Translation

The following document, a spinoff of the March 2021 14th Five-Year Plan, *describes China's strategy for the growth of its big data industry through 2025. Although the big data plan includes very few quantitative targets for the industry, it does qualitatively describe the Communist Party's near-term vision for China's big data industry, which involves both making big data more broadly accessible and improving data security.*

Title
"14th Five-Year" Plan for the Development of the Big Data Industry
“十四五”大数据产业发展规划

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Source
MIIT website. The plan was finalized on November 15, 2021 and was released to the public on November 30, 2021.

The Chinese source text is available online at:
https://www.miit.gov.cn/zwgk/zcwj/wjfb/tz/art/2021/art_c4a16fae377f47519036b26b474123cb.html
An archived version of the Chinese source text is available online at: https://perma.cc/4NF2-FW6D
U.S. $1 ≈ 6.4 Chinese Yuan Renminbi (RMB), as of February 4, 2022.

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"14th Five-Year" Plan for the Development of the Big Data Industry

Ministry of Industry and Information Technology

Contents

Data are important factors of production (生产要素) in the new era and are a fundamental national strategic resource. Big data is a collection of data, which is mainly characterized by large capacity, multiple types, fast speeds, a high degree of accuracy, and high value. Big data serves as a new driving force for economic transformation and development, offers a new way to improve government governance capacity (政府治理能力), and provides a new opportunity to reshape the country's competitive advantages. As a strategic emerging industry, big data focuses on data generation, collection, storage, processing, analysis, and services. It is a critical support for activating the potential of data factors of production (数据要素) and an important engine for accelerating improvements to quality, efficiency, and momentum in economic and social development.

The 14th Five-Year Plan period [2021-2025] is a critical period for China's industrial economy to move towards a digital economy, and new requirements are proposed for the development of the big data industry to allow it to enter a new stage of integrated innovation, rapid development, in-depth applications, and structural optimization. In order to promote the high-quality development of China's big data industry, this plan is prepared in accordance with the overall deployments of the *Outline of the People's Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035*.[1]

1. Development effectiveness

During the 13th Five-Year Plan period [2016-2020], China's big data industry grew rapidly. According to estimates, the average compound annual growth rate in industrial scale exceeded 30% and will exceed 1 trillion Chinese yuan Renminbi (RMB) in 2020. Industry development has achieved remarkable results, and big data has gradually become a well-positioned industry (优势产业), supporting China's economic and social development.

The policy system has gradually improved. The Party Central Committee and the State Council have made a series of strategic deployments around the digital economy, the data factor of production market, and the layout of the national integrated big data centers and have established an inter-ministerial joint conference system to promote the development of big data. Relevant ministries and commissions have issued more than 20 big data policy documents, and various localities have issued more than 300 related policies. 23 provinces, autonomous regions, and municipalities, and 14 cities with independent planning status under the national economic and social development plan and sub-provincial-level cities have established big data management agencies with central and local collaboration to gradually form a regionally linked big data development and promotion system.

The industrial foundation has become increasingly consolidated. Our data resources are extremely rich, with a total volume ranking among the top in the world. Industrial innovation has become increasingly active, placing China as the world's

[1] Translator's note: CSET's English translation of China's 14th Five-Year Plan Outline is available online at: https://cset.georgetown.edu/publication/china-14th-five-year-plan/.

second-largest country in terms of relevant patents, with the total number of patents received accounting for nearly 20% of the global total. The infrastructure has been continuously consolidated, and the world's largest fiber-optic network and 4G network have been built, and our number of 5G terminal connections exceeds 200 million, ranking China first in the world. The system of standards has gradually improved with the establishment of 33 national standards and the announcement of 24.

The production chain has taken shape. A big data product and service system centered on "data resources, basic hardware, general purpose software, industry applications, and security assurance" has taken shape with 338 outstanding big data products and solutions selected nationwide and 400 big data pilot demonstrations. Industry integration has gradually deepened, and big data applications have gradually expanded from fields with good data resources such as the internet, finance, and telecommunications to smart manufacturing, digital society, and digital government. Big data has also provided critical support in epidemic prevention and control as well as the resumption of production.

The ecosystem continues to improve. Regional agglomeration has achieved remarkable results, with eight national big data comprehensive test areas and 11 national new industrialization industry demonstration bases in the big data field. A number of leading big data companies have risen rapidly, forming an initial development pattern led by large companies with collaboration between small and medium-size enterprises and innovators. The industry's support capacity has been continuously improved, and service assurance systems such as consulting services, evaluation, and testing have been basically established. The digital business environment has continued to improve, and the country's e-government online service index jumped to 9th place in the world, claiming a position in the world's leading echelon.

