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FinTech-Driven Trust Rebuilding and Ecosystem Construction in Qingyuan's Manufacturing Supply Chain Finance

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Abstract: Manufacturing serves as the cornerstone of regional economies. However, the financing difficulties faced by Small and Medium-sized Enterprises (SMEs) at the end of the supply chain, particularly the lack of trust mechanisms, have become a core bottleneck restricting high-quality manufacturing development. As a "bridgehead" for the deep integration of northern Guangdong into the Guangdong-Hong Kong-Macao Greater Bay Area, Qingyuan City's "Manufacturing as Priority" strategy urgently requires innovation in financial service models. Traditional supply chain finance models, due to over-reliance on the corporate credit of core enterprises, information asymmetry, and difficulties in movable property supervision, fail to allow credit to effectively penetrate to multi-level SMEs, resulting in prominent trust fractures. The rapid development of Financial Technology (FinTech), especially the integrated application of technologies like blockchain, the Internet of Things (IoT), and big data, has provided a new paradigm for solving this dilemma. Grounded in the industrial characteristics of Qingyuan's manufacturing sector, this paper, from the perspective of trust rebuilding, deeply analyzes the intrinsic mechanism of FinTech empowering supply chain finance. The study posits that the core empowerment logic of FinTech lies in shifting supply chain finance from its traditional reliance on "entity credit" to being driven by "objective credit" and "digital trust." This is achieved by rebuilding "transfer trust" through blockchain, "asset trust" through IoT, and "risk trust" through big data, thereby realizing the transparency of transaction processes, the trustworthiness of movable assets, and the dynamic assessment of risks. On this basis, the paper further explores the implementation path for constructing a regional supply chain finance ecosystem characterized by multi-party participation (financial institutions, core enterprises, SMEs, technology platforms, and government supervision), synergistic governance, and shared value. The aim is to provide a financial support solution with theoretical and practical value for the transformation and upgrading of the manufacturing industry in Qingyuan and similar regions.

Keywords: FinTech; Supply Chain Finance; Trust Rebuilding; Manufacturing; SMEs; Ecosystem Construction; Qingyuan City.

1. Introduction

Against the backdrop of profound adjustments in the global economic landscape and China's economy entering a stage of high-quality development, the "ballast" status of the manufacturing industry has become increasingly prominent. Qingyuan City, as a key node in Guangdong Province's regional coordinated development strategy, is at a critical juncture of comprehensively aligning with the Guangdong-Hong Kong-Macao Greater Bay Area, implementing the "Hundred, Thousand, and Ten Thousand Projects," and solidifying its "Manufacturing as Priority" foundation. However, among the burgeoning manufacturing clusters in Qingyuan, the "difficult and expensive financing" dilemma for the vast number of SMEs, which are crucial components of the industrial chain, has yet to be fundamentally resolved. This predicament not only restrains the innovative vitality and resilience of SMEs but also threatens the stability and security of the entire industrial and supply chain.

Supply Chain Finance (SCF), as a financial service model designed to optimize capital flow within industrial chains and alleviate the financing constraints of SMEs, has been met with high expectations since its inception. It attempts to transcend the financial limitations of a single enterprise, instead evaluating the real-world transaction context and operational status of an enterprise within the supply chain [1]. However, in practice, the efficacy of traditional SCF models has been unsatisfactory. The core issue lies in the fragility and fragmentation of its "trust" mechanism.

On one hand, traditional SCF heavily relies on the credit endorsement of core enterprises within the supply chain. Financial institutions provide financing to upstream suppliers based on the payment commitments of these core enterprises. This "1+N" model involves a rigid, tiered transmission of "entity credit." Credit decays severely during transmission, often only covering first-tier suppliers. SMEs further down the chain (second, third, or Nth-tier), lacking a direct transactional relationship with the core enterprise, remain excluded from financial services, forming "credit islands."

