



Blue Book Series

 FUNG BUSINESS INTELLIGENCE

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Commercial Applications and Development Trends of Innovative Technologies in China

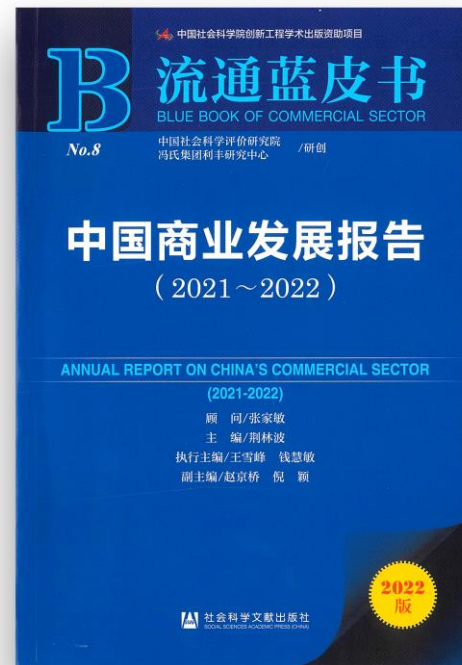
Blue Book of China's Commercial Sector:
Annual Report on China's Commercial Sector (2021 -2022)

Introduction

The COVID-19 outbreak has brought unprecedented challenges to businesses, affecting their operations and performance to varying degrees. Moreover, the pandemic also highlighted the importance of digitalization for business development. In response, many businesses have accelerated their digitalization efforts in order to better adapt to dynamic changes in the market, furthering the development and application of various innovative technologies. The government has also introduced a series of measures and policies to encourage businesses to adopt new technologies within the commercial sector. In particular, the government has launched several assistance programmes targeting SMEs and their digital transformations.

This report highlights several key technologies, including cloud computing, Internet of Things, blockchain, 5G network, smart supply chain (smart manufacturing and smart logistics) and their current commercial applications. It provides an overview of the current use of new technologies, policy support as well as future development trends.

The content of this report is based on our recently published Blue Book of China's Commercial Sector (2021 -2022) (in Chinese).



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I. Overview of the Current Use of Technologies in the Commercial Sector



Cloud Computing

According to the US National Institute of Standards and Technology, cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

This cloud model is composed of:

Four deployment models:

- Private cloud (for internal use)
- Community cloud (for shared use by several organizations)
- Public cloud (for open use by the general public; e.g. AWS, AlibabaCloud – paid access offered by third-party providers)
- Hybrid cloud

Five key characteristics

- On-demand self-service
- Broad network access
- Resource pooling
- Rapid elasticity
- Measured service

Three service models

- Cloud Software as a Service (SaaS)
- Cloud Platform as a Service (PaaS)
- Cloud Infrastructure as a Service (IaaS)