During the 13th Five-Year Plan period, China's big data industry made important breakthroughs, but there are still several limiting factors. **First is** society's understanding of big data, and the big data concept of "using data to speak, using data to make decisions, using data to manage, and using data to innovate" has yet to solidify, as corporate data management capabilities are weak. **Second is** a lack of strong technical support. There is a certain gap between China and the world's leaders in terms of basic software, hardware, open-source frameworks, and other key areas. **Third is** that the market system is imperfect, and basic systems and standards such as data resource property rights and transaction circulation must improve. Multi-source data has yet to become more open, data barriers are prominent, and fragmentation problems are serious. **Fourth is** imperfect security mechanisms. The data security industry's supporting capacity is insufficient, and hidden dangers such as sensitive data leaks and illegal cross-border data flows still exist.

2. Confronting the situation

A strategic choice must be made to seize new opportunities for industrial transformation in the new era. In the face of major changes in the world not seen in a century (世界百年未有之大变局), countries the world over generally regard the big data

industry as the focus of economic and social development and aim to seize the commanding heights of the development of the big data industry by introducing "Digital New Deals," strengthening institutional arrangements, and increasing capital investment. China must seize new opportunities for the development of the digital economy, unswervingly implement the national big data strategy, give full play to the engine role of the big data industry, use the first-mover advantage of the big data industry to drive the overall improvement of thousands of industries, and firmly grasp the initiative in development.

Embody the new trend of integrated innovation (集成创新) and ubiquitous empowerment. The new round of S&T revolution is in full swing, and the integration of big data with new technologies such as 5G, cloud computing, artificial intelligence (AI), and blockchain is accelerating, reshaping technical architecture, product forms, and service models, and promoting comprehensive economic and social innovation. The digitalization process in various industries and fields has been accelerating, and management and decision-making models based on big data have become increasingly mature, which broadly empowers the modernization of the industry's quality, costs, and efficiency as well as the modernization of the governance system and governance capabilities.

Practical necessities for the construction of the new pattern of development (新发展格局). Give full play to the multiplier effect of data as a new factor of production, use data flow to lead the flow of technology, material, capital, and talent, open up production, distribution, circulation, and consumption, and promote the optimal allocation of resource factors of production. Give full play to the driving force of the big data industry. Accelerate the comprehensive linking of domestic and international, production and daily life, and online and offline. Drive profound changes in management mechanisms, organizational forms, production methods, and business models. Provide support for the establishment of the new pattern of development.

3. Overall requirements

(1) Guiding ideology

Take Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era as the guide, and deeply implement the spirit of the 19th Party Congress and the Second, Third, Fourth, Fifth, and Sixth Plenums of the 19th Central Committee. Be firmly rooted in the new stage of development (新发展阶段). Completely, accurately, and comprehensively implement the new concept of development (新发展理念). Construct the new pattern of development, with the theme of promoting high-quality development, with supply-side structural reforms as the main focus and the release of the value of data factors of production as the guide. Focus on consolidating the foundation for industrial development and promoting high-quality data resources, high-level technological innovation, and high-efficiency infrastructure. Aim to build a stable and efficient production chain, focusing on improving the supply capacity of industry and the enabling effect of industry. Coordinate development and safety, incubate an independently controllable (自主可控), open (开放), and cooperative

industrial ecosystem, and create new advantages in the development of the digital economy. Provide strong support for the building of China into a manufacturing powerhouse,[2] a cyber powerhouse, and a Digital China.

(2) Basic principles

Lead with value. Adhere to the value orientation of data and market-oriented mechanisms, optimize resource allocation, give full play to the multiplier effect of big data, collect, manage, and use data well, stimulate the potential of all links in the production chain, and use the value chain to lead the production chain and innovation chain to promote the high-quality development of the industry.

Begin with the foundation. Maintain a solid foundation, promote advantages, and make up for shortcomings. Pay equal attention to strengths and weaknesses, strengthen standards leadership and technological innovation, and focus on important links such as storage, computing, and transmission. Appropriately advance the layout of digital infrastructure to promote the level of advancement of the industrial foundation.

Push forward with systems. Adhere to the simultaneous advancement and overall development of all links of the production chain, centering on digital industrialization and industrial digitalization, system layout, and ecological cultivation. Strengthen synergy between technology, products, and services and promote the modernization of the production chain.

Integrate and innovate. Adhere to the deep integration of big data with the economy and society, promote the improvement of total factor productivity and the sharing of data resources, promote industrial transformation and upgrading, improve the efficiency of governance, and accelerate the construction of a digital society.

Develop securely. Persist in taking security as a prerequisite for development. Development is the guarantee for security. Give equal weight to both security and development to ensure national data security. Comprehensively improve the sustainability and stability of development and achieve the unity of development quality, scale, efficiency, and security.