On the other hand, traditional SCF faces significant information asymmetry when dealing with movable property financing. The assets with the most potential for monetization by SMEs are often inventory, goods in transit, and semi-finished products. However, due to their inherent characteristics—being easily transferred, difficult to value, having indeterminate ownership, and being challenging to

supervise—financial institutions struggle to conduct effective risk control, leading to a situation where they are "unwilling or afraid to lend." Ultimately, financial institutions cannot trust the authenticity, integrity, or timeliness of the asset and transaction information provided by SMEs.

This absence of a trust mechanism is the fundamental barrier preventing traditional supply chain finance from "sinking" to serve the vast number of SMEs. The rise of FinTech, particularly the integrated application of technologies such as blockchain, the Internet of Things (IoT), big data analytics, and Artificial Intelligence (AI), is fundamentally changing the way information is produced, verified, and transmitted, offering a possibility to rebuild the trust foundation of supply chain finance [2]. FinTech is not merely a "technical improvement" but an empowering force capable of sparking a "paradigm revolution" in financial services. Through technological embedding, it enables the ideal state of "four flows in one" (information, commercial, logistics, and capital) to be realized, thereby transforming untrustworthy assets into credible digital vouchers and converting implicit transaction backgrounds into explicit data credit.

Grounded in the industrial ecosystem and development needs of Qingyuan's manufacturing sector, this study distinguishes itself from previous quantitative analyses focused on technological application or empirical effects. It is dedicated to a theoretical exploration, deeply analyzing the core "trust rebuilding" mechanism of FinTech's empowerment of supply chain finance. The central questions of this paper are: How exactly does FinTech break the trust dilemma of traditional supply chain finance? What are the specific logical paths for rebuilding this trust? And based on this rebuilt trust, how should Qingyuan construct a new, multi-win manufacturing supply chain finance ecosystem? Through an in-depth exploration of these questions, this paper aims to provide a systematic theoretical framework and a forward-looking practical vision for solving the financing problems of Qingyuan's manufacturing SMEs.

2. Theoretical Foundations: The Trust Deficit in Supply Chain Finance and the Empowerment Opportunity of FinTech

2.1. The "Trust Deficit" in Traditional Supply Chain Finance

Trust is the prerequisite for financial transactions. In the realm of supply chain finance, the trust deficit manifests on three primary levels:

First is the limitation of entity credit. The operational logic of traditional supply chain finance is an extension of "entity credit." Whether in factoring models based on accounts receivable or in models based on future payment guarantees from core enterprises, the source of credit is the core enterprise itself. Financial institutions trust the core enterprise, not the SMEs transacting with it. The drawbacks of this model are apparent: (i) Core enterprises often lack sufficient motivation to provide credit guarantees for their entire supplier base. (ii) The dominant position of core enterprises can sometimes be distorted into an occupation of upstream SMEs' capital [3]. (iii) The long credit transmission chain leads to the "disenfranchisement" of multi-tier suppliers. At a deeper level, this reliance on "entity" trust has an inherent "non-market" flaw: an SME's access to financing is not determined by its own operational health or ability to perform, but is highly dependent on its "relationship" with the core enterprise, leading to a misallocation of financial resources.

Second is the ambiguity of the transaction background. The core of finance is risk pricing, which is based on the completeness of information. In complex supply chain networks, financial institutions, as external parties, find it difficult to verify the authenticity of every transaction in a real-time, penetrative manner. SMEs, to obtain financing, may face moral hazards such as forging orders or fabricating trade backgrounds. Underlying this is the fragmentation of the supply chain's "information flow," "commercial flow," and "capital flow." A company's internal ERP system, a warehouse's WMS, a transporter's TMS, and a bank's credit system all exist as "information silos." Financial institutions cannot obtain a complete, continuous, and dynamic view of transactions. To mitigate such risks, they must invest heavily in manual due diligence and repeated audits, which significantly drives up financing costs for SMEs and reduces the efficiency of financial services, failing to meet the "short-term, small-scale, frequent, and urgent" capital needs of SMEs.

