a place for ceremonial practice, but also as a locally recognizable social space.

Changes were also visible in patterns of communication. In earlier periods, interaction depended heavily on direct participation in rituals and personal introductions through existing believers. More recently, however, online communication and social media have provided additional channels through which participants first encounter the organization. Several younger parents interviewed during fieldwork indicated that they initially became aware of the church through childcare-related activities or online information rather than through inherited religious affiliation.

At the same time, the organization’s resource structure also appeared to diversify gradually. In addition to ritual-related offerings and donations, educational and community-support activities increasingly occupied an important place within everyday organizational operation. Nevertheless, interviewees repeatedly emphasized that these activities were not understood internally as commercial expansion. Instead, participants often described them as necessary responses to changing local conditions and declining opportunities for community interaction.

The relationship between religious practice and welfare-oriented activity therefore remained somewhat ambiguous. On the one hand, community activities helped increase local accessibility and social visibility. On the other hand, clergy members remained cautious about allowing religious practice itself to become entirely secondary to social service functions.

One interviewee expressed this concern in the following way: “If the church becomes only a community center, something essential may eventually disappear.” This comment reflects an ongoing tension within the organization’s transformation process. While adaptation to social change was widely recognized as necessary, participants also remained concerned about maintaining continuity with ritual tradition and religious identity.

For this reason, the transformation observed at Shinrikyō may be understood less as a replacement of traditional religious functions than as a gradual layering of additional social roles around existing ritual structures. Organizational continuity and organizational change therefore appeared to coexist simultaneously rather than develop in a purely linear manner.

4.5 Negotiating Ritual Continuity and Community Involvement

One of the most significant themes that emerged during the fieldwork concerned the relationship between traditional ritual practice and expanding community-oriented activities. Although Shinrikyō has gradually increased its involvement in childcare support, intergenerational interaction, and local welfare-related activities, participants repeatedly emphasized that these efforts were not intended to replace religious practice itself.

At the same time, however, interviewees also acknowledged that the boundaries between religious activity and community support had become increasingly complex in everyday organizational life. Several clergy members described a sense of careful balancing between openness toward the local community and preservation of ritual continuity. One senior sensei explained: “If we become too closed, younger generations stop coming entirely. But if we move too far away from ritual tradition, the church may lose its meaning.” This concern appeared throughout interviews in both direct and indirect ways.

During participant observation, the researcher noted that formal rituals in the main sanctuary were conducted according to highly structured procedures, including traditional forms of worship and ceremonial etiquette. In contrast, activities connected to childcare support or intergenerational exchange were often informal in atmosphere and involved participants with widely varying levels of religious familiarity. These differences did not appear to produce open conflict within the organization. However, they did create subtle distinctions regarding how space, participation, and interaction were organized.

For example, several clergy members explained that community-oriented activities were usually positioned “around” the church rather than fully “inside” ritual practice itself. One participant described this distinction in the following way: “Not everyone who comes here participates as a believer. But maintaining some kind of relationship still matters.” This perspective suggests that the organization increasingly accepts multiple forms of proximity that do not necessarily involve strong doctrinal commitment.

At the same time, some interviewees expressed uncertainty regarding how far this expansion of community functions should continue. A younger sensei involved in educational activities commented: “Sometimes we wonder whether people understand this place mainly as a religious organization or simply as a comfortable local space.” This ambiguity appeared particularly visible among younger families and first-time visitors, many of whom initially encountered the church through childcare or community activities rather than through inherited religious affiliation.

Rather than resolving these tensions completely, the organization seemed to manage them through a gradual separation of social functions and ritual functions within everyday practice. Formal ceremonies continued to preserve traditional procedures and symbolic continuity, while community-related activities remained comparatively flexible and accessible.

Importantly, participants rarely described this arrangement using explicit managerial or strategic language. Instead, many interviewees framed these adjustments pragmatically, as necessary responses to changes in local society, aging, and declining opportunities for everyday interaction. One clergy member reflected on this issue by stating: “The church cannot survive only as a place people visit after someone dies. There must also be some connection to ordinary life.” This comment captures an important aspect of Shinrikyō’s transformation. The organization’s expansion into community-oriented activities does not appear to represent simple secularization or abandonment of religious identity. Rather, it reflects an ongoing attempt to negotiate how ritual tradition can remain socially meaningful under changing demographic and relational conditions.

At the same time, the fieldwork suggests that this process remains incomplete and potentially unstable. Community accessibility may increase social visibility and local trust, but it may also blur institutional boundaries and alter expectations regarding the role of religious organizations in everyday life.

5. Discussion

5.1 Religious Continuity, Community Practice, and Organizational Adaptation

The findings of this study suggest that the recent transformation of Shinrikyō cannot be understood adequately through a simple opposition between “religious tradition” and “secular adaptation.” Instead, the fieldwork indicates a more gradual and negotiated process in which ritual continuity and community-oriented activities increasingly coexist within the same organizational setting. This finding resonates with Baffelli’s discussion of Japanese new religions entering secular domains such as education, welfare, and public activity, while also maintaining contested religious identities (Baffelli, 2017).

Previous discussions of contemporary Japanese religion have often emphasized institutional decline, weakening religious affiliation, or the commercialization of funerary practice. While these perspectives remain important, the Shinrikyō case suggests that local religious organizations may also function as sites where social relationships are reorganized under conditions of aging and community fragmentation.

In particular, the fieldwork demonstrated that many community-related activities were not experienced by participants primarily as strategic “innovation.” Rather, clergy members and volunteers frequently described these activities in practical and relational terms, such as maintaining connection, reducing isolation, or creating opportunities for repeated local interaction.

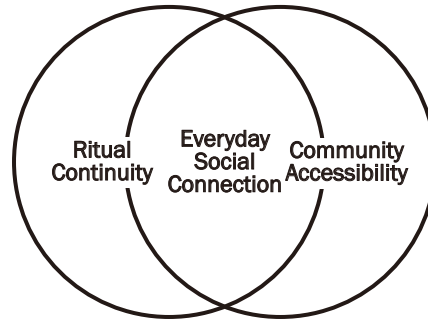


Figure 3. Relationship Between Ritual Continuity and Community Accessibility

This point is significant because it complicates interpretations that frame religious organizational adaptation solely in terms of marketization or managerial rationalization. Although organizational change at Shinrikyō certainly involved adjustments in communication methods, participant relationships, and patterns of accessibility, these changes were often shaped less by commercial expansion than by attempts to preserve local social continuity.

The study also suggests that digital outreach should not be interpreted simply as technological modernization. In the Shinrikyō case, online prayer systems and social media communication appeared to function primarily as supplementary mechanisms for maintaining weak but ongoing forms of connection among elderly participants, geographically distant members, and younger families with limited prior religious involvement.

At the same time, the findings indicate that organizational adaptation remains accompanied by unresolved tension. Community accessibility may increase social visibility and local trust, but it may also create uncertainty regarding the boundaries between religious identity and welfare-oriented activity. Several participants expressed concern that excessive expansion of non-ritual functions could eventually weaken the distinctiveness of the church itself.

For this reason, the Shinrikyō case may be understood less as a successful “transformation model” than as an ongoing process of negotiation between continuity and change. Ritual tradition was not abandoned during this process. Rather, the organization appeared to construct additional layers of social interaction around existing religious structures in response to changing demographic and relational conditions.

This perspective may also have broader implications for the study of religious organizations in aging societies. Under conditions of declining local interaction and increasing elderly isolation, religious institutions may continue to retain significance not only through doctrine or formal belief, but also through their ability to sustain spaces of repeated everyday contact and social recognition within local communities.

5.2 Practical Implications

The Shinrikyō case suggests several broader implications regarding the changing role of religious organ-

izations in aging local communities.

First, the findings indicate that organizational continuity may depend less on large-scale institutional reform than on the maintenance of repeated everyday interaction. During the fieldwork, participants frequently emphasized the importance of sustaining ordinary forms of local connection rather than pursuing dramatic organizational innovation. In this sense, relatively small-scale activities—such as childcare support, informal gatherings, seasonal events, and opportunities for intergenerational interaction—appeared to play an important role in maintaining the church's local presence.

Second, the case suggests that community accessibility and ritual continuity do not necessarily exist in direct opposition. At Shinrikyō, community-oriented activities were often positioned not as substitutes for religious practice, but as surrounding conditions that helped maintain ongoing relationships with local residents. This arrangement may be particularly important for smaller religious organizations that lack the financial and organizational resources required for large-scale technological or commercial expansion.

The findings also indicate that digital communication may function most effectively when used in relatively modest and relational ways. Rather than replacing face-to-face ritual participation, online prayer systems and social media communication appeared to support weak but continuing forms of contact among elderly participants, geographically distant members, and younger families with limited prior involvement.

At the same time, the fieldwork suggests that organizational adaptation involves continuing uncertainty. Expanding welfare-oriented or community-support activities may increase local visibility and accessibility, but it may also create ambiguity regarding institutional identity and the boundaries of religious practice. For this reason, adaptation should not be understood simply as organizational success or modernization, but as an ongoing process of negotiation shaped by local demographic and social conditions.

More broadly, the study suggests that religious organizations in aging societies may continue to retain social significance not only through doctrinal authority, but also through their ability to provide spaces of repeated interaction, familiarity, and low-threshold participation within everyday community life.

5.3 Limitations and Future Directions

Several limitations of this study should be acknowledged.

First, the research focuses primarily on a single religious organization and relies on a relatively limited period of field observation. Although the Shinrikyō case provides valuable insight into organizational adaptation under conditions of aging and community fragmentation, the findings cannot automatically be generalized to all sectarian Shinto organizations or Japanese religious institutions more broadly.

Second, because access to internal organizational processes was necessarily partial, certain aspects of institutional decision-making and financial management remained difficult to observe directly. In several interviews, participants appeared cautious when discussing sensitive topics related to declining membership, generational transition, or long-term organizational sustainability. As a result, some organizational tensions may have remained only partially visible during the fieldwork.

Third, the present study focused primarily on clergy members, educational staff, elderly participants, and community-related activities associated with the Shinrikyō. Younger participants and individuals with only temporary or indirect involvement in church activities were less fully represented in the interview materials. Future research could therefore examine more closely how younger generations perceive community-oriented religious organizations in contemporary Japan.

In addition, the study concentrated mainly on qualitative interpretation rather than comparative measurement. Future research may benefit from combining ethnographic fieldwork with broader survey-based analysis concerning participation patterns, perceptions of accessibility, or forms of community attachment among religious participants.

The findings also suggest the importance of comparative research across different types of religious organizations. While Shinrikyō appears to emphasize gradual relational adaptation and community accessibility, other organizations may adopt substantially different approaches toward digitalization, welfare activity, or organizational restructuring. Comparative analysis could therefore help clarify how different institutional histories and local conditions shape patterns of religious adaptation in aging societies.

Finally, the present study has attempted to interpret organizational transformation as an ongoing and incomplete process rather than as a finalized model of successful adaptation. For this reason, continued longitudinal observation may be necessary in order to understand how these community-oriented activities evolve over time and whether they contribute to durable forms of intergenerational continuity in the future.

6. Conclusion

This study examined the recent transformation of Shinrikyō, with particular attention to the activities of the Shinrikyō in Kitakyushu City. Through field interviews, participant observation, documentary analysis, and statistical materials, the research explored how a local sectarian Shinto organization has responded to demographic aging, weakening intergenerational continuity, and changing forms of community participation in contemporary Japan.

The findings suggest that the changes observed at Shinrikyō cannot be understood simply as either religious decline or organizational modernization. Rather, the fieldwork revealed a more gradual process in

which ritual continuity, community interaction, childcare support, digital communication, and local welfare-related activities increasingly coexist within the same organizational setting.

In particular, the study highlighted the importance of everyday forms of connection surrounding the church. Community-oriented activities did not appear to function merely as supplementary programs added onto religious practice. Instead, they often created opportunities for repeated interaction among elderly residents, children, parents, volunteers, and clergy members in ways that helped sustain the church's local social presence.

At the same time, the fieldwork also revealed continuing uncertainty regarding the future direction of these transformations. Although community accessibility and digital outreach expanded opportunities for contact, participants remained cautious about maintaining ritual continuity and preserving the distinctiveness of the church as a religious institution.

For this reason, the Shinrikyō case should not be interpreted as a finalized model of successful adaptation. Rather, it reflects an ongoing attempt to negotiate the relationship between religious tradition and changing local social conditions in an aging society.

More broadly, the study suggests that the significance of religious organizations in contemporary Japan may increasingly depend not only on doctrinal authority or hereditary affiliation, but also on their capacity to sustain spaces of familiarity, repeated interaction, and low-threshold social connection within everyday community life.

At the conclusion of the fieldwork, one clergy member reflected quietly: "Perhaps what matters most is simply that people still feel able to come here."

This comment captures an important aspect of the present study. The transformation of Shinrikyō appears less as a dramatic institutional reinvention than as a gradual effort to preserve forms of human connection under conditions in which many traditional social relationships are becoming increasingly fragile.

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- Appendix A: Semi-Structured Interview Guide
- Appendix B: M-GTA Analytical Worksheets

Appendix A: Semi-Structured Interview Guide (for Shinrikyō Case Study)

Introduction to Participants

Thank you for agreeing to participate in this interview. This research aims to understand how religious organizations in Japan adapt to social changes such as population aging, declining community ties, and weakening intergenerational continuity. Your responses will be treated confidentially and anonymized. Participation is voluntary, and you may decline to answer any question. The interview will take approximately 60 minutes.

Section 1: Organizational Profile and Basic Information

- 1.1 Could you briefly describe the founding history of your religious organization and its core doctrines?
- 1.2 How would you describe the current organizational structure (headquarters, local churches, membership system)?
- 1.3 What is the approximate scale of your church in terms of registered members, active participants, and affiliated facilities?

Section 2: Perceptions of Social and Demographic Change

- 2.1 How have you observed Japanese society changing over the past two decades, particularly regarding aging, depopulation, and community relationships?
- 2.2 In what ways have these social changes affected the church's relationship with local residents and registered believers?
- 2.3 Have you noticed a decline in participation or interest among younger generations? If so, how do you interpret this trend?
- 2.4 How has the aging of the membership affected daily operations and activities?

Section 3: Value Proposition and Changes in Organizational Activities

- 3.1 How has your church's range of activities evolved over the past 10 years? What new programs or services have been introduced?
- 3.2 What motivated the church to expand into community-oriented activities such as childcare support, educational programs, or intergenerational exchange?
- 3.3 How do these new activities relate to traditional ritual functions? Do you see any tension or complementarity between them?

3.4 What do you consider to be the core value that your church provides to the local community today, compared to the past?

Section 4: Community Engagement and Intergenerational Interaction

4.1 Can you describe the specific community activities your church currently organizes (e.g., kindergarten, after-school programs, elderly gatherings, seasonal events)? How were these initiated?

4.2 What kind of feedback have you received from participants—especially elderly residents, children, parents, and local families?

4.3 Do you feel these activities help maintain the church's presence and visibility in the local community?

4.4 Have these activities created new forms of connection with people who were not previously involved with the church?

Section 5: Digital Outreach and Communication

5.1 What digital tools or online services does your church currently use (e.g., official website, social media, online prayer requests, remote worship)?

5.2 How effective have these digital channels been in reaching both existing members and new audiences?

5.3 What challenges have you encountered in using digital tools, particularly for elderly participants with limited digital literacy?

5.4 How do you see the relationship between online communication and traditional in-person ritual participation?

Section 6: Organizational Capabilities, Resources, and Challenges

6.1 What do you consider to be your church's strengths in developing and operating new activities (e.g., human resources, networks, brand, facilities)?

6.2 What are the main challenges or obstacles in promoting organizational change?

6.3 How does the church address issues of financial sustainability? What is the approximate structure of income sources?

6.4 How do you balance the preservation of traditional rituals with the need to remain socially accessible and responsive?