Alibaba Cloud Engineers Working In Data Centers

China's Cloud Computing Market

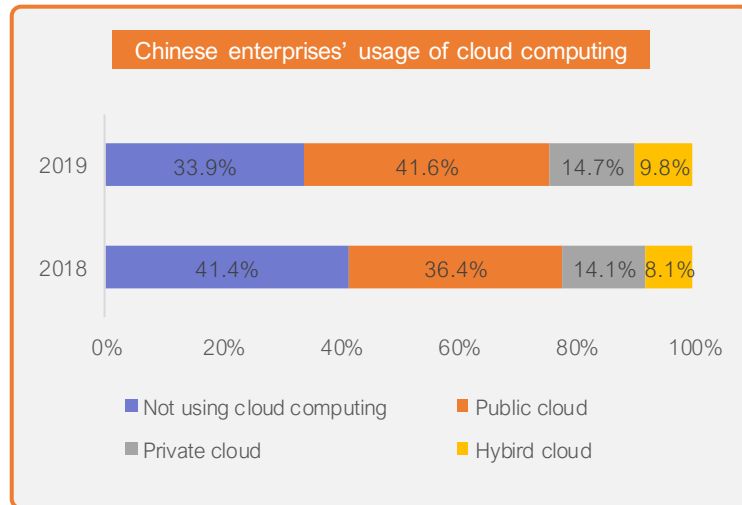
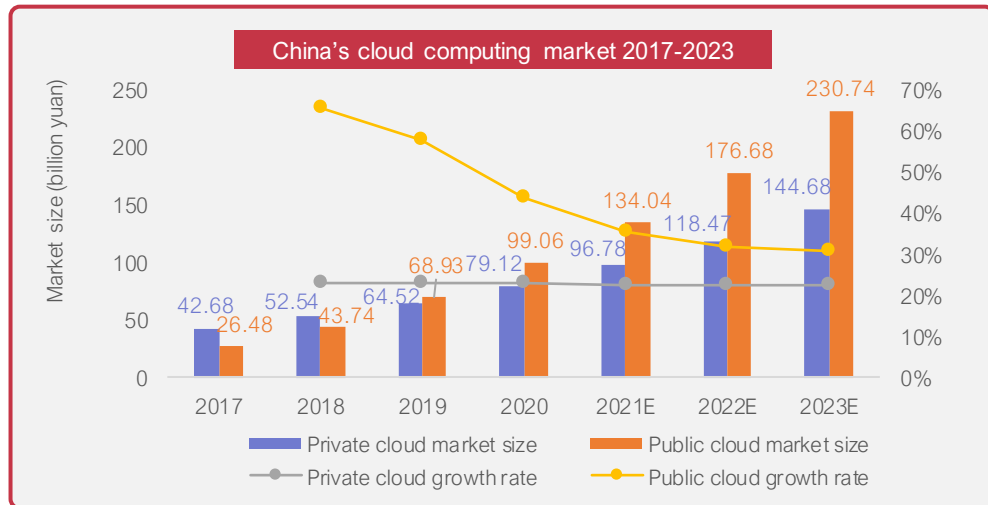
China's cloud computing market has maintained rapid growth in recent years. The pandemic has boosted remote working and online education, further fueling market growth and development.

In 2020, the total market size of China's cloud computing market reached 178.1 billion yuan, with a year-on-year growth of more than 33%.

An increasing number of traditional industries and businesses are migrating to cloud. Public cloud is preferred by enterprises, due to its low costs, non-requirement for maintenance, pay-per-use model and reliability.

According to a survey report on cloud computing development by the China Academy of Information and Communications Technology, 66.1% of enterprises had adopted cloud computing in 2019, up 7.5 percentage points from 2018. Among them, 41.6% of enterprises were using public cloud, 14.7% were using private cloud, and 9.8% of enterprises were using both.

In 2023, the total market size of cloud computing is expected to reach 380 billion yuan, with the public cloud market expected to exceed 230 billion yuan.



Internet of Things (IoT)

- IoT refers to everything that uses sensors (such as RFID, infrared sensors, GPS), software and other technologies to connect to the internet for the purpose of exchanging data and information with other devices and systems.
- By combining these connected devices with automated systems, it is possible to "gather information, analyze it and create an action" to help someone with a particular task, or learn from a process. IoT has broad commercial applications.
- Commercial IoT is commonly used in retail, F&B, and lifestyle stores to provide smart services for businesses and consumers.
 - Smart operations: facial recognition, digital price tags, anti-theft devices, etc.
 - Smart money management: POS, payment tools, etc.
- According to a report by China Economic Information Service, the total size of China's IoT market has reached 1,700 billion yuan in 2021. International Data Corporation forecasts that the overall market size is expected to reach \$300 billion (2,000 billion yuan) by 2025, accounting for 26.1% of the global IoT market.



China's AIoT Market

IoT's adoption in the commercial sector is usually combined with the use of AI. The rapid development of AI and the broad application of IoT has increasingly deepened the integration of the two technologies.

Use cases: healthcare (e.g. surgical robots), smart cities (e.g. traffic control), retail (e.g. point of sale), manufacturing (e.g. automated production)