Cooperate openly. Persist in both bringing in (引进来) and going global (走出去), follow the laws of industrial development, grasp the development direction of the global digital economy, and continuously improve the collaboration mechanisms of benefit sharing and risk sharing as well as the consideration of all parties.

(3) Development goals

The industry will maintain rapid growth. By 2025, the estimated scale of the big data industry will exceed 3 trillion RMB, with an average compound annual growth rate of about 25%, and a modern big data industry system with strong innovation, high

[2] Translator's note: This translation renders the Chinese word 强国 qiángguó—which literally means "strong nation"—as "powerhouse," as in the phrase "manufacturing powerhouse" (制造强国). For a more thorough discussion in English of the Chinese word qiángguó, see: https://www.newamerica.org/cybersecurity-initiative/digichina/blog/lexicon-wangluo-qiangguo/.

added value, and independent controllability will be basically formed.

The value system will be initially formed. The data factor of production value evaluation system will be initially established, the factor of production price market will be determined, data flows will be autonomous (自主) and orderly, resource allocation will be efficient and fair, a number of more mature trading platforms will be cultivated, and market mechanisms will be basically formed.

The industrial foundation will continue to be consolidated. Breakthroughs will be made in key and core technologies (关键核心技术), the leading role of standards will be significantly enhanced, a number of high-quality big data open source projects will have been formed, and infrastructure such as storage, computing, and transmission will have reached an internationally advanced level.

The industrial chain will be stable and efficient. Data collection, labeling, storage, transmission, management, application, security, and other full-lifecycle industries will be systematically developed, deeply integrated with the innovation chain and value chain, and new models and new business formats (新业态) will continue to emerge, forming a batch of technologically advanced and widely used big data products and services.

The industrial ecosystem will achieve healthy development. Society's awareness of big data will continuously improve, corporate data management capabilities will be significantly enhanced, the development environment will continue to be optimized, a digital industry cluster with international influence will be formed, and international exchanges and cooperation will be comprehensively deepened.

4. Main tasks

(1) Accelerate the cultivation of the data factor of production market

Establish a data factor of production value system. Improve the nature of property rights in accordance with the nature of data, establish basic systems and standards for data resource property rights, transaction circulation, cross-border transmission, and security, and improve data property rights transactions and industry self-discipline mechanisms. Develop a data factor of production value evaluation framework and evaluation guidelines, including basic criteria, methods, and evaluation procedures for value accounting. In fields with good data management foundations, such as the internet, finance, communications, and energy, carry out pilot projects to evaluate the value of data factors of production, summarize experiences, and carry out demonstrations.

Improve market rules for data factors of production. Promote the establishment of data factor of production market mechanisms for market pricing and government supervision and develop market operation systems such as data asset evaluation, registration and settlement, transaction matching, and dispute arbitration. Cultivate the big data trading market, encourage enterprises of all types of ownership to participate in the construction of factor of production trading platforms, and explore various forms of data trading models. Strengthen market supervision and improve risk prevention

and disposal mechanisms. Establish an emergency allocation mechanism for data factors of production to improve the ability to efficiently coordinate the allocation of data factors of production in urgent situations such as emergency management, epidemic prevention and control, and resource allocation.

Enhance the role of data factor of production allocation. Accelerate the transformation of data factors of production, carry out pilot demonstrations of the market-oriented allocation reform of factors of production, give play to the multiplier role of data factors of production in connecting to innovation, activating funds, and cultivating talents, and foster new models such as data-driven production integration and collaborative innovation. Promote the conversion of factors of production into data (要素数据化), guide various entities to improve their data-driven factor of production allocation capabilities, promote the rational allocation of labor, capital, technology, and other factors of production among fields, industries, and regions, and improve total factor productivity.

(2) Give full play to the advantages of big data

Accelerate the convergence of "large volumes" of data. Support enterprises that promote the collection of data in all aspects of R&D, production, operation, and services by upgrading information systems and deploying Internet of Things (IoT) sensing devices. Carry out national data resource surveys and draw up a national data resource map. Establish a large national industrial base database with multi-level linkages and databases for industries such as raw materials, equipment, consumer goods, and electronic information to promote the comprehensive convergence of industrial data.

Strengthen data "diversity" processing. Improve the diversified processing capabilities of multiple types of data such as numerical values, text, graphics and images, and audio and video. Promote associations between data with heterogeneous degrees of multidimensionality, create new data fusion models, improve the comprehensive processing level of multimodal data, and enhance the comprehensiveness of cognition through data integrity. Build a catalog of industry data resources to promote cross-level, cross-regional, cross-system, cross-department, and cross-business data integration and development and utilization.