Section 7: Tensions and Balancing Strategies

- 7.1 Have there been any disagreements or concerns within the organization regarding the expansion of community-oriented activities?
- 7.2 How do you manage the church's dual identity as both a religious institution and a provider of community/welfare services?
- 7.3 Have you encountered tensions between doctrinal principles and the practical needs of local participants? How have these been addressed?
- 7.4 How do long-term believers and newer participants perceive these changes differently?

Section 8: Future Outlook and Mission Transmission

- 8.1 What do you see as the main challenges facing the church in the next 5–10 years?
- 8.2 What strategies or directions do you consider essential for sustaining the church's role in the community?
- 8.3 In your view, what does it mean for a religious organization to “remain relevant” in an aging and atomized society?
- 8.4 How do you envision the intergenerational continuity of the church in the future?

Closing Question

- 8.5 Is there anything else you would like to add regarding your church's transformation, current activities, or its future direction?

Appendix B: M-GTA Analytical Worksheets

This appendix presents the analytical worksheets generated through the M-GTA coding process. Following Kinoshita's (2003) methodological framework, each worksheet documents: (1) the concept name; (2) its definition; (3) representative data examples (verbatim or paraphrased extracts from interview transcripts and field notes); and (4) theoretical memos recording the researcher's analytical reasoning, interpretive decisions, and comparisons across multiple data sources. Coding conventions: Interviewees are identified by codes (S-01 to S-05) followed by interview date. Field notes are marked as (FN) with observation date.

Worksheet 1: Concept "Generational Discontinuity"

Item	Content
Concept Name	Generational Discontinuity (世代断絶)
Definition	The perceived weakening or rupture of intergenerational transmission of religious affiliation and participation, wherein younger generations no longer automatically inherit the religious involvement of their parents or grandparents.
Data Examples	S-02: "Young people today do not inherit religious involvement in the same way as before. If the church only waits for people to come, the relationship eventually disappears." (May 7, 2026) S-04: "In the past, families remained connected to the church almost automatically. Today, that continuity no longer exists." (May 8, 2026) S-03: "Younger family members may attend rituals occasionally, but the everyday relationship has become much weaker." (May 7, 2026)
Theoretical Memo	This concept appeared consistently across all five interviews, regardless of the informant's role. Informants did not describe abrupt institutional collapse, but rather a gradual erosion of taken-for-granted continuity. The concept was initially coded as "declining participation," but repeated comparisons suggested that informants emphasized the rupture of inheritance (a relational problem) more than the reduction of numbers (a statistical problem). This distinction shaped later category formation. Saturation reached after the fourth interview.

Worksheet 2: Concept "Ritual–Community Spatial Differentiation"

Item	Content
Concept Name	Ritual–Community Spatial Differentiation (儀礼空間とコミュニティ空間の分化)
Definition	The organizational practice of maintaining a functional and spatial distinction between formal ritual spaces (main sanctuary) and community activity spaces (educational facilities, common rooms), allowing religious and non-religious functions to coexist without open conflict.
Data Examples	S-01: "If we become too closed, younger generations stop coming entirely. But if we move too far away from ritual tradition, the church may lose its meaning." (May 7, 2026) S-05: "Not everyone who comes here participates as a believer. But maintaining some kind of relationship still matters." (May 9, 2026) FN (May 7, 2026): Morning worship was conducted with strict formal procedures in the main sanctuary. In contrast, the adjacent community room hosted a casual gathering of elderly visitors and children preparing for a seasonal event. The spatial proximity was notable, but the two activities appeared functionally independent.
Theoretical Memo	This concept emerged from both interviews and observations. Informants rarely described this differentiation in explicit strategic language; rather, it appeared as a practical arrangement that had developed incrementally. Initial coding treated "space" as a background condition, but repeated observational data pushed it toward a more central analytical position. The concept was compared across three observation periods and found to be consistent. Saturation reached after the third observation.

Worksheet 3: Concept “Weak-Tie Digital Outreach”

Item	Content
Concept Name	Weak-Tie Digital Outreach (弱い紐帯としてのデジタル・アウトリーチ)
Definition	The use of online communication tools (website, social media, online prayer requests) not as a replacement for in-person ritual participation, but as a supplementary mechanism for maintaining minimal but continuing contact with participants who are elderly, geographically distant, or otherwise limited in physical access.
Data Examples	S-01: “Some elderly members can no longer travel easily to the church. Online prayer requests became one way to help them remain connected.” (May 7, 2026) S-04: “The internet cannot substitute for direct worship. But if communication disappears completely, people gradually drift away.” (May 8, 2026) S-03: “It is easier now for people to find information about the church online. But that does not automatically create deeper involvement.” (May 7, 2026)
Theoretical Memo	The concept of “weak ties” (Granovetter, 1973) was initially considered as an external framework. However, repeated readings of the data suggested that informants themselves conceptualized online communication in relational rather than technological terms. The concept was therefore generated inductively from the data rather than imposed deductively. The phrase “maintaining connection” appeared repeatedly, suggesting that informants understood digital tools primarily in terms of relational continuity rather than technological innovation. Saturation reached after the third interview.

Worksheet 4: Concept “Community Accessibility as Mission Extension”

Item	Content
Concept Name	Community Accessibility as Mission Extension
Definition	The organizational perception that community-oriented activities—particularly childcare support, intergenerational exchange, and welfare-oriented programs—are not separate from religious practice but serve as extensions of religious mission by creating conditions of trust, familiarity, and repeated contact with local residents.
Data Examples	S-02: “The church cannot survive only as a place people visit after someone dies. There must also be some connection to ordinary life.” (May 7, 2026) S-05: “Some parents first come because of the kindergarten, not because of religion. But after repeated visits, they gradually become familiar with the church itself.” (May 9, 2026) S-01: “We cannot assume that children who grow up here will automatically become believers later. But at least some relationship remains.” (May 7, 2026) FN (May 8, 2026): Elderly visitors and children shared physical spaces in relatively casual ways that differed from the more formal atmosphere of ritual events. Staff members did not attempt to draw explicit religious boundaries around these interactions.
Theoretical Memo	This concept was initially difficult to code because informants themselves expressed ambiguity about the relationship between community activities and religious mission. However, the phrase “some relationship remains” suggested that informants conceptualized community activities not as secularization but as a minimum condition for possible future connection. This interpretive direction was strengthened by repeated comparison with observational notes. Saturation reached after the fifth interview.

Worksheet 5: Concept “Organizational Anxiety”

Item	Content
Concept Name	Organizational Anxiety (組織的危機感)
Definition	A diffuse sense of unease among clergy members and staff regarding the church’s long-term sustainability, expressed primarily through concerns about decreasing opportunities for everyday interaction with younger generations, rather than through explicit discussion of numerical decline or financial crisis.
Data Examples	S-02: “In the past, families remained connected to the church almost automatically. Today, that continuity no longer exists.” (May 7, 2026) S-01: “If we become too closed, younger generations stop coming entirely.” (May 7, 2026) S-03: “People still come for funerals or memorial services. But outside those occasions, there are fewer opportunities for regular contact.” (May 7, 2026) FN (May 8, 2026): During a break between interviews, one staff member remarked informally: “We have fewer young people visiting now. It’s not that they don’t respect the church. It’s just that they don’t think about us at all.”
Theoretical Memo	This concept was not initially part of the analytical plan, but emerged from repeated patterns in interviews. Informants rarely used the word “crisis” (kiki). Instead, they described gradual shifts in everyday routine. The concept of “anxiety” was chosen to capture this diffused, non-catastrophic quality. This distinction influenced the final theoretical interpretation: the transformation observed at Shinrikyō appeared to be driven more by preventive adaptation than by crisis response. Saturation reached after the fourth interview.

Summary of Concept-to-Category Integration

After repeated comparative analysis, the above concepts were integrated into four higher-order categories:

Higher-Order Category	Constituent Concepts
Weakening Relational Infrastructure (関係的インフラの弱体化)	Generational Discontinuity; Organizational Anxiety
Flexible Organizational Adaptation (柔軟な組織適応)	Ritual–Community Spatial Differentiation; Weak-Tie Digital Outreach
Community Re-Embedding (コミュニティへの再埋め込み)	Community Accessibility as Mission Extension
Core Tension (核心的緊張関係)	Mission Retention vs. Social Accessibility (emerged from comparative analysis across all worksheets)

Core Category Identified: “Gradual Coexistence of Ritual Continuity and Community Accessibility” (儀礼継承とコミュニティ・アクセシビリティの漸進的共存).

The analytical process was terminated when no new concepts emerged from the fifth interview and additional data from field observations consistently aligned with existing concepts, indicating theoretical saturation.

Article

AI Literacy and the Formation of Data Strategist Role Identity: The Mediating Role of Human-AI Trust

生成AI時代におけるAIリテラシーと データストラテジスト役割認知の形成メカニズム —人とAIの信頼の媒介効果—

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Abstract

The proliferation of generative AI is reshaping the way knowledge workers operate, and organizations urgently need to cultivate “data strategist” talents with strategic insight. However, whether employees identify with this new role and how such identification is formed remain unclear. Drawing on social cognitive theory and trust theory, this study constructs a moderated mediation model to explore the influence mechanism of AI literacy on data strategist role identity, with a focus on the mediating role of human-AI trust and the moderating role of AI usage frequency. Using a two-wave survey of 312 knowledge workers in technology firms, the results show that AI literacy positively affects role identity; human-AI trust partially mediates this relationship, accounting for 44.2% of the total effect; and AI usage frequency positively moderates the AI literacy→trust link, with this moderation transmitting to role identity through the mediation path. Theoretically, this study reveals the psychological pathway through which AI literacy influences role identity via trust mechanisms, extending the explanatory power of role identity theory in the AI context. Practically, it offers organizations a dual-pathway reference—literacy training and trust building—for cultivating data strategist talents.

Keywords: AI literacy; human-AI trust; data strategist; role identity; knowledge worker

1. Introduction

1.1 Background and Problem Statement

Generative AI is penetrating business operations at an unprecedented pace. Informatica's 2026 survey of 600 global chief data officers shows that 69% of firms have deployed generative AI, yet 76% of data leaders admit that their governance frameworks lag behind employees' actual AI usage. This gap between technological deployment and organizational readiness constitutes a core dilemma—organizations can deploy AI technologies but have failed to simultaneously cultivate employees' ability to use AI responsibly. This ability, in essence, is employees' AI literacy—the composite capability to understand AI's basic principles, skillfully use AI tools to accomplish tasks, and critically evaluate its outputs.

This gap also gives rise to another layer of tension: IDC (2025) found that only 40% of organizations have configured risk-control measures for their AI systems, yet those lacking such controls exhibit even higher trust in generative AI. The over-reliance formed through anthropomorphic interactions may cause employees to overlook potential risks in AI accuracy. This raises a critical question: employees can neither blindly rely on AI nor reject it out of anxiety—they need a calibrated form of trust, which is precisely the core competency of the “data strategist” role. However, what factors facilitate employees' identification with this role has yet to be systematically examined in existing research.

1.2 Research Purpose

This study aims to explore how AI literacy influences knowledge workers' identification with the “data strategist” role through human-AI trust, and to examine the moderating role of AI usage frequency in this mechanism. In essence, the core lies in elucidating the psychological pathway through which AI literacy translates into role identity, and how usage experience enhances this translational efficiency.

1.3 Formulation of the Overall Hypothesis

Drawing on social cognitive theory and trust theory, this study proposes: AI literacy positively affects data strategist role identity through the mediating role of human-AI trust, and this mediation path is positively moderated by AI usage frequency. That is, employees with higher AI literacy are more likely to develop trust in AI systems, and subsequently embrace the new role deeply intertwined with AI; meanwhile, frequent usage experience strengthens the efficiency of translating literacy into trust, thereby accelerating the identification process.

2. Literature Review and Theoretical Framework

2.1 Literature Review on AI Literacy

AI literacy, as an academic concept, has been progressively enriched with the evolution of AI technologies. Long and Magerko (2020) defined AI literacy as a set of competencies that enable individuals to critically evaluate AI, communicate and interact effectively with AI, and apply it to learning and work—a

definition that laid an important foundation for subsequent research. Some researchers further distinguished AI literacy from AI competence: the former emphasizes knowledge, understanding, and critical awareness, while the latter stresses the practical ability to proficiently use AI in real-world contexts; literacy serves as the foundation of competence, and competence is the behavioral extension of literacy (Chiu, 2025). There is broad consensus that AI literacy encompasses not only understanding the basic principles of AI, but also the ability to apply AI tools to solve practical problems, as well as critical scrutiny of AI outputs and ethical reflection (Liu et al., 2025).

Existing research has extensively explored the outcome variables of AI literacy. At the individual level, AI literacy is positively associated with employee job performance. A study based on the ability-motivation-opportunity framework found that generative AI literacy had a standardized path coefficient of 0.68 on job performance, with creative self-efficacy partially mediating this effect (Liu et al., 2025). Research grounded in the job demands-resources model found that AI literacy significantly reduces emotional exhaustion and indirectly promotes innovative behavior through this pathway (Qiu et al., 2025). However, despite these associations with various outcome variables, the self-concept variable of role identity has received scant attention. Whether employees identify with their transition from technical executor to strategic decision-maker is likely influenced by their AI literacy, yet this path has not been directly tested in existing literature—a theoretical gap this study seeks to fill.

2.2 Literature Review on Human-AI Trust

Human-AI trust refers to individuals' belief in and willingness to rely on the reliability and dependability of AI systems. Unlike interpersonal trust, human-AI trust places greater emphasis on confidence in the functional stability and output accuracy of technical systems (Hald et al., 2025). Some scholars further distinguish between cognitive and affective dimensions of human-AI trust: cognitive trust stems from rational evaluation of system capability and reliability, while affective trust arises from intuitive safety and emotional connection formed through long-term interaction (Aquilino et al., 2025). In organizational contexts, human-AI trust directly relates to whether employees are willing to delegate critical tasks to AI assistance, and thus constitutes a key variable in determining whether AI can truly integrate into knowledge work processes.

Regarding the formation mechanisms of human-AI trust, a systematic review covering 562 empirical studies shows that trust antecedents fall into three main categories: technical characteristics of AI systems (e.g., explainability, transparency), user individual characteristics (including AI literacy and usage experience), and contextual and social factors (Dang & Li, 2025). In terms of consequences, human-AI trust most stably predicts users' behavioral intentions and is positively associated with attitudes, acceptance, satisfaction, and actual usage behavior (Bucinka et al., 2025). However, the relationship between human-AI trust and the self-concept variable of role identity has yet to be adequately explored—precisely the gap this study attempts to fill.

2.3 Literature Review on Data Strategist Role Identity

Role identity theory holds that individuals gradually form their self-definition by internalizing the expectations and meanings of specific roles through social interaction (Stryker, 1980). When employees identify with a role, they more actively exhibit behaviors consistent with that role; role identity formation is influenced by multiple factors including individual capability cognition, feedback from others, and organizational environment, and is a dynamic psychological process (Aquilino et al., 2025). In the context of deep AI embedding in organizations, the “data strategist” as an emerging work role is being jointly constructed by practitioners and academia—requiring not only technical expertise in understanding and leveraging AI, but also the strategic thinking ability to translate data insights into business decisions.

Combining practical observations and literature review, this study operationalizes data strategist role identity as: knowledge workers’ self-perceived degree of transitioning from technical executor to strategic decision-maker. Specifically, it encompasses three dimensions: AI collaboration capability identity—employees’ belief that they can effectively collaborate with AI tools; business insight capability identity—employees’ belief that they can extract valuable business insights from data analysis; and strategic thinking capability identity—employees’ belief that their role is transcending task execution to participate in or influence higher-level decision-making. This definition provides a conceptual foundation for subsequent empirical measurement.

