


# The Intelligent Future Is Written with ThunderSoft

Annual Report 2021
アニュアルレポート 2021
연간 보고서 2021

# A Message from Our CEO



*To our investors,*

*Every time I've looked back along our solid path, my thoughts have taken me to when we'd just started this business, in 2008, with only a few dozen people. I talked to every friend who joined this tiny team, expressing my hope for ThunderSoft to become a foundation on which each of us could strive for a fulfilling career and toward a destination rich with achievements. As an experienced engineer, I have long believed that every genuine technological innovation or breakthrough can create value for its developer, all the individual customers, their families, and the whole of society. With the passage of time, our team of ThunderSofters has grown, reaching a landmark 10,000 members in 2021. What has changed for every familiar or new face here is that the promise is even brighter and the career platform is growing still broader. But the vital things remain unchanged: ThunderSoft's customer-centered value proposition, unity in our pursuit of excellence, and work that has technology at its core.*

*In 2021 when participating in China Central Television's Dialogue program, I described ThunderSoft as a bridge. The operating system, the DNA of our creators, and the unswerving and dedicated work in our field together form a connection between technology and services, a bridge connecting hardware and applications, and the enabling bridge between cloud and device environments.*

*Every step forward draws footprints from the determined strivings of the past and carries prospects for the future. Our quest to follow our mission despite any challenges we might face bore good fruit in 2021. The year saw us reach an operating revenue of 4.127 billion CNY, which represents year-on-year growth of 57.04%. This has given our company a compound annual growth rate of 37.32% in revenue from 2015 to 2021.*

*ThunderSofters in 40 cities, all around the world, have stood shoulder to shoulder to guarantee successful delivery of customer products and solutions and to consolidate ThunderSoft's leading position in the operating-system technology field. Some have dealt with rapid cycles of iterative product/technology development and release or with innovative integration – whether involving smart cockpits, autonomous driving, or even the most cutting-edge intelligent connected vehicles. Others have focused on continuous breakthroughs in many Internet-of-Things-related, with the OS at the core of the development. The impressive progress of our Smart Software business group attests to the progress of others both in partnership-based sustainable construction and in strategic cooperation with customers. Yet another element of this united front is how ThunderSofters' technology literacy has enabled embracing and investing in Open Source initiatives. Such facets of our cohesion have validated the wealth of solid technology amassed in ThunderSoft's operating system and attest to the entire team's thriving culture and organization.*

*Therefore, we can confidently set out on the back of the Year of the Tiger, embarking on an express journey into the future. There are expectations for the curtain to be raised for smart-industry advances from 2022 onward. The advent of technological revolution in such areas as edge computing, distributed systems, converged intelligence, and high-performance automotive computing calls on us to engage actively with constant digital and intelligent transformation in collaboration with leading global partners. We will continue to focus on operating-system and middleware technology aimed at building greater customer value. This entails ushering in technological innovation in our Smart Software, Smart Vehicle, and Smart IoT areas. Simultaneously, we will keep strengthening our customer support and expanding our market share with a global perspective, maintain and enhance our collaborative innovation efforts, and pursue ongoing strategic integration.*

*We will continue to incubate efforts in new directions and build from them multi-dimensionally to create a new portfolio of products, supporting patterns of the future. We can gain strength by offering a full toolbox for product development that covers every aspect of autonomous driving, cross-domain fusion, edge computing, distributed AIoT OS offerings, and Extended Reality. We can create a rich ecology – and a strong position for ThunderSoft in it – by building the world's leading end–edge cloud-distributed intelligent IoT platform. Likewise, groundbreaking strides in autonomous driving and for the next-generation cockpit platform go hand in hand, promising synergy. For further integration benefits, we will continue our innovative collaboration with customers who are global leaders in the field of smart software.*

*ThunderSoft's geekish spirit and courage in OS work are where the dreams, mission, and talents of all ThunderSofters come together. We greatly cherish OS thinking, and we are determined to create an OS-based intelligent organization to match. The strength of our OS, ThunderSoft people's belief in what we do, and our vision – which involves the products' technical core, cross-domain connections, intelligent expression, and ecological empowerment – together formed the cornerstone for our development, and they promise a bright future. They will enable us to ride the wind and waves, daring to explore in the tide of intelligence. It is my hope that this vision will inspire your actions and mine as the wave of combined human and machine intellect sweeps our world. May all of us be happy innovators, users, and strivers as we pursue our mission:*
*Enriching an Intelligent World.*

*Hongfei Zhao*
*Co-Founder, President, & CEO*

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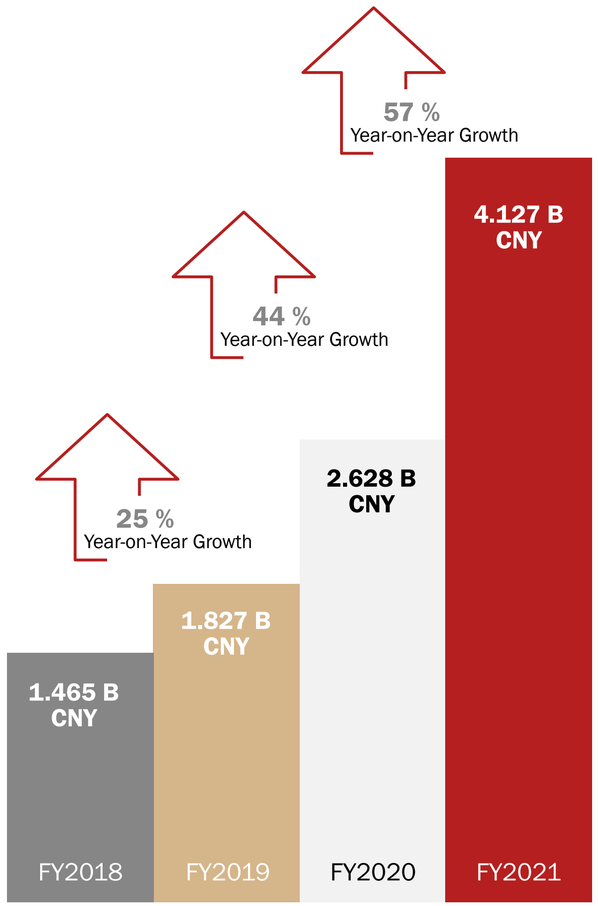
# Key Financials 2021




**Smart Software**

**Revenue**

CNY **1.63 B**

40.33% YoY Growth

**Smart Vehicle**

**Revenue**

CNY **1.22 B**

58.91% YoY Growth

**Smart IoT**

**Revenue**

CNY **1.27 B**

82.87% YoY Growth


AI
ThunderSoft
ThunderSoft
OS Technologies,
our foundation enriching
Intelligent World

# ThunderSoft OS Technologies, innovating on Smart Software, Smart Vehicle, Smart IoT

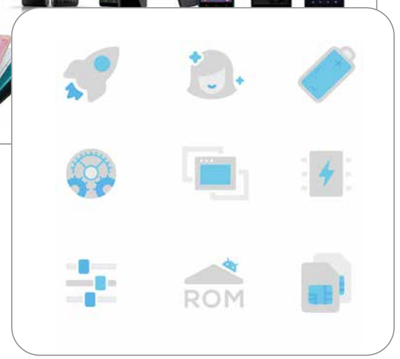
ThunderSoft, trading as Thunder Software Technology Co., Ltd (stock code SZ.300496), is a world-leading provider of intelligent-OS products and technologies with independent intellectual property rights at their core. We focus on key AI technologies that support and accelerate productization, and we spearhead technological innovation through our three business groups: Smart Software, Smart Vehicle, and Smart IoT.

The **Smart Software** business group devises customer-oriented solutions and services, then develops them and sees them through to completion.

Diversified Mobile Products



Key Technologies of Product Differentiation




The **Smart Vehicle** group invents and fully develop customer-oriented automotive solutions, from smart cockpits to autonomous driving and OS solutions for intelligent connected vehicles.



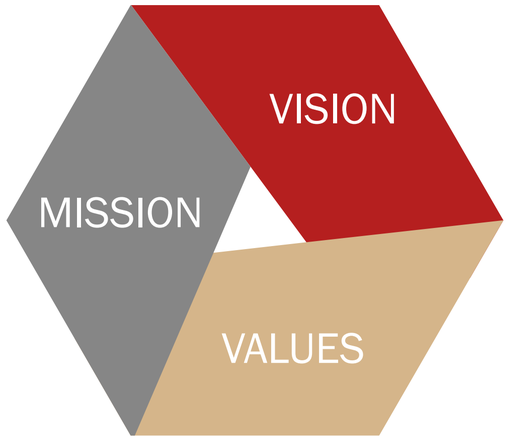
The **Smart IoT** group combines emerging disruptive technologies such as AI, 5G, IoT, and cloud computing systems to provide customers with comprehensive end-to-end solutions.