Third is the failure of movable property supervision. In inventory financing and warehouse receipt pledging models, the value stability and clear ownership of the pledged assets are key to risk control. However, the physical nature of movable property makes it easily transferable, replaceable, repeatedly pledged, or subject to value depreciation. Financial institutions rely on reports from third-party logistics and warehousing companies, but this third-party supervision itself is subject to moral and operational risks. This traditional "man-to-man" supervision model is costly and rife with loopholes. It is nearly powerless when dealing with "work-in-progress," "semi-finished goods," or "bulk raw materials" common in manufacturing. This leads to a general reluctance among financial institutions to engage in movable property financing, leaving a vast amount of SMEs' dormant assets unactivated.

2.2. FinTech: From "Technical Empowerment" to "Trust Rebuilding"

The value of FinTech lies not only in enhancing efficiency (e.g., mobile payments, robo-advisors) but also in its use of technological means to solve the core pain point that traditional finance struggles with: trust [4]. New-generation information technologies offer systematic solutions to the aforementioned "trust deficits" in supply chain finance.

Blockchain, as a distributed, immutable, and traceable ledger technology, is hailed as a "trust machine." Through consensus mechanisms and cryptographic algorithms, it can provide a unified, transparent, and credible information record for all participants in a decentralized or multi-centered network. Its core value is providing a technical endorsement for "processes" and "ownership."

The Internet of Things (IoT), through sensors, RFID, GPS, and visual recognition, enables a real-time connection between the physical and digital worlds. It gives "things" the ability to speak, allowing data on the status, location, and environment of physical assets to be collected and uploaded automatically, objectively, and continuously. Its core value is providing authenticity verification for "physical assets."

Big Data and Artificial Intelligence (AI) provide powerful information processing and risk identification capabilities. By

integrating multi-dimensional data from the supply chain (e.g., transactions, logistics, warehousing) and external alternative data (e.g., taxes, utilities, public records), big data analytics can construct more comprehensive and dynamic corporate credit profiles. AI algorithms can then achieve more precise risk warnings and smarter credit decisions [5].

When these technologies are integrated into supply chain finance, they are no longer isolated tools but collectively form a new trust mechanism. The core of this mechanism is a fundamental shift in how trust is generated: from a reliance on "relationships" and "entities" (e.g., trust in the core enterprise, trust in supervisors) to a reliance on "data" and "processes" (e.g., trust in algorithmically-verified data, trust in the automatic execution of smart contracts). This is a paradigm revolution from "subjective trust" to "objective trust," or "digital trust."

3. Analysis of the Trust Rebuilding Mechanism in FinTech-Empowered Supply Chain Finance

FinTech's rebuilding of trust in supply chain finance is not a simple, single-dimensional technological overlay but a multi-level, systematic process of logical transformation. It targets the three major pain points of "untransferable credit," "unverifiable assets," and "unidentifiable risk" by constructing three corresponding mechanisms: "transfer trust," "asset trust," and "risk trust."

3.1. Blockchain Technology: Rebuilding "Transfer Trust" in Accounts Receivable

In traditional supply chain finance, an account payable from a core enterprise to a first-tier supplier is considered a high-quality asset by banks. However, when the first-tier supplier wishes to use this receivable to pay its own upstream (second-tier) supplier, this "credit" becomes difficult to transfer. The second-tier supplier does not trust the first-tier supplier's ability to pay, and the bank cannot verify the transaction between the first and second tiers. Consequently, the credit is terminated after the first level.

The application of blockchain technology fundamentally changes this dynamic. Its core mechanism is the creation and circulation of "digital vouchers."