When discussing emerging roles, scholars often conflate role identity with concepts such as capability and identity, which to some extent blurs the theoretical boundaries of the data strategist role. To sharpen the construct clarity of this study, it is necessary to distinguish it from several easily confounded related concepts. Professional identity is a relatively broad concept referring to individuals’ sense of belonging to their occupational group, whereas this study focuses on identification with the specific work role of data strategist—a much narrower scope. AI literacy is defined at the capability-cognition level in this study’s framework; it answers what employees can do and what they understand, while role identity addresses what kind of person employees believe they should become and what role they occupy—the two belong to antecedent and outcome respectively and should not be conflated. Digital competence covers individuals’ general ability to use various digital tools, while this study focuses on a strategic role deeply coordinated with AI technology, not general-purpose tool use. Strategic decision-making orientation emphasizes cognitive style and behavioral tendency, describing how employees tend to make decisions; role identity, by contrast, taps into a deeper psychological structure concerning employees’ acceptance and internalization of their self-definition. Through these distinctions, this study positions data strategist role identity as employees’ internal acceptance and self-definition of transitioning from technical executor to strategic decision-maker in this specific work role.

2.4 Theoretical Foundations and Research Framework

This study is underpinned by social cognitive theory and trust theory as dual theoretical pillars. Social cognitive theory (Bandura, 1986) emphasizes the continuous reciprocal interaction among individual

cognition, behavior, and environment—AI literacy can be viewed as capability cognition, role identity as self-concept, and AI usage frequency as behavioral manifestation—providing the foundation for explaining the “cognition→psychology→self-concept” transmission mechanism. Trust theory (Mayer et al., 1995) identifies ability, benevolence, and integrity as three core antecedents of trust; extending this framework to the human-AI interaction context, AI literacy, as a signal of capability, directly affects employees’ trust in AI systems, which in turn further influences their acceptance of AI-related new roles.

Based on the above theoretical analysis, this study constructs an integrated research framework, as shown in Figure 2-1 and Table 2-1. The framework takes AI literacy as the independent variable, data strategist role identity as the dependent variable, human-AI trust as the mediating variable, and AI usage frequency as the moderating variable. It comprises three core pathways: AI literacy directly and positively affects role identity; AI literacy indirectly affects role identity through the mediation of human-AI trust; and AI usage frequency positively moderates the first half of the mediation path. This framework integrates the logic of “capability cognition → psychological mechanism → self-concept” from social cognitive theory with the logic of “ability → trust → role acceptance” from trust theory, and subsequent chapters will empirically test this framework. The theoretical sources and operational definitions of each variable are presented in Table 2-1.

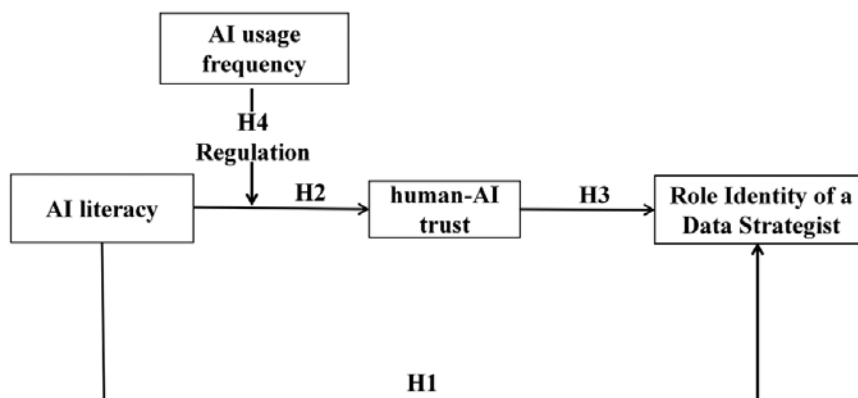


Figure 2-1 Theoretical Model of This Study (Proposed by the Author)

Table 2-1 Core Variable Definitions and Theoretical Sources

Variable Name	Variable Type	Theoretical Source	Variable Definition
AI literacy	Independent variable	Social cognitive theory	Employee’s comprehensive ability to understand, apply, and critically evaluate AI technology (Long & Magerko, 2020)
Human–AI trust	Mediator	Trust theory	Employee’s belief in and willingness to rely on AI system reliability and dependability, including cognitive and affective dimensions (Bucinca et al., 2025)
Data strategist role identity	Dependent variable	Role identity theory	Employee’s self-perceived degree of transition from technical executor to strategic decision-maker, reflected in self-identification with AI collaboration, business insight, and strategic thinking capabilities
AI usage frequency	Moderator	Social cognitive theory	Intensity of employee interaction with AI systems, manifested as daily usage duration or functional dependence

3. Research Design and Methods

3.1 Research Subjects and Data Collection

3.1.1 Definition of Research Subjects

This study targets knowledge workers in technology firms. Three inclusion criteria were applied: currently employed, using AI tools at least three times per week, and engaged in roles involving data analysis or decision support. Samples were obtained through corporate partnerships and professional community recruitment—we contacted human resources departments of six technology companies in Beijing, Shanghai, and Shenzhen, who distributed invitations via internal emails; simultaneously, recruitment announcements were posted through data analyst associations and product manager communities. All three channels applied the same inclusion criteria.

Sample size was determined with reference to general requirements for structural equation modeling, and the final valid sample comprised 312 respondents, sufficient for subsequent mediation and moderation analyses. Sample proportion settings drew upon demographic distribution characteristics of knowledge workers in technology firms reported in similar studies, combined with reasonable pre-estimation based on the actual workforce structure of technology enterprises. For instance, given that the 26–35 age group constitutes the core workforce in the technology industry, its proportion was set at approximately 50%; and since data analysts are most closely associated with AI tool usage, their proportion was set at approximately 40%. All proportions were premised on ensuring that each subsample met the minimum sample size required for statistical testing, thereby ensuring sufficient statistical power for subsequent subgroup analyses.

3.1.2 Two-Wave Data Collection Design

To reduce common method bias, this study adopted a two-wave data collection design. T1 (March 1–15, 2026) collected AI literacy, AI usage frequency, and demographic variables; T2 (April 1–15, 2026) collected human-AI trust and role identity data. With an interval of approximately one month, questionnaires were distributed via the Wenjuanxing platform, and the two waves were matched using participants' mobile phone numbers, which were deleted after matching to protect privacy. Attention-check items were included, and all participants signed informed consent forms. Data screening applied the following criteria: correct responses to attention-check items; no missing values on core scale items; completion time of no less than 5 minutes (referencing the average completion time from the pretest); and no patterned responding (e.g., selecting the same option throughout). Only cases meeting all criteria were retained. A total of 412 questionnaires were collected at T1, and 335 at T2; after matching and screening, 312 valid samples were obtained. The measurement contents at each stage of the two waves are summarized in Table 3-1.

Table 3-1 Summary of Two-Wave Measurement Contents

Time Point	Measurement Content	Scale Source	No. of Items
T1	AI literacy	Adapted from Long & Magerko (2020); Ng et al. (2021)	6
T1	AI usage frequency	Adapted from GAIES frequency subscale	4
T1	Demographics	Self-developed	6
T2	Human-AI trust	Adapted from Gulati & Sytch (2008)	4
T2	Data strategist role identity	Adapted from role-based identity scale (RBI), self-developed	4

3.2 Variable Measurement

3.2.1 AI Literacy Scale

AI literacy was measured by adapting the definition of Long and Magerko (2020) and the scale framework of Ng et al. (2021), covering three dimensions: understanding, application, and critique. A 7-point Likert scale was used, with 6 items in total (2 per dimension). Sample items include: “I understand the basic working principles of generative AI,” “I can skillfully use AI tools to complete data analysis tasks,” and “I can identify possible errors or biases in AI outputs.” The item structure is shown in Table 3-2.

Table 3-2 Item Structure of the AI Literacy Scale

Item No.	Dimension	Item Content	Theoretical Source
AIL ₁	Understanding	I understand the basic working principles of generative AI	Long & Magerko (2020); Ng et al. (2021)
AIL ₂	Understanding	I know the capability boundaries and applicable scope of AI tools	Long & Magerko (2020)
AIL ₃	Application	I can skillfully use AI tools to complete data analysis tasks	Ng et al. (2021)
AIL ₄	Application	I can integrate AI outputs into my daily workflow	Self-developed
AIL ₅	Critique	I can identify possible errors or biases in AI outputs	Ng et al. (2021)
AIL ₆	Critique	I critically evaluate AI-provided information rather than directly accepting it	Long & Magerko (2020)

Note: 7-point Likert scale, 1=strongly disagree, 7=strongly agree.

3.2.2 Human-AI Trust Scale

Human-AI trust was measured using the trust scale developed by Gulati and Sytch (2008), adapted to the AI context, covering both cognitive and affective trust dimensions. The scale consists of 4 items using a 7-point Likert scale. Sample items include: “I believe the information provided by AI tools is reliable” and “I am willing to delegate important tasks to AI assistance.” The item structure is shown in Table 3-3.

Table 3-3 Item Structure of the Human-AI Trust Scale

Item No.	Dimension	Item Content	Source
HTS ₁	Cognitive trust	I believe the information provided by AI tools is reliable	Gulati & Sytch (2008)
HTS ₂	Cognitive trust	I think the output of AI systems is accurate	Körber (2018)
HTS ₃	Affective trust	I am willing to delegate important tasks to AI assistance	Gulati & Sytch (2008)
HTS ₄	Affective trust	I have confidence in the working ability of AI systems	Körber (2018)

3.2.3 Data Strategist Role Identity Scale

The data strategist role identity scale was self-developed following the classical scale development paradigm. First, three dimensions were identified through literature review: AI collaboration capability identity, business insight capability identity, and strategic thinking capability identity. Subsequently, three corporate managers and two organizational behavior scholars were invited to participate in item revision; after three rounds of modification, four measurement items were finalized. A 7-point Likert scale was used. The item structure is shown in Table 3-4.

Table 3-4 Item Structure of the Data Strategist Role Identity Scale

Item No.	Dimension	Item Content	Theoretical Source
DSR ₁	AI collaboration identity	I think I can effectively collaborate with AI to complete complex work tasks	Self-developed
DSR ₂	Business insight identity	I believe I can extract valuable business insights from data analysis	Self-developed
DSR ₃	Strategic thinking identity	I feel my role is transitioning from technical execution to strategic decision-making	Self-developed
DSR ₄	Overall role identity	I consider myself to be becoming a “data strategist” type of talent	Self-developed

3.2.4 Control Variables

Control variables included demographic variables (age, gender, education level) and work-related variables (job type, tenure, years of AI use), all measured at T1. Measurement methods are shown in Table 3-5.

Table 3-5 Measurement of Control Variables

Variable	Measurement Method	Options/Units
Age	Grouped	1= $\leq$ 25; 2=26–35; 3= $\geq$ 36
Gender	Binary	0=male; 1=female
Education	Grouped	1=bachelor or below; 2=master; 3=doctorate or above
Job type	Grouped	1=data analysis; 2=product operations; 3=technology R&D
Tenure	Grouped	1= $\leq$ 3 years; 2=3–5 years; 3= $\geq$ 5 years
Years of AI use	Grouped	1= $\leq$ 1 year; 2=1–3 years; 3= $\geq$ 3 years

3.3 Data Analysis Methods

3.3.1 Reliability and Validity Tests

SPSS and AMOS were used for reliability and validity tests. Reliability was assessed using Cronbach's alpha, requiring $\alpha \geq 0.70$. Validity was evaluated through confirmatory factor analysis, requiring factor loadings $\lambda \geq 0.50$ and significant, average variance extracted (AVE) ≥ 0.50 , and composite reliability (CR) ≥ 0.70 (Fornell & Larcker, 1981). Discriminant validity required that the square root of AVE for each variable be greater than its correlations with other variables. Model fit followed the criteria recommended by Wen et al. (2004): $\chi^2/df < 3$, CFI ≥ 0.90 , RMSEA < 0.08 , SRMR < 0.08 . The criteria are presented in Table 3-6.

Table 3-6 Reliability and Validity Test Indicators and Criteria

Test Category	Indicator	Symbol	Criterion
Reliability	Cronbach's alpha	α	$\alpha \geq 0.70$
Reliability	Composite reliability	CR	$CR \geq 0.70$
Convergent validity	Average variance extracted	AVE	$AVE \geq 0.50$
Convergent validity	Standardized factor loading	λ	$\lambda \geq 0.50$ and significant
Discriminant validity	AVE square root vs. correlations	$\sqrt{\text{AVE}}$ vs. r	$\sqrt{\text{AVE}} > r$
Model fit	Chi-square/df	χ^2/df	< 3 good, < 5 acceptable
Model fit	Comparative fit index	CFI	≥ 0.90
Model fit	Root mean square error of approximation	RMSEA	< 0.08
Model fit	Standardized root mean square residual	SRMR	< 0.08

3.3.2 Common Method Bias Test

This study combined procedural and statistical methods to control common method bias. Procedurally, two-wave data collection, anonymous responses, and random item ordering were employed as ex ante remedies. Statistically, Harman's single-factor test was used, with bias considered not severe if the first factor explained less than 40% of the variance; the unmeasured latent method factor approach was also adopted as a supplementary test, comparing model fit improvement after adding a common method factor (Tang & Wen, 2020). The test methods are presented in Table 3-7.

Table 3-7 Common Method Bias Test Methods and Criteria

Method	Procedure	Criterion
Harman's single-factor test	Unrotated EFA on all measurement items	First factor variance $< 40\%$ of variance
Unmeasured latent method factor	Add common method factor in CFA; compare fit	No significant improvement after adding method factor

3.3.3 Hypothesis Testing Methods

Main and mediation effects were tested using structural equation modeling (Kline, 2016), with AI literacy as the exogenous latent variable, human-AI trust as the mediator, and role identity as the endogenous latent variable, estimated via maximum likelihood. Mediation was tested using the bootstrap method with 5,000

resamples, computing 95% bias-corrected confidence intervals (Preacher & Hayes, 2008). Moderated mediation was tested using PROCESS Model 7 (Hayes, 2017), corresponding to the moderator acting on the first half of the mediation path. All analyses controlled for demographic and work-related variables. The test methods are presented in Table 3-8.

Table 3-8 Hypothesis Testing Methods and Technical Indicators

Test Type	Analytical Method	Key Indicator	Criterion	PROCESS Model
Main effect	SEM	Path coefficient β , p-value	$p < 0.05$	–
Mediation	Bootstrap method	Indirect effect estimate, 95% CI	CI does not contain 0	Model 4
Moderation	Hierarchical regression	Interaction coefficient, ΔR^2	Interaction significant	–
Moderated mediation	Conditional indirect effect	Index of moderated mediation	CI does not contain 0	Model 7

4. Data Analysis and Hypothesis Testing

4.1 Sample Characteristics and Descriptive Statistics

4.1.1 Sample Demographics

The final valid sample comprised 312 respondents. The distributions of gender, age, education, job type, tenure, and years of AI use are presented in Table 4-1. The overall structure is consistent with the characteristics of knowledge workers in technology firms.

Table 4-1 Demographic and Job-Related Characteristics of the Sample (N=312)

Variable	Category	Frequency	Percentage (%)
Gender	Male	164	52.6
	Female	148	47.4
Age	≤25 years	57	18.3
	26–35 years	170	54.5
	≥36 years	85	27.2
Education	Bachelor or below	130	41.7
	Master	151	48.4
	Doctorate or above	31	9.9
Job type	Data analysis	120	38.5
	Product operations	109	34.9
	Technology R&D	83	26.6
Tenure	<3 years	98	31.4
	3–5 years	131	42.0
	>5 years	83	26.6
Years of AI use	<1 year	113	36.2
	1–3 years	143	45.8
	>3 years	56	18.0

4.1.2 Descriptive Statistics of Key Variables

The means, standard deviations, and correlation matrix of key variables are presented in Table 4-2. AI literacy ($M = 5.21$, $SD = 0.86$), human-AI trust ($M = 4.98$, $SD = 0.92$), and role identity ($M = 4.76$, $SD =$

0.98) were all at above-moderate levels; all three pairs were significantly positively correlated ($r = 0.42$ – 0.51 , $p < .01$), providing preliminary support for subsequent hypothesis testing.