Promote the "timely" flow of data. Establish a data resource catalog and a data resource dynamic update mechanism to meet the needs of dynamic data updates. Take the lead in building a safe and reliable data sharing space in industry and other fields, forming a data sharing mechanism that accurately connects supply and demand, responds in a timely manner, and enhances the ability to efficiently share data. Develop a cloud-edge-terminal collaborative big data storage and calculation model to support the efficient transmission and distribution of big data and improve the efficiency of data flow.

Accelerate "high-quality" data governance. Focusing on the full life cycle of data, improve data quality through quality monitoring, diagnostic evaluation, cleaning and repair, and data maintenance to ensure that the data is available and easy to use.

Improve the data management capability evaluation system, implement the data security management certification system, promote the implementation of the *Data Management Capability Maturity Assessment Model* (hereinafter referred to as DCMM), data security management, and other national standards, and continue to improve the data management level of enterprises and public institutions.[3] Strengthen categorized and graded management of data, promote data resource planning, create a data governance system with scientific categorization, accurate grading, and orderly management, and promote the authenticity and credibility of data.

Box 1 Data Governance Capability Improvement Campaign

Improve corporate data management capabilities. Guide enterprises to implement the DCMM national standard, catalog excellent cases of data management in key areas such as manufacturing, energy, and finance, and excel in propaganda and promotion. Encourage qualified localities to introduce policies and measures to increase funding support in terms of funding subsidies, personnel training, and pilot implementation of standards.

Construct an industry data governance system. Encourage the development of data governance-related technologies, theories, tools, and standards research, build a data governance system covering planning, implementation, evaluation, and improvement, and enhance corporate data governance awareness. Cultivate data governance consulting and solution service capabilities and improve the level of industry data governance.

Promote "high-value" data conversion. Strengthen the application of big data in governance and community management, improve the level of situational research and judgment, scientific decision-making, and precision management (精准管理), reduce the uncertainty of the external environment, and improve the risk response capabilities of various entities. Strengthen the application of big data in all aspects of the manufacturing industry, continue to optimize the entire process of design, manufacturing, management, and services, promote new models such as digital prototyping, flexible manufacturing, business intelligence, and predictive maintenance, and promote changes in production methods. Strengthen the application of big data in information consumption, financial technology, and other fields, promote new models such as accurate profiling and intelligent recommendations, and promote business model innovation.

(3) Consolidate the foundation for industrial development

Improve infrastructure. Fully deploy new generation communication network

[3] Translator's note: "Public institutions" (事业单位) are organizations created and led by PRC government departments that provide social services. Unlike state-owned enterprises (SOEs), public institutions do not create material products and do not generate income. Public institutions are not considered government agencies, and their employees are not civil servants. Most public institutions are fully or partially government-funded, but some fully privately funded (but still government-led) public institutions exist. Public institutions typically provide services in areas such as education, science and technology, culture, health, and sanitation.

infrastructure and increase the construction of 5G networks and fifth generation fixed networks (F5G). Combining the digital transformation of the industry and the development of the intelligentization (智能化) of cities, accelerate arrangements for the industrial internet, the Internet of Vehicles (IoV), smart pipe networks (智能管网), and smart grids, and promote the efficient collection and transmission of global data. Accelerate the construction of a nationwide integrated big data center system, promote the construction of the National Industrial Internet Big Data Center, strengthen the overall intelligent scheduling of computing power, and build several national hub nodes and big data center clusters. Build high-performance computing clusters and rationally deploy supercomputing centers.

Accelerate technological innovation. Focus on improving the general technical level of data generation, collection, storage, processing, analysis, security, and privacy protection. Make up for key technical shortcomings, focus on strengthening the underlying support capabilities of independent (自主) basic software and hardware, promote R&D on independent open source frameworks, components, and tools, develop a big data open source community, cultivate an open source ecosystem, and comprehensively improve technical research and market cultivation capabilities. Promote the integration of cutting-edge technologies and promote the integration and innovation of big data with new generation information technologies such as AI, blockchain, and edge computing.

Strengthen standards leadership. Coordinate the advancement of national standards, industry standards, and organizational standards, and accelerate the formulation and revision of key standards for areas such as technology R&D, product services, data governance, transaction circulation, and industry applications. Establish national-level standard verification inspection points in the big data field, select key industries, fields, and regions to carry out standard test verification and pilot demonstrations, improve the big data standard compliance evaluation system, and accelerate the application and promotion of standards. Strengthen exchanges and cooperation between domestic and foreign big data standardization organizations and encourage enterprises, institutions of higher education, research institutes, and industry organizations to actively participate in the formulation of international big data standards.