First, asset confirmation and digitization (on-chaining). The core enterprise, on a consortium blockchain (usually led by a bank or tech platform), confirms its account payable to a first-tier supplier based on a real trade background (e.g., verified orders and invoices). This creates a "digital debt voucher" (known in the industry as an "e-voucher" or "supply chain note"). This process is executed via a "smart contract" and requires the "consensus signature" of multiple nodes—such as the core enterprise, the first-tier supplier, and the financial institution (and perhaps the logistics provider)—ensuring the voucher's authenticity, uniqueness, and immutability.

Second, free splitting and circulation of the voucher (credit transfer). Upon receiving this digital voucher, the first-tier supplier can "split" it into any amount based on the actual procurement sum owed to a second-tier supplier. For example, a 1 million RMB voucher can be split into 400,000 and 600,000 RMB. The first-tier supplier then uses the 400,000 RMB voucher to pay the second-tier supplier. Because the underlying asset of this voucher is the core enterprise's hard payment commitment, and the entire circulation process (from the 1M split to the 400k transfer) leaves a clear, transparent, and traceable "timestamp" on the blockchain, the second-tier supplier can fully trust the voucher's due-date payment.

Third, multi-tier credit penetration and financing (credit monetization). After receiving the voucher, the second-tier supplier can either continue to split and pay its upstream (third-tier) suppliers (achieving N-level credit penetration) or apply for financing from a financial institution at any time. Based on the clear, immutable chain of debt and the underlying credit of the core enterprise, the financial institution can bypass the cumbersome entity credit assessment of the second or third-tier supplier and issue a loan directly based on this "trusted voucher."

In this process, blockchain substitutes "relationship trust" with "technical trust" [6]. The core enterprise's credit is no longer "stagnant water" but is activated by technology into "flowing credit" that can circulate freely along the supply chain. The originally broken trust chain is rebuilt into a closed loop that is credible, divisible, transferable, and financeable, thoroughly solving the "credit island" problem for multi-tier suppliers.

3.2. IoT Technology: Rebuilding "Asset Trust" in Movable Property Supervision

SME manufacturers often possess large amounts of inventory (raw materials, semi-finished goods, finished products) and production equipment. However, in traditional finance, these movable assets are difficult to value and supervise, preventing them from serving as effective collateral. The "asset trust" crisis faced by financial institutions—the dilemma of "can't see, can't verify, can't control"—is solved by IoT technology.

The core mechanism of IoT technology is the objective mapping of the "physical world" to the "digital world."

First, digital identification and binding of assets ("account-asset consistency"). This is the cornerstone of rebuilding "asset trust." By assigning a unique digital identity to each batch of inventory (e.g., using RFID tags, QR codes, NFC chips) or piece of equipment (e.g., installing sensors), and binding this identity to the financing information on a blockchain or financial platform, it ensures that the "account" in the bank's credit system precisely matches the "asset" in the physical warehouse.

Second, real-time, visualized status monitoring ("real-time credibility"). IoT devices (such as high-definition cameras, temperature/humidity sensors, weight sensors, GPS locators, electronic fences) deployed in warehouses or on production floors can collect data on the status of the pledged assets 24/7. For example, the system can monitor in real-time if a batch of steel has decreased in weight (weight sensor), if a batch of chemicals is stored at an abnormal temperature (temp sensor), or if a piece of production equipment has been moved at an unauthorized time (GPS and e-fence). This data is fed back to the financial institution's risk control platform in real-time.

Third, automated alerts for abnormal situations ("intelligent risk control"). Combined with AI-powered image recognition and data analysis, the system can automatically identify anomalies. For instance, if the system detects that a warehouse e-fence has been breached, the quantity of pledged goods does not match the system registry (visual inventory count), or a key equipment's operational parameters deviate from the norm, it will immediately send an alert to the financial institution and supervisors. This "machine

supervision" model replaces "manual supervision," significantly reducing moral hazard and operational errors.

Through this mechanism, IoT technology achieves the credit rebuilding of "things." Financial institutions no longer need to rely on manpower for inefficient, on-site inventory checks. Instead, they can remotely, continuously, and penetratively grasp the true status of pledged assets through credible IoT data [7]. The "untrustworthy" status of assets is transformed into a "trustworthy" one. Dormant assets, once sunk in SME warehouses and workshops, are activated as liquid financial assets, allowing inventory financing and equipment leasing to be carried out securely and efficiently.