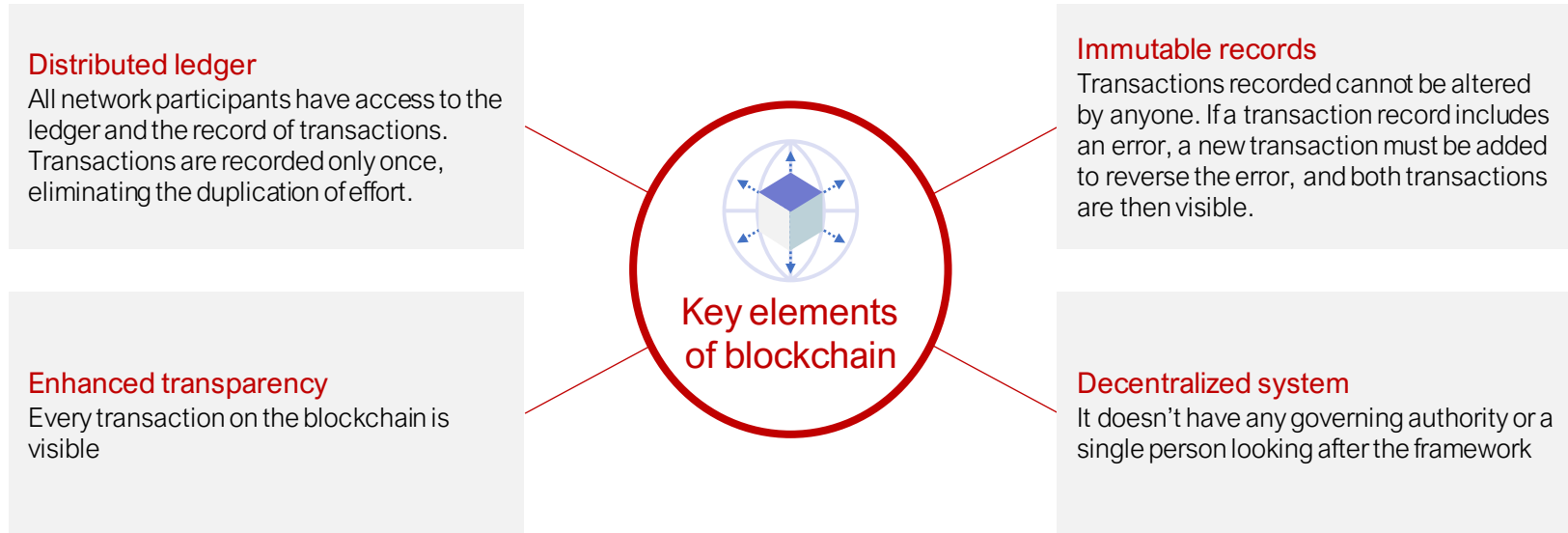


Avery Dennison has partnered with the Fung Group to create a RFID-enabled smart store



Blockchain

Blockchain is defined as a shared, immutable ledger that facilitates the process of recording transactions and tracking assets in a business network.



Gartner forecasts that the business value-added of blockchain will grow to slightly more than \$176 billion by 2025 and will exceed \$3.1 trillion by 2030.



Main applications

Financial settings: supply chain financing, trade financing, payment and settlement, etc.

Supply chain traceability: recording and encrypting supply chain data which can be accessed downstream (by businesses and by in-store consumers)

Other industries: healthcare, government, manufacturing, etc.



In combination with other technologies

IoT: improving data security, real-time data sharing

Big data: increasing the value of data

AI: improving the level of automation in business processes

Cloud computing: reducing the cost of blockchain deployment

5G Networks

- China has made 5G a national priority. According to the outline of the 14th FYP, China will accelerate large-scale deployment of 5G networks and increase its penetration rate to 56% over the next five years.
- China started the commercial use of 5G in June 2019 when the Ministry of Industry and Information Technology issued commercial 5G licenses to China Mobile, China Unicom, China Telecom and state-owned broadcaster China Broadcasting Network.
- As of end-2021, China has deployed a total of 1.43 million 5G base stations nationwide with 5G network covering all prefectural-level cities, over 98% of county-level urban areas and 80% of township-level urban areas, according to China's Ministry of Industry and Information Technology.
- In the next few years, China will continue to promote 5G network construction, widespread application, technological development and improved security. The China Academy of Information and Communications Technology forecasts that between 2020-2025, 5G commercialization will:



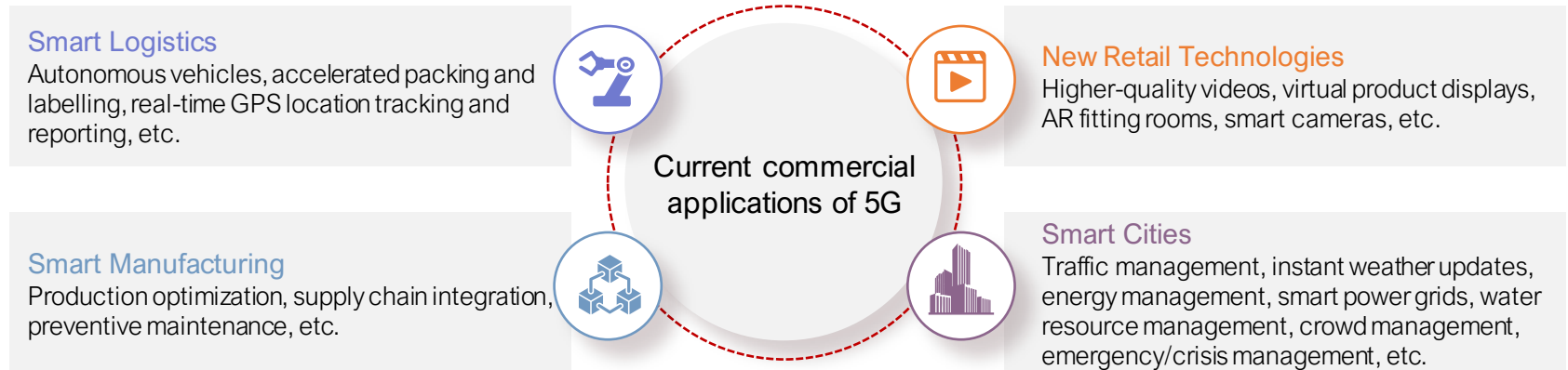
Current Commercial Applications of 5G

5G represents significant improvements across various performance indicators.



Source: Recommendation ITU-R M.2083 by International Telecommunication Union

Commercial applications of 5G tend to rely on its increased speed and consistency, as well as the latency reduction it offers. There are a plethora of opportunities for 5G technology given its flexibility, unused spectrum availability and low-cost solutions for deployment.



Smart Supply Chains

Smart supply chains combines various innovative technologies to enable digital transformations and automations across the supply chain (i.e. manufacturing, logistics, distribution and consumption)

Smart Manufacturing

- Smart manufacturing integrates various technologies and solutions into the traditional manufacturing process. It can predict production requirements, identify errors, self-learn, self-adapt, self-execute, as well as better optimize the manufacturing process.
- China carried out 305 pilot projects for smart manufacturing during the 13th Five-Year Plan (2016-2020) and will continue to carry out a series of pilot projects to accelerate the development of smart manufacturing during the 14th Five-Year Plan period.
- China aims to fully digitize its manufacturing enterprises by 2035.



Alibaba's "Xunxi Digital Factory" uses leading technology to improve manufacturing efficiency and reduce production time and costs.

- Delivery time shortened from 15 days to 7 days
- Minimum order quantity reduced from 1000 to 100

Smart Logistics

Smart logistics utilizes technologies such as IoT, AI, big data, cloud computing to facilitate self-learning, analysis, and problem solving across the logistics systems (including transportation, warehousing, packaging, distribution and delivery).

Smart logistics can help companies optimize their operations, predict risks, reduce costs, increase efficiency, as well as better serve customers.

China's smart logistics market has grown by about 20% per year from 2012-2019. The market size is expected to exceed 1 trillion yuan in 2025.

COVID-19 further accelerated the development of contactless, unmanned and autonomous delivery technologies such as unmanned vehicles and automated guided vehicles (AGVs).

Beijing High-level Automated Driving Demonstration Area issued China's first road test licenses for autonomous delivery vehicles in May 2021. JD.com, Meituan and Neolix were the first three companies to receive licenses to test unmanned delivery in Beijing.

Besides warehousing, transportation and distribution, smart logistics is also used in supply chain planning and management of logistics systems to improve efficiency and reduce costs.



Suning launched its first 5G unmanned warehouse in August 2020

- The warehouse integrates driverless vehicles, AGVs, robotic arms, automatic packing machines
- Robots can pick 600 items in an hour, 5x faster than human workers
- Items can leave the warehouse 20 minutes after the order is placed

II. Government Policies and Regulations to Support Technological Innovation



Government Support

The Fifth Plenary Session of the 19th CPC Central Committee emphasized that innovation is the primary driving force for the nation's development. China will further improve the national innovation system and speed up efforts to build the country into a scientific and technological powerhouse.