# ThunderSoft OS Technologies, building our culture, our strategy and business model

**ThunderSoft's 2021 business in a nutshell**

Over decades of development and changes in computing and communication, the two paths of informatization and intelligence have formed. ThunderSoft is situated exactly where these intersect, in an era of the overlapping growth of the two, and our OS has demonstrated remarkable values for both – addressing the importance and complexity of informatization and intelligence in an exemplary manner. With a mission of "Enriching an Intelligent World" and foundations established on intelligent-OS technologies, ThunderSoft has long been focused on the development of underlying technologies and applications for intelligent operating systems such as Android, other Linux distributions, various real-time operating systems, and HarmonyOS. The company has continuously invested in developing cutting-edge AI-based technologies and exploited these to fuel and accelerate its productization and technological innovation.




## *Mission*

***Enriching an Intelligent World***

## *Vision*

***Empowering Every Device with Our Technology***

## *Values*

***Customer Focus***
***Dedication Essential***
***Technology Driven***

**Our key strategies**

Our main strategies are to keep technology at the core of all we do, use the ecosystem as the foundation, and maintain global focus.

**1** **Technology strategy** forms the key to our competitiveness, through which we cultivate advantages offering market a highly limited and valuable resource: ThunderSoft is uniquely capable of providing full-stack technology, extending from the chip layer, through the system layer, to the application layer and into the cloud.

**2** **Ecosystem strategy** work entails close collaboration along the entire industry chain, with leading chipset vendors, OEM players, operators, software and Internet developers, and component manufacturers, to guarantee solid customer-centered development of our intelligent-OS technology while also enabling industrial connection and ecological empowerment across the intelligent-OS domain.

**3** **Global focus strategy** has encouraged us to sail into the deeper seas and empowered us to co-develop smart industries by establishing partnership with well-chosen industry entities for building close cooperation with global technology leaders. In addition, we focus on serving the major customers in each local market, to realize our value proposition and deliver on a win–win strategy.

# ThunderSoft OS Technologies, building our culture, our strategy and business model

**Our central business models**

Our business models all are centered on our OS technology. The three main models are the software-based “IP” model, provision of software-centered integration via “Service + Solutions,” and “Product Sales” for customers desiring fully integrated software and hardware.

## 1 IP business model

*In this software-licensing model, we license the technology and IP we have developed to our customers, mainly in line with a time- or royalty-based approach.*

## 2 Service + Solutions business model

*We execute software design and custom development in accordance with the customer’s actual needs, and we deliver the final development outputs to customers by charging development fees. This model also includes providing corresponding technical personnel and supplying technical support, technical consultation, system maintenance, and other services.*

## 3 Product Sales business model

*ThunderSoft sells comprehensive hardware–software integration products, which may include our IP, complemented with all the related product-design services.*






Smart
Software

# Smart Software

The Smart Software division provides software development and technical solution for a wide range of smart devices, including smartphones, tablet computers, mobile devices, laptops, and point-of-sale systems. Our smart operating systems support all popular mobile operating systems – Android and other Linux-based OSes, Harmony OS, Windows operating systems, etc.

Covering the full stack, the products encompass full driver development and integration, framework optimization, operator certification, security enhancements, UI design, and application customization, with services for a broad range of satisfied customers. Among those customers are OEMs, ODMs, and various other brand manufacturers with OS-related technology and service requirements.

**Several categories of smart-software solutions and services**

**Strategic cooperation with providers of chip platforms**
A full-stack OS with advanced technical capabilities extracts the most from the chipset base technologies. From the beginning, ThunderSoft has focused on research and development for OS technology, to establish reliable underlying intelligent system software technology and integrate key technologies with chipsets. The advantages of our “Chip + Full Stack” approach enable us to reap scarcity benefits from our OS technologies while also – in awareness of the high cost of platform conversion – nurturing long-term strategic cooperation with customers who rely on our platform-technology expertise and know-how.

**Turnkey product solutions**
The OS products we provide for our various customers are highly versatile and expandable. ThunderSoft has formed a complete technical system that extends from hardware drivers, the OS kernel, and middleware to upper-layer applications. We have accumulated rich R&D experience and valuable proprietary intellectual property rights in many domains along the way. Among our other innovations are core technologies covering the 5G communication-protocol stack, deep learning, graphics and image technology, system optimization, automated testing, and security technology.

**Product-differentiation solutions**
ThunderSoft is experienced in providing complete well-differentiated solutions with comprehensive driver adaptation, development of the necessary special components, OS customization, optimization of power consumption and performance, and multi-domain customized ROM. We are also prepared for the unique requirements connected with highly customized operating systems – such as low power consumption, a small memory footprint, and high connectivity.



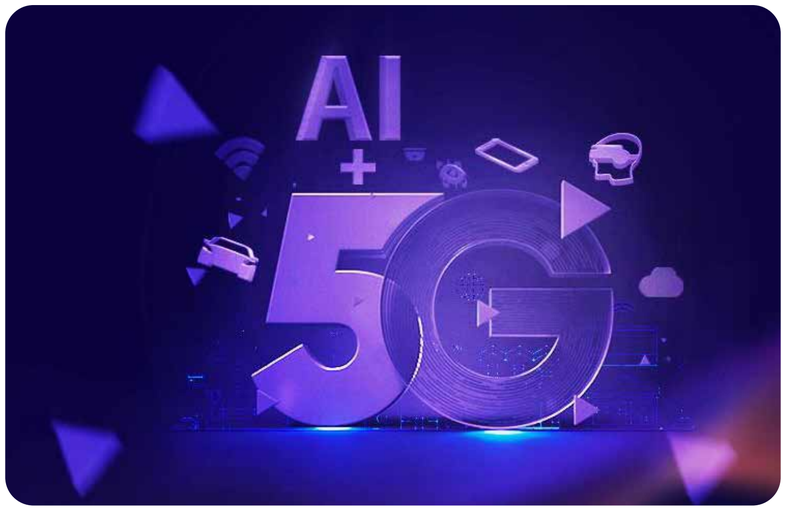
# Smart Software

**An operator-certification solution**

On the basis of a wealth of experience of cooperation with operators in China, Japan, Korea, Europe, and North America, ThunderSoft provides OEM customers with mature custom solutions that are fully certified. These solutions are complete with feature development, user-interface design, interoperability, security, and pre-installed software packages – all designed to meet the needs of various operators.

**System security**

At levels spanning security-hardware support, OS security enhancement, and security applications, in conjunction with cloud-based management interfaces, ThunderSoft provides multilevel security protection for mobile terminals' hardware, operating systems, applications, data flow to networks, etc. These safeguard the security of enterprise data and enable safe use of mobile applications.




5G technology enables the world to become smarter and more connected. It holds promise to change entire industries, our ways of working, and lifestyles. Developments in computing, communication technology, and artificial intelligence have changed software itself, and software engineering now is entering the era of DevOps. This represents an opportunity. Automation of software delivery and architecture design provides a chance for much more agile, frequent, and reliable software build–test–release cycles. This revolution not only is shaping the kernel of system software's core technology but also challenging the traditional definition of software engineering as a culture, by demanding greater emphasis on efficient collaboration and seamless connections within the organization. Long-term focus on the intelligent-OS field and on forming a globally integrated intelligent organizational culture and R&D infrastructure have positioned ThunderSoft well for such transition. The company has established unique, industry-leading core capabilities related to software technology and products, R&D, delivery, and creativity. Therefore, the gates are open for its further continuous innovation and vigorous development of intelligent software business via ongoing extension of 5G technology and artificial intelligence.


ThunderSoft
Smart
Vehicle

# Smart Vehicle

Software is redefining vehicles, with the smart vehicle having become another major smart mobile device alongside tablet computers and smartphones. General trends in software have also brought a shift from distributed automotive E/E architecture to domain/technology concentration. This has progressed even further toward complete integration within the central computing unit, which, through groundbreaking innovation will provide vast space and rich scenarios for continuous software innovation and incremental upgrades. ThunderSoft's core advantages in the smart-vehicle OS field continue to drive the rapid development of the automotive business.

## Smart cockpits

Our smart cockpit solutions have created an integrated cockpit platform based on a service-oriented architecture, with a new four-screen solution, rich multi-screen linkage, and an upgraded virtual assistant in all scenes to create an exclusive living space. Kanzi's higher-quality 3D rendering is used to achieve a movie-level effect: Kanzi One leads the world in 3D graphics rendering technology with its Around View Monitor (AVM) and Auto Parking Assist (APA) integrated interfaces presenting exquisite and attractive immersive parking experiences and scenarios.

Through integration of a traditional ultrasonic radar ranging algorithm and AI-based intelligent-vision technology, the system not only adapts to more abundant parking scenes but also offers greatly improved perception and decision capabilities in complex parking environments, thus perfectly melding the low-speed autonomous driving and cockpit domain. In addition, the enhanced security features of ThunderSof cockpit solutions bring full, multilevel security protection: user-data encryption, storage security, functional security, and vehicle-to-cloud security. The advanced architecture for software/hardware separation in the smart cockpit is easily achieved via OTA upgrade.

The cockpit, as the critical factor connecting the vehicle's driver with all the highly complex technologies the future holds, will represent higher-value-added spaces in the long term. As our brains push the cockpit forward in leaps and bounds, the brains of the car can take driving beyond what the human mind has ever imagined. ThunderSoft is already showcasing products and technological achievements built on the intelligent-cockpit software platform. These demonstrate the company's technological foresight, R&D strength, and commercial achievements.