Table 4-2 Means, Standard Deviations, and Correlation Matrix of Key Variables

Variable	M	SD	1	2	3	4	5	6	7
1. Gender	0.47	0.50	1						
2. Age	2.09	0.68	−0.08	1					
3. Education	1.68	0.64	0.05	−0.13	1				
4. Years of AI use	1.82	0.72	−0.11	0.21*	0.14	1			
5. AI literacy	5.21	0.86	−0.09	−0.11	0.19*	0.31**	1		
6. Human–AI trust	4.98	0.92	0.03	−0.06	0.08	0.22*	0.47**	1	
7. Role identity	4.76	0.98	−0.04	0.02	0.12	0.26**	0.42**	0.51**	1

Note: Gender (0=male, 1=female); Age (1= ≤ 25 , 2=26–35, 3= ≥ 36); Education (1=bachelor or below, 2=master, 3=doctorate or above); Years of AI use (1=<1 year, 2=1–3 years, 3= > 3 years); * $p < 0.05$, ** $p < 0.01$, two-tailed.

4.2 Reliability and Validity Test Results

4.2.1 Reliability Results

All scales demonstrated good internal consistency. Cronbach’s alpha and composite reliability values for each scale are shown in Table 4-3. For the self-developed role identity scale, corrected item-total correlations ranged from 0.63 to 0.76; test-retest ICCs ranged from 0.78 to 0.83.

Table 4-3 Reliability Test Results

Scale	No. of items	Cronbach’s α	CR	ICC
AI literacy	6	0.86	0.87	0.81
Human–AI trust	4	0.82	0.84	0.78
Data strategist role identity	4	0.88	0.90	0.83
Criterion	–	≥ 0.70	≥ 0.70	≥ 0.70

4.2.2 Validity Results

Confirmatory factor analysis showed that the three-factor baseline model fit well: $\chi^2/df = 2.34$, CFI = 0.95, TLI = 0.94, RMSEA = 0.06, SRMR = 0.05. Standardized factor loadings ranged from 0.64 to 0.88, and AVEs ranged from 0.53 to 0.69. For discriminant validity, all alternative models showed significantly worse fit than the baseline model (all $\Delta\chi^2$ significant, $p < .001$), and the square root of AVE for each variable was greater than its correlations with other variables. Model comparison results are presented in Table 4-4.

Table 4-4 CFA Model Comparison Results

Model	Factor structure	χ^2/df	CFI	TLI	RMSEA	SRMR	$\Delta\chi^2$
Baseline	Three-factor: AIL; TRU; IDN	2.34	0.95	0.94	0.06	0.05	—
Model A	Two-factor: AIL+TRU; IDN	4.21	0.82	0.80	0.12	0.10	146.8***
Model B	Two-factor: AIL; TRU+IDN	4.05	0.83	0.81	0.11	0.09	135.4***
Model C	Single-factor: AIL+TRU+IDN	5.87	0.71	0.68	0.16	0.13	268.9***

Note: AIL=AI literacy; TRU=human-AI trust; IDN=data strategist role identity; *** $p < 0.001$.

4.2.3 Common Method Bias Test Results

Harman's single-factor test extracted five factors with eigenvalues greater than 1, with the first factor explaining 28.6% of the variance. The unmeasured latent method factor test showed limited improvement after adding a common method factor ($\Delta\text{CFI} = 0.02$, $\Delta\text{RMSEA} = 0.01$), and the method factor accounted for only 7.3% of the variance. Common method bias does not constitute a serious concern.

4.3 Hypothesis Testing

4.3.1 Main Effect Test

SEM results showed that AI literacy had a standardized path coefficient of 0.43 on role identity ($p < .001$, see Table 4-5), supporting the main effect. Among control variables, only years of AI use was significant ($\beta = 0.16$, $p < .05$).

Table 4-5 Main Effect Test Results (N=312)

Path	Standardized β	SE	CR	p	Significance
AI literacy $\rightarrow$ Role identity	0.43	0.06	7.82	<0.001	Significant
Years of AI use $\rightarrow$ Role identity	0.16	0.07	2.31	<0.05	Significant
Education $\rightarrow$ Role identity	0.11	0.06	1.89	<0.10	Marginally significant
Age $\rightarrow$ Role identity	-0.05	0.05	-0.93	0.352	Not significant
Gender $\rightarrow$ Role identity	-0.03	0.04	-0.67	0.501	Not significant
Job type $\rightarrow$ Role identity	0.07	0.05	1.42	0.156	Not significant

Note: Model fit: $\chi^2/\text{df}=2.41$, $\text{CFI}=0.94$, $\text{TLI}=0.93$, $\text{RMSEA}=0.06$, $\text{SRMR}=0.05$.

4.3.2 Mediation Effect Test

Bootstrap analysis (5,000 resamples) showed that the total effect of AI literacy on role identity was 0.43, the direct effect was 0.24, and the indirect effect via human-AI trust was 0.19 (95% CI [0.12, 0.27]). The indirect effect accounted for 44.2% of the total effect (Table 4-6), indicating significant mediation.

Table 4-6 Bootstrap Analysis of Mediation Effect

Effect Type	Path	Effect	SE	95% CI	Proportion
Total	AI literacy → Role identity	0.43	0.06	[0.31, 0.54]	100%
Direct	AI literacy → Role identity	0.24	0.07	[0.11, 0.37]	55.8%
Indirect	AI literacy → Trust → Role identity	0.19	0.04	[0.12, 0.27]	44.2%
Path a	AI literacy → Trust	0.51	0.05	[0.41, 0.60]	–
Path b	Trust → Role identity	0.38	0.06	[0.27, 0.49]	–

Note: Bootstrap resamples=5,000; bias-corrected CI.

4.3.3 Moderation Effect Test

Hierarchical regression analysis showed that the interaction between AI literacy and AI usage frequency significantly predicted human-AI trust ($\beta = 0.16$, $p < .01$, $\Delta R^2 = 0.03$), indicating a moderation effect (Table 4-7). Simple slope analysis revealed that for the high-frequency group, the slope of AI literacy on human-AI trust was 0.63 ($p < .001$), while for the low-frequency group it was 0.35 ($p < .01$), suggesting that frequent usage strengthened the translation of literacy into trust.

Table 4-7 Hierarchical Regression Results for Moderation Effect

Variable	Model 1	Model 2	Model 3
Control variables	Controlled	Controlled	Controlled
AI literacy	–	0.47***	0.46***
AI usage frequency	–	0.19**	0.18**
AI literacy × Usage frequency	–	–	0.16**
R^2	0.08	0.34	0.37
ΔR^2	0.08	0.26	0.03
F	4.52**	18.76***	16.93***

Note: Dependent variable = human-AI trust; *** $p < .001$, ** $p < .01$. Control variables include age, gender, education, job type, tenure, and years of AI use.

4.3.4 Moderated Mediation Effect Test

PROCESS Model 7 analysis showed an index of moderated mediation of 0.08 (95% CI [0.03, 0.14]), indicating significant moderated mediation. Conditional indirect effects at different levels of AI usage frequency are presented in Table 4-8, showing that mediation strength increased with usage frequency.

This result can be interpreted as follows: the mediating role of human-AI trust in the AI literacy→role identity relationship is generally robust—trust plays a partial explanatory role regardless of usage frequency. However, the strength of this transmission mechanism is context-dependent—employees who use AI more frequently can more fully translate literacy into trust, and consequently experience stronger role identity; those who use AI less frequently, even with adequate literacy, struggle to achieve the same gains in trust and identity.

Table 4-8 Moderated Mediation Results (Process Model 7)

AI usage frequency level	Conditional indirect effect	SE	95% CI
Low (M-1SD)	0.12	0.04	[0.05, 0.20]
Mean (M)	0.18	0.03	[0.11, 0.25]
High (M+1SD)	0.24	0.04	[0.16, 0.32]
Index of moderated mediation	0.08	0.03	[0.03, 0.14]

Note: Bootstrap resamples=5,000; mean of AI usage frequency=2.08, SD=0.72.

4.4 Robustness Checks

4.4.1 Alternative Measurement Tests

When AI literacy was transformed into a categorical variable and human-AI trust was split into social-entity trust and tool-trust dimensions, the core conclusions remained unchanged (Table 4-9).

Table 4-9 Robustness Test Results for Alternative Measurement

Measurement	Total effect	Direct effect	Indirect effect	95% CI
Continuous (original)	0.43***	0.24***	0.19***	[0.12, 0.27]
Categorical	0.38***	0.22***	0.16***	[0.09, 0.23]
Social-entity trust dimension	0.43***	0.25***	0.18***	[0.11, 0.25]
Tool trust dimension	0.43***	0.31***	0.12**	[0.05, 0.19]

Note: *** $p < 0.001$, ** $p < 0.01$.

4.4.2 Additional Control Variable Test

After including perceived organizational support as an additional control, the direct effect was 0.22 ($p < .001$), the indirect effect was 0.17 (95% CI [0.10, 0.24]), the interaction remained significant ($\beta = 0.14$, $p < .01$), and the index of moderated mediation was 0.07 (95% CI [0.02, 0.12]), indicating robust core conclusions (Table 4-10).

Table 4-10 Robustness Test Results After Adding Organizational Support

Effect	Path	Original effect	After adding control
Direct	AI literacy $\rightarrow$ Role identity	0.24***	0.22***
Indirect	AI literacy $\rightarrow$ Trust $\rightarrow$ Role identity	0.19***	0.17***
Moderation	AI literacy $\times$ Frequency $\rightarrow$ Trust	0.16**	0.14**
Index of moderated mediation	Moderated mediation	0.08 [0.03, 0.14]	0.07 [0.02, 0.12]

Note: *** $p < 0.001$, ** $p < 0.01$.

4.5 Heterogeneity Tests

Heterogeneity test results by job type and years of AI use are presented in Tables 4-11 and 4-12. Group difference tests showed that differences across job types did not reach statistical significance ($\chi^2 = 4.28$, $p = 0.12$), while differences across years of AI use were significant ($\chi^2 = 5.67$, $p < .05$).

Table 4-11 Heterogeneity by Job Type

Job type	N	Main effect β	Indirect effect	Mediation proportion	95% CI
Data analysis	120	0.47***	0.23***	48.9%	[0.15, 0.31]
Product operations	109	0.41***	0.18***	43.9%	[0.10, 0.26]
Technology R&D	83	0.36**	0.14**	38.9%	[0.05, 0.23]
Group difference test	—	$\chi^2 = 4.28, p = 0.12$	—	—	—

Note: *** $p < 0.001$, ** $p < 0.01$. Inter-group difference analysis was performed using a structural equation model for multi-group comparisons.

Table 4-12 Heterogeneity by Years of AI Use

Years of AI use	N	Main effect β	Indirect effect	Mediation proportion	95% CI
<1 year	113	0.31**	0.11*	35.5%	[0.02, 0.20]
1–3 years	143	0.44***	0.19***	43.2%	[0.11, 0.27]
>3 years	56	0.52***	0.26***	50.0%	[0.16, 0.36]
Group difference test	—	$\chi^2 = 5.67, p < .05$	—	—	—

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

5. Conclusions and Discussion

5.1 Summary of Findings

Based on two-wave survey data from 312 knowledge workers in technology firms, this study systematically tested its theoretical hypotheses. The results showed that all core hypotheses received support. AI literacy had a significant positive effect on data strategist role identity ($\beta = 0.43, p < .001$), with human-AI trust partially mediating this relationship (indirect effect = 0.19, 95% CI [0.12, 0.27]). AI usage frequency significantly moderated the AI literacy→human-AI trust relationship ($\beta = 0.16, p < .01$), and the moderated mediation effect was significant (index = 0.08, 95% CI [0.03, 0.14]). This finding is consistent with Zwingmann et al.’s research on AI and creative role identity, suggesting that AI-related factors influence individuals’ role cognition through psychological mechanisms.

Synthesizing the hypothesis test results, this study yields three core findings. First, AI literacy positively affects data strategist role identity—employees with higher levels of AI understanding, application, and critical ability are more likely to position themselves as new types of talent integrating technical expertise with strategic insight. Second, human-AI trust plays a mediating role between AI literacy and role identity—the reason why more AI-literate employees are more likely to form role identity lies partly in their stronger trust in AI systems. Third, AI usage frequency positively moderates this mediation path—employees who use AI more frequently are better able to translate literacy into trust, thereby reinforcing role identity.

5.2 Theoretical Contributions

This study’s theoretical contributions are mainly reflected in four aspects. First, it extends AI literacy research from “capability outcomes” to “self-concept outcomes,” revealing how literacy influences

employees' self-definition through psychological mechanisms. Kong and Tsang similarly emphasized the importance of psychological readiness in developing AI identity, suggesting that AI literacy encompasses psychological dimensions beyond technical knowledge—a view supported by our empirical evidence. Second, it validates the key mediating role of human-AI trust in the AI literacy→role identity relationship, providing new evidence for human-AI trust as a core psychological mechanism in the AI era. Trust theory emphasizes ability as a crucial antecedent of trust; this study tests and extends this proposition in the AI context. Third, it extends role identity theory to the intersection of AI and knowledge workers, offering a theoretical explanation for the formation mechanism of the emerging “data strategist” role, thereby enriching the explanatory power of role identity theory in the AI era. Fourth, extending from a resource conservation theory perspective, this study finds that AI literacy can be viewed as a type of individual cognitive resource, while human-AI trust constitutes a psychological resource; their interaction reveals how employees transform technical competence into self-concept resources. AI usage frequency, as a manifestation of behavioral intensity, strengthens this resource transformation efficiency, echoing the “experience-competence-identity” evolutionary chain in management.

5.3 Practical Implications

For talent development, this study offers two parallel pathways: “literacy training” and “trust building.” Approximately 44% of the effect of AI literacy on role identity operates through human-AI trust—simply emphasizing skill enhancement while neglecting trust cultivation may undermine talent development outcomes. Organizations could prioritize trust building in the early stages of employee AI exposure, followed by systematic literacy training.

For managers' daily practice, the moderating effect of AI usage frequency suggests differentiated empowerment strategies. For low-frequency users, managers should focus on empowerment and encouragement to help them cross the “understanding-to-trust” threshold; for high-frequency users, managers should guide them from “being able to use” toward “using well” to accelerate role identity formation.

For AI tool design and selection, organizations should prioritize products with high explainability and transparency. Such tools enable employees to understand the basis and logic of AI outputs, making it easier to build cognitive trust. Explainable AI design features—such as confidence indicators, input highlighting, and contrastive explanations—can reduce the “black box” perception of AI systems and promote trust formation.

5.4 Limitations and Future Directions

This study has three limitations. First, the sample primarily comprises knowledge workers from technology firms; generalization to other industries should be made with caution. Second, although the two-wave design reduced common method bias, it still cannot fully establish causality. Third, self-report measures may be subject to social desirability bias.

Future research could extend this work in several directions: adopting longitudinal designs to examine the dynamic evolution of role identity; further exploring, on the basis of heterogeneity tests, how AI usage experience alters the dynamic boundaries of the literacy→trust→identity relationship; designing intervention experiments to directly test the differential effects of training strategies; and expanding the range of outcome variables to examine the downstream effects of role identity on innovative behavior and career development.

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Article

Valuation Discounts, Factor Exposures, and Disclosure-Window Reactions in Japanese Sogo Shosha

日本の総合商社におけるバリュエーション・ディスカウント、
ファクター・エクスポージャー、開示ウィンドウ反応

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Abstract

Using a frozen sample ending on 31 December 2025, this paper studies Berkshire Hathaway's investment in Japan's five largest sogo shosha. The analysis combines EDINET DB firm-year data, a historically reconstructed wholesale-trade peer sample, public adjusted prices, Japan factor returns, and timestamped disclosure dates. A corrected uniqueness audit yields 117 non-core peer issuers, 674 peer complete cases, 26 focal complete cases, and 122 EDINET-entity clusters. The core firms traded below book value and at a conditional peer-relative PBR discount. Post-2020 alpha becomes statistically fragile in the declared rich no-sector model. The strongest event evidence remains the August 2020 disclosure and the February 2025 annual-report window. Correcting the March reaction date to 18 March produces strong evidence only in $[-1,+1]$, not $[-3,+3]$, while the 28 August Mitsubishi window is explicitly contaminated by issuer-specific off-shore-wind news. The design identifies disclosure-window associations rather than a standalone Berkshire certification effect.