The Outline of the 14th Five-Year Plan (2021-25) for National Economic and Social Development and the Long-Range Objectives Through the Year 2035 (the “14th FYP Outline”) includes “Accelerating Digital Development and Building a Digital China” as an independent chapter. Specifically, the Plan calls for further fostering and growing emerging digital sectors including AI, big data, blockchain, cloud computing and cybersecurity, and enhancing production standards of industries like communications equipment, core electronic parts and components and key software.

The Plan also calls for developing 5G applications and its ecosystem, as well as launching pilot demonstration projects in sectors including smart transport, smart logistics, smart energy and smart medicine.

China will improve the legal and policy environment for scientific and technological innovation, and strengthen the protection of intellectual property rights.

On top of the government's heightened efforts to launch major technology projects and build scientific research centers, businesses will also be given more policy support to conduct scientific research and carry out innovation.

Government Policies and Regulations to Support Technological Innovation

Issuance Date	Issuing Authority	Regulation	Summary
8 May 2015	State Council	Made in China 2025	As the government's 10-year strategic plan to further develop the manufacturing sector, the strategic plan defines 10 core industries, such as robotics, power equipment, and next generation IT, in which China aims to achieve breakthroughs and set up globally competitive companies.
17 January 2017	Ministry of Industry and Information Technology	Development Plan for the Big Data Industry (2016-2020)	Lists out 7 key tasks, 8 key projects and 5 support measures for the big data industry.
10 August 2018	Ministry of Industry and Information Technology	Implementation Guidelines for Promoting Cloud Adoption (2018-2020)	Encourages enterprises to adopt cloud computing to accelerate digital transformation to streamline processes, improve productivity, better manage business processes, and optimize costs
18 March 2020	Ministry of Industry and Information Technology	Special Action Plan for Digital Empowerment of SMEs	Proposes 13 key tasks and 4 promotion measures to help SMEs to resume work and production through digitization, network and intelligence
24 March 2020	Ministry of Industry and Information Technology	Notice from the MIIT Regarding Promoting the Accelerated Development of 5G	Calls for accelerated construction of 5G network and its applications. The notice specifically cites industrial Internet, the "Internet of Vehicles", and healthcare as focus areas
7 April 2020	National Development and Reform Commission, Cyberspace Administration of China	Implementation Plan for Smart Cloud Adoption to Promote New Economic Development	Promotes the digital transformation of enterprises and strengthen support and resources for enterprises
21 April & 24 July 2020	Ministry of Industry and Information Technology	Recommended Catalogue of Digital Empowerment Services and Activities for SMEs (Phase 1 & 2)	Includes 8 categories of service providers, including Alibaba, Tencent, JD.com, etc. offering services and activities to SMEs. SMEs are encouraged to make use of services from these companies according to their needs.

Government Policies and Regulations to Support Technological Innovation (Contd)

Issuance Date	Issuing Authority	Regulation	Summary
4 August 2020	State Council	Policies to Promote the High-quality Development of the Integrated Circuit (IC) and Software Industries in the New Era	Proposes policies in 8 areas (finance and taxation, investment, R&D, import and export, intellectual property, etc.) aiming at optimizing the development of the IC and software industries, as well as deepening international cooperation
21 September 2020	General Office of the State Council	Opinions on Accelerating the Development of New Consumption through New Business Forms and Models	Proposes 15 targeted policies to promote new modes of consumption, including improving IT infrastructure, promoting the integration of online and offline consumption and innovative application of smart technology; the goal is to cultivate a number of demonstration cities and leading enterprises by 2025 and promote new consumption models (e.g. "Internet + services")
13 January 2021	Ministry of Industry and Information Technology	Industrial Internet Innovation and Development Action Plan (2021-2023)	Notes China will promote new models and formats of industrial Internet, further improve infrastructure, and build 30 fully 5G-connected factories in 10 key sectors by 2023
29 January 2021	Ministry of Commerce	Notice on Accelerating the Development of Digital Commerce and Serving the Establishment of a New Development Pattern	Encourages businesses to focus more on innovations in hi-tech areas including 5G, big data, artificial intelligence, blockchain etc. to improve the level of business digitization, and to drive the development of China's digital economy
12 March 2021	Central Committee	Outline of the 14th Five-Year Plan (2021-2025) for National Economic and Social Development and the Long-Range Objectives Through the Year 2035	Calls for reinvigorating the country through science and education, strengthening domestic talent, innovation-driven development, improving the national innovation system, and accelerating national science and technology development
28 December 2021	Ministry of Industry and Information Technology	The 14th Five-Year Plan for Smart Manufacturing Development	Guides the development of China's smart manufacturing industry; the goal is that by 2025, domestic manufacturing enterprises above designated size will achieve basic digitalization and key business enterprises will have digitally transformed their businesses