## Autonomous driving

ThunderSoft has much to offer for both of the scenarios considered in autonomous driving: low-speed and high-speed. For low-speed driving, ThunderSoft integrates cross-domain innovation related to the cockpit and low-speed driving, utilizing AVM, APA , Remote Parking Assist (RPA), Home-zone Parking Assist (HPA), and Automated Valet Parking (AVP)* to cover full products chains, with numerous technologies and solutions. At the higher-speed-driving  end, ThunderSoft targets the whole platform for autonomous driving and the future vehicle computing market. Forming an open platform and ecology for autonomous driving that covers the domain controller, base system, OS, middleware, software integration, and testing, ThunderSoft focuses on the underlying development and on integration of autonomous driving-software with the larger experience. This involves considering the existing experience at real-time OS level, the overall system framework, and the company's solid foundations from the base and underlying technologies. The company aims to create a shared software platform where all application-level algorithms can be migrated to different chip platforms seamlessly.




*) AVM: Around View Monitor
APA: Auto Parking Assist
RPA: Remote Parking Assist
HPA: Home-zone Parking Assist
AVP: Automated Valet Parking

# Smart Vehicle

**An architecture for vehicle–cloud integration**

ThunderSoft has developed its own SOA-based intelligent-software platform that unlocks flexibility for cross-domain deployment and configuration between vehicles and the cloud. This cross-OS platform (for Android, QNX, and various other OSes) supports standard service description languages in parallel, to guarantee compatibility throughout the vehicle environment irrespective of the platform. The company's SOA for vehicle–cloud integrated middleware represents a complete cross-OS, cross-device, and vehicle–cloud integration solution.

What does this mean for the future? At base, the smart-vehicle OS is the software infra-structure at the heart of the "software redefining the vehicle" revolution. It carries all of the software, applications, services, and business innovations. At the same time, against the backdrop of general cross-domain integration, OEM demand for in-vehicle software is increasing by the day. Taking the smart-cockpit field as home base, ThunderSoft is vigorously expanding its work for maturity in the autonomous-driving arena while also developing a series of cross-domain software solutions. By broadening the software's capabilities throughout the cockpit and autonomous-driving domain, the company's work on the entire vehicle OS can yield multi-domain power. ThunderSoft will be able to provide comprehensive, open, expandable, and ultimately unified software-integration products that are among the fruit of solid integration themselves.






# Smart IoT

# Smart IoT

ThunderSoft's Smart IoT operations give OEM/ODM players, other enterprise customers, and developers genuine one-stop solutions. The company's solid expertise extends all the way from the chip layer, driver, OS, and algorithm through to specific applications. By integrating advanced technologies in such realms as artificial intelligence, 5G, the full spectrum of Internet of Things activities, and cloud computing, ThunderSoft is crafting its innovation into a vital ingredient for successfully augmenting device capabilities related to real-time perception of the local environment, human–computer interaction, and decision-making control/support. Our solid tools and synthesis of world-leading systems accelerate the process of turning smart-product prototypes into production solutions, for rapid creation of reliable IoT-OS-centered integrated solutions with full-scene capability and a distributed architecture encompassing the end device, edge computing, and cloud systems.

ThunderSoft's delivery volume in this expanding sphere has reached a record high in the wake of significant breakthroughs in multiple categories of smart IoT activities and in multiple market regions. In 2021, we continued our work with leading semiconductor vendors on various aspects of development and deepened our strategic cooperation with cloud-technology companies still further. Our intelligent industrial PaaS platform has won favor among industry-leading customers and laid a solid foundation for the vibrant growth visible in ThunderSoft's cloud business. Continuing the development journey for our IoT activities involves moving from end devices to end–edge–cloud integration. This organic process is sure to bring global customers the full range of intelligent products and solutions, from modules to complete devices, with continuous expansion of our XR, robot, smart-camera, and other product lines.






# Core Competitiveness

# Platform-techology Leadership

At ThunderSoft, we are technology enthusiasts, and we are justified in our strong confidence that our position in all of our target technology domains will remain very solid. This is because we can supply highly competitive, high-performance end-to-end solutions and technology systems that suit every customer case. We are one of those exceedingly rare companies that can act as a turnkey, one-stop-shop technology provider from chip layer to OS, following on with integration layers, middleware, and the application layer – including complete cloud solutions.

Through our global leadership in full-stack OS technology and AI-based solutions, we represent something in short supply that numerous actors, across the entire landscape. We can reap rewards also from our ability to operate with a host of options, always offering technology-neutral solutions that suit any stakeholder.

### IP and core Key technologies

In the development of our IP and core key technologies, ThunderSoft has formed a comprehensive system stack with its own IP from the system kernel, through middleware, to the upper-layer applications that are the target for the communication-protocol stack. We gain value from our advanced technology for OS optimization, system security, graphics and image processing, artificial-intelligence algorithms, intelligent vision and voice, UI engines, and security. We have more than 1,100 protected IP elements under our belt, including patents, trademarks, and software copyrights, which are becoming the driving force for the rapid development of industries such as artificial intelligence, smart devices, the Internet of Things, and intelligent connected vehicles.

### Comprehensive Software capabilities

ThunderSoft's software capabilities in the smart-software field cover the full chain of driver development, integration, framework optimization, operator certification, security enhancements, UI design, and applications' customization. One-stop solution for various SW-defined car technologies, intelligent, deep learning IoT systems are under the category of IP and core Key technologies.

### One-stop solution for various SW-defined car technologies

For Smart Vehicle, ThunderSoft provides one-stop solutions for the full product life cycle – from OS development, core technology authorization, application customization, and automated testing to far beyond.

### Intelligent, deep learning IoT systems

In the field of intelligent IoT systems, ThunderSoft provides one-stop solutions from the chip layer, driver layer, OS layer, and algorithm layer to the application layer for IoT customers. These improve perception of the local real-time environment, improve human–computer inter-action, and facilitate decision control. The company's constant pursuit of such improvements accelerates progress along the prototype-to-product journey.

These achievements represent technology leadership and an established "leg up" on the competition, which have propelled ThunderSoft along its constant OS journey from technology to ecology, from organization to talent, and from bricks to foundations and walls. The journey is bearing fruit in an intelligent computing platform that displays excellent performance, rich interfaces, convenient invocation, and diverse applications.

# The Heart of Our Competitiveness

## Partnerships and the ecosystem

The OS platforms of today form a more complex multidimensional connection between cloud entities, chips, and systems than ever witnessed before, and the ecosystem has become the key focus for OS development. A modern OS requires a more multilateral ecology from chips, cloud systems, etc. to support system operation. At the same time, more and more innovations these days stem from collaborative work, which requires a process of cooperation for discovering how customer needs are developing, co-innovating, and solving customer problems. Therefore, a tendency has emerged for the entire OS to be open and serve the whole industry through application of partnership and ecosystem thinking. From the start, ThunderSoft's in-house technology has been complemented by an outstanding worldwide network of partners, typically engaged in deep collaboration with us.




HarmonyOS Connect ISV Partnership.




Cooperation with Xiaomi to establish a Mijia ecological link and join the certification laboratory initiative.




2021 Excellent Partner of Huawei Smart Car Solutions.




Tencent "TIME Plan 2021 Excellent Partner".







Qualcomm XR Ecological Partner.

# The Heart of Our Competitiveness

**Participation in the open-source ecosystem – embracing the future**

Open source has become the dominant model for global software technology and industrial innovation. ThunderSoft, as the world's OS-product and technology leader, is creating the future also by embracing and participating in the open-source ecosystem.




Become the member of the OpenHarmony project group.




Euler open source community.




OpenBoard working group jointly promotes the development board standard based on RISC-V.



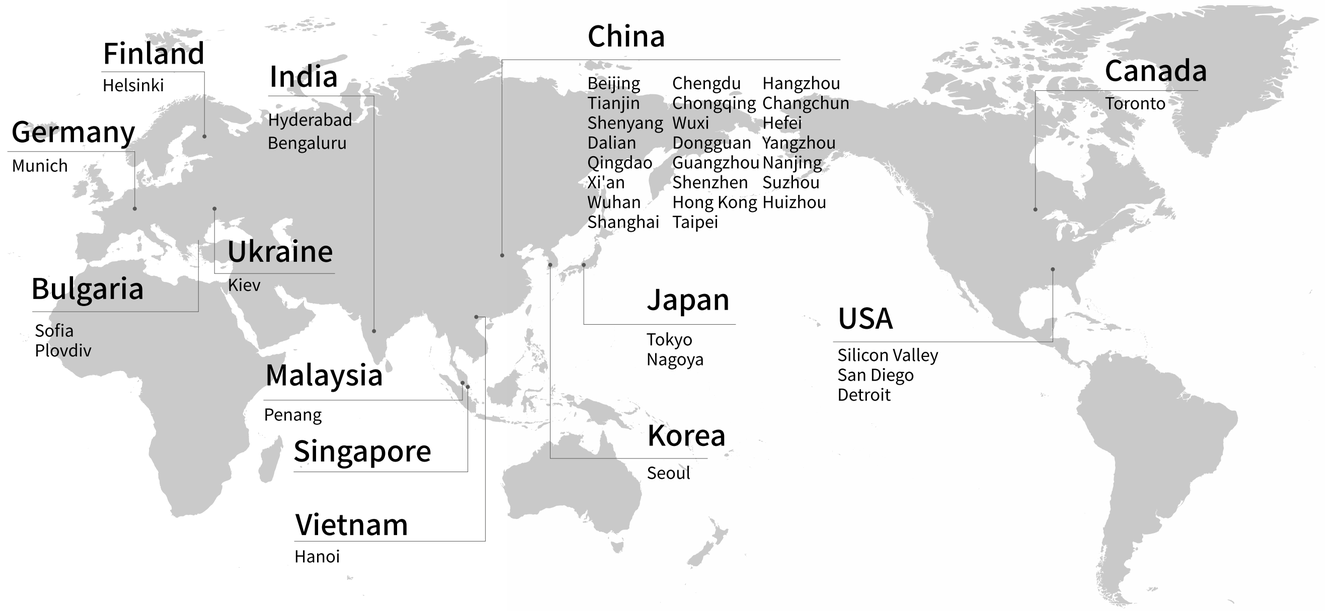

Participate in Smart Car Alliance Open Alliance ICCOA.

