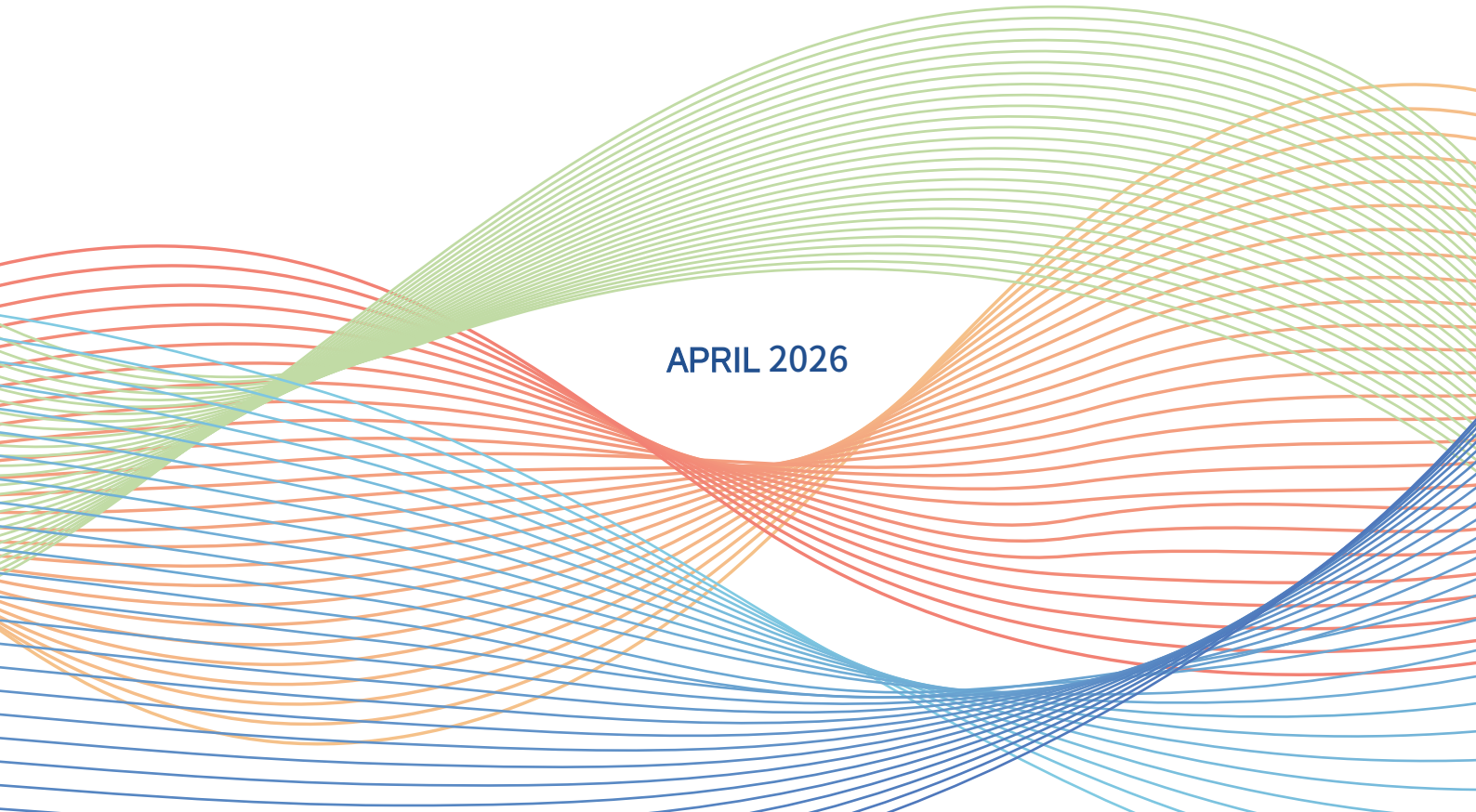
世界互联网大会
World Internet Conference

China unicom中国联通

Outcomes of World Internet Conference
Think Tank Cooperation Program

Grasping the Global Wave of Data Elements Market Development Practices and Prospects of Trusted Data Spaces