3.3. Big Data and AI: Rebuilding "Risk Trust" in Risk Assessment

Traditional financial risk control relies excessively on historical financial statements and collateral. This "static" and "lagging" assessment model fails to reflect the current operational vitality and potential risks of SMEs. The lack of "risk trust" in SMEs from financial institutions stems from partial and asymmetric information.

The core mechanism of Big Data and AI technology is the construction of a dynamic, multi-dimensional "corporate credit profile."

First, "four-in-one" data integration (data breadth). FinTech platforms use APIs to connect the fragmented ERP (enterprise resource planning), WMS (warehouse management system), and TMS (transportation management system) of the supply chain. This integrates the previously separate commercial flow (orders, contracts), logistics flow (warehousing, transport), capital flow (payments, settlement), and information flow (invoices, documents). This provides financial institutions with a panoramic view of the enterprise's true transactional behavior.

Second, cross-validation of multi-source heterogeneous data (data depth). The platform is not limited to transaction data. It actively incorporates external alternative data, such as tax payments, utility consumption (electricity, water), public records (shareholder changes), judicial information (litigation), customs (imports/exports), and social security (employee numbers). For example, a manufacturing firm's rising electricity consumption and stable tax payments are stronger proof of its operational health than its quarterly financial report [8]. Through this cross-verification of multi-source data (i.e., "triangulation"), an enterprise's ability to "window dress" its financials is significantly compressed, and the information's "fraud-resistance" is greatly enhanced.

Third, AI-based dynamic risk modeling and warning (data validity). AI algorithms (e.g., machine learning) process massive, high-dimensional, and unstructured data to build complex risk pricing and warning systems that far surpass traditional risk models. The system can analyze an enterprise's cash flow health, performance capability, and counterparty risk in real-time. As soon as it detects an early signal of rising default probability (e.g., an upstream supplier starts delaying deliveries, or a downstream payment cycle suddenly lengthens), it can automatically issue a warning or even dynamically adjust the credit line.

Through this mechanism, Big Data and AI technology achieve the credit rebuilding of "risk." The basis of the financial institution's trust shifts from "past financial reports" to "present data," from the "static entity" to the "dynamic transaction." This "risk trust," built on objective data, emboldens financial institutions to provide more precise and flexible credit-based loans to "asset-light" manufacturing SMEs that are rich in data and orders.

4. The Practical Landscape of Qingyuan's Manufacturing Supply Chain Finance and Empowerment Opportunities

The three trust-rebuilding mechanisms described above provide the theoretical possibility for solving SME financing. The unique current state of Qingyuan's manufacturing industry provides fertile ground for the implementation of these mechanisms.

4.1. Industrial Characteristics and Financing Bottlenecks in Qingyuan's Manufacturing

As the "North Gate" of Guangdong Province, Qingyuan is actively undertaking industrial transfers from the Greater Bay Area's core cities, forming a modern manufacturing system pillared by new materials, smart home furnishings, fine chemicals, and biomedicine. These industries generally share the following characteristics:

(1) Significant Cluster Development. Qingyuan's manufacturing is highly concentrated in major industrial parks (e.g., Guang-Qing Industrial Park, Yingde High-Tech Zone). This clustering feature means that upstream and downstream enterprises are geographically and operationally proximate, providing a natural "scenario" for supply chain finance. This "geographic proximity" and "industrial linkage" reduce the coordination costs for building a regional trust platform.

(2) Clear "Core-Satellite" Structure. Within each industrial cluster, there are often one or a few large core (or "dragon-head") enterprises, surrounded by a large number of SME "satellite" suppliers providing raw materials, parts, and processing services. For example, a leading enterprise in the smart home industry is supported by a massive number of SMEs in hardware, wood panels, and coatings. This structure is a typical use case for SCF, but it is also where the credit decay of the traditional model is most pronounced.