Box 2 Key Standards Development and Application Promotion Campaign

Accelerate the development of key standards. Focusing on the development needs of the big data industry, accelerate the development of basic general purpose standards, national standards, and industry standards for data open interfaces and interoperability, data resource planning, data governance, data asset evaluation, data services, digital transformation, and data security in key application fields such as industrial big data.

Strengthen the construction of the standard compliance evaluation system. Increase the promotion and implementation of key national standards such as big data systems, data management, and open data sharing. Promote the cultivation of

a standard compliance evaluation system covering data product evaluation, data resource planning, data governance implementation, data asset evaluation, and data service capabilities.

Accelerate the process of international standardization. Encourage domestic experts to actively participate in the work of the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC), the International Telecommunication Union (ITU), and other international standardization organizations and accelerate the promotion of international standard proposals. Strengthen the analysis of the applicability of international standards and encourage the adoption of outstanding international standards. Support relevant units that participate in international standardization work and assume relevant duties and that undertake international standardization activities, and increase China's rate of international contributions.

(4) Build a stable and efficient production chain

Create a high-end product chain. Arrange big data products in critical links such as data generation, collection, storage, processing, analysis, services, and security and establish a big data product map. In the data generation and collection link, focus on improving the compatibility of heterogeneous data sources of products and the efficiency of large-scale data collection and processing. In the data storage and processing link, focus on promoting R&D on high-performance storage and computing systems and edge computing systems to create dedicated hyper-converged hardware solutions. In the data analysis service link, focus on promoting the development and application of multimodal data management, big data analysis, and governance systems.

Create a new high-quality service chain. Focus on the needs of data cleaning, data labeling, data analysis, and data visualization, and accelerate the development of big data services towards specialization, engineering (工程化), and platformization (平台化). Create new big data service models and business formats and develop new service models such as smart services, value network collaboration (价值网络协作), and integration of development and operations. Encourage enterprises to open up search, e-commerce, social, and other data and develop third-party big data service industries. Focus on comprehensive service requirements such as diagnostic consulting, architecture design, system integration, and operations and maintenance (O&M), and incubate high-quality big data services suppliers.

Optimize the industrial value chain. Led by the digital transformation of the manufacturing industry, incubate specialized and scenario-based big data solutions for the entire process of R&D, design, manufacturing, operations management, and sales services. Construct a multi-level industrial internet platform system, enrich platform databases, algorithm libraries, and knowledge bases, and incubate and develop a batch of industrial apps oriented to segmented scenarios. Promote the in-depth application of industrial big data, incubate new models such as data-driven platform design, network collaboration, personalized customization, intelligent production, service extension, and digital management, and standardize the development of new

business formats such as the gig economy, shared manufacturing, industrial e-commerce, and supply chain finance.

Box 3 Campaign to Enhance the Value of Industrial Big Data

Big data in the raw materials industry: Support companies working in raw materials such as steel, petroleum, pipeline networks, hazardous chemicals, nonferrous metals, and building materials that comprehensively use data associated with equipment, production and operations, and external environments. Build analysis models and improve the level of intelligence and precision in the entire process of resource exploration, mining, processing, storage, and transportation to achieve process optimization, energy savings, emissions reduction, and safe production.

Big data in the equipment manufacturing industry: Support equipment manufacturing companies in opening up the data flow of the entire value chain such as for R&D, procurement, manufacturing, management, and after-sales services, develop data-driven product R&D, simulation optimization, smart production, predictive maintenance, precision management, remote O&M, and other new models and new business formats, and improve product quality, reduce production costs, and accelerate service-oriented innovation and upgrading.

Big data in the consumer goods industry: Support consumer goods companies that offer access to online and offline global data, develop personalized recommendation algorithms, achieve customized product production, refine channel operations, and promote the precise linkage of supply and demand. Support enterprises that establish a quality traceability database covering the entire process, accelerate linkages with national product quality supervision platforms, and realize the traceability and management of product quality.

Big data in the electronic information industry: Support electronic information manufacturing enterprises that accelerate the application of big data in the entire process of product sales forecasting and demand management, product production planning and scheduling, supply chain analysis and optimization, and product quality management and analysis. Accelerate iterative innovation of products, optimize production processes, improve product quality, and ensure the stability of the industrial supply chain.

Extend the industry value chain: Accelerate the construction of industry big data platforms, improve the level of data development and utilization, promote the capitalization and productization (产品化) of industry data, and realize the re-creation and value enhancement of data. Create mature application scenarios that serve the government, society, and enterprises, use data innovation to drive management innovation and model innovation, and promote the vigorous development of financial technology and smart healthcare. Continue to carry out pilot demonstrations for the development of the big data industry, promote the integrated application of big data and various industries and fields, and increase the promotion of excellent application

solutions.