# The Heart of Our Competitiveness

**A global R&D network and worldwide collaboration**

The ThunderSoft OS is a global technology. It provides the virtualization function that underlies the whole of industry, provides the operating environment for various applications, and assumes the core position in each industry. The “gene attribute” of this technology is destined for OS technology and product providers who require not only a long period of technology accumulation but also a global integrated development logic.

ThunderSoft benefits from a strong worldwide presence. With global R&D centers and subsidiaries spanning 40 cities, our growing organization delivers economics of scale with benefits that can yield huge advantages in our projects. We continuously nurture our competitiveness by investing not just in our technologies but also in further developing the competence of all personnel. In addition, we can guide our global R&D and sales networks to support our customers, helping them grow with us.




11000+ Employees

90% Engineers

40 Cities

1200+ Patents & Copyrights

# The Heart of Our Competitiveness

**Focus on value for the customer**

ThunderSoft's attention to customer focus involves more than creating value. We co-create value, and we connect customers in cross-cutting networks. On one dimension, we link all partners in the industry chain from providers of chips, OSes, Internet services, AI, and cloud solutions. At the same time, we connect smartphone, car OEM, Tier 1 network, IoT, and other providers, building a networked ecosystem industry-wide. ThunderSoft holds a strategically valuable position as a lynchpin: the expansion of any party brings us growth opportunities. A partner for value-added scaling, we bring our customers innovative, reliable, and commercial-application-ready products and solutions by offering value in areas that are crucial for customer success. The key sources of value that customers may recognize are shorter time to market, reduction in total cost, provision of reliable service, and delivery of high quality.




Support China's First Mass-Produced Self-Driving Vehicle-WM W6.



Provide leading robot development platform to support Meituan drone.



TurboX C404 SOM product support LOUIS VUITTON Horizon Light Up Speaker.




ThunderSoft won the 'Outstanding Innovative Supplier' award of SAIC MOTOR.

# The Heart of Our Competitiveness

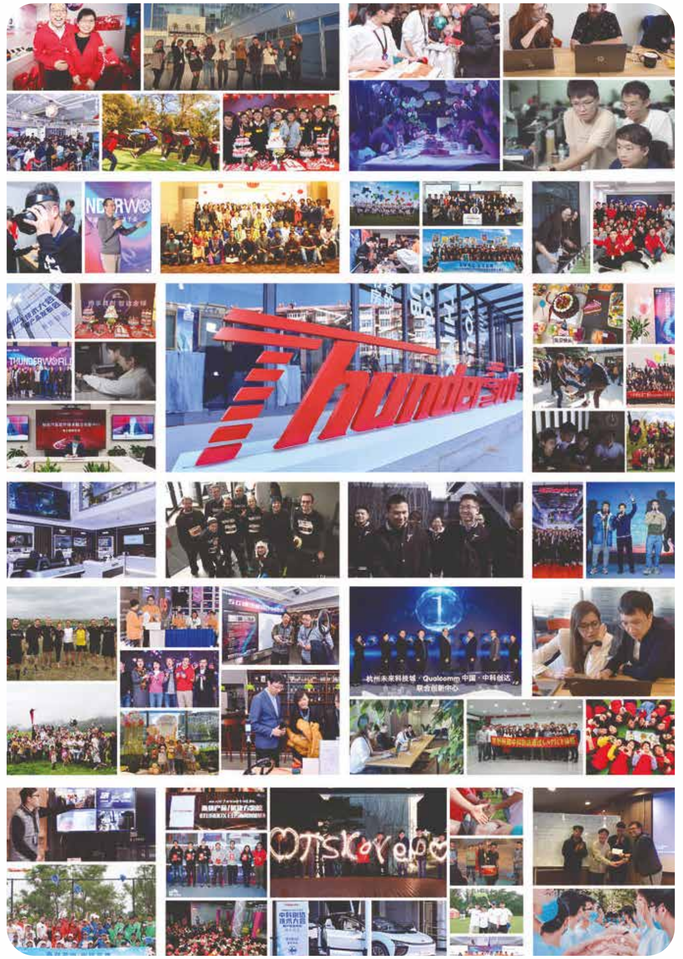
**Talent and organization intelligence**

Invention, development, and comprehensive realization of intelligent-OS products and technologies depend on the construction of a talent system and on collaboration of intelligent organizations.

Nurturing our talent system, we have formed an efficient and practical intelligent talent management model and system for organization-internal use. This is centered on strategy and business development that is demand-oriented, efficient, and practical. Because the teams with more than 11,000 people at ThunderSoft are more than 90% R&D engineers and technical experts, ThunderSoft has formed a strategy that builds on a strong engineer-based culture. It applies a multi-channel and multi-driver approach that supports such elements as management ability, professionalism, culture-related values, and entrepreneurial spirit. All-around talent systems are in place also, for broad-based talent discovery, career development, a robust talent ecology, and talent innovation. Our organization integrates support for training for everyone from the first steps with the company to the last. ThunderSoft's pursuit of talent excellence includes stimulating employees' innovation related vitality, organizational research and innovation, and creation of successful careers – setting the stage for valuable achievement and personal growth.

We support the intelligent organization of our intelligence-focused company by building and nurturing an open and flat structure, trial-and-error-based rapid adjustment of organizational capabilities as needed, matrix development of the R&D system, global linkage of functions across software products, evidence-based indicators for OKR talent, and the application of Feishu throughout the enterprise. Thus we can retain industry-leading practical human resources and excellence in organizational management.

The importance of the ThunderSoft brand is growing significantly, and with our growth come the eyes and ears of many organizations. We feature among the "ChiNext top 50 valuable public company" entries on the 15th Chinese Listed Companies Appraisal List and were among the top 50 of "Forbes China's Most Innovative Companies". Such recognition and several employer awards further increase our prominence on the world stage.






# Strategy and Business Plan 2022

# Strategy and Business Plan 2022

**ThunderSoft's business strategy**

The world is experiencing a new stage in its digital transformation. Life is being restructured by all kinds of innovative technologies in which ThunderSoft has a hand: the Internet of Everything, 5G, AI, the software-redefined vehicle, high-performance automotive computing, edge computing, distributed systems. At ThunderSoft, we are pushing forward to be at the frontline with these technologies – to put them to use for our ongoing mission and constant strategic goal of acting as a platform-technology enabler in the intelligent world by amassing profound OS-technology expertise and resources.

Staying on track with our promising three-pronged activities – with Smart Software, Smart Vehicle, and Smart IoT – we will deepen the technology vertically and expand the product space horizontally. Thus, we will build our Smart Vehicle OS and Smart IoT OS to cultivate extensive value for the customer and ThunderSoft both. Our plan for this has a three-element structure. Firstly, we will focus on OS and middleware technology as the backbone, to continue enriching products and technical services with customer-orientation and boost mutual value. The second component is strengthening our global delivery and consulting capabilities, as we continue expanding our market share. Finally, we will nurture and enhance strategic partnerships and collaborate in innovation.

**The business strategies and goals specific to our three business groups are:**

- **For Smart Software:**
  becoming the preferred strategic partner for customers' software-technology services, thus cementing ourselves as the firm cornerstone for the companies' sustainable development.

- **For Smart Vehicle:**
  to provide customers with leading smart-car platform products and services, all rooted in innovation that has the operating system at its core.

- **For Smart IoT:**
  growing into the world's leading provider of IoT-related smart products and solutions, giving global enterprises access to intelligent services, and making the products more intelligent – all so that users can enjoy the convenience and happiness brought by intelligence.