China Unicom (Hong Kong) Innovation Research Institute



APRIL 2026


世界互联网大会
World Internet
Conference


China
unicom中国联通

Editorial Team

Team Leader

Feng Lanxiao

Deputy Team Leaders

Chi Xingjun　Zhang Kai

Team Members

Ou Jinghuai　Sun Haowen

Li Han　Zheng Tao

Zhu Zhiru　Zhang Yang

Contents

I. Overview of the Global Trusted Data Space Industry

(I) Overview of China's Trusted Data Space Industry

In November 2024, the National Data Administration (NDA) issued the "Trusted Data Space Development Action Plan (2024—2028)" (hereinafter referred to as the "Action Plan"). The "Action Plan" defines the Trusted Data Space as a data circulation and utilization infrastructure based on consensus rules, connecting multiple entities to achieve resource sharing and joint use. It is an application ecosystem for co-creating the value of data elements and a key carrier for supporting the construction of a national integrated data market. Guided by scenarios and centered on entities, the "Action Plan" categorizes trusted data spaces into five types: Enterprise Trusted Data Space, Industry Trusted Data Space, City Trusted Data Space, Personal Trusted Data Space, and Cross-border Trusted Data Space.

(II) Overview of the International Trusted Data Space Industry

Internationally, the Trusted Data Space is typically defined as a virtual environment or architectural framework supporting trustworthy, secure, and compliant data sharing and exchange. Its goal is to achieve interoperability and value realization of data across organizations and domains while safeguarding data sovereignty. By encapsulating the core capabilities of Trusted Data Spaces into cloud-native service models that are subscribable, scalable, and callable on demand—known as Data Space as a Service (DSaaS)—enterprises and organizations can quickly access and participate in the data space ecosystem. Classified by service entities, there are three product forms: Industry Data Space, Corporate Data Hub, and Data Marketplace, primarily serving three scenarios: industrial chain collaboration, internal corporate data governance, and facilitation of data element transactions.

(III) Main Differences between China and International Trusted Data Spaces

The development paths of the Chinese and international Trusted Data Space industries exhibit differentiated characteristics, primarily reflected in four aspects: Classification System and Product Forms, Driving Factors and Strategic Priorities, Scope of Application Scenarios, and Market Scale and Growth Expectations.

Dimension	China Trusted Data Space	International Trusted Data Space
Classification System & Product Forms	Classified into five major categories based on scenarios and entities: • Enterprise Trusted Data Space • Industry Trusted Data Space • City Trusted Data Space • Personal Trusted Data Space • Cross-border Trusted Data Space	Classified into three forms based on "Service Entities and Functions": • Industry Data Space • Corporate Data Hub • Data Marketplace
Driving Factors & Strategic Priorities	Driven by the NDA Action Plan, focusing on four strategic directions: 1. Strategic Resource Security 2. Physical-Digital Integration 3. Self-reliance and Strength in Science and Technology 4. Enhancement of Public Services	Balancing Technology-Driven and Regulation-Driven approaches: • USA: Technology-driven, relying on deep integration of cloud computing and AI. • EU: Regulation-driven, benefiting from institutional frameworks such as the "Data Governance Act," emphasizing data sovereignty protection.
Scope of Application Scenarios	Full-domain coverage and public integration: Covers 32 major sectors of the national economy, focusing on 20 key areas. Particularly emphasizes the fusion of public data and enterprise data, and cross-domain scheduling of national strategic resources.	Implemented around three main product forms: 1. Industry Collaboration Scenarios: e.g., manufacturing supply chain collaboration. 2. Internal Corporate Governance Scenarios: e.g., supporting AI model development, reducing IT O&M costs. 3. Data Trading Scenarios: e.g., listing, subscription, and purchase of standardized data products.

Table 1: Main Differences between China and International Trusted Data Spaces

II. Analysis of Current Status Characteristics of the Global Trusted Data Space Industry

(I) Current Status Characteristics of China's Trusted Data Space Industry

On April 3, 2025, the National Data Administration issued the "Notice on Organizing the Innovative Development Pilot of Trusted Data Spaces in 2025," launching the selection of pilot projects. A total of 63 pilot projects were selected in the first batch, comprising 28 enterprise data spaces, 22 industry data spaces, and 13 city data spaces. These cover more than 20 provinces and municipalities nationwide, forming over 900 application scenarios covering 20 key fields and 4 urban governance fields, showing rapid development momentum.