Box 4 Industry Big Data Development and Utilization Campaign

Big data in communications: Accelerate the large-scale deployment of 5G networks and promote upgrading to gigabit fiber-optic networks. Expand the interconnection nodes of the backbone network and set up a batch of international communication entrances and exits (国际通信出入口). Improve the earthquake resistance of public communication facilities in earthquake-prone areas, strengthen the construction of "super base stations" in mountainous areas, plan and reserve mobile base stations, and improve the resilience of public communication networks. Strengthen data development and utilization and security governance capabilities internally, improve corporate management efficiency, empower industry applications externally, and support supervision by the market.

Big data in finance: Through big data actuarial calculations, statistics, and model construction, help improve the modern financial supervision system, complement the shortcomings of the supervision system, and promote financial innovation in an orderly manner under the premise of prudential supervision (审慎监管). Optimize risk identification, credit evaluation, and other models to enhance data-driven risk management capabilities.

Big data in healthcare: Improve electronic health records, medical records, electronic prescriptions, and other databases and accelerate data sharing among medical and health institutions. Promote telemedicine and the application of medical imaging-assisted interpretation and clinical assisted diagnosis. Enhance the ability to supervise medical institutions and medical behaviors and promote the joint reform of healthcare, health insurance, and medicine.

Big data in emergency management: Build a safe production monitoring and perception network, increase the collection and sharing of natural disaster data, and strengthen the ability to obtain data from the site of disasters. Build and improve a big database for emergency management tasks such as disaster risk surveys and monitoring and early warning, give full play to the role of big data in monitoring and early warning, supervision and law enforcement, decision-making assistance, actual rescue, and social mobilization, promote intelligentized application modes such as supervision by data, data disaster prevention, and data nuclear disasters (数据核灾), realize the deep integration of big data and emergency management, and continuously improve the modernization of emergency management.

Big data in agriculture and water conservancy: Give full play to the role of big data in agricultural production, economic operations, resource and environmental monitoring, and production and marketing of agricultural products, promote precision seeding of field crops, precision fertilization and pesticide application, and precision harvesting, and promote the intelligentized application of greenhouse horticulture (设施园艺) and livestock and aquaculture. Promote the construction of a smart water conservancy system and improve water quality forecasting and intelligent dispatching capabilities targeting river basins.

Big data standards in public security: Strengthen compliance applications of data such as identity verification. Promote the construction of a smart public security big data platform, coordinating the new generation of public security information infrastructure, strengthen police data resource management services, strengthen the correlation analysis of cross-industry and cross-regional public security data, continuously improve the public security governance capabilities of security risk prediction and early warning, precision strikes against crime, precision and intelligence in public security incident prevention and control, and convenient and efficient services for benefiting the people.

Big data in transportation: Strengthen the collection and analysis of data related to vehicles and transportation infrastructure to provide support for the development and application of autonomous driving and vehicle-road collaborative technology. Carry out application innovations such as travel planning and traffic flow monitoring and analysis and promote intelligent road management, traffic signal linkages, and public transportation priority lane controls. Through the sharing and application of transportation and logistics data, promote the development of multimodal transportation such as railways, highways, water conservancy, and aviation.

Big data in power generation: Based on technologies such as big data analysis and mining algorithms, optimization strategies, and visual presentation, strengthen the in-depth application of big data in power generation, power transmission and transformation, power distribution, and power consumption. Utilize big data to facilitate the intelligentized upgrading of power plants, carry out extensive collection of electricity consumption information, online energy efficiency analysis, and realize source-network-load-storage interaction, multi-energy synergy and complementarity, and intelligent regulation of energy demand.

Big data in information: Strengthen the collection, sharing, disclosure, and application of credit information. Utilize AI, autonomous learning, and other technologies to build a credit big data model to improve capabilities for intelligent identification, research, judgment, analysis, and processing of credit risks. Improve the credit-based new regulatory mechanism and optimize the allocation of regulatory resources based on credit risk. Deepen the application of credit information in financing, credit granting, business cooperation, public services, and other fields, strengthen credit risk prevention, and continue to optimize the environment for the people's livelihoods.

Big data in employment: Utilize big data on aspects such as online recruitment, mobile telecommunications, and social security to monitor trends in the labor market, keep abreast of changes in enterprise employment and labor employment and unemployment status in a timely manner, and better analyze and judge the employment situation to make scientific decisions.

Big data in social security: Accelerate the advancement of the digital transformation of social security management offices, carry out social security data mining and application work through scientific modeling and analysis methods,

build digital panoramas (数字全景图) for insured units and individuals, and support personalized services and precision supervision (精准监管). Build a social security big data management system and accelerate the sharing of social security data. Improve categorized management of risk prevention and control, strengthen business operation monitoring, and build institutionalized and normalized data audit mechanisms.