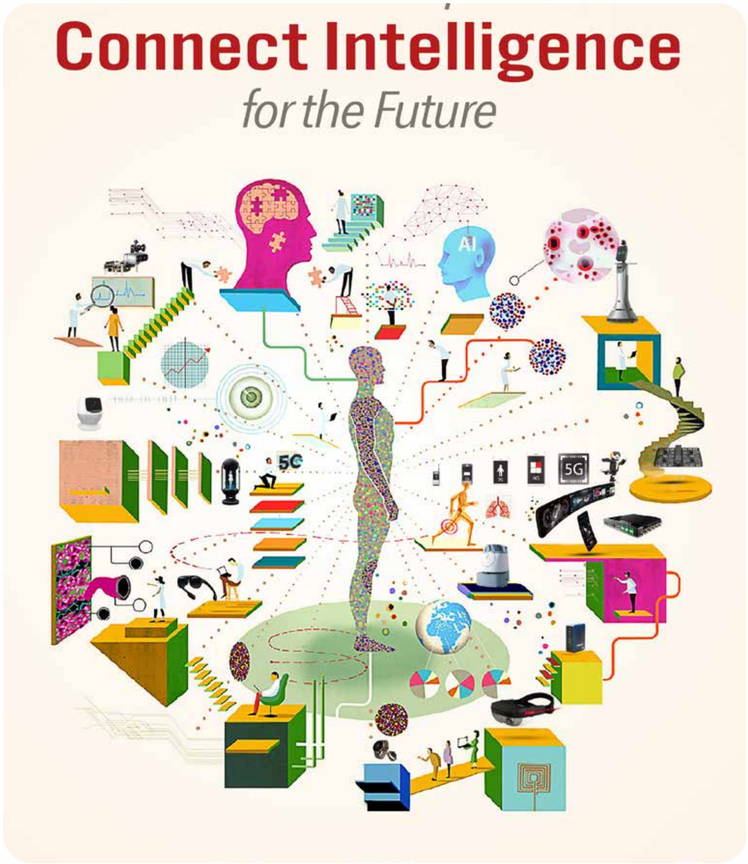
# Strategy and Business Plan 2022

**Multi-point incubation, with product-innovation vitality**

ThunderSoft will fully support autonomous driving, edge computing, a distributed AI-enriched IoT OS, and Extended Reality. This will extend all the way from early software development to software/hardware integration, culminating in new-product incubation for the real world.

In the smart IoT field, we will seize the opportunities offered by AI, industrial digital intelligence, edge computing, and 5G to build the world's leading end–edge–cloud distributed smart IoT solutions. By means of this ecology-embedded platform, we will empower making smart IoT software and hardware into something more – complete solutions and intelligent industries.

For Smart Vehicle, we will invest in the development of autonomous-driving domain controllers, develop the next generation of cockpit solutions, and forge full-stack technology for an outstanding smart-vehicle OS. Behind these efforts is our aim to lead the way globally in base software for the automotive industry. In the smart-software field, our core objective is to keep our focus steadily on the globe's leading players. This encourages both strong customer relationships and fruitful innovation in partnership with key actors.



# Strategy and Business Plan 2022

**Intelligent organization,**
**with our global “G-P-S” approach**

Rapid expansion in the pool of R&D talent has enabled ThunderSoft to establish an organizational system with a scale of more than 10,000 professionals. We continue to tune and enhance the people-based resources at our disposal. After all, individuals and the organizations they make up are central to the OS. They form the engine behind the processes of developing and constantly upgrading OS-based systems, and it is through them that ThunderSoft can remain a level above any possible competitors. Likewise, ThunderSoft’s ultimate pursuit in shaping the future of OS technology hinges on the smooth, efficient operation of the borderless organization we have created. Its success demands rich interfaces that link all of its elements, flexible approaches flexible approaches to interfaces and calls, constantly better performance, and continuous optimization and innovation for the various OSes supporting the organization’s own operations. Therefore, we have crafted a born-intelligent organizational culture, in combination with born-intelligent software value, with our own hands.

We have formulated the “**G-P-S**” plan for ThunderSoft’s global path. This refers to applying an innovative logic for going overseas **(G = Go Global)**, clarifying our positioning for these overseas moves **(P = Pathway)**, and building/augmenting our core advantages **(S = Strength)**. The underlying logic as we go global is integrating industry-leading companies and business sectors at worldwide scale. At the heart of this is the innovation ability afforded by the OS – enabled by the long-term accumulation of the technology within. Looking at the global canvas, we will concentrate on value at the top of the structure, select industry leaders as strategic partners, and focus on cooperating with key major customers in our wordwide market.
Our objective in this is to build a technological innovation ecosystem with the leading companies globally, utilizing – established and pioneering – technologies, and apply our base-software capabilities and localized services (via superimposing and underpinning) to create a technical and ecological moat.



# Strategy and Business Plan 2022

## OS-oriented thinking, with an OS-driven organization

There are four dimensions to OS-oriented thinking: the core technology, cross-domain connection, intelligent expression, and ecological empowerment. ThunderSoft encapsulates all of these. On the basis of its OS-oriented thinking, ThunderSoft has organically honed an open and compatible, unique, and leading OS platform. A smart OS journey that began in the era of smartphones and the mobile Internet has led ThunderSoft into times of overlapping growth of informatization and intelligence.

The intelligence of the future will have its roots in **interaction, connection, computing, and sensing**. In this environment, where the value and complexity of OSes both have taken on unprecedented importance, ThunderSoft's position as the world's leading smart OS provider is becoming the key. Here, we are a hub, forming the entire general OS platform. Therefore, our three business groups will together strive toward Smart Software, Smart Vehicle, and a Smart IoT with continued emphasis on building full-stack software capabilities. A full stack, from the application-layer algorithm API down to the initialization layer (the BSP and above), plus the kernel-level OS, can encompass a comprehensive technical system – all the hardware drivers, OS kernels, middleware, and upper-layer applications. With this solid framework supplied by the OS platform, customers gain flexibility in their platform choices, and they can benefit from reduced difficulty in implementing technical applications, platform transplantation, and system updates. Moreover, these foundations can unify the AI frameworks of smartphones, automobiles, and the IoT in one OS-platform-based product and technology with rapid iteration and innovation cycles.

Everything will be connected when we have reached our goal of deploying and fully implementing OS-oriented thinking and an OS-driven organization structure in all aspects of our day-to-day operations; throughout the OS technology; and in organizational capabilities across the Smart Software, Smart Vehicle, and Smart IoT business groups. Thus, we will build solid infrastructure supporting the entire intelligent industry, for all scenarios. ThunderSoft's people, our profound attention to OS-oriented thinking, and concentration on platform value will lead us continuously toward this vision. In 2022, we will move forward steadily in accumulating everything our business practices require for this ambitious long-term goal.







# Financial Performance 2021

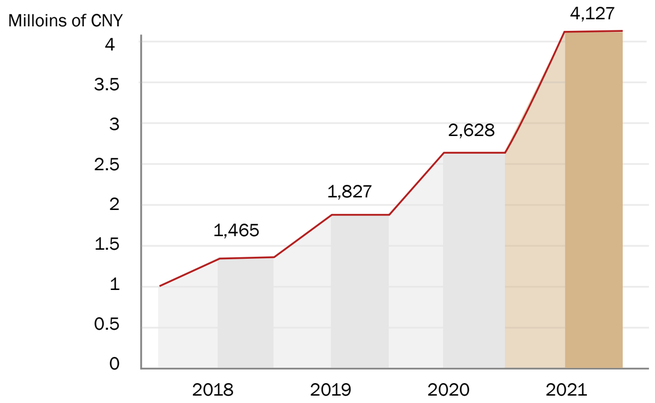
# Key Financial Indicators

| Millions of CNY | 2021 | 2020 | Change | 2019 | 2018 |
|---|---|---|---|---|---|
| **Operating revenue** | **4,127** | **2,628** | **57.04%** | **1,827** | **1,465** |
| Net profit attributable to shareholders of listed companies | 647 | 443 | **45.96%** | 238 | 164 |
| Net profit attributable to shareholders of the listed company after deduction non-recurring gains and losses | 576 | 366 | **58.97%** | 171 | 103 |
| Net cash flow from operating activities | 139 | 341 | **-59.97%** | 142 | 253 |
| Basic earnings per share | 1.5271 | 1.0805 | **41.33%** | 0.5941 | 0.4141 |
| Diluted earnings per share | 1.5023 | 1.0670 | **40.80%** | 0.5897 | 0.4070 |
| Weighted average return on equity | 13.68% | 15.04% | **-9.04%** | 13.94% | 11.96% |

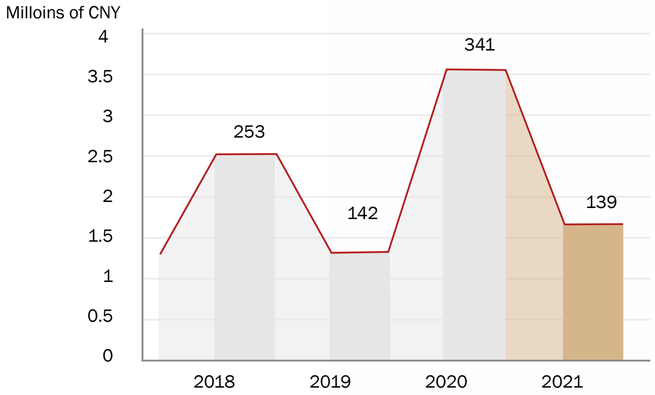
| Millions of CNY | 20211231 | 20201231 | Year-to-Year | 20191231 | 20181231 |
|---|---|---|---|---|---|
| **Total assets** | **7,239** | **5,558** | **30.25%** | **2,830** | **2,603** |
| Net assets attributable to shareholders of listed companies | 5,189 | 4,327 | **19.92%** | 1,916 | 1,493 |