Government Policies and Regulations to Support Technological Innovation (Contd)

Issuance Date	Issuing Authority	Regulation	Summary
12 January 2022	State Council	The 14th Five-Year Plan for Digital Economy Development	Guides the development of China's digital economy; the goal is that by 2025, the digital economy will be in full expansion mode, with the added value of core industries in the digital economy accounting for 10% of GDP
2 July 2022	Ministry of Science and Technology, Ministry of Commerce, and 3 other ministries	Action Plan to Facilitate the Digitalization of the Consumer Goods Industry (2022-2025)	Proposes 10 tasks to facilitate the digitalization of the consumer goods industry, such as developing "internet + consumer products", and popularizing the application of key technologies; the goal is to achieve notable improvement in the integration and application of digital technologies in the consumer goods industry by 2025
15 August 2022	Ministry of Science and Technology, Ministry of Finance	Action Plan to Boost the Capacity of Enterprises for Technological Innovation (2022-2023)	Proposes supportive measures in 10 areas, including establishing a mechanism for enterprises to participate in the country's sci-tech innovation decision-making, implementing tax incentives for frontier basic research, calling for financial support for enterprise innovation and greater enterprise access to sci-tech resources and application scenarios
28 October 2022	National Development and Reform Commission, Ministry of Commerce	Catalogue of Encouraged Industries for Foreign Investment (2022 Edition)	Encourages foreign investment in advanced manufacturing aiming at improving the level of the industrial chain and supply chain, and accelerating the upgrading of technologies
9 November 2022	Ministry of Industry and Information Technology	Guideline to Facilitate the Digital Transformation of SMEs	Calls for the creation of digital applications in instant communication, long-distance collaboration and project management, and strengthening the construction of new infrastructure, such as industrial internet, artificial intelligence, 5G and big data
11 November 2022	China Securities Regulatory Commission, State-owned Assets Supervision and Administration Commission of the State Council	Notice on Supporting Central SOEs in Issuing Sci-tech Innovation Bonds	Supports central SOEs to raise funds for sci-tech innovation via the issuance of sci-tech innovation corporate bonds, and launches REIT pilots related to new infrastructure, such as data centers, industrial internet and artificial intelligence

Internet Giants' Supporting Measures for SMEs

Micro, small, and medium enterprises make up 99% of enterprises in China and contribute more than 70% of technological innovations. The government has introduced various policies and measures to support the digital transformation of these enterprises. For example, the government has partnered with leading internet companies to launch digital transformation support programmes for SMEs in terms of software and hardware support, supply chain support, consulting services, professional training, financial support, etc.

Platform	Support Areas for SMEs
	Cloud services, traffic support, start-up subsidies, training certifications
	AI, cloud computing, blockchain, big data, digital procurement platform
	Blockchain, cloud services, AI
	Cloud resources, remote working apps, online operation tools, building traffic, digitalization tools