Big data in urban security: Establish an urban security risk monitoring and early warning system to realize the effective aggregation of urban operations data in urban construction, transportation, municipal administration, and high-risk industries, and use advanced technologies such as cloud computing and AI to monitor and provide early warning urban security risks to improve the level of urban security management.

(5) Create a prosperous and orderly industrial ecosystem

Incubate and strengthen enterprises. Give full play to the role of leading enterprises in research and manufacturing, collaboration, use, and demonstration, continue to improve independent innovation (自主创新), product competition, and intellectual property (IP) distribution capabilities, and use the capital market to become stronger and better. Encourage small and medium-size enterprises to engage in "professional, meticulous, specialized, and innovative" (“专精特新”) development, and continuously improve their innovation capacity and professionalism. Guide leading enterprises to provide data, algorithms, computing power, and other resources for small and medium-size enterprises and promote the development of integration of small, medium-size, and large enterprises and collaborative innovation between the upstream and downstream areas of the product chain. Support qualified vertical industry enterprises in carrying out big data business divestiture and reorganization, enhance professional, large-scale, and market-oriented service capabilities, and accelerate enterprise development.

Box 5 Campaign to Boost the Level of Development Energy of Enterprises

Fully stimulate the innovation vitality of small and medium-size enterprises. Implement a special campaign for digital empowerment of small and medium-size enterprises and encourage small and medium-size enterprises to improve the quality of development through digitalized, networkized (网络化), and intelligentized empowerment. Through the holding of matchmaking events, entrepreneurial competitions, and other forms of activities, promote the supply of and demand for big data technology, talent, capital, and other factors of production.

Strengthen tracking services for key enterprises. Focus on data resources, basic hardware, general purpose software, industry applications, security, and other related links in the big data industry chain, sort out the list of key big data companies, and establish “solicitous and clean”[4] contact mechanisms and

[4] Translator's note: The "new 'solicitous and clean' government-business relationship," (“亲” “清”新型政商关系) or "solicitous and clean" (“亲清”) for short, refers to PRC government officials' duty to be

transparent communication channels to make corporate appeals smoother.

Optimize big data public services. Build a big data collaborative research and development platform to promote joint research on integration applications for government, industry, academia, research institutes, and users (政产学研用). Build a big data application innovation promotion center and other vehicles to promote the industrialization of technological achievements. Strengthen the construction of public data training sets, build big data testing and certification platforms, experience centers, and training bases, and improve service levels such as evaluation and consultation, supply-demand linking, entrepreneurship incubation, and talent training. Build a big data industry operations monitoring system and strengthen public management capabilities such as operations analysis, trend research and judgment, and scientific decision-making.

Promote the development of industrial clusters. Promote the high-level construction of national new industrialization industry demonstration bases in the big data field, guide the differentiated development of the big data industry in various regions, and continue to improve the ability of industrial clusters to radiate and drive forward. Encourage places where conditions permit to rely on national-level new zones, special economic zones, and free trade zones to carry out pilot trials around data factor of production market mechanisms and international exchanges and cooperation. Give full play to the role of associations and alliances as bridges, and support the organization of industry forums, industry competitions, and other activities to create a good industrial development atmosphere.

(6) Build a strong line of defense for data security

Improve the data security assurance system. Strengthen the top-level design of big data security and implement laws, regulations, and policy standards related to cybersecurity and data security. Encourage industries, localities, and enterprises to promote categorized and graded management of data and data security sharing and use and carry out data security capability maturity assessment and data security management certification. Strengthen the construction of data security assurance capabilities, guide the construction of a data security situational awareness platform, and improve the monitoring, analysis, and disposal capabilities of security risks such as sensitive data leakage and illegal cross-border data flows.

Promote data security industry development. Support key industries in developing technical data security means to improve data security protection and emergency response capabilities. Strengthen the research, development, and application of data security products and promote the application of big data technology in the security protection of digital infrastructure. Strengthen the development and application of data security technologies and products such as privacy-preserving computation, data desensitization, and passwords, improve the supply of data security products, and expand and strengthen the data security industry.

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solicitous to the needs of private companies, and to private companies' obligation to refrain from corrupt and illegal behavior.

Box 6 Data Security Forged Shield (铸盾) Campaign

Strengthen data security management capabilities. Promote the establishment of a data security management system, formulate related supporting management methods and standards, organize the development of categorized and graded management of data, formulate an important data protection catalog, and conduct record management, regular evaluation, and key protection of important data.