# Key Financial Indicators

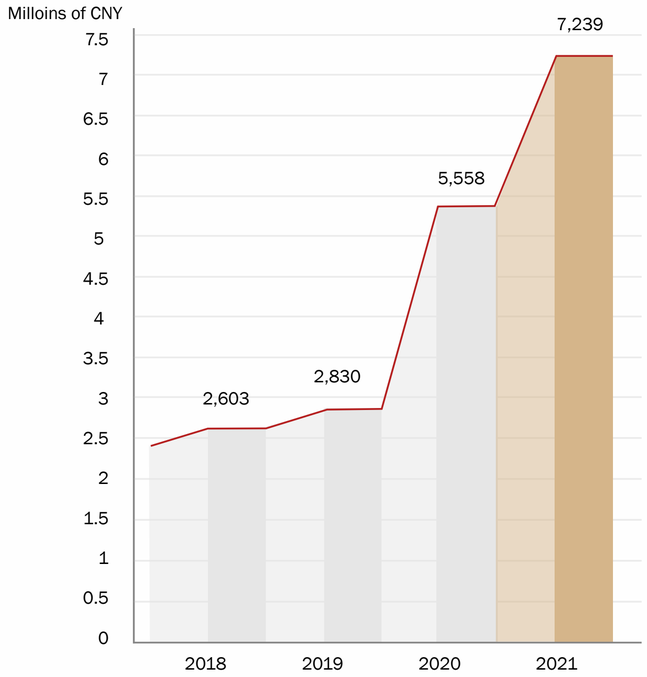
Operating revenue



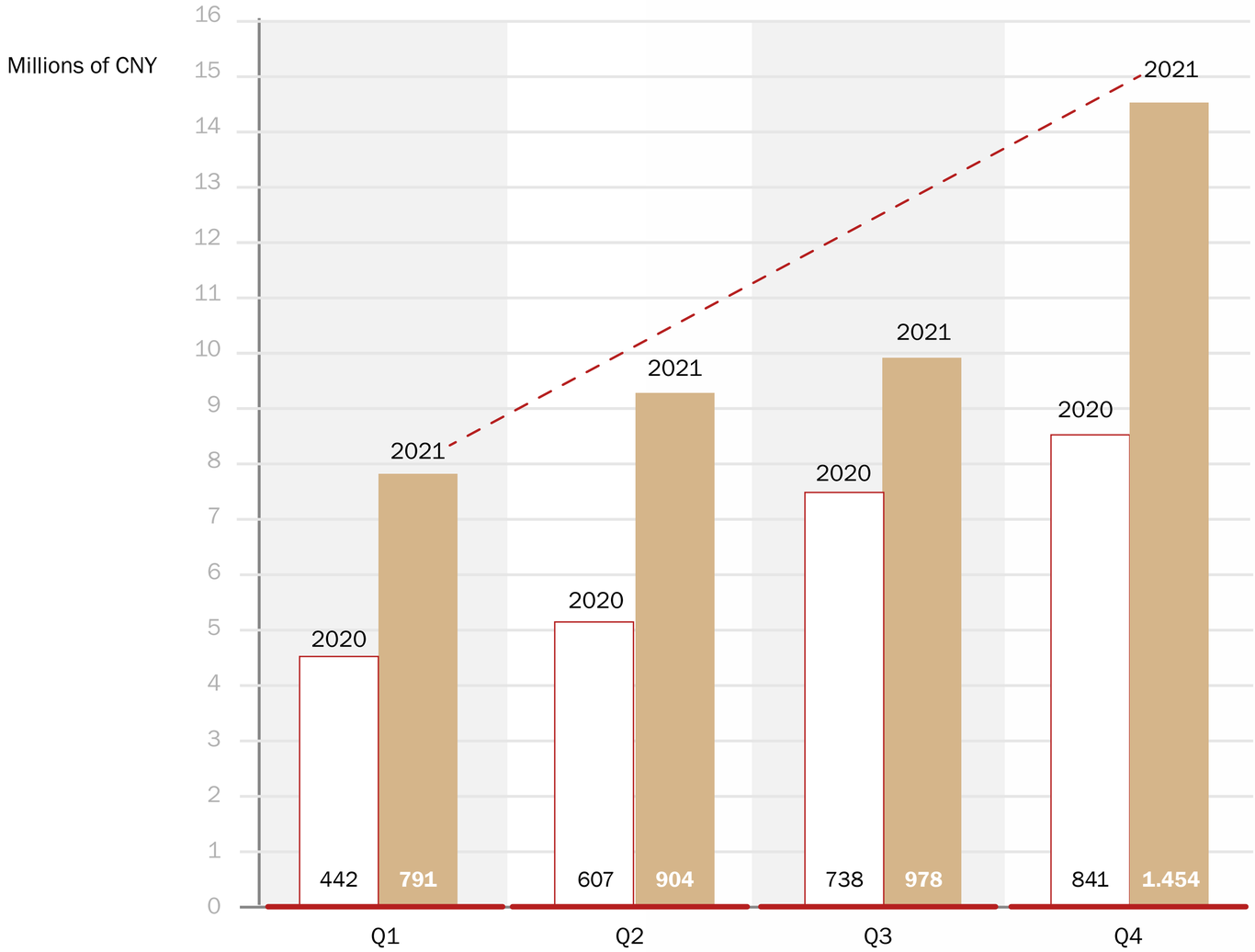

Net cash flow from operating activities




Total assets



# Main Financial Indicators by Quarter

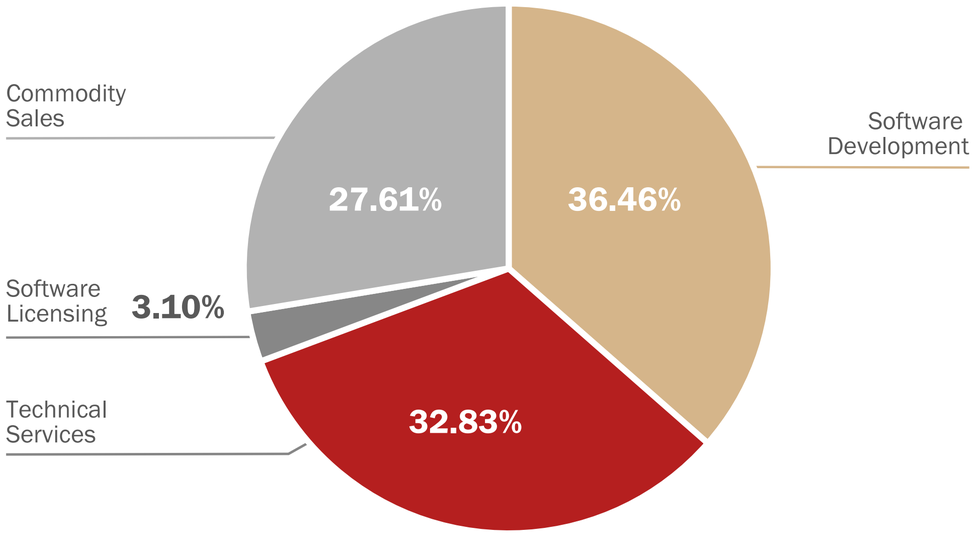


# Statement of Operating Revenue

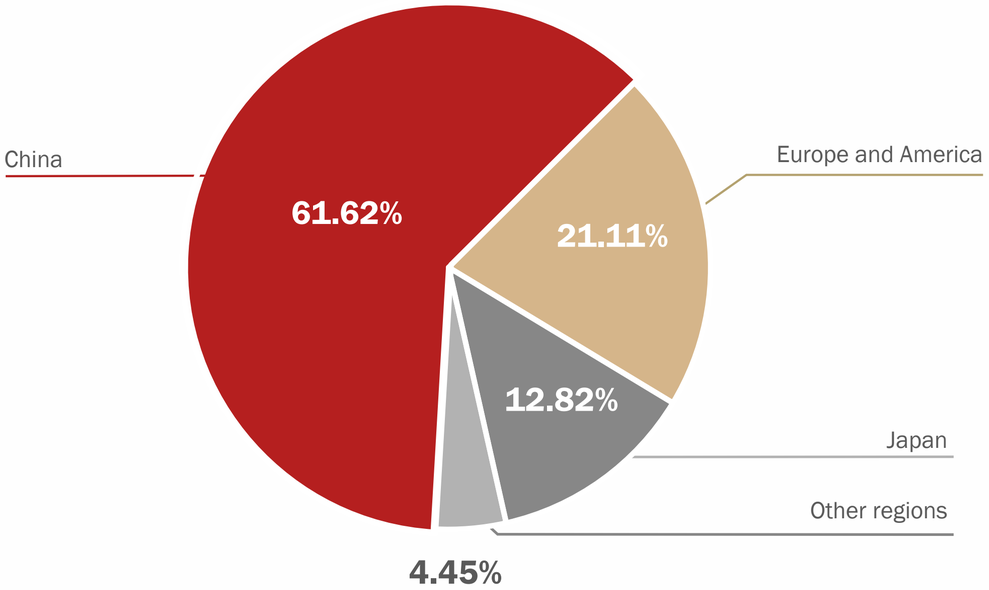
| Millions of CNY | 2021 | 2020 | Change | 2019 | 2018 |
|---|---|---|---|---|---|
| **Total operating revenue** | **4,127** | **2,628** | **57.04%** | 1,827 | 1,465 |
| | | | | | |
| **By Product Type** | | | | | |
| Software development | 1,505 | 954 | **57.70%** | 552 | 652 |
| Technical service | 1,355 | 958 | **41.48%** | 788 | 357 |
| Software licensing | 128 | 115 | **11.26%** | 154 | 153 |
| Commodity Sales | 1,139 | 601 | **89.53%** | 333 | 301 |
| | | | | | |
| **By Region** | | | | | |
| China | 2,543 | 1,477 | **72.22%** | 812 | 795 |
| Europe and America | 871 | 580 | **50.28%** | 508 | 329 |
| Japan | 529 | 403 | **31.08%** | 333 | 280 |
| Other | 184 | 168 | **9.27%** | 174 | 61 |