Keywords: Berkshire Hathaway; sogo shosha; diversified general trading companies; valuation discount; factor decomposition; disclosure-window reactions; foreign institutional ownership

1. Introduction

Berkshire Hathaway's August 2020 disclosure of approximately 5% positions in Itochu, Marubeni, Mitsubishi Corporation, Mitsui & Co., and Sumitomo Corporation (Berkshire Hathaway Inc., 2020) provides a compact setting in which valuation discount, factor exposure, disclosure-window reactions, and currency translation can be studied jointly. Sogo shosha are diversified Japanese general trading companies whose activities span resources, industrial inputs, logistics, consumer businesses, and financial or investment holdings. The episode is unusual not because it offers a clean causal experiment, but because it brings several familiar finance mechanisms into one listed sector and one clearly bounded public-information sequence.

At a practical level, Berkshire's official release describes the positions as long-term holdings and reports JPY 625.5 billion of yen-denominated bonds outstanding at the announcement date (Berkshire Hathaway Inc., 2020). Commodity and currency conditions are treated in this paper as measured public-market controls rather than as unsupported narrative explanations. The empirical task is narrower: did the core firms trade at a meaningful peer-relative discount before disclosure; how much of the subsequent return path is explained by standard factors, style tilts, commodity exposure, currency movements, and sector exposure; and were Berkshire-related disclosures associated with abnormal returns once event timing, contamination, and multiple testing are handled conservatively?

More specifically, the paper contributes a reproducible decomposition framework for analyzing high-profile foreign-investor episodes in segmented equity markets. Peer valuation regressions, factor-model return decomposition, event-study tests, and currency measurement are combined in one design so that a widely discussed investment episode can be broken into observable channels without pretending to recover Berkshire's private decision rule.

The article proceeds in standard research-paper form. Section 2 positions the study in the literature and states the research questions. Section 3 describes the data, benchmark construction, and empirical methods at a reproducible level. Section 4 reports the main results and key figures. Sections 5 and 6 discuss interpretation, limitations, and conclusions. A slim appendix, notes, and references close the paper.

2. Related Literature and Research Questions

2.1. Value Investing and Empirical Asset Pricing

In the value-investing literature, low valuation multiples can signal mispricing, omitted risk, or compensation for systematic exposure. Fama and French (1992, 1998, 2015) show the central role of value characteristics and related common factors in expected returns, while Lakonishok et al. (1994) and Carhart (1997) frame the interaction between value, momentum, and persistent performance. For the present paper, the relevant implication is that the core sogo shosha should be judged against comparable firms, not

merely against low headline multiples.

2.2. Conglomerate Discount and Japanese Complexity Discount

A low price-to-book ratio for a diversified trading house can reflect more than generic value exposure. Berger and Ofek (1995) and Lins and Servaes (1999, 2002) document diversification discounts, while Japan-specific work on keiretsu affiliation and disclosure quality (Frendy, 2022) underscores how group structure, opacity, and internal capital allocation can shape investor interpretation of multi-segment firms. The related NAV-discount literature makes the same point in a sum-of-the-parts setting: holding-company structures can trade below estimated underlying asset value because overhead, tax frictions, control wedges, and opacity stand between outside investors and subsidiary cash flows (Rommens et al., 2004), and carve-out evidence shows that parent-subsidiary prices can diverge sharply from implied asset values when arbitrage is constrained (Lamont & Thaler, 2003). In practice, segment-level sum-of-the-parts valuation is widely used precisely because consolidated valuation can obscure asset-level value in complex multi-business firms (Chlomou & Demirakos, 2020). That matters directly here because the five *sogo shosha* are conglomerates rather than single-line commodity or industrial operators. Any claim of pre-2020 mispricing must therefore confront the alternative view that part of the discount was a complexity or holding-company discount rather than a pure bargain in the Buffett sense.

2.3. International Asset Pricing and Currency Measurement

Cross-border investors do not experience local equity returns in isolation. Exchange-rate movements, funding conditions, and hedge choices can materially alter realized performance. Adler and Dumas (1983), Campbell et al. (2010), Cho et al. (2020), and Lustig et al. (2011) motivate separate treatment of local returns, translated U.S.-dollar returns, and currency-linked factor exposure, while also underscoring that hedge ratios and safe-haven currency roles can vary materially with market volatility. That distinction matters here because the Berkshire episode is often discussed in local-currency terms even though yen depreciation materially changes the outside-investor payoff profile.

2.4. Event Studies and Foreign-Investor Certification

Evidence on Japanese equity markets and factor models cautions that local risk premia, market structure, and institutional ownership should not be assumed to transport mechanically across countries (Hamao et al., 2007; Kubota & Takehara, 2018). The foreign-institutional-ownership literature likewise shows that monitoring, governance, and long-horizon ownership effects vary across markets and investor types (Ferreira & Matos, 2008; Aggarwal et al., 2011; Bena et al., 2017). Event-study methods remain the standard tool for measuring market responses to discrete disclosures. Brown and Warner (1985), MacKinlay (1997), Binder (1998), Boehmer et al. (1991), Kolar and Pynnönen (2010), and Corrado (2011) stress benchmark choice, event-induced variance, cross-sectional dependence, and robustness to non-parametric alternatives. Berkshire's disclosures are therefore treated here as public-information windows, not as direct evidence about Berkshire's private decision rule. The design asks whether abnormal returns are associated with the disclosures, not whether a pure certification effect can be cleanly identified from five

firms and a small set of dates.

2.5. Japanese Governance Reform and the Post-2023 Capital-Efficiency Push

Japan's post-2014 governance reforms (Aoyagi & Ganelli, 2017; Miyajima & Hoda, 2015) and the Tokyo Stock Exchange's 31 March 2023 request, titled "Action to Implement Management that is Conscious of Cost of Capital and Stock Price," create a plausible institutional backdrop for rerating low-price-to-book firms (Tokyo Stock Exchange, 2023). Recent evidence from the TSE capital-efficiency campaign (D'Ercole et al., 2026) points to investor-side repricing of chronically undervalued low-PBR firms rather than an immediate profitability jump. The TSE disclosure-status list and related materials are treated as institutional background only, not as a regression input or a stand-alone outcome dataset. The interpretive implication is narrow: if Berkshire entered a segment already positioned to benefit from governance pressure and investor attention to low-PBR firms, later rerating need not imply that Berkshire itself created the entire repricing.

2.6. Contribution to the Literature

Three contributions matter here. Relative to the Japan governance and value-rerating literature, the paper adds a transparent listed-peer decomposition centered on a specific foreign-investor episode rather than a market-wide reform estimate. Relative to the foreign institutional ownership literature, it connects the episode to the global institutional-investor evidence of Ferreira and Matos (2008), Aggarwal et al. (2011), and Bena et al. (2017) while treating Berkshire's disclosures as a public-information sequence whose valuation, factor, event, and currency channels can be separated. Relative to event-study applications in corporate finance, it shows how a small-N, high-profile case can be evaluated with source tables, portfolio and cross-sectional tests, block-bootstrap inference, and placebo comparisons.

2.7. Research Questions

Against that backdrop, the paper evaluates three linked research questions. RQ1 asks whether the core five traded at a statistically meaningful peer-relative valuation discount before Berkshire's disclosure. RQ2 asks how much of the subsequent return path is explained by standard Japan factor models, style factors, commodity exposure, currency movements, and sector exposure. RQ3 asks whether Berkshire-related disclosure windows are associated with abnormal returns under conservative event-study specifications. The study is therefore framed around valuation, factors, and events, with governance reform treated as contextual background rather than as a standalone causal block.

3. Data and Methods

3.1. Institutional Setting, Focal Firms, and Benchmark Choice

The focal sample consists of Itochu, Marubeni, Mitsubishi Corporation, Mitsui & Co., and Sumitomo Corporation, the five trading houses disclosed by Berkshire Hathaway in August 2020. Toyota Tsusho is retained as an economically close but out-of-sample comparison because its automaker-linked business

mix and higher pre-2020 valuation make it informative as a comparator yet less suitable as the core benchmark for the discount test. At each historical fiscal-year snapshot, an eligible peer was a domestic JPX-listed issue classified as Wholesale Trade in the relevant 33-sector JPX/TOPIX files, included in the year-specific TOPIX universe, non-core (excluding the five focal firms and Toyota Tsusho), and resolvable to an EDINET DB identifier. The main peer universe is therefore reconstructed year by year from historical JPX listed-issue, updated-issue, TOPIX-weight, annual-history, and new-index-code files rather than backfilled from surviving firms.

The reconstructed benchmark contains 117 non-core wholesale-trade issuers and 701 potential peer firm-year records over 2015-2020. Twenty-seven peer records lack PBR, leaving 674 peer complete cases. The five focal firms contribute 30 potential firm-years and 26 complete cases; Sumitomo 2015, Mitsubishi 2016, Mitsui 2016, and Marubeni 2020 are omitted for missing PBR and market capitalization. The combined regression therefore uses $N = 700$ (674 peer plus 26 focal observations) and 122 EDINET-entity clusters (117 peer plus five focal entities). The previously reported 740 peer observations and $N = 766$ arose because override recollections were appended without a final security-entity-year deduplication and because two stale identifier mappings were retained. The corrected pipeline enforces the resolved EDINET identifier, gives targeted override files priority, and requires uniqueness at both JPX-security-by-fiscal-year and EDINET-entity-by-fiscal-year levels; both residual duplicate counts are zero. The audited duplication was a pipeline artifact, not evidence of amended, short-period, or multiple-security firm-year records in the selected sample.

3.2. Data Sources, Identifiers, and Reproducibility

The study combines firm-year valuation and accounting measures from EDINET DB, daily and monthly adjusted market prices, and Berkshire-related event dates linked to public sources. Yahoo Finance series were retrieved on 22 May 2026 using `yfinance` 1.3.0 with adjusted closes; provider adjustments incorporate splits and cash dividends, missing prices are not forward-filled, and the tracked tickers and proxy identifiers are listed in Appendix Table A7. Daily portfolio returns are equal-weighted across available constituent returns and therefore rebalance daily; monthly factor tests use the equal-weighted month-end-frequency analog. JPY/USD translation uses the inverse USD/JPY return and the multiplicative formula $(1 + \text{local return}) \times (1 + \text{JPY/USD return}) - 1$. All main return, factor, event-study, and currency results are frozen at the 31 December 2025 market-data cutoff. No independent official or commercial price database was available for a full cross-check, so provider errors remain a stated limitation rather than an unreported validation claim.

Appendix Table A7 supplies the replication register: source URLs, exact JPX and factor file names, access dates, FRED series IDs, EDINET DB endpoint fields, tracked tickers, software versions, and local output names. The register also identifies the official TSE capital-efficiency page as background only. The local requirements file pins `numpy` 2.3.5, `pandas` 3.0.1, `scipy` 1.17.1, `statsmodels` 0.14.6, `Pillow` 12.2.0, `python-docx` 1.2.0, `openpyxl` 3.1.5, and `yfinance` 1.3.0. Missing dependent or control variables are dropped within

each specification without imputation.

Generative AI was not used to construct the empirical dataset or estimate the reported statistics. During the preparation of this manuscript, the author used OpenAI GPT-5 (Codex environment) for editorial revision, document assembly, and code-assisted formatting checks. The author reviewed and edited the output and takes full responsibility for the content of this publication.

Table 1. Data sources and replication role.

Data block	Source / identifiers	Access / version	Treatment
Prices and FX	Yahoo Finance tickers; see A7	2026-05-22; yfinance 1.3.0	Adjusted close; no forward fill
Valuation	EDINET DB ratios and financials	2026-05-21 to 2026-05-26	Resolved EDINET code; one security-entity-year
Peer universe	JPX/TOPIX Wholesale Trade	2026-05-21	117 non-core issuers; fiscal-year reconstruction
Factors	French Japan FF5/Momentum; AQR BAB/QMJ	2026-05-21 / 2026-05-26	Monthly decimal returns
Events	Official Berkshire, EDINET, TDnet/ issuer sources	Timing audit 2026-07-29	Tokyo-session reaction-date hierarchy

Source: Author calculations based on public data described in the text.

3.3. Valuation, Factor, and Event-Study Specifications

Pooled valuation tests use PBR in levels as the primary outcome because the coefficient is directly interpretable in PBR units and comparable with the descriptive valuation tables. The annual PBR field is the EDINET DB firm-fiscal-year ratio record; no winsorization, discretionary deletion, or imputation is applied. In the corrected 2015-2020 base, 31 of 731 potential observations have missing PBR, no observed PBR is nonpositive, and complete-case estimation leaves $N = 700$. The primary model includes a core-five indicator, ROE, equity ratio, log market capitalization, and year fixed effects with covariance clustered by resolved EDINET code (122 clusters). A levels-model diagnostic finds 17 negative fitted values (2.43%) and a fitted range of -2.118 to 4.555 versus an observed range of 0.279 to 11.024. This is a functional-form limitation, so log-PBR receives equal prominence as the positive-domain robustness model; its corrected core-five coefficient is -0.815 (clustered $t = -5.44$, $p < 0.001$). Table A6 reports these diagnostics and the alternative ROA and FCF-control specifications; Tables A8A-A8B report construction rules and full coefficients.

Monthly excess-return regressions begin with the Kenneth French Japan FF5 factors (Mkt-RF, SMB, HML, RMW, CMA and RF), then add Japan momentum, the Japan columns of AQR's BAB and QMJ workbooks, DBC and copper returns, JPY/USD, and finally a sector proxy. The French and AQR inputs are monthly decimal returns; the dependent variable is the portfolio return minus the French Japan RF series. The commodity proxies use the public adjusted price series in their quoted currencies, while JPY/

USD is retained as a separate FX control; no forward fill or discretionary hedge is applied. The carry proxy uses the U.S.-Japan three-month rate differential (FRED DTB3 minus IR3TIB01JPM156N) lagged one month. Japanese factor-model context follows Hamao et al. (2007), Kubota and Takehara (2018), Frazzini and Pedersen (2014), Asness et al. (2019), and the AQR source workbooks (AQR Capital Management, n.d.). HC3 is the primary covariance estimator; Newey-West is a sensitivity estimator using the rule $4(T/100)^{(2/9)}$, rounded to an integer, which gives four lags in the 65-month post-2020 sample. The no-sector rich model is primary. The 1629.T ETF model is only an overlap diagnostic, while a 120-firm current-constituent ex-core wholesale basket is reported as a qualified sensitivity in Appendix Table A9.

The primary event-study specification is the Nikkei 225 market model estimated over trading days [-250, -30]. Sensitivity specifications use a TOPIX ETF proxy and a market-plus-JPY/USD-plus-DBC model, each over [-250,-30], [-200,-20], and [-120,-20]; Appendix Table A13 reports the CAR range across all nine model-window combinations. Portfolio TS p-values in Tables 7A-7B are conventional two-sided t-tests using estimation-window residual volatility. The separate bootstrap p-values in Table A11 use 5,000 moving-block replications, five-trading-day blocks drawn with replacement from the portfolio model's estimation-window residuals, contiguous within blocks, truncated to the event-window horizon, and never wrapped across the estimation-sample boundary. Placebos use every eligible Tokyo trading date with a valid estimation and event window, exclude dates within ± 10 trading sessions of any actual event, and retain overlapping placebo windows because the placebo calculation is an empirical date distribution rather than an independent-event regression. The baseline model produces 3,501 placebo dates; Section 4.4 and Tables A3, A11, and A13 distinguish standardized, bootstrap, placebo, and sensitivity evidence. Replication files are `event_study_utils.py`, `run_event_study_robustness.py`, `run_event_placebo_checks.py`, and `run_event_contamination_checks.py`.