1. Enterprise Trusted Data Space

Enterprise Trusted Data Spaces have formed a data circulation and utilization model led by lead enterprises (chain masters), driving upstream and downstream enterprises to collaborate on transformation. Covering five links—market insight, R&D design, production organization, product services, and supply chain guarantee—they achieve business coordination optimization, precise resource allocation, and service value-added innovation by driving data sharing across the supply chain. Core applications focus on two scenarios: Production Organization, mainly focusing on production coordination optimization, supplier management upgrades, and agile order response; and Supply Chain Guarantee, emphasizing strengthening capabilities in supply chain finance, logistics coordination, and risk warning.

2. Industry Trusted Data Space

Industry Trusted Data Spaces promote the smooth flow and efficient allocation of industry data resources through a mechanism of co-construction, co-governance, and mutual benefit, spawning four new models of shared and common use:

- Aggregated Data Integration Model: Concentrated in industries with numerous associated subjects and fragmented data characteristics, such as automotive, healthcare, and satellite remote sensing. Specialized industry service companies converge peer and related data around common scenarios to form standardized solutions addressing industry-wide issues.
- Linked Data Integration Model: Concentrated in industries with high demand for upstream-downstream collaboration, such as transportation logistics and energy. Leading enterprises dominate by opening their own data to integrate upstream and downstream enterprise data, improving industry operational efficiency.
- Cross-Domain Data Fusion Model: Concentrated in fields with significant spill-over empowerment and strong business interaction needs, such as transportation logistics, energy, and meteorology. Trusted third parties or professional service agencies with management capabilities release data resources to multiple industries to incubate cross-border applications, such as precision insurance for new energy vehicles, vehicle-charging pile-grid coordinated scheduling, and renewable energy power prediction based on meteorological data.
- High-Quality Dataset-Driven AI Innovation Model: Concentrated in frontier technological innovation fields such as healthcare, new materials, and basic sciences. Neutral institu-

tions with outstanding research advantages aggregate high-quality data to form authoritative datasets, supporting large model R&D for the industry and shortening the innovation cycle.

3. City Trusted Data Space

City Trusted Data Spaces are led by public data to drive the integration and application of enterprise data, forming a dual-drive pattern of "Refined City Governance" and "Integrated Development of Industry and City."

- City Governance Scenarios: Cover four categories—operation management, convenient services, government affairs management, and zero-carbon construction. They improve management refinement levels and service response efficiency through public data sharing.
- Industry-City Fusion Scenarios: Target industries such as finance, healthcare, transportation logistics, and automobiles. Relying on the compliant fusion of public data with enterprise and personal data, they support data product development and service mode innovation, enhancing industrial digital transformation capabilities.

(II) Current Status Characteristics of the International Trusted Data Space Industry

Global construction of Trusted Data Spaces continues to evolve towards multi-domain collaborative promotion and multi-level linkage development. Advanced economies represented by the EU are systematically promoting the transformation of data element circulation from the technology verification stage to an ecological and systematic governance pattern through institutional design and practical exploration. During this process, major forms such as industry-level data spaces, enterprise-level data hubs, and market-oriented data trading platforms are gradually maturing. Application practices continue to expand, accelerating the formation of an infrastructure system covering diverse scenarios and supporting trustworthy circulation.

1. Industry Data Space

Industry Data Spaces are based on unified data exchange standards and compliant governance frameworks, aiming to build data collaborative circulation mechanisms across enterprises and regions. This model aims to construct a decentralized data exchange environment, supporting participating parties in carrying out safe and trustworthy data sharing with partners while effectively safeguarding their own data sovereignty. Participating parties deploy standardized connection components to establish controlled data connection channels and implement sharing based on preset data usage policies, thereby conducting data analysis and value mining on this basis. Currently, this model has been successfully applied in key scenarios such as manufacturing supply chain collaboration, high-end equipment digital twins, healthcare service optimization, energy efficiency management, and logistics process visualization. Major participating entities include data demand sides with cross-organizational data sharing needs and technical service providers providing connection components, policy execution engines, and platform support capabilities.