# Statement of Operating Revenue

Revenue by Product Type, 2021

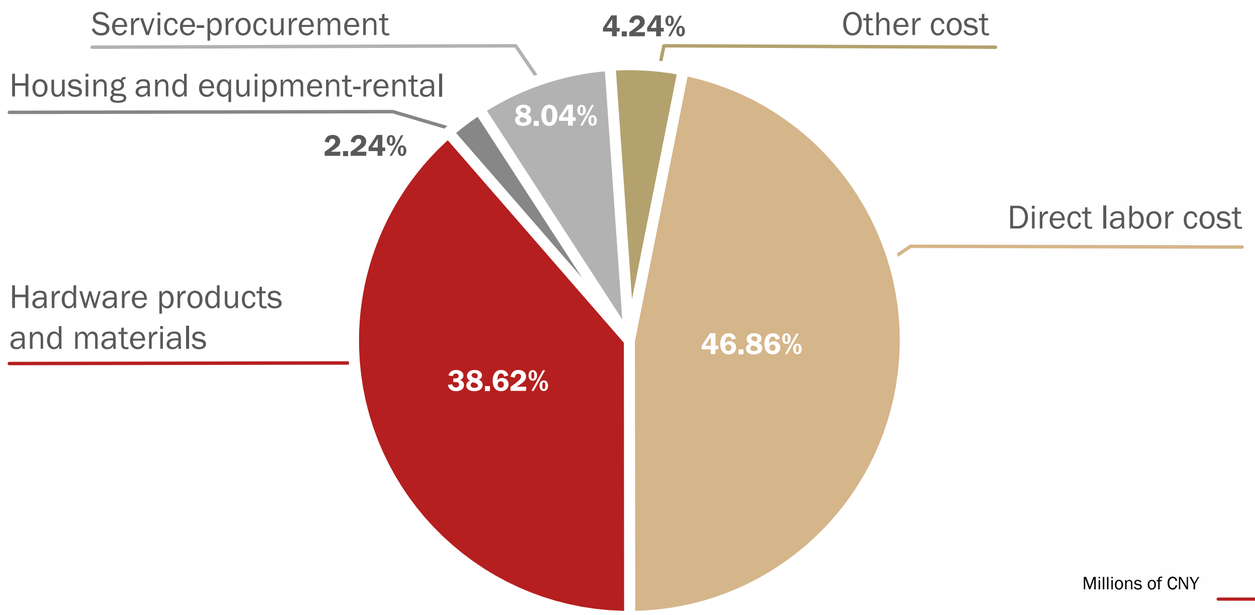



Revenue by Region, 2021



# Statement of Operating Costs

## 2021



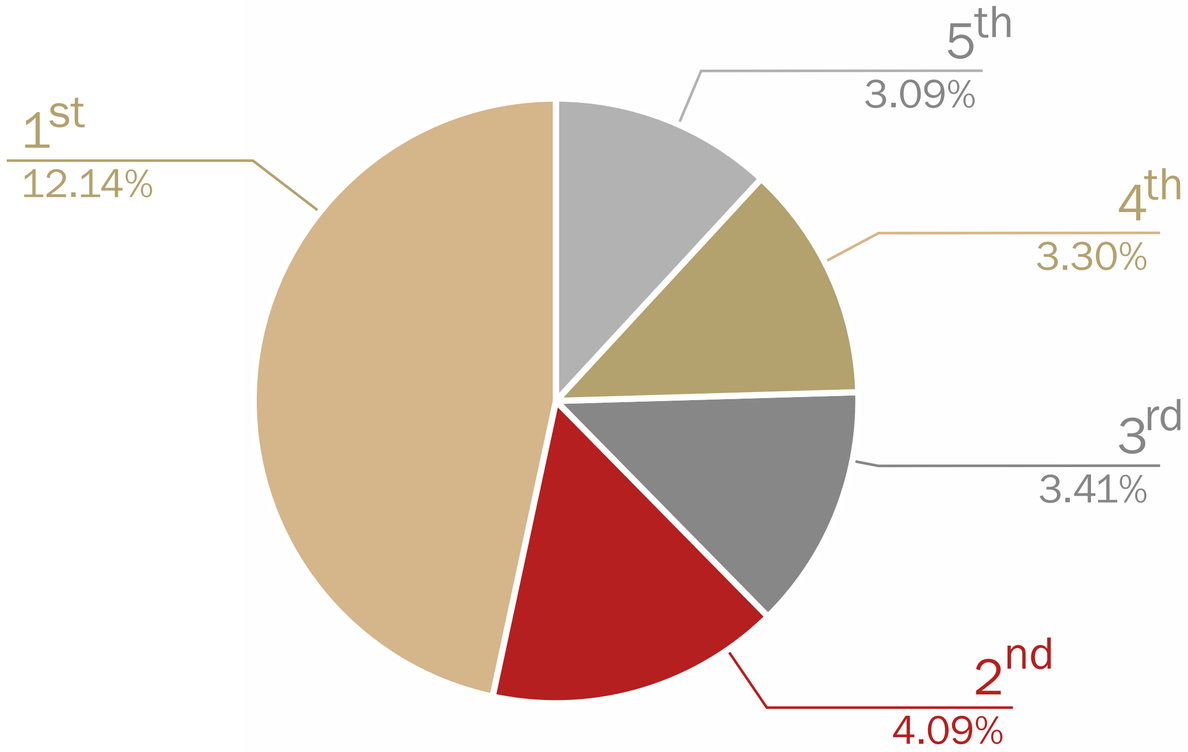

| Millions of CNY | 2021 | 2020 | Change |
|---|---|---|---|
| Direct labour costs | 1,172 | 806 | 45.54% |
| Procurement costs for hardware products and materials | 966 | 405 | 138.68% |
| Housing and equipment-rental costs | 56 | 44 | 27.74% |
| Service-procurement costs | 201 | 138 | 46.24% |
| Other costs | 106 | 74 | 41.89% |
| **Total** | **2,501** | **1,466** | 70.61% |

# Statement of Cash Flow

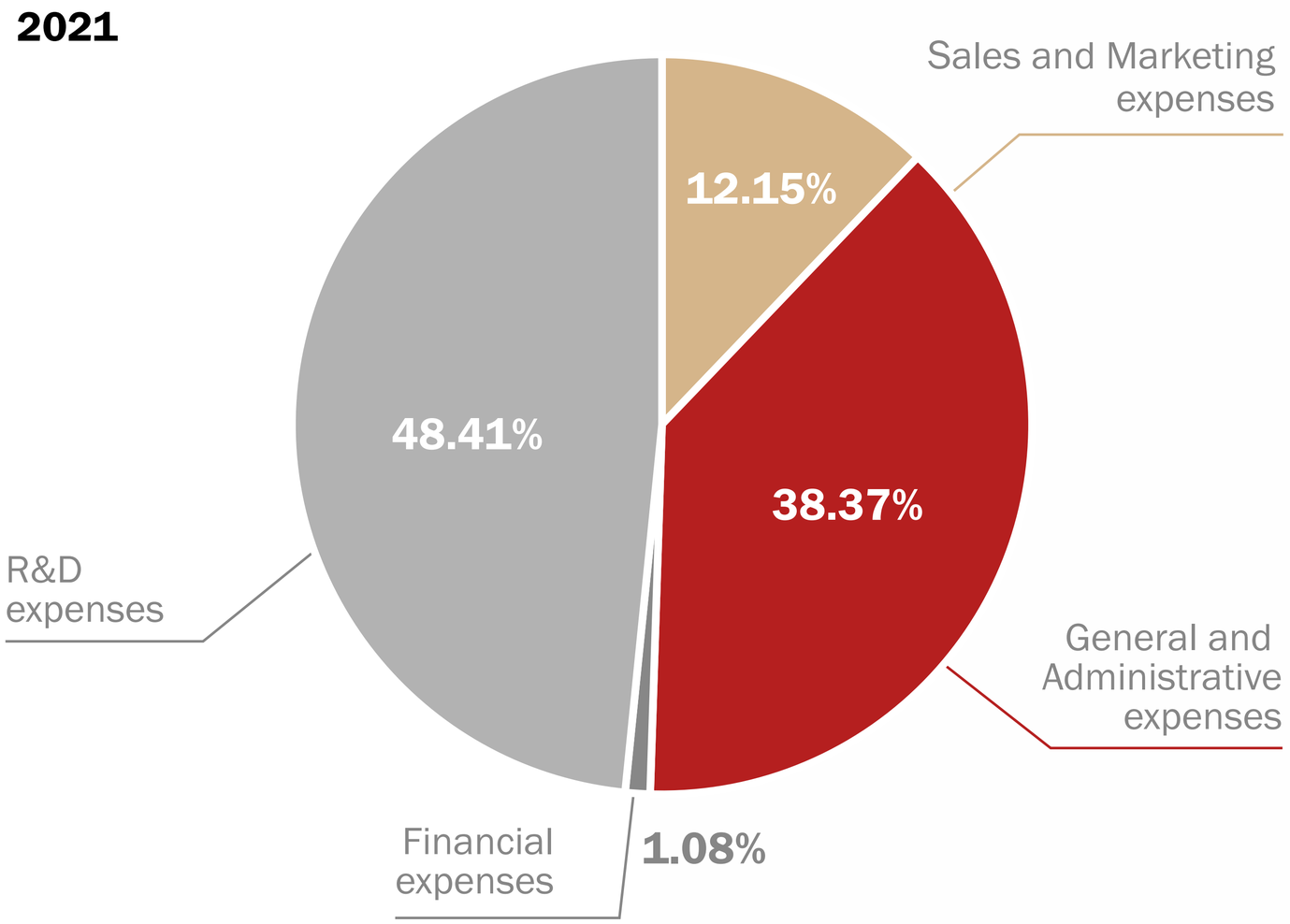
| Millions of CNY | 2021 | 2020 |
|---|---|---|
| Net cash flow from operating activities | 139 | 341 |
| Net cash flow from investing activities | -443 | -525 |
| Net cash flow from financing activities | 345 | 1,530 |
| Net Increase in cash and cash equivalents | 46 | 1,330 |