4. Results

4.1. Performance Overview and Event Timeline

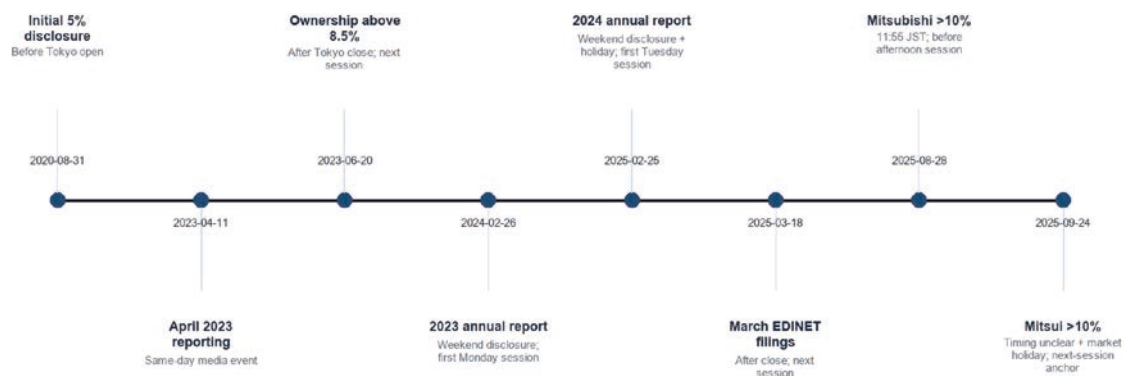


Figure 1. Berkshire-related event timeline used in the main event-study specification.

Source: Author calculations based on public data described in the text.

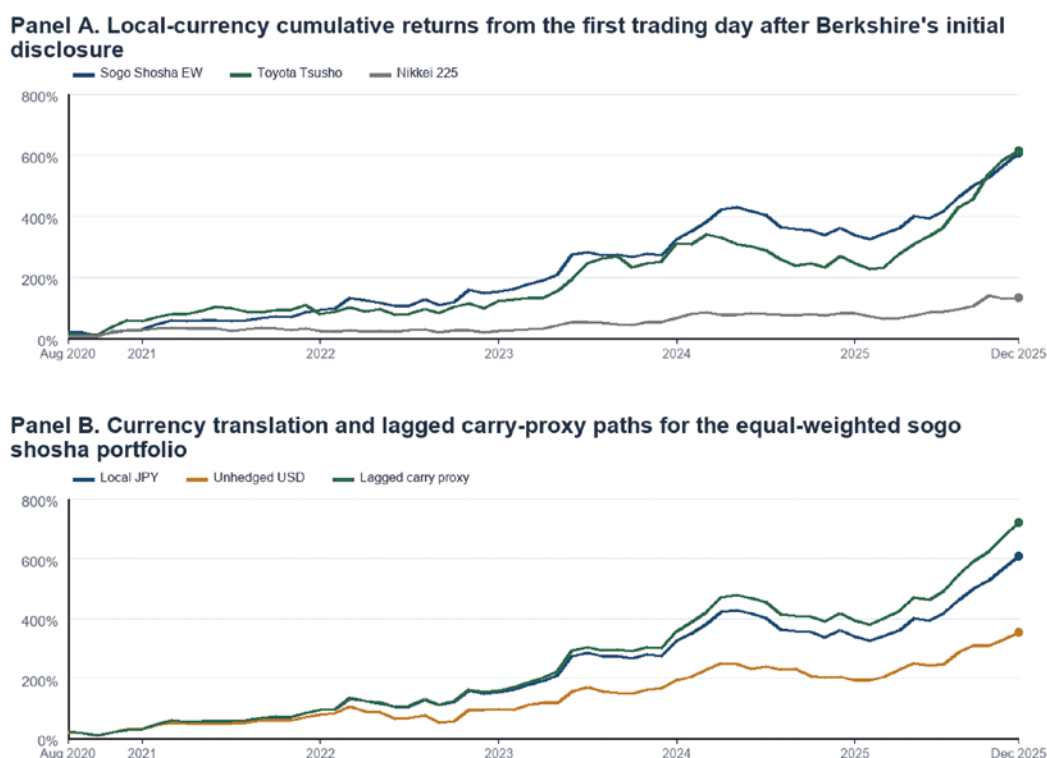


Figure 2. Cumulative return paths for the equal-weighted sogo shosha portfolio, key benchmarks, and the currency-translation variants.

Source: Author calculations based on public data described in the text.

Even before formal decomposition, the return path is economically large. The daily, event-aligned path from the first Japanese trading day after Berkshire's initial disclosure (31 August 2020) through the last Japanese trading day before the 31 December 2025 cutoff (30 December 2025) produces an equal-weighted local-currency return of approximately 525.5%, compared with approximately 120.0% for the Nikkei 225 and roughly 525.4% for Toyota Tsusho over the same daily window. The translated U.S.-dollar return is approximately 306.4%. Table 6 reports a different, monthly-aligned quantity: its 65 monthly observations run from the August 2020 month-end observation through December 2025, so the August monthly return includes the pre-disclosure portion of that calendar month. The 606.8% figure in Table 6 is therefore a monthly-frequency analog for factor and commodity comparison, not a replacement for the daily event-to-cutoff path. The two figures are not interchangeable because they differ in frequency, rebalancing convention, and start-of-return calculation.

Toyota Tsusho's outperformance is informative for interpretation rather than fatal to the paper's core claim. In the pre-disclosure window it carried median PBR of 1.06 and median ROE of 11.0%, versus 0.79 and 9.9% for the Berkshire-selected core five. That higher starting valuation and profitability profile, together with Toyota Tsusho's more concentrated automaker-linked operating mix, make it a useful out-of-sample comparator but a weaker test of whether Berkshire entered the cheapest listed segment of Japanese wholesale trade. The comparison therefore weakens any strong Berkshire stock-picking narrative even as it remains consistent with a narrower segment-valuation story.

4.2. Pre-Disclosure Valuation Discount

Table 2. EDINET DB valuation and profitability summary for the five core sogo shosha.

Period	Years	Firm-years	Mean PBR	Median PBR	Median PER	Median earnings yield	Median dividend yield	Median ROE	Median FCF yield
Pre-disclosure valuation window	2015-2020	30	0.82	0.79	8.01	12.5%	3.8%	9.9%	9.8%
Post-disclosure revaluation window	2021-2025	25	1.15	1.08	7.87	12.7%	3.3%	15.0%	10.0%

Source: Author calculations based on public data described in the text.

Table 3. Pre-2020 valuation comparison with the reconstructed TOPIX wholesale-trade peer sample.

Sample group	Firm-years	Median PBR	Median PER	Median earnings yield	Median dividend yield	Median ROE	Median FCF yield
Core five sogo shosha	26	0.793	8.01	12.5%	3.8%	9.9%	9.8%
Corrected non-core wholesale peers	674	0.835	11.70	8.5%	2.6%	7.6%	5.4%
Toyota Tsusho	5	1.061	9.74	10.3%	2.6%	11.0%	5.7%

Source: Author calculations based on public data described in the text.

Table 4. Controlled valuation regressions versus the reconstructed peer sample.

Outcome	N	Clusters	Core-five coef.	Clustered SE	t	p	R ²	Controls
PBR	700	122 EDINET entities	-1.125	0.349	-3.22	0.001	0.456	ROE, equity ratio, log market cap, year FE
Earnings yield	700	122 EDINET entities	0.067	0.013	5.21	<0.001	0.291	ROE, equity ratio, log market cap, year FE
Dividend yield	693	122 EDINET entities	0.025	0.004	6.68	<0.001	0.247	ROE, equity ratio, log market cap, year FE

Source: Author calculations based on public data described in the text.



Figure 3. Before-and-after price-to-book and return-on-equity changes for the five focal firms.

Source: Author calculations based on public data described in the text.

Across both absolute and peer-relative views, the valuation evidence remains consistent after the count correction. The core firms' 2015-2020 mean and median PBR are 0.82 and 0.79, while the corrected peer median is 0.83. The year-fixed-effect regression produces a core-five coefficient of -1.125 (EDINET-clustered SE 0.349, $p = 0.001$; 122 clusters; $R^2 = 0.456$). The coefficient remains negative in the log-PBR, ROA-control, FCF-control, size-restricted, and leave-one-focal-firm-out specifications. Because 17 fitted values from the levels model are negative, the result is interpreted jointly with the log-PBR specification rather than as a fully adequate positive-domain prediction model.

4.3. Factor and Currency Decomposition

To keep the factor regressions legible, Table 5 is split into three sample-period panels.

Table 5A. Factor regressions for the full sample.

Portfolio	Specification	Covariance	N	Alpha/month	Alpha/year	p(alpha)	R ²
Local JPY	FF5	HC3	191	0.97%	12.3%	0.005	0.473
Local JPY	FF5	Newey-West	191	0.97%	12.3%	0.001	0.473
Local JPY	Rich no-sector (primary)	HC3	191	0.75%	9.4%	0.017	0.675
Local JPY	Rich no-sector (primary)	Newey-West	191	0.75%	9.4%	0.003	0.675
USD translated	FF5	HC3	191	0.54%	6.6%	0.080	0.522
USD translated	FF5	Newey-West	191	0.54%	6.6%	0.030	0.522
USD translated	Rich no-sector (primary)	HC3	191	0.70%	8.7%	0.028	0.633
USD translated	Rich no-sector (primary)	Newey-West	191	0.70%	8.7%	0.006	0.633

Source: Author calculations based on public data described in the text.

Table 5B. Factor regressions for the pre-2020-08 split sample.

Portfolio	Specification	Covariance	N	Alpha/month	Alpha/year	p(alpha)	R ²
Local JPY	FF5	HC3	126	0.56%	7.0%	0.182	0.530
Local JPY	FF5	Newey-West	126	0.56%	7.0%	0.088	0.530
Local JPY	Rich no-sector (primary)	HC3	126	0.59%	7.3%	0.108	0.749
Local JPY	Rich no-sector (primary)	Newey-West	126	0.59%	7.3%	0.010	0.749
USD translated	FF5	HC3	126	0.31%	3.8%	0.405	0.505
USD translated	FF5	Newey-West	126	0.31%	3.8%	0.290	0.505
USD translated	Rich no-sector (primary)	HC3	126	0.53%	6.5%	0.154	0.683
USD translated	Rich no-sector (primary)	Newey-West	126	0.53%	6.5%	0.022	0.683

Source: Author calculations based on public data described in the text.

Table 5C. Factor regressions for the post-2020-08 split sample.

Portfolio	Specification	Covariance	N	Alpha/month	Alpha/year	p(alpha)	R ²
Local JPY	FF5	HC3	65	1.93%	25.8%	0.020	0.410
Local JPY	FF5	Newey-West	65	1.93%	25.8%	0.004	0.410
Local JPY	Rich no-sector (primary)	HC3	65	0.81%	10.2%	0.351	0.642
Local JPY	Rich no-sector (primary)	Newey-West	65	0.81%	10.2%	0.172	0.642
USD translated	FF5	HC3	65	0.94%	11.9%	0.210	0.583
USD translated	FF5	Newey-West	65	0.94%	11.9%	0.077	0.583
USD translated	Rich no-sector (primary)	HC3	65	0.77%	9.7%	0.367	0.658
USD translated	Rich no-sector (primary)	Newey-West	65	0.77%	9.7%	0.196	0.658

Source: Author calculations based on public data described in the text.

Interpretation changes materially once the declared model hierarchy is applied consistently. In the full sample, local-currency FF5 alpha is 0.97% per month (12.3% annualized; HC3 $p = 0.005$; $R^2 = 0.473$). Under the rich no-sector primary specification, it is 0.75% per month (9.4% annualized; HC3 $p = 0.017$; $R^2 = 0.675$). Tables 5A-5C now report this no-sector specification for both local- and U.S.-dollar returns in the full, pre-2020, and post-2020 samples, under HC3 and Newey-West covariance. The overlapping 1629.T ETF and the current-constituent ex-core basket remain clearly separated in Appendix Table A9 as diagnostic and sensitivity specifications.

In the 65-month post-2020 sample, local-currency FF5 alpha is 1.93% per month, but falls to 0.81% (HC3 $p = 0.351$; Newey-West $p = 0.172$; $R^2 = 0.642$) in the rich no-sector primary specification. The corresponding U.S.-dollar alpha is 0.77% per month (HC3 $p = 0.367$; Newey-West $p = 0.196$; $R^2 = 0.658$). Adding 1629.T reduces local alpha to 0.34%, while the 120-firm current-constituent ex-core basket

produces 0.60%; these are overlap diagnostic and sensitivity results rather than replacements for the no-sector model. The defensible conclusion is that residual performance shrinks and becomes statistically fragile once common style, commodity, and currency movements are included.

These factor results motivate a separate comparison with external merchant and commodity benchmarks. Table 6 therefore asks whether the remaining medium-horizon rerating co-moved with Glencore, broad commodities, and copper, without treating those correlations as a causal decomposition.

Table 6. External commodity-cycle comparison using Glencore and broad commodity proxies.

Period	Months	Sogo Shosha EW cum. return	Glencore cum. return	DBC cum. return	Corr. with Glencore	Corr. with DBC	Commodity-bundle R^2
Full sample	131	882.8%	64.1%	52.0%	0.41	0.46	0.25
Monthly analog: 2020-08 to 2025-12	65	606.8%	133.4%	98.6%	0.35	0.37	0.17
Post April 2023 stake-increase reports	33	154.4%	-12.4%	7.6%	0.27	0.16	0.07

Source: Author calculations based on public data described in the text.

Table 6 makes the interpretive point more concrete using the monthly analog described above. From the August 2020 month-end observation through the frozen sample end, the equal-weighted sogo shosha portfolio returned about 606.8% cumulatively in local currency, while Glencore returned 133.4% and DBC returned 98.6%. Over that same monthly window, the portfolio's correlation is 0.35 with Glencore and 0.37 with DBC, and the simple Glencore-DBC-copper bundle explains about 17.4% of monthly variation. Those magnitudes do not imply that the Japanese trading houses were mechanically tracking Glencore. They do, however, indicate that the rerating moved with a broader merchant-and-commodity cycle rather than appearing as a purely idiosyncratic Buffett effect. The weaker post-April-2023 co-movement in Table 6 is consistent with Berkshire-specific news still mattering at the margin, but not dominating the entire medium-horizon return path.

The sector comparison disciplines, but does not eliminate, reverse-causality concerns. The ETF contains the focal firms and is therefore an overlap boundary case. The ex-core basket removes them, but uses firms appearing in the public 30 April 2026 constituent file and is consequently a current-constituent sensitivity rather than a historically reconstructed tradable index. The no-sector model remains primary, with both sector variants used only to show how strongly medium-horizon conclusions depend on sector construction. Appendix Table A12 reports the exact overlap diagnostics: the 1629.T and ex-core baskets correlate 0.63, while their joint-diagnostic VIFs are 2.85 and 2.07, respectively; these figures are reported to expose overlap, not to imply that either sector proxy identifies an independent causal channel.