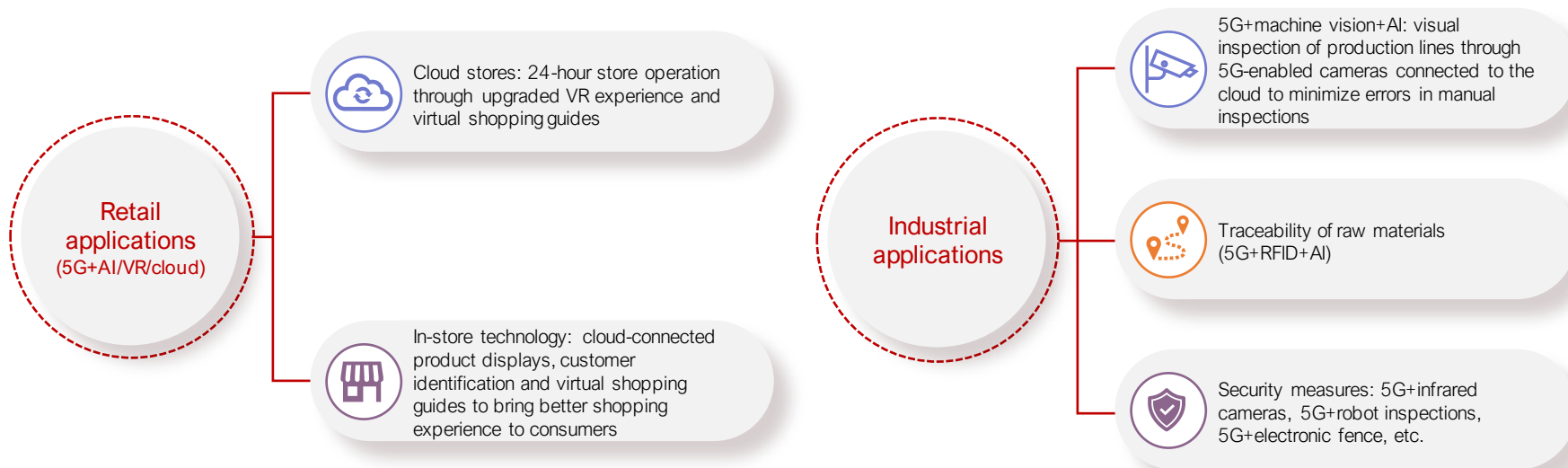
III. Development Trends



Combination of Technologies to Drive Innovation

Technologies, such as cloud computing, IoT, AI, blockchain and 5G, continue to drive global digital transformations. The combination of these technologies will bring huge opportunities for innovation, as well as create new business opportunities and user experiences.

In particular, industrial Internet, empowered by 5G, is considered a key to China's digital transformation. Currently, China has more than 1,100 projects empowered by 5G technology and industrial Internet, and over 30 industries have seen the application of industrial Internet.



Rapid Growth of Cloud Computing Calls for Greater Focus on Cloud Security



The Chinese government has released a number of policies to support the development of the cloud computing industry. It is expected that the average annual growth rate of China's cloud computing market will exceed 30% between 2021-2023. The scope of cloud applications will also continue to expand.



As the market matures and businesses gradually move to the cloud, greater focus will be placed on cloud security.



China's cloud security market is still in its initial phase of development but is growing rapidly. The market size is estimated to reach 11.57 billion yuan in 2021.



Globally, the proportion of spending on cloud security is relatively low. Global spending on cloud security only accounted for 1.1% of total cloud IT spending in 2020.



With the increasing awareness on the importance of cloud security, and the gradual improvement of industry policies and regulations, it is expected that the development of cloud security products and services will speed up.

Technologies in Building Smart Cities

01

Smart city is a new concept of urban development, using information and various technologies, such as cloud computing, 5G and AI, to improve operational efficiency, share information with the public and provide a better quality of government service and citizen welfare.

02

Construction of smart cities in China is entering a rapid growth phase. Nearly 800 Chinese cities have implemented smart city pilot programmes, which accounts for more than half of the total smart cities around the world.

03

Investment in smart cities and smart community-related projects is expected to exceed 230 billion yuan by 2024, mainly focusing on public safety, transportation, government services, environmental protection, and emergency management. It is predicted that 40% of urban products and services will be provided digitally by 2026.

04

In the future, various technologies will be further implemented in the public service and commercial sectors to improve urban governance and living services.



Technological Innovation Conducive to Sustainable Development

The progress of technological innovation not only leads to a new round of industrial upgrading, but also effectively promotes sustainable development.



Allow businesses to share computing resources

Research from Accenture has found that shifting from on-premise data centres to the public cloud can reduce energy usage by 65% and cut carbon emissions by more than 84% on average.



Power data centres through renewable energy

Example: The cloud computing arm of Alibaba Group aims to have its global data centres running entirely on clean energy by 2030.



Improve the efficiency of resource utilization

Big data analytics can be used to better predict consumer demand, thereby lowering inventory levels and reducing wastage of raw materials.



Monitor environmental impacts

“Cloud computing + big data + AI”, along with other technological applications, can help businesses monitor the environmental impacts of business activities more accurately and adjust operation processes promptly.

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