# The 5 Biggest Customers Share of Revenue

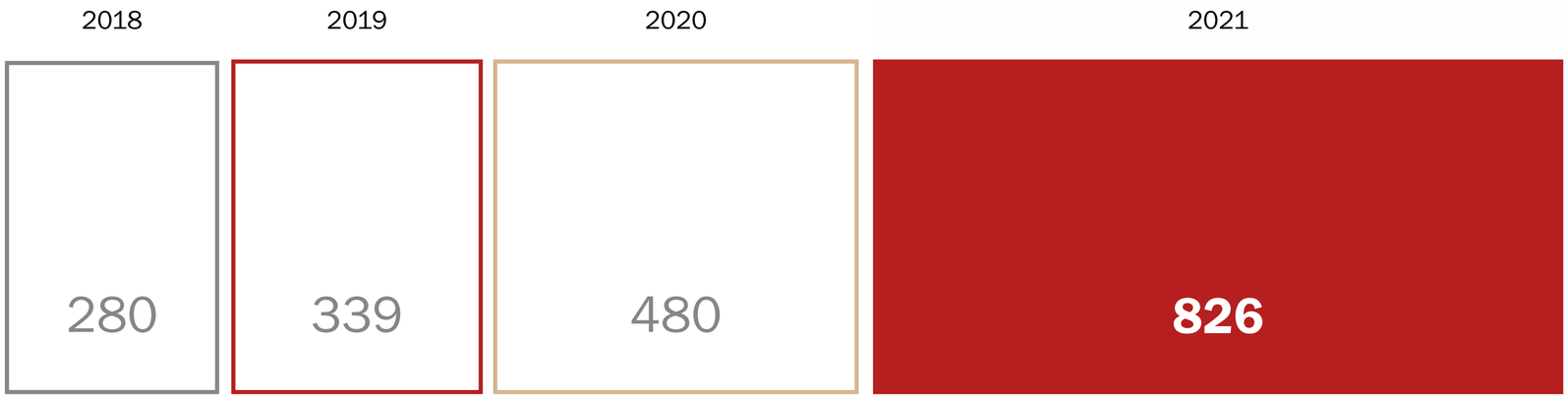
| CNY | % of annual sales |
|---|---|
| 1st | 12.14% |
| 2nd | 4.09% |
| 3rd | 3.41% |
| 4th | 3.30% |
| 5th | 3.09% |
| **Total** | **26.03%** |



# Breakdown of Expenses



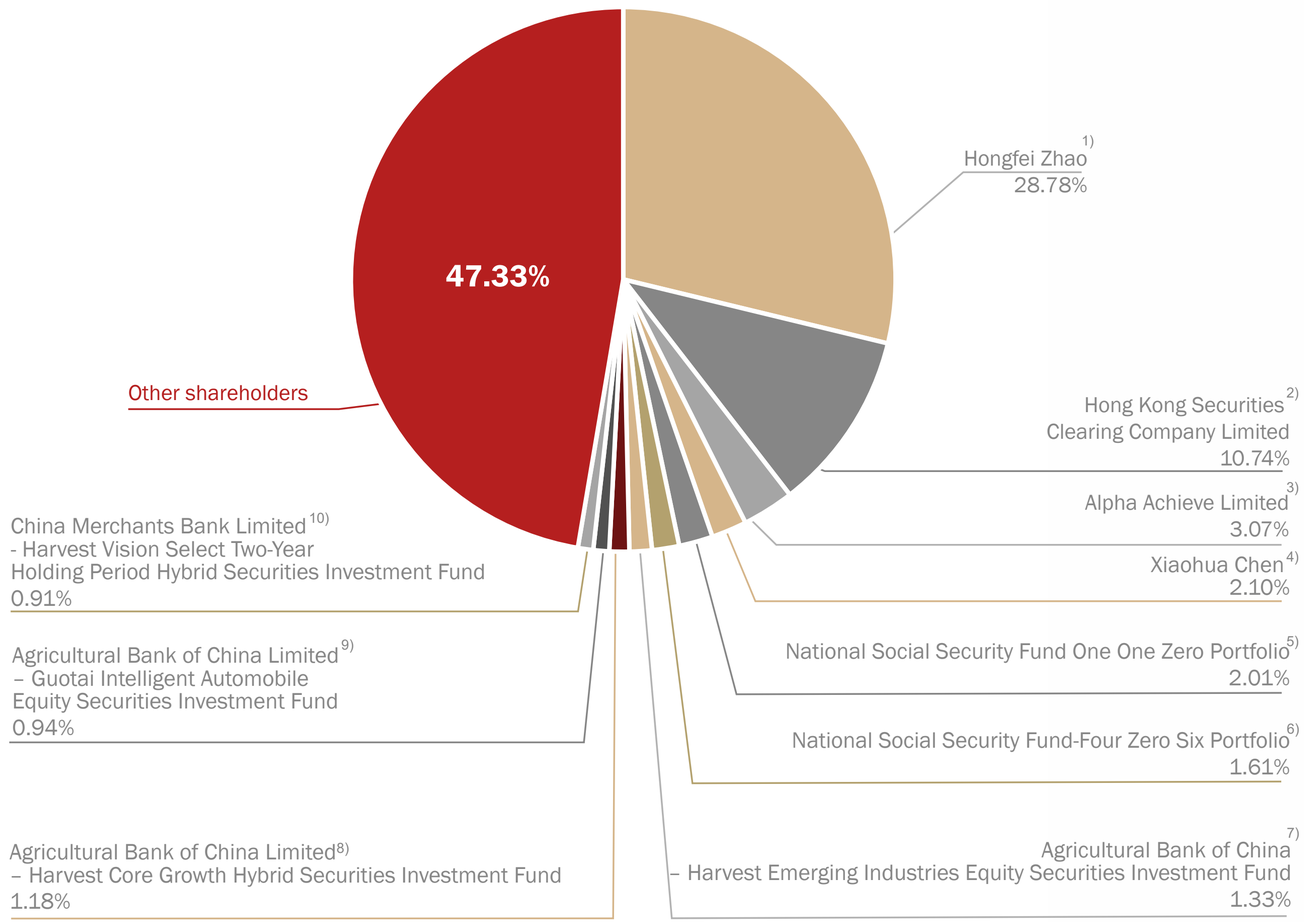
# R&D investments




Millions of CNY

| Millions of CNY | 2021 | 2020 | 2019 | 2018 |
|---|---|---|---|---|
| Amount of R&D investment | 826 | 480 | 339 | 280 |
| R&D investment as a percentage of operating income | 20.02% | 18.27% | 18.56% | 19.10% |
| Capitalised R&D expenditure | 313 | 77 | 58 | 45 |

# Main Shareholders –
# Top 10 shareholders – FY2021




1)赵鸿飞
2) 香港中央结算有限公司
3) 越超有限公司
4)陈晓华
5) 全国社保基金一一零组合
6) 全国社保基金四零六组合
7) 中国农业银行股份有限公司 - 嘉实新兴产业股票型证券投资基金
8) 中国农业银行股份有限公司 - 嘉实核心成长混合型证券投资基金
9) 中国农业银行股份有限公司 - 国泰智能汽车股票型证券投资基金
10) 招商银行股份有限公司 - 嘉实远见精选两年持有期混合型证券投资基金

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