4.4. Berkshire Disclosure Event Study

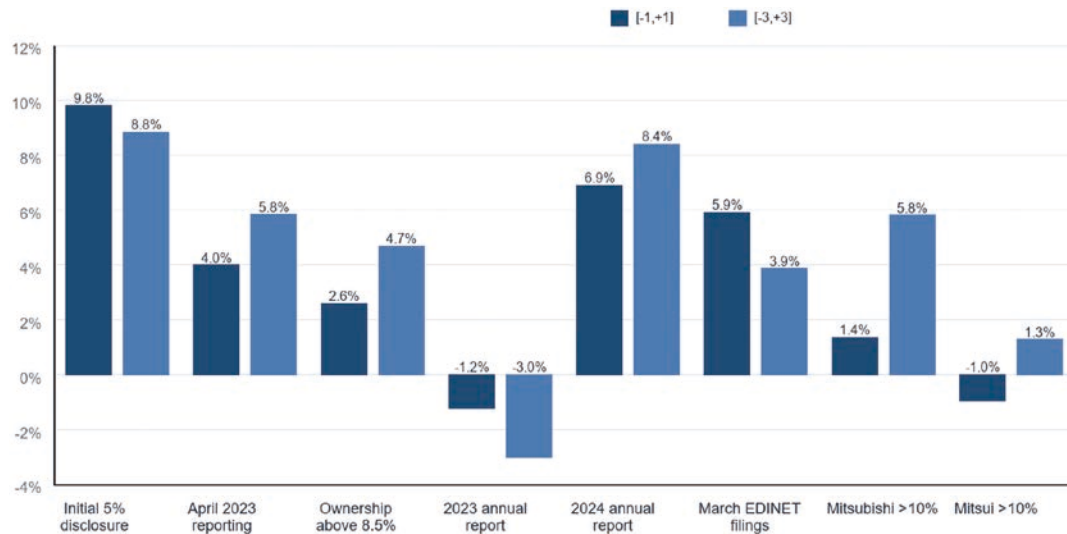


Figure 4. Portfolio cumulative abnormal returns around Berkshire-related disclosures under the primary Nikkei 225 market model (estimation window [-250,-30]).

Source: Author calculations based on public data described in the text.

Table 7A. Primary event-study results: Nikkei 225 market model, estimation window [-250,-30], event window [-1,+1].

Reaction date	Event	CAR	95% CI	TS t	TS p	XS t	XS p
2020-08-31	Initial >5%	9.8%	[6.5%, 12.5%]	6.88	<0.001	7.69	0.002
2023-04-11	April 2023	4.0%	[0.3%, 8.3%]	1.97	0.050	7.12	0.002
2023-06-20	Ownership >8.5%	2.6%	[-1.1%, 6.3%]	1.37	0.172	3.25	0.031
2024-02-26	2023 annual report	-1.2%	[-4.6%, 1.8%]	-0.68	0.498	-1.41	0.232
2025-02-25	2024 annual report	6.9%	[3.3%, 10.6%]	3.68	<0.001	10.96	<0.001
2025-03-18	March EDINET filings	5.9%	[1.9%, 9.8%]	3.12	0.002	11.83	<0.001
2025-08-28	Mitsubishi >10% (contaminated)	1.4%	[-2.7%, 5.2%]	0.72	0.474	4.41	0.012
2025-09-24	Mitsui >10%	-1.0%	[-5.2%, 2.9%]	-0.51	0.607	-1.82	0.143

Source: Author calculations based on public data described in the text.

Table 7B. Primary event-study results: Nikkei 225 market model, estimation window [-250, -30], event window [-3,+3].

Reaction date	Event	CAR	95% CI	TS t	TS p	XS t	XS p
2020-08-31	Initial >5%	8.8%	[4.6%, 12.9%]	4.06	<0.001	9.48	<0.001
2023-04-11	April 2023	5.8%	[-0.2%, 12.0%]	1.89	0.060	7.23	0.002
2023-06-20	Ownership >8.5%	4.7%	[-1.5%, 10.0%]	1.63	0.105	4.00	0.016
2024-02-26	2023 annual report	-3.0%	[-8.5%, 1.7%]	-1.10	0.273	-4.73	0.009
2025-02-25	2024 annual report	8.4%	[3.1%, 14.3%]	2.94	0.004	19.26	<0.001
2025-03-18	March EDINET filings	3.9%	[-1.6%, 10.1%]	1.34	0.183	8.73	<0.001
2025-08-28	Mitsubishi >10% (contaminated)	5.8%	[-1.1%, 11.0%]	2.01	0.046	12.23	<0.001
2025-09-24	Mitsui >10%	1.3%	[-5.5%, 6.7%]	0.44	0.660	1.98	0.119

Source: Author calculations based on public data described in the text.

Tables 7A-7B report standardized portfolio time-series inference (TS) and the separate five-firm cross-sectional statistic (XS). TS p is calculated from estimation-window residual volatility; the moving-block bootstrap p-value and confidence interval are separate quantities, and the raw and multiplicity-adjusted bootstrap results appear in Table A11. Appendix Table A3 reports the 3,501-date placebo distribution, while Table A13 summarizes nine expected-return-model and estimation-window combinations. Cross-sectional t-statistics remain descriptive because only five firms contribute to each event.

The August 2020 portfolio CAR remains 9.8% over [-1,+1] and 8.8% over [-3,+3], with both windows surviving Holm and BH-FDR adjustment. The February 2025 annual-report CARs are 6.9% and 8.4%; both survive BH-FDR but not Holm adjustment. After correcting the EDINET timing, the March 2025 reaction-date CAR is 5.9% over [-1,+1] (bootstrap p = 0.0078; BH-FDR p = 0.026; Holm p = 0.106) but only 3.9% over [-3,+3] (bootstrap p = 0.187; BH-FDR p = 0.273). March is therefore short-window evidence, not an established February-March sequence. The Mitsubishi reaction date is 28 August 2025: its CAR is 1.4% over [-1,+1] and 5.8% over [-3,+3], neither surviving multiplicity adjustment. Because Mitsubishi released offshore-wind information on 26-27 August, including the 27 August decision not to proceed with three projects, the window is treated as clearly issuer-specific contamination and not as an isolated Berkshire reaction.

5. Discussion

5.1. What the Evidence Supports

Taken together, the evidence supports a narrower interpretation than a Berkshire-centered causal narrative. The focal firms were inexpensive relative to listed wholesale peers, and post-2020 performance shares substantial variation with market, style, commodity, currency, and sector movements. The design does not separately identify a governance premium, capital-allocation effect, or Berkshire certification channel.

That valuation result matters because it anchors the rest of the paper. With a weak benchmark, the discount finding would collapse into a generic conglomerate comparison. The reconstructed TOPIX whole-sale-trade benchmark is not perfect, but it is sector-relevant, listed, and broad enough to support controlled estimation. More important, the negative core-five PBR coefficient survives size-matched and leave-one-out checks, which makes the discount harder to dismiss as a one-firm artifact or a fragile peer-definition choice.

Taken alongside the valuation block, the factor and currency results sharpen the interpretation of Berkshire's subsequent gains. Returns after 2020 were clearly large, but the richer specifications show that they should not be described as unexplained headline alpha. Market exposure, value exposure, commodity sensitivity, and yen depreciation all contribute. That point matters for the reverse-causality critique: the medium-horizon rerating looks more like Berkshire entering a favorable state of the global trading-house and commodity cycle than Berkshire creating the entire sector and macro backdrop by itself. The practical implication is simple: Berkshire appears to have entered an inexpensively valued segment that later benefited from rerating and favorable systematic exposures, while U.S.-dollar investors experienced a materially weaker payoff than the local-currency path often highlighted in commentary.

The corrected event set sharpens rather than broadens the timing claim. August 2020 remains the clearest reaction and February 2025 remains economically large. The 18 March 2025 reaction is supported only in the narrow $[-1,+1]$ window after BH-FDR adjustment, not in $[-3,+3]$. The 28 August Mitsubishi result is inseparable from issuer-specific offshore-wind disclosures, and the September Mitsui window remains weak. The evidence therefore does not establish a joint February-March sequence or a uniform response to later Berkshire-related disclosures.

5.2. What the Design Cannot Identify

Even after the revisions, the design still cannot recover Berkshire Hathaway's private decision rule, establish persistent alpha in the strongest asset-pricing sense, or support broad generalization from five trading companies to foreign-investor episodes more broadly. The benchmark is better defended than in earlier drafts, but it remains sector-specific. The event-study results are likewise informative association evidence from a small set of focal dates, not a high-power causal design.

Those limits are not cosmetic. A reviewer could still argue that part of the pre-disclosure discount reflects omitted balance-sheet complexity or commodity-cycle exposure, that part of the post-2020 performance comes from a broader value-and-reopening environment, and that some event windows absorb overlapping macro news rather than Berkshire-specific certification. The paper narrows those objections with benchmark justification, alternative expected-return models, placebo comparisons, contamination checks, explicit timing notes, and the external-context discussion of global trading-house comparators. It does not eliminate them. The contribution therefore lies in careful empirical decomposition using public data rather than in definitive identification of one causal channel.

5.3. Limitations and Replication Implications

The main limitations are straightforward. The focal sample contains five firms. The peer and return designs are observational, and the study does not separately estimate governance or capital-allocation effects. Event windows cannot fully remove macro or issuer-specific news, particularly without a comprehensive commercial news archive. Yahoo Finance adjustments are not fully cross-checked against a second licensed database. The ex-core sector basket uses current public constituents, currency inference is proxy-based, and EDINET DB ratios inherit provider fiscal-year alignment and peer accounting-standard heterogeneity. These limitations bound interpretation but do not invalidate the descriptive decomposition.

Those same limitations explain why the replication package matters. Because the design combines several moderate-strength empirical blocks rather than one decisive identification strategy, transparency becomes part of credibility. The event-date source notes, timing alternatives, peer-construction files, and machine-readable result tables let readers see where the paper is robust and where it remains suggestive.

6. Conclusions

Viewed as an empirical decomposition rather than a reconstructed investment memorandum, the episode yields a bounded conclusion: the five firms traded at a conditional peer-relative discount; post-2020 abnormal-performance estimates shrink under the declared rich no-sector model; and the clearest short-window reactions are the August 2020 disclosure and the February 2025 annual-report window. The corrected March result is limited to $[-1,+1]$, and the Mitsubishi event is issuer-specifically contaminated. The study does not identify a separate governance premium, capital-allocation channel, or established February-March sequence.

A clear hierarchy of findings emerges. The strongest evidence is the pre-disclosure valuation discount relative to the reconstructed wholesale-trade benchmark, supported by descriptive comparisons and controlled regressions, together with the large short-window reaction around Berkshire's initial 2020 disclosure. The weakest evidence is any claim that the episode reveals a distinct governance premium or generalizable stock-picking alpha independent of systematic exposures and currency effects.

For the present submission, the paper's contribution is methodological as much as topical. It shows how a high-profile investment episode can be broken into benchmark-relative valuation, factor exposure, disclosure-window revaluation, and currency translation using transparent public-data workflows. That contribution is modest compared with a clean causal design, but it is also more durable. On that narrower basis, the Berkshire-sogo shosha case functions as a coherent and testable empirical case study rather than as an overextended narrative.

Appendix

This appendix reports corrected sample-count and PBR diagnostics, peer sensitivity, placebo evidence, event timing, firm-level CARs, the detailed source register, sector-proxy sensitivity and sector-overlap diagnostics, contamination diagnostics, multiple-testing adjustments, and event-model/estimation-window sensitivity.

Table A1. Peer-definition sensitivity for the valuation-discount result.

Peer definition	N	EDINET entities	Core-five coefficient	t-statistic	R ²
Full corrected wholesale-trade peers	700	122	-1.125	-3.22	0.456
Wholesale peers, upper-half market cap by fiscal year	354	73	-1.701	-3.86	0.573
Wholesale peers, upper-quartile market cap by fiscal year	179	40	-1.711	-2.63	0.624

Source: Author calculations based on public data described in the text.

Table A2. Focal-firm observations omitted from the complete-case valuation regression.

Firm	Fiscal year	Excluded from	Reason
Sumitomo Corporation	2015	Complete-case PBR regression	PBR and market capitalization are missing; descriptive panel retained.
Mitsubishi Corporation	2016	Complete-case PBR regression	PBR and market capitalization are missing; descriptive panel retained.
Mitsui & Co.	2016	Complete-case PBR regression	PBR and market capitalization are missing; descriptive panel retained.
Marubeni Corporation	2020	Complete-case PBR regression	PBR and market capitalization are missing; descriptive panel retained.

Source: Author calculations from the EDINET DB firm-year panel; no imputation was applied.

Table A3. Event-study placebo evidence for the retained Berkshire disclosures.

Date	Event	Placebo dates	CAR [-1,+1]	p	CAR [-3,+3]	p	Selection rule
2020-08-31	Initial >5%	3,501	9.8%	<0.001	8.8%	0.006	All eligible dates; exclude ± 10 sessions around actual events
2023-04-11	April 2023	3,501	4.0%	0.032	5.8%	0.029	All eligible dates; exclude ± 10 sessions around actual events
2023-06-20	Ownership >8.5%	3,501	2.6%	0.109	4.7%	0.069	All eligible dates; exclude ± 10 sessions around actual events
2024-02-26	2023 annual report	3,501	-1.2%	0.406	-3.0%	0.202	All eligible dates; exclude ± 10 sessions around actual events
2025-02-25	2024 annual report	3,501	6.9%	0.004	8.4%	0.007	All eligible dates; exclude ± 10 sessions around actual events
2025-03-18	March EDINET filings	3,501	5.9%	0.008	3.9%	0.117	All eligible dates; exclude ± 10 sessions around actual events
2025-08-28	Mitsubishi >10% (contaminated)	3,501	1.4%	0.360	5.8%	0.030	All eligible dates; exclude ± 10 sessions around actual events
2025-09-24	Mitsui >10%	3,501	-1.0%	0.506	1.3%	0.546	All eligible dates; exclude ± 10 sessions around actual events

Source: Author calculations based on public data described in the text.

Table A4A. Event-date primary sources and exact source URLs.

Announce- ment	Reaction	Event	Primary source	Exact source URL
2020-08-30	2020-08-31	Initial >5% disclosure	Berkshire Hathaway press release	https://www.berkshirehathaway.com/news/aug3020.pdf
2023-04-11	2023-04-11	Buffett visit / ~7.4%	Reuters/Nikkei reporting	https://www.reuters.com/markets/deals/buffett-says-he-has-increased-stakes-five-japanese-trading-houses-nikkei-2023-04-11/
2023-06-19	2023-06-20	Ownership >8.5%	Berkshire Hathaway press release	https://www.berkshirehathaway.com/news/jun1923.pdf
2024-02-24	2024-02-26	2023 annual report	Berkshire Hathaway 2023 annual report	https://www.berkshirehathaway.com/2023ar/2023ar.pdf
2025-02-22	2025-02-25	2024 annual report	Berkshire Hathaway 2024 annual report	https://www.berkshirehathaway.com/2024ar/2024ar.pdf
2025-03-17	2025-03-18	March EDINET filing — Itochu (8001)	Official EDINET change report S100VE5H (National Indemnity Company)	https://disclosure2dl.edinet-fsa.go.jp/searchdocument/pdf/S100VE5H.pdf
2025-03-17	2025-03-18	March EDINET filing — Marubeni (8002)	Official EDINET change report S100VE5X (National Indemnity Company)	https://disclosure2dl.edinet-fsa.go.jp/searchdocument/pdf/S100VE5X.pdf
2025-03-17	2025-03-18	March EDINET filing — Mitsui (8031)	Official EDINET change report S100VE4E (National Indemnity Company)	https://disclosure2dl.edinet-fsa.go.jp/searchdocument/pdf/S100VE4E.pdf
2025-03-17	2025-03-18	March EDINET filing — Mitsubishi (8058)	Official EDINET change report S100VE43 (National Indemnity Company)	https://disclosure2dl.edinet-fsa.go.jp/searchdocument/pdf/S100VE43.pdf
2025-03-17	2025-03-18	March EDINET filing — Sumitomo (8053)	Official EDINET change report S100VE65 (National Indemnity Company)	https://disclosure2dl.edinet-fsa.go.jp/searchdocument/pdf/S100VE65.pdf
2025-08-28	2025-08-28	Mitsubishi >10% (contaminated)	Mitsubishi Corporation timestamped TDnet major-shareholder notice	https://www.mitsubishicorp.com/jp/en/news/release/2025/files/mcpr250828e.pdf
2025-09-22	2025-09-24	Mitsui >10%	Mitsui & Co. major-shareholder notice	https://www.mitsui.com/jp/en/release/2025/1252094_14855.html

Source: Author calculations and project source metadata.

Table A4B. Event timing classifications and alternative Tokyo-session anchors.