(3) Relatively Weak Digital Foundations among SMEs. Compared to the core cities of the Greater Bay Area, the majority of Qingyuan's manufacturing SMEs started their informational and digital transformation later. The adoption rate of digital management tools (like ERP, MES) is still low and has room for improvement, which means their "data assets" have not been fully mined. This "digital divide" is both a challenge and an opportunity to "leapfrog" development via cloud-based SaaS services.

(4) Insufficient Coverage by Traditional Financial Services. Constrained by the "trust deficit" described earlier, Qingyuan's traditional financial institutions still primarily rely on fixed assets like land and factory buildings for collateral when serving manufacturing SMEs. The most valuable assets for SMEs—orders, inventory, and accounts receivable (i.e., "movable assets" and "debt claims")—are difficult to get credit against, leading to a significant mismatch in financial supply and demand.

4.2. The Strategic Fit of FinTech Empowerment for Qingyuan's Manufacturing

Combining the FinTech trust-rebuilding mechanisms with

Qingyuan's industrial reality reveals a high degree of strategic alignment:

(1) Promoting Trust Mechanisms at the "Industrial Cluster" Level. Within Qingyuan's industrial parks, an ecosystem of leading enterprises, SME suppliers, logistics providers, and financial institutions already exists. The government and park administrators can take the lead, guiding leading enterprises to be the first to adopt blockchain platforms. This would convert the "credit" they extend to park-based suppliers into tradable "digital vouchers," activating the capital chain of the entire cluster. A consortium chain based on "park consensus" is highly feasible.

(2) Unlocking SME Potential through "Movable Asset Activation." Qingyuan's manufacturing firms (e.g., in new materials, smart homes, fine chemicals) typically hold large inventories of raw materials and finished goods. This is a perfect scenario for IoT technology. By introducing IoT supervision, "smart warehouses," and "digital silos," the problem of movable property supervision can be effectively solved, turning these dormant assets into "living money" for SME financing.

(3) Bridging the Information Gap through "Data Governance." To address the weak digital foundation of SMEs, the adoption of SaaS (Software as a Service) supply chain collaboration platforms should be encouraged in Qingyuan. SMEs should be guided to "move to the cloud and onto platforms," digitizing their business processes (e.g., order receiving, purchasing, warehousing) to accumulate authentic transaction data at a low cost. Simultaneously, the local government should lead the charge in opening up public data (e.g., tax, electricity, social security) to financial institutions in a compliant and secure manner, providing the raw material for big data risk control and rebuilding "risk trust."

5. A Logical Framework for Building a New Supply Chain Finance Ecosystem in Qingyuan's Manufacturing

The ultimate goal of FinTech-driven trust rebuilding is not a mere accumulation of technology, but the construction of a sustainable, efficient, and multi-win financial service ecosystem. This new ecosystem is an iterative upgrade of the traditional "1+N" linear model; it is a "M+N+F+P+G" networked and collaborative ecosystem, composed of core enterprises (M), SMEs (N), financial institutions (F), technology platforms (P), and the government (G).

5.1. Ecosystem Participants and Their Role Transformation

In the new FinTech-empowered ecosystem, the traditional roles and functions of all participants will undergo a profound transformation:

(1) Financial Institutions (F): From "Capital Providers" to "Ecosystem Organizers" and "Risk Managers."

Banks and other financial institutions will no longer be passive "counters" waiting for applications, but active "service providers" embedded in the industrial chain. Using FinTech platforms, they will source data from its origin, design products, and proactively extend credit. Their core competence will shift from capital scale and physical branches to the depth of their understanding of the industrial chain, their data analysis capabilities, and their risk-pricing accuracy [9]. They must transform from "capital intermediaries" to "information" and "service intermediaries."