2. Corporate Data Hub

Corporate Data Hubs are led by core enterprises, aiming to build a data coordination system covering all business units of the group, providing foundational support for data-driven decision-making and intelligent applica-

tion innovation. Currently, this model primarily adopts a group internal interconnectivity architecture, applicable to multinational corporations and large enterprise groups. By centrally deploying central data hubs and distributed connection nodes, it achieves unified data standards and safe sharing among subsidiaries across regions while strictly complying with local data storage regulations. Specific implementation paths include: orderly accessing internal business systems to the hub platform via pre-set connection components; synchronously configuring hierarchical access permissions and data quality control rules; and achieving convenient calling of high-quality data resources via APIs, business intelligence tools, or standardized data service interfaces.

3. Data Marketplace

As an important trading carrier of Trusted Data Spaces, the Data Marketplace aims to build a circulation ecosystem that efficiently connects data supply and demand sides, strongly pushing data elements to evolve from resources to assets. This model serves as a key intermediary connecting data suppliers and consumers, supporting suppliers in listing standardized data products such as datasets, data service interfaces, and AI models for consumers to subscribe or purchase on demand. Its effective operation relies on the collaborative linkage of three types of entities: First, data suppliers realize value conversion of data assets via the platform; second, data consumers effectively reduce data acquisition costs and enhance decision precision and innovation efficiency by purchasing external data products; third, technical service and platform operation providers offer full-chain service support covering data access, product listing, compliance review, transaction fulfillment, and integrated analysis, providing a solid guarantee for the efficient circulation and value realization of data elements.

(III) Current Status Characteristics of Cross-border Trusted Data Space Development

Cross-border Trusted Data Spaces are still in the early stages of development. Overall maturity is significantly lower than enterprise, industry, and city trusted data spaces, sustainable commercial application scenarios are limited, and scalable operating paradigms that are replicable and promotable have not yet been formed. Against this background, China's various Free Trade Zones focus on data circulation needs in major cross-border business scenarios, combined with their institutional innovation practices, conduct relevant research, support condition-ready scenarios for preliminary trials, accumulate replicable pilot experience, and actively explore the construction path of cross-border trusted data spaces.

Relying on blockchain's immutable and traceable characteristics, privacy computing's secure data interaction capabilities, and the standardized interfaces and interoperability functions of data space connectors, cross-border trusted data spaces support the following typical application scenarios: Cross-border trade circulation, cross-border financial services, cross-border joint research, and cross-border public services.

- Cross-border Trade Circulation: Integrates customs data, logistics data, credit data, and trade process data elements including cargo flow, capital flow, contract flow, and information flow. It supports applications such as identity verification, credit assessment, product traceability, quality certification, and trade data analysis.
- Cross-border Financial Services: Focuses on the integration of bank-grade data such as inter-bank customer credit data, enterprise asset

proof, personal asset proof, bank statements, enterprise guarantee information, and credit reporting data. Taking the cross-border trusted data space as a carrier, it provides core applications such as mutual recognition of inter-bank customer credit data, cross-border financing credit verification, and improved loan issuance risk assessment capabilities.

- Cross-border Joint Research: Integrates various research data from both regions. Using the cross-border trusted data space as a tool, it supports high-value research activities such as intelligent new drug R&D, AI medical device R&D, disease mechanism research, population health prevention and control research, multi-center clinical study collaboration, new material joint simulation computing, and distributed intelligent experimental data processing.
- Cross-border Public Services: Integrates government affairs and livelihood data such as academic credentials, tax data, social security data, medical data, personal asset proofs, and enterprise asset proofs. Leveraging the platform service capabilities of cross-border trusted data spaces, it realizes applications such as real-time cross-border verification of academic credentials, cross-border tax data verification, cross-border verification of personal asset proofs, authenticity verification of enterprise credit information, AI-assisted diagnosis, and smart medical services.

III. Excellent Practice Cases of Global Trusted Data Spaces

(I) Automotive Industry Data Space: Catena-X

Catena-X was jointly initiated by BMW Group and SAP Company, establishing an industry-level trusted data space by uniting core enterprises of the industrial chain such as Mercedes-Benz, Bosch, Siemens, and ZF. Its aim is to build a data trust circulation infrastructure for the global automotive industrial chain. Operated in the form of an industrial alliance, it focuses on promoting efficient data collaboration and secure sharing between automobile manufacturers and suppliers at all levels.