Reaction	Alternative	Timing classification	Source/timing note
2020-08-31		Before Tokyo open; first tradable session is 2020-08-31	Primary event window uses the first Japanese trading day after the pre-open Berkshire press release.
2023-04-11		Same-day media disclosure event	Use as a media-disclosure event with same-day Tokyo trading.
2023-06-20	2023-06-19	After Tokyo close; primary reaction date is next trading day	Primary specification uses 2023-06-20 and reports 2023-06-19 as a sensitivity anchor because the press release followed the Japanese cash-session close.
2024-02-26	2024-02-27	Weekend disclosure; primary reaction date is first Monday trading session	Primary specification uses 2024-02-26. The 2024-02-27 anchor is retained only as a sensitivity check because an earlier stale return file skipped the 2024-02-26 Tokyo session.
2025-02-25		Weekend disclosure with Tokyo holiday; primary reaction date is first Tuesday trading session	The 2024 annual report states that the five companies agreed to moderately relax Berkshire's 10% ceiling and that Berkshire will likely increase ownership over time.
2025-03-18	2025-03-17	After Tokyo close at 15:33-15:34 JST; first observable regular-session reaction date is 2025-03-18	The five EDINET change reports were filed on 17 March 2025 at 15:33-15:34 JST after the 15:30 TSE close. Reuters is retained only as secondary context. The prior 17 March anchor is reported as a timing sensitivity.
2025-08-28	2025-08-29	Released at 11:55 JST during the midday recess; 2025-08-28 is the primary reaction date and 2025-08-29 is sensitivity only	The 28 August return can reflect the notice before the afternoon session but is issuer-specifically contaminated by Mitsubishi offshore-wind disclosures on 26-27 August including the 27 August decision not to proceed with three projects. No isolated Berkshire interpretation is made.
2025-09-24	2025-09-22	Release-date timing not clearly time-stamped and 2025-09-23 was a Tokyo market holiday; primary reaction date is next trading day with same-day anchor retained as sensitivity	Mitsui announced on September 22 2025 that Berkshire had informed the company on September 21 that it now held 10% or more of voting rights.

Source: Author calculations and project source metadata.

Table A5. Firm-level CARs for the retained Berkshire disclosure windows.

Reaction	Event	Itochu	Marubeni	Mitsubishi	Mitsui	Sumitomo	Portfolio
2020-08-31	Initial >5%	5.0%	11.7%	11.2%	9.6%	11.7%	9.8%
2023-04-11	April 2023	2.9%	5.7%	3.3%	3.0%	4.9%	4.0%
2023-06-20	Ownership >8.5%	0.7%	3.2%	4.5%	3.9%	0.7%	2.6%
2024-02-26	2023 annual report	-3.9%	-0.3%	0.6%	0.1%	-2.6%	-1.2%
2025-02-25	2024 annual report	7.5%	7.8%	8.2%	4.7%	6.4%	6.9%
2025-03-18	March EDINET filings	6.1%	5.7%	7.7%	5.4%	4.8%	5.9%
2025-08-28	Mitsubishi >10% (contaminated)	1.7%	0.7%	2.2%	1.5%	0.6%	1.4%
2025-09-24	Mitsui >10%	-2.3%	0.5%	-1.4%	0.0%	-1.7%	-1.0%

Source: Author calculations and project source metadata.

Table A6. PBR diagnostic memo: fitted range, influence, log-PBR, robust regression, and leave-one-out checks.

Diagnostic	Specification	Value	Interpretation
Sample uniqueness	JPX-year and EDINET-year	0 duplicate rows	Resolved identifiers and override priority are enforced.
Observed PBR range	Complete-case N = 700	0.279 to 11.024	All observed PBR values are positive.
Levels fitted range	Primary levels model	-2.118 to 4.555	Negative predictions fall outside the positive outcome domain.
Negative predictions	Primary levels model	17 / 700 (2.43%)	Functional-form limitation; interpret with log-PBR.
Log-PBR	Same controls and year FE	coef -0.815; t -5.44	Negative and significant on the positive-domain scale.
Alternative control	Add ROA	coef -1.124; t -2.97	Discount remains negative.
Alternative control	Add FCF yield	coef -1.056; t -3.06	Discount remains negative.

Source: Author calculations and project source metadata.

Table A7. Detailed data-source and replication register.

Input	Identifiers / variables	Access/version and local file	Public source
Yahoo Finance	Core tickers, Nikkei, TOPIX proxy, JPY/USD, DBC, copper	Retrieved 2026-05-22; public_daily_returns.csv	https://finance.yahoo.com/
EDINET DB	Resolved EDINET code; PBR, ROE, equity ratio, market cap	2026-05-21 to 2026-05-26; corrected N = 700	https://edinetdb.jp/v1
JPX/TOPIX	Historical Wholesale Trade membership files	Retrieved 2026-05-21	https://www.jpx.co.jp/english/markets/
Japan factors	French FF5, RF, momentum; AQR BAB and QMJ	2026-05-21 / 2026-05-26	French Data Library; AQR datasets
Event filings	Five official EDINET change reports: S100VE5H (Itochu), S100VE5X (Marubeni), S100VE4E (Mitsui), S100VE43 (Mitsubishi), and S100VE65 (Sumitomo)	Filed 2025-03-17; first regular-session reaction 2025-03-18	Direct official FSA PDF URLs in Table A4A
Mitsubishi TDnet	Major-shareholder notice at 11:55 JST on 2025-08-28	Reaction date 2025-08-28	Mitsubishi Corporation notice
Mitsubishi issuer news	Offshore-wind disclosures 2025-08-26 to 2025-08-27	Manual contamination register	Mitsubishi IR news releases
Software	numpy, pandas, scipy, statsmodels, Pillow, python-docx	Pinned in requirements.txt	Replication package

Source: Author calculations and project source metadata.

Table A8A. PBR construction, cleaning, and interpretation rules.

Issue	Implemented rule	Evidence / limitation	Location
Sample counts	117 peer issuers; 674 peer plus 26 focal complete cases	N = 700; 122 resolved EDINET clusters; zero duplicate entity-years	Sections 3.1 and 3.3; Table A6
Outcome scale	Levels PBR primary; log-PBR equally prominent robustness	17 negative levels predictions; log coefficient -0.815, t = -5.44	Section 3.3; Table A6
Missing values	Drop within specification; no imputation	31 of 731 potential rows lack PBR	Sections 3.1 and 3.3
Identifier rule	Resolved EDINET code and JPX code by fiscal year	Override files take priority; stale mappings are rejected	Replication code
Outliers	No winsorization or discretionary deletion	Observed PBR range 0.279 to 11.024	Table A6
Clustering	Resolved EDINET entity	122 clusters in the main regression	Table 4 and A8B
Alternative controls	Add ROA or FCF yield	Coefficients -1.124 and -1.056	Table A6

Source: Author calculations and project source metadata.

Table A8B. Baseline PBR regression intercept, controls, and year effects.

Parameter	Estimate	Clustered SE	p	Interpretation
const	-4.717	1.683	0.005	2015 intercept at zero-valued continuous controls; not a standalone economic forecast.
core_five	-1.125	0.349	0.001	Conditional focal-firm difference.
roe	14.969	3.162	<0.001	ROE slope.
equity_ratio	1.061	0.330	0.001	Equity-ratio slope.
ln_market_cap	0.170	0.074	0.021	Log-market-cap slope.
fy_2016	-0.117	0.060	0.050	2016 fixed effect versus 2015.
fy_2017	-0.076	0.079	0.336	2017 fixed effect versus 2015.
fy_2018	-0.008	0.109	0.940	2018 fixed effect versus 2015.
fy_2019	-0.134	0.070	0.056	2019 fixed effect versus 2015.
fy_2020	-0.057	0.081	0.477	2020 fixed effect versus 2015.

Source: Author calculations and project source metadata.

Table A9. Post-2020 sector-proxy sensitivity, local-currency portfolio.

Sector treatment	Covariance	N	Alpha/mo.	Alpha/yr.	p	R ²
No sector (primary)	HC3	65	0.81%	10.2%	0.351	0.642
No sector (primary)	Newey-West	65	0.81%	10.2%	0.172	0.642
1629.T ETF (overlap diagnostic)	HC3	65	0.34%	4.1%	0.247	0.958
1629.T ETF (overlap diagnostic)	Newey-West	65	0.34%	4.1%	0.043	0.958
120-firm ex-core EW (sensitivity)	HC3	65	0.60%	7.5%	0.498	0.665
120-firm ex-core EW (sensitivity)	Newey-West	65	0.60%	7.5%	0.336	0.665

Source: Author calculations and project source metadata.

Table A10. Quantitative event-window contamination diagnostics, [-1,+1].

Reaction	Event	Nikkei z	JPY/USD z	DBC z	Issuer/news assessment
2020-08-31	Initial >5%	-0.14	-0.15	0.41	all firms same sign in [-1,+1]
2023-04-11	April 2023	1.05	-0.93	0.50	all firms same sign in [-1,+1]
2023-06-20	Ownership >8.5%	-0.29	-0.46	0.31	all firms same sign in [-1,+1]
2024-02-26	2023 annual report	1.25	-0.22	1.22	none
2025-02-25	2024 annual report	-0.56	1.31	-2.27	DBC broad commodities ETF [-1,+1] z >=2; WTI crude [-1,+1] z >=2; all firms same sign in [-1,+1]
2025-03-18	March EDINET filings	0.69	-0.88	0.73	all firms same sign in [-1,+1]
2025-08-28	Mitsubishi >10% (contaminated)	0.28	0.64	0.40	Clear issuer-specific contamination: Mitsubishi offshore-wind disclosures on 26-27 Aug.
2025-09-24	Mitsui >10%	0.58	-0.61	0.68	none

Source: Author calculations and project source metadata.

Table A11. Bootstrap p-values adjusted across eight events and two windows.

Reaction	Event	Window	Bootstrap p	Holm p	BH-FDR p
2020-08-31	Initial >5%	[-1,+1]	<0.0002	0.003	0.003
2020-08-31	Initial >5%	[-3,+3]	0.0004	0.006	0.003
2023-04-11	April 2023	[-1,+1]	0.0456	0.502	0.117
2023-04-11	April 2023	[-3,+3]	0.0584	0.552	0.117
2023-06-20	Ownership >8.5%	[-1,+1]	0.1494	1.000	0.239
2023-06-20	Ownership >8.5%	[-3,+3]	0.1056	0.845	0.188
2024-02-26	2023 annual report	[-1,+1]	0.4904	1.000	0.560
2024-02-26	2023 annual report	[-3,+3]	0.2324	1.000	0.310
2025-02-25	2024 annual report	[-1,+1]	0.0082	0.106	0.026
2025-02-25	2024 annual report	[-3,+3]	0.0076	0.106	0.026
2025-03-18	March EDINET filings	[-1,+1]	0.0078	0.106	0.026
2025-03-18	March EDINET filings	[-3,+3]	0.1874	1.000	0.273
2025-08-28	Mitsubishi >10% (contaminated)	[-1,+1]	0.4084	1.000	0.503
2025-08-28	Mitsubishi >10% (contaminated)	[-3,+3]	0.0552	0.552	0.117
2025-09-24	Mitsui >10%	[-1,+1]	0.5574	1.000	0.595
2025-09-24	Mitsui >10%	[-3,+3]	0.6296	1.000	0.630

Source: Author calculations and project source metadata.

Table A12. Correlation and VIF diagnostics for sector-proxy specifications.

Variable	Corr. with 1629.T	Corr. with ex-core EW	Joint VIF
Mkt-RF	0.521	0.478	5.287
HML	0.056	0.008	1.528
DBC broad commodities ETF	0.299	0.156	1.192
JPY/USD	-0.172	-0.143	3.042
Wholesale Trade ETF (1629.T)	1.000	0.630	2.847
Wholesale ex-core EW	0.630	1.000	2.067

Source: Author calculations from the 65-month post-2020 factor sample. Both sector proxies appear together only for this diagnostic, not in the primary regression.

Table A13. Event-study expected-return-model and estimation-window sensitivity.

Reaction	Event	Window	Specifications	Minimum CAR	Maximum CAR
2020-08-31	Initial >5%	[-1,+1]	9	9.7%	10.2%
2020-08-31	Initial >5%	[-3,+3]	9	8.8%	9.8%
2023-04-11	April 2023	[-1,+1]	9	3.2%	4.0%
2023-04-11	April 2023	[-3,+3]	9	4.9%	6.1%
2023-06-20	Ownership >8.5%	[-1,+1]	9	1.7%	2.8%
2023-06-20	Ownership >8.5%	[-3,+3]	9	3.1%	5.3%
2024-02-26	2023 annual report	[-1,+1]	9	-1.5%	-0.5%
2024-02-26	2023 annual report	[-3,+3]	9	-3.2%	-2.0%
2025-02-25	2024 annual report	[-1,+1]	9	6.2%	7.8%
2025-02-25	2024 annual report	[-3,+3]	9	7.0%	9.7%
2025-03-18	March EDINET filings	[-1,+1]	9	4.4%	6.6%
2025-03-18	March EDINET filings	[-3,+3]	9	1.9%	4.8%
2025-08-28	Mitsubishi >10% (contaminated)	[-1,+1]	9	0.9%	2.2%
2025-08-28	Mitsubishi >10% (contaminated)	[-3,+3]	9	4.5%	5.8%
2025-09-24	Mitsui >10%	[-1,+1]	9	-1.1%	-0.9%
2025-09-24	Mitsui >10%	[-3,+3]	9	0.6%	1.5%

Source: Author calculations across three expected-return models and three estimation windows (nine specifications per event-window).

Supplementary Materials

The replication package contains the machine-readable empirical tables, source register, variable dictionary, public-source links, and code used to reproduce the reported calculations, subject to the access terms of third-party data providers.

Author Contributions

Conceptualization, methodology, investigation, data curation, formal analysis, writing-original draft preparation, writing-review and editing, and visualization: B.M. The author read and approved the submitted version.

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Data Availability Statement

The study uses public data from EDINET DB, JPX/TOPIX, Yahoo Finance, the Kenneth French Data Library, AQR, FRED, Berkshire Hathaway releases, and issuer disclosures. Derived data, source links, and code are included in the accompanying replication package where redistribution is permitted; readers should obtain restricted or rate-limited third-party inputs directly from the cited providers.

Data-Use and Licensing Statement

The inputs are public or publicly accessible datasets and disclosures, subject to the terms of EDINET DB, JPX/TOPIX, Yahoo Finance/yfinance, the Kenneth French Data Library, AQR, FRED, Berkshire Hathaway, and issuer websites. The replication package redistributes derived tables, source metadata, and code where permitted; it does not redistribute restricted third-party raw files when provider terms or access limits prohibit redistribution. Readers should obtain such inputs directly from the cited providers.

Conflicts of Interest

The author declares no conflict of interest.

Research Ethics and Institutional Review Board Statement

The study uses publicly available secondary financial and market data only and does not involve human participants, identifiable personal data, or intervention-based experiments. APRIN human-subject training was not used as a condition of this analysis. If the journal or host committee requires APRIN certification for publication processing, the author will comply and document completion before acceptance.

Informed Consent Statement

Not applicable.

AI Use Disclosure

Generative AI was not used to construct the empirical dataset or estimate reported statistics. OpenAI GPT-5 in the Codex environment was used for editorial revision, document assembly, and code-assisted formatting checks. The author reviewed the output and takes responsibility for the content.

Note

- [1] The empirical sample is frozen at 31 December 2025. All return, factor, event-study, and currency results reported in the manuscript use that cutoff.
- [2] Public inputs comprise EDINET DB firm-year data, JPX listed-issue and TOPIX classification files, Yahoo Finance adjusted prices and exchange rates, Kenneth French Japan factors, FRED rate series, and Berkshire Hathaway public releases and annual reports.
- [3] The research-ethics, AI-use, and data-use/licensing statements are separate back-matter items. No APRIN completion placeholder is retained; the manuscript states the study's data-only ethics basis and the author's intended compliance if the journal or host committee separately requires APRIN certification.

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