(2) Core Manufacturing Enterprises (M): From "Credit Centers" to "Data Hubs" and "Ecosystem Enablers."

The role of leading enterprises is reshaped. They are not just the "source" of credit but also the "hub" of data. By opening their supply chain management systems (e.g., procurement, production, sales data) to the FinTech platform, they help financial institutions accurately identify the true operational status of their upstream and downstream SMEs. This empowerment not only stabilizes their own supply chain but also enhances their ecological control and social responsibility image as a "chain leader."

(3) SMEs (N): From "Passive Financing Seekers" to "Active Data Contributors."

SMEs are no longer at the bottom of the financial service chain or passive recipients. By digitizing and bringing their own operational behaviors (orders, warehousing, logistics) online, they actively participate in the construction of "digital trust." They exchange "data" for "credit" and "credit" for "capital," significantly improving their position in the financial game. "Data assets" will become a critical component of their core assets.

(4) FinTech Platforms (P): From "Technology Vendors" to "Ecosystem Operation Service Providers."

Technology companies, or platforms co-built by multiple parties, are the infrastructure builders and operators of the new ecosystem. They not only provide the technical tools (blockchain, IoT, big data) but, more importantly, they are responsible for setting data standards, maintaining platform operations, matching multi-party transactions, and ensuring information security. They are the "connectors," "dispatchers," and "neutral third parties" that enable the smooth operation of the new ecosystem.

(5) Government and Regulators (G): From "Traditional Approvers" to "Ecosystem Cultivators" and "Rule Setters."

The government (especially the Qingyuan local government and park management committees) plays a key role in guiding and cultivating this new ecosystem. On one hand, it uses policy incentives (e.g., fiscal subsidies for interest, digital transformation grants) to guide all parties to "get on the chain and on the platform." On the other hand, it takes the lead in establishing regional data-sharing norms and privacy protection mechanisms. Concurrently, regulators should introduce agile governance concepts like "regulatory sandboxes" to foster innovation while maintaining a firm line against systemic risks [10].

5.2. Operational Characteristics and Value Creation of the New Ecosystem

This new ecosystem, rebuilt on "digital trust," will exhibit operational characteristics vastly different from the traditional model:

(1) Data-Driven: The initiation, approval, disbursement, and risk control of financial services will be based entirely on credible, real-time, multi-dimensional data flows, rather than on cumbersome, static, and easily-forged paper documents or collateral assessments.

(2) Credit Penetration: Based on blockchain digital vouchers, the high-quality credit of core enterprises can penetrate to N-tier suppliers at any level of the industrial chain with zero decay and low cost, achieving "full-chain" financial coverage.

(3) Asset Traceability: Based on real-time IoT monitoring,

every piece of movable collateral will achieve "source-traceable, destination-trackable, status-verifiable, and responsibility-accountable," realizing "end-to-end" asset transparency.

(4) Process Automation: Based on smart contracts and AI algorithms, processes such as credit application, document verification, risk warning, and repayment settlement can be executed automatically and intelligently, vastly increasing service efficiency, reducing operational costs, and enabling a "7x24" financial response.

The construction of this new ecosystem creates multi-dimensional, win-win value. For SMEs, it means a significant increase in financing accessibility and a reduction in costs, achieving "inclusive finance." For core enterprises, it strengthens supply chain resilience and coordination, consolidating their "chain leader" status. For financial institutions, it enhances risk control capabilities and expands their inclusive finance business, opening up a "new blue ocean" of assets. For Qingyuan's regional economy, it provides the financial foundation to solidify the "Manufacturing as Priority" strategy and systemically optimize the business environment.