- Organizational Structure: Adopting an open alliance governance model, Catena-X has accepted over a hundred member units from Europe, the Americas, Asia, etc., covering whole-vehicle manufacturing, parts supply, recycling, and cross-industry technical service providers, forming an ecological collaboration network covering the entire lifecycle of automobiles.
- Technical Path: Based on the International Data Space Association (IDSA) technical standards, it deploys distributed connectors for participants to achieve end-to-end data connectivity, ensuring that data providers retain data control and usage rights throughout the circulation process, effectively balancing data sharing and security control needs.
- Application Practice: Focuses on high-value business scenarios such as carbon footprint information exchange, end-to-end quality traceability, and manufacturing collaboration, promoting standardized data exchange and business process optimization in the industrial chain. Its scenario-driven and standards-first construction approach provides a replicable

practical paradigm for the scaled landing of industry-level data spaces. Currently, this model is gradually extending to cross-industry fields, reflecting the development trend of trusted data spaces evolving from vertical industry pilots to ubiquitous infrastructure.

(II) Shanghai City Data Space

The Shanghai City Trusted Data Space was approved by the National Data Administration in July 2025 as one of the first 63 innovative development pilot projects for trusted data spaces. Shanghai Data Group undertakes the responsibility of operation and implementation, relying on the Shanghai Hub Node of the National Blockchain Network to systematically build a data circulation infrastructure for super-large cities. Standing at the forefront of the reform of market-oriented allocation of data elements, it is committed to breaking through key bottlenecks such as "inefficient data supply, doubtful data usage, and disordered data flow," promoting the orderly fusion and trusted transfer of public and enterprise data under compliant premises, and gradually forming a full-chain trusted management mechanism covering data supply, circulation, application, and security, providing institutional support for the digital transformation of super-large cities.

During the construction and promotion process, the space continuously expanded its ecosystem coverage. As of August 2025, nearly 300 market entities participated in trial operations, 12,000 publicly authorized operating public data resources from about 60 municipal departments were accessed, and over 300 data products were developed cumulatively. Among them, the call volume of financial-type data products for small and micro enterprises exceeded 400 million times, effectively supporting a loan scale of over 100 billion yuan in the field of inclusive finance, further clarifying the path for data elements empowering the real economy.

- Technical Architecture: With blockchain and privacy computing technologies as the dual core, it builds an infrastructure system driven by "City Hub + Industry Federation." It simultaneously established a "2+8" rule system consisting of "Two-Level Governance Framework and Eight Operation Links," providing common technical service capabilities such as digital identity authentication, trusted evidence preservation, and security auditing, supporting sub-spaces in industries such as finance, energy, and manufacturing for on-demand access and customized expansion.
- Application Scenarios: Continuously expanded, creating demonstration effects in finance, urban governance, transportation, and healthcare: Finance relies on public data products such as electricity usage and logistics to help small and micro enterprises with financing and credit enhancement; Urban governance improves the precision of flood control emergency decision-making through multi-source data fusion; Healthcare conducts traditional Chinese medicine full-chain traceability and supply chain finance pilots, promoting the deep release of data value in industrial links.
- Collaboration Mechanism: A tri-party collaboration pattern has been formed with Shanghai Data Group as the overall operator, Shanghai Big Data Center as the public data supplier, and Shanghai Data Exchange as the product registration and trading party, bringing together hundreds of financial institutions, technology enterprises, and industry groups to participate in ecosystem construction. In December 2025, the Shanghai Municipal Bureau

of Data announced 18 additional municipal-level trusted data space innovation pilot projects, marking that the trusted data circulation system based on city spaces as the base and industry sub-spaces as extensions has entered a new stage of collaborative promotion, providing a replicable and promotable "Shanghai Practice" for national data element market construction.

(III) Cross-border Trusted Data Space by China Unicom (Hong Kong) Innovation Research Institute

China Unicom (Hong Kong) Innovation Research Institute, based in the Greater Bay Area, actively promotes cross-border trusted data space product practice and has achieved phased success.

- Technical Architecture: Strictly follows the construction logic of "Bottom-layer Foundation, Mid-layer Compliance, Top-layer Trust Empowerment." The bottom layer relies on the deep integration of computing, bandwidth, and storage capabilities in digital infrastructure to build a solid base; the core layer establishes a trust mechanism through blockchain technology, integrates data factories, privacy computing, and container sandbox technologies to ensure data security and privacy, and utilizes domestic and overseas connector to achieve cross-domain network interconnection under strict compliance with the cross-border compliance system; the top layer addresses the needs of key industries such as finance, healthcare, and logistics, forming a safe, trustworthy, compliant, and efficient cross-border data circulation and application service system.proof, personal asset proof, bank statements, enterprise guarantee information, and credit reporting data. Taking the cross-border trusted data space as a carrier, it provides core applications such as mutual recognition of inter-bank customer credit data, cross-border financing credit verification, and improved loan issuance risk assessment capabilities.