Strengthen data cross-border security management. Carry out pilot projects for cross-border data transmission security management, support qualified regions in making innovations in cross-border data flow management mechanisms, and establish work mechanisms such as record review, risk assessment, and security audits for cross-border data transmission. Encourage relevant pilot regions to participate in international cooperation on digital rules and increase the protection of cross-border data.

Build a data security monitoring system. Based on important network nodes such as big data platforms and internet data centers, build a national data security monitoring platform covering industries, localities, and enterprises to form sensitive data monitoring and discovery, data abnormal flow analysis, and data security incident tracking and traceability capabilities.

5. Assurance Measures

(1) Improve our data mindset

Strengthen the popularization of big data knowledge and promote industry achievements through various methods such as media propaganda, forums and exhibitions, competitions, and experience centers (体验中心) so as to improve everyone's awareness of big data. Increase training in big data theory knowledge, improve the ability of the whole of society to obtain, analyze, and use data, and enhance the ability to use data for innovation across various tasks. Promote the chief data officer system, strengthen a data-driven strategic orientation, establish a new decision-making mechanism based on big data, and use data to accelerate organizational and management changes.

(2) Improve the promotion mechanism

Coordinate the relationship between the government and the market, promote the marketization of resource allocation, further stimulate the vitality of market players, and promote a better combination of effective markets and effective governments. Establish and improve the platform economy governance system and promote the healthy and sustainable development of the platform economy. Coordinate the implementation of policies, improve the national big data development and application coordination mechanism, and strengthen inter-departmental linkages across policies, markets, supervision, and security. Strengthen coordination between the central and local governments, establish a unified big data industry measurement method for the

implementation of the Plan, guide localities when carrying out routine assessments and dynamic adjustments, guide localities when achieving integration, and ensure that planning tasks are implemented.

(3) Strengthen the supply of technology

Reform technology R&D project establishment, organization, and implementation methods, strengthen demand orientation, and establish and improve an innovative mechanism of market-oriented operations, professional management, and platform-based collaboration. Encourage places where conditions permit to deepen the reform of the right to use, dispose of, and benefit from big data-related S&T achievements, carry out pilot projects that grant scientific research personnel the right to own or to long-term use of S&T achievements, and improve the incentives for the conversion of technological achievements into practical applications (技术成果转化) as well as rights and interests sharing mechanisms. Incubate and develop technology transfer institutions and technology managers in the field of big data and improve professional service capabilities for technology transfer.

(4) Strengthen funding support

Strengthen R&D investment in big data basic software and hardware, and key and core technologies, make up for industry shortcomings, and improve basic capabilities. Encourage government industry funds, venture capital, and social capital[5] to increase investment in big data companies in accordance with market principles. Encourage local governments to strengthen their support for the development of the big data industry and provide funding awards and supplements for big data industry development pilot demonstration projects and the implementation of the DCMM standard. Encourage banks to launch IP pledge financing and other such lines of business and support qualified big data companies in going public and raising funds.

(5) Accelerate talent development

Encourage colleges and universities to optimize the establishment of big data curricula, deepen the construction of education in emerging engineering fields (新工科), increase the construction of related curricula, and explore the construction of new forms of digital teaching resources based on knowledge graphs. Encourage vocational colleges and big data companies to deepen school-enterprise collaboration, build training bases, promote professional upgrading and adjustments, meet industry needs, and cultivate high-quality technical and skilled personnel. Encourage enterprises to strengthen on-the-job training, explore new models of remote vocational training, and carry out vocational training for big data engineering and technical personnel, job skills improvement training, and entrepreneurship and innovation training. Recruit innovative

[5] Translator's note: The Chinese term 社会资本, translated literally as "social capital," and its synonyms "social funding" (社会资金), "social investment" (社会投资), and "social financing" (社会融资), refer to any source of funding outside of government budget outlays. These terms encompass investment by private individuals and private institutions. However, investment from state-funded entities such as state-owned enterprises (SOEs), including state-run banks, also falls under the umbrella of "social capital."

talents and entice big data talents to return to China for employment and entrepreneurship.

(6) Promote international cooperation

Give full play to the role of multilateral and bilateral international cooperation mechanisms and support domestic and foreign big data companies that carry out in-depth collaborations in technology R&D, standards formulation, product services, and intellectual property rights (IPR). Encourage big data companies to “go global” and actively explore international markets in Belt and Road Initiative[6] countries and regions. Encourage multinational companies and scientific research institutions to set up big data research and development centers and education and training centers in China. Actively participate in the formulation of international rules and digital technology standards in areas such as data security, digital currency, and digital taxes.

[6] Translator's note: The "Belt and Road Initiative" (“一带一路”) refers to the Silk Road Economic Belt (丝绸之路经济带) and the 21st Century Maritime Silk Road (21世纪海上丝绸之路).