6. Implementation Paths and Policy Recommendations for Ecosystem Construction

Theory must be grounded in practical paths. To build the aforementioned manufacturing supply chain finance ecosystem based on Qingyuan's reality, a gradual, multi-party, and coordinated approach is required, focusing on the following areas:

6.1. Top-Level Design: Build a "Government-Guided, Market-Operated" Regional Service Platform

The Qingyuan municipal government should play the role of "building the nest to attract the phoenix." It is recommended that the government take the lead, in partnership with major local financial institutions, leading enterprises in key industrial parks, and advanced domestic FinTech companies, to jointly establish a "Qingyuan Manufacturing Supply Chain Finance Service Platform." The government should provide initial policy and financial support, defining data standards and access protocols. Subsequent commercial operation of the platform should be entrusted to a market-based entity to ensure its sustainable development. This platform must prioritize interoperability with other financial platforms in the Greater Bay Area to avoid creating new "data silos."

6.2. Data Infrastructure: Breaking Down "Data Silos" and Ensuring "Data Security"

Data is the bedrock of the new ecosystem. First, the digital transformation of Qingyuan's manufacturing SMEs must be accelerated. Through special subsidies and SaaS service vouchers, enterprises should be encouraged to deploy basic information systems (ERP, MES) to achieve "business digitization." Second, "data walls" between the government, banks, and enterprises must be broken. It is recommended to establish a "data-usable-but-not-visible" authorized query mechanism for public data (e.g., tax, electricity, social security, judicial, customs) while ensuring security and privacy. Explore the use of privacy-computing technologies like Federated Learning and Multi-Party Computation to unlock data value while protecting data privacy, providing support for big data risk control by financial institutions.

6.3. Pilot Programs First: Use "Key Parks and Key Industries" as Breakthrough Points

The construction of the new ecosystem should not be a widespread rollout. Instead, it should start with pilot programs to create models. It is recommended to select parks with a good foundation and high willingness from leading enterprises, such as the Guang-Qing Industrial Park, as pilot zones. Resources should be concentrated on industries with high inventory value and long supply chains, such as "new materials" or "smart home furnishings," to create flagship use cases for movable asset pledging and accounts receivable financing based on "Blockchain + IoT." By summarizing and promoting the successful experiences from these pilots, a replicable "Qingyuan Model" can be formed, gradually attracting more enterprises and financial institutions into the ecosystem.

6.4. Policy Escorts: Cultivate an "Able, Willing, and Ready" Institutional Environment

First, optimize the regulatory environment. Actively seek provincial support to establish a FinTech "regulatory sandbox" in Qingyuan, allowing financial institutions to test and iterate innovative SCF products and services within a risk-controlled environment. Second, strengthen positive incentives. Provide clear fiscal subsidies, guarantee rate discounts, or risk compensation for core enterprises that are first-adopters of digital debt vouchers, SMEs that actively integrate IoT supervision, and financial institutions that proactively develop innovative products. This will lower the initial costs and reservations for all parties joining the new ecosystem. Third, cultivate digital literacy. Strengthen digital training for SME owners, helping them understand the concept of "data as an asset" and increasing their motivation to "move to the cloud and onto platforms."

7. Conclusion

The FinTech wave is reshaping the financial industry with unprecedented depth and breadth. For developing cities like Qingyuan, which are dedicated to solidifying their manufacturing foundations, this is not just a technological revolution but a strategic opportunity for "changing lanes and overtaking." This study argues that the core value of FinTech's empowerment of supply chain finance is not a simple efficiency gain. Rather, it is a fundamental rebuilding of "trust," which in turn solves the "risk-cost-efficiency" trilemma that was irreconcilable in traditional financial models.

By rebuilding "transfer trust" with blockchain, "asset trust" with IoT, and "risk trust" with big data, a new SCF service paradigm based on "digital trust" is established. Building upon this, the construction of a regional financial service ecosystem with multi-party participation and synergistic governance will be the necessary path for Qingyuan to solve its SME manufacturing financing bottlenecks, activate the vitality of its industrial chains, and solidify its "Manufacturing as Priority" foundation. Although this

process faces multiple challenges in data governance, technical standards, and stakeholder coordination, it represents the evolutionary direction of "finance serving the real economy" and holds profound theoretical significance and broad practical prospects.

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