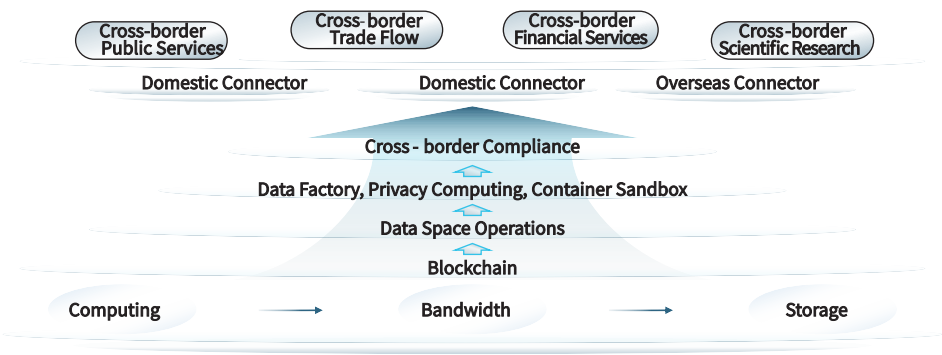


Figure 1: Technical Architecture of Cross-border Trusted Data Space by China Unicom (Hong Kong) Innovation Research Institute

- Alignment with International Rules: The Institute actively integrated into the global data governance ecosystem, joined the International Data Space Association (IDSA), and successfully obtained IDS Connector Certification. This ensures that its technical architecture and governance rules remain consistent with international mainstream standards, effectively enhancing the interoperability and recognition of its products in overseas markets, accumulating practical experience for Chinese enterprises participating in global data space rule formulation.
- Policy and Market Synergy: The Institute seized the strategic opportunity of building the "Data Special Zone" of the Greater Bay Area. Guangdong Province explicitly proposed exploring the creation of a "Greater Bay Area Data Special Zone" to accelerate the construction of a two-way cross-border data circulation mechanism. The "Standard Contract for Cross-border Flow of Personal Information in the Greater Bay Area (Mainland, Hong Kong)" released in December 2023 provided a clear path for compliant data flow between Shenzhen and Hong Kong. Against this backdrop, the Institute actively responded to the urgent needs of cross-border data verification, sharing, and collaboration in the scientific research, medical, and insurance fields in Shenzhen and Hong Kong, promoting the landing and application of trusted data space products in real business scenarios, aiding the high-quality development of the "Digital Bay Area."

IV. Development Potential and Trends of Global Trusted Data Spaces

(I) Trusted Data Spaces Will Break Through Bottlenecks in AI Training Data

The trend of deep integration between artificial intelligence and the real economy will become increasingly significant, and its rigid demand for high-quality data will continue to rise. The data supply bottleneck facing AI technology development will deepen from "scarcity of quantity" to "absence of quality." On the one hand, public internet data is difficult to meet training requirements for complex scenarios such as industry, healthcare, and finance due to lack of professionalism and logic; on the other hand, industry entities holding high-value corpora generally form "data silos" due to concerns about intellectual property leakage and data abuse, which may exist for a long time. Against this background, trusted data spaces will establish a new supply paradigm of "original data does not leave the domain, data is usable but invisible" through unified semantic standards, metadata management, and trusted circulation protocols, becoming a core path to solving the problem of high-quality data supply. Internationally, advanced economies have already built cross-institutional distributed training networks in the healthcare field relying on data space technology, successfully realizing algorithm iteration under the premise of protecting patient privacy; some leading pilot zones in China have also gathered government and industry data through such architectures to provide compliant and high-quality corpus support for large model training.

(II) Trusted Data Spaces Will Drive Enterprise Decision-Making Towards Precise Models

Enterprise operation and management will accelerate towards a new paradigm of intelligent decision-making based on the comprehensive data fusion. As the digital economy develops deeply, enterprise digital transformation will extend from internal process optimization to cross-organizational ecological collaboration. A single entity's closed-loop data system is difficult to support the scientific nature and forward-looking nature required for strategic-level decisions. Against this background, integrating multi-source data such as macroeconomics, industrial chain upstream and downstream, and heterogeneous markets will become an inevitable path to enhance corporate insights and adaptability. Trusted data spaces will continue to reduce the trust cost and technical threshold of cross-entity data interaction through standardized connectors and unified identity authentication mechanisms, effectively replacing the high cost and unsustainability problems faced by traditional point-to-point modes. Enterprises capable of cross-domain data integration will continue to maintain structural advantages in market response speed and operational efficiency. In the future, leading global enterprises will further rely on trusted data spaces to integrate real-time data such as global production capacity, supply chains, and market demands, driving decision-making models to evolve from experience-based judgment to precision. Trusted data spaces are expected to become strategic infrastructures for enterprises to build global domain data insights and enhance core competitiveness, realizing scaled application in broader industrial fields.

(III) Trusted Data Spaces Will Guarantee Industrial Chain Safety and High-Quality Collaboration

With the continuous evolution of the trend towards localization, regionalization, and diversification of global industrial chains and supply chains, the demand of enterprises on the supply chain for information transparency and collaborative response capabilities will increase further. Against this background, how to achieve efficient, trustworthy cross-entity data collaboration while strictly safeguarding data sovereignty and trade secrets will become a critical issue universally faced by the industrial sector. Trusted data spaces, with their embedded usage control and sovereignty protection technical architectures, are expected to systematically resolve the binary paradox of sharing and confidentiality in data element circulation, providing a solid technical foundation for industrial chain safety and high-quality collaboration. It can be foreseen that practices carried out in fields such as international advanced manufacturing, such as using trusted data spaces to achieve carbon footprint tracking and quality traceability for the entire lifecycle of parts to simultaneously meet compliance requirements for green trade barriers and ensure the security of core data for suppliers at all levels, will gradually form replicable and promotable paradigms, accelerating penetration into more industries. In the future, trusted data spaces will become key support for enhancing industrial chain resilience, strengthening lead enterprises' collaborative control capabilities, and driving efficient linkages between upstream and downstream, comprehensively empowering enterprise operation and management to transform deeply towards data-driving.

(IV) Trusted Data Spaces Will Reduce Compliance Risks of Cross-border and Cross-domain Data Circulation

As global data sovereignty competition continue to deepen, major economies will further improve legal and regulatory systems for data security and personal information protection. Compliance costs and legal risks faced by cross-border and cross-domain data circulation will continue to rise. Against this background, traditional compliance models relying solely on legal text constraints will be difficult to adapt to future massive, high-frequency, multi-entity data interaction needs. Trusted data spaces, through embedded access control, automatic contract execution, and full-link audit mechanisms, are expected to achieve look-through supervision and automated compliance throughout the data circulation process, becoming a key carrier to bridge the gap between legal rules and technical execution. In the future, regions will adopt data space architectures more widely, ensuring that data is only accessed and processed within the scope authorized by the laws of the country of origin in cross-border data flow scenarios. This model of hardening legal rules into executable technical codes will provide standardized and reusable compliance solutions for enterprises to cope with complex and changing international legal environments, representing the necessary path to safeguard the safe and orderly flow of data elements.

(V) Trusted Data Spaces Will Accelerate the Implementation of Market-oriented Mechanisms for Data Elements

The inherent non-rivalry, non-excludability, and easy replicability of data will continue to pose challenges to confirmation of data rights, pricing, and delivery, constraining the transformation process of data resources into data assets. In the future, realizing the value monetization of data elements will depend more heavily on the effective separation of data ownership and usage rights, and ensuring that the usage process is fully controllable and precisely measured. Trusted data spaces will build an increasingly perfect trusted delivery environment relying on blockchain, privacy computing, and smart contract technologies. Under this environment, data holders can gradually achieve precise restrictions on the object, time, frequency, and purpose of data usage, and implement precise billing based on actual usage. Major worldwide data trading institutions will accelerate the innovation of on-exchange trading models based on data space technology, effectively reduce security and compliance risks in the circulation links of data products, and promote the orderly circulation and efficient allocation of high-value data resources. Trusted data spaces will not only serve as key technical carriers but also evolve into value centers for constructing multi-level data element markets and releasing the multiplier effect of data elements.