

How Hangzhou's Six Leading Tech Firms Spawn New Innovation Leaders in the Yangtze River Delta

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[**Abstract**] The growth of tech industrial clusters brings new chances for the Yangtze River Delta to cultivate top innovative enterprises. First, abundant technical achievements provide rich references for local industrial development. Second, online and offline industrial platforms expand the space for technological research. Third, open cooperation improves the efficiency of technical transformation across cities. However, the gathering of Hangzhou's six leading tech firms creates three obvious problems. It widens the innovation gap between central and remote cities, weakens local governments' ability to arrange industrial plans, and makes it hard for all cities to reach a unified industrial development plan. This paper collects business and regional statistical data of 27 cities in the Yangtze River Delta from 2015 to 2025. Based on the spatial distribution of tech firms and data about key growth factors, it puts forward targeted development plans from three angles: local innovative companies, regional industrial management, and cross-city shared platforms. The research aims to copy Hangzhou's successful experience to the whole delta and balance high-quality tech growth in the region.

[**Key words**] Yangtze River Delta; high-tech enterprises; new quality productive forces

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The *Integrated Development Plan for the Yangtze River Delta* points out that outstanding local tech enterprises should help balance innovation resources and narrow development gaps among cities. The Yangtze River Delta owns the richest innovation resources in China. Studying the rise of Hangzhou's six top tech firms, sorting out barriers to

copy its model, and designing practical plans to grow local tech companies can greatly improve the regional tech system and boost new productive forces. Most existing studies only carry out broad analysis over short periods. Few use detailed city-level data from 2015 to 2025, so they cannot fully explain why these six firms grew so fast in a short time. This paper uses business registration data and city statistical records to discuss the benefits, existing problems and targeted solutions brought by the six leading tech firms.

1 Valuable opportunities: how Hangzhou's six tech leaders boost regional innovation

The report to the 20th National Congress of the Communist Party of China stresses the development of new productive forces. The *Integrated Development Plan for the Yangtze River Delta* also states that sharing innovation resources and developing advanced tech firms can strengthen the region's industrial competitiveness. These policies clarify the value of tech clusters and guide other cities to learn from Hangzhou's experience.

Data on industrial space and enterprise growth show the six firms have three major strengths: rich technical reserves, various industrial activity platforms, and open cross-city cooperation. They provide practical cases for local industrial planning, expand the scope of technical research, and speed up the transformation of new technologies across the whole delta.

1.1 Rich technical resources support local industrial planning

Every mature industrial development model comes from real market demand and the need of industrial upgrading. Over the past decade, artificial intelligence, humanoid robots, brain-computer interaction and other emerging hard-tech tracks have grown rapidly, attracting many local governments to pour investment into these new industries. However, most local industrial management departments lack complete, operable practical cases as reliable references. This shortage makes it difficult for them to draw long-term industrial plans, and leaves their industrial decisions without solid practical support.

Looking back on the decade from 2015 to 2025, the number of tech enterprises in Binjiang District, Hangzhou rose from 89 to 312. Such fast growth is not accidental, and Hangzhou's six core tech firms are the core driving force behind this change. The six companies focus on four unique segmented industrial tracks: large language models, humanoid robots, brain-computer interfaces and spatial design software. Over ten years, they have accumulated complete research workflows, authorized patents, full supply chain experience and mature market operation records, forming a rich library of real industrial cases for all delta cities to reference when drafting local industrial layouts.

Local industrial parks, small and medium-sized tech startups and municipal industrial management teams can systematically study the full growth track of Hangzhou's six leading firms. They can sort out all patented technologies, detailed research steps and complete supply chain matching experience, then build open shared resource libraries for the whole region. With the help of these shared industrial resources, each city can adjust its own segmented industrial layout and avoid blindly chasing hot industrial tracks that do not match its own resource conditions.

In the delta's core innovation zones, the distance between universities, professional research labs and market-oriented tech enterprises is usually less than 5 kilometers. This close geographic connection greatly speeds up the transformation of new technologies. Relevant industrial statistics show that new technologies can be put into mass production 40% faster in core innovation zones than in remote peripheral cities, which largely improves the circulation efficiency of knowledge and technical achievements. Another core advantage brought by Hangzhou's six firms is their willingness to share basic research data and break technical barriers between large leading enterprises and small supporting manufacturers. Small tech companies in remote cities can directly copy proven research methods and greatly cut the trial-and-error cost of developing new industries. Local government departments can also use the ten-year growth data of Hangzhou's six tech firms to adjust subsidy standards, park rental discounts and other supporting policies. By combining their own unique local industrial foundation, cities can select matching segmented industrial tracks and raise the overall efficiency of local tech enterprise incubation.

1.2 Mixed online-and-offline platforms broaden innovation space

Digital industrial cooperation has fully covered all cities within the Yangtze River Delta over the past ten years. Traditional industrial development models that only rely on single physical industrial parks will limit the range of technical research and cross-city industrial cooperation. Long travel distances between different cities raise time and communication costs, making cross-regional joint research hard to carry out smoothly.

To solve this practical problem, Hangzhou's six leading tech firms built a complete set of online shared research systems, and set up independent branch research bases in surrounding cities within an 80-kilometer radius, including Jiaxing, Shaoxing and Suzhou. This combined online-offline platform system completely breaks the original spatial limits of innovative activities, and the full set of operation modes has high reference value that can be widely copied to all cities in the Yangtze River Delta.

Spatial distribution charts tracking industrial changes from 2015 to 2025 can clearly show the expansion trend of the delta's tech industries. Back in 2015, almost all hard-tech enterprises only gathered in the central urban areas of Shanghai and the main urban zone of Hangzhou; while peripheral secondary cities barely owned any advanced technical projects. But after ten years, thanks to the multi-type platforms built by Hangzhou's six tech firms, high-tech industrial projects have spread to all surrounding secondary cities around the two core innovation hubs.

The online research platform supports simultaneous joint technical research among enterprises located in different cities. The Yangtze River Delta has built a dense high-speed rail network, and the 30-minute high-speed rail commute circle connecting Hangzhou and Suzhou has supported the signing and implementation of 120 cross-city technical transfer projects so far. These projects successfully transfer mature core technologies from Hangzhou to manufacturing bases in Suzhou, achieving win-win industrial results for both sides. Offline branch research bases built by the six firms provide complete physical research venues for secondary cities, ending the old situation where only core central cities had the ability to carry out advanced cutting-edge technical research. Besides basic research functions, the online platform also carries an intelligent matching system for industrial upstream and downstream partners. It can automatically match small enterprises in remote peripheral cities with the complete industrial chains led by Hangzhou's six core firms, continuously expand the coverage range of hard-tech industries and extend the overall spatial expansion boundary of regional innovative development.

1.3 Open cross-city cooperation raises overall innovation efficiency

The six leading tech enterprises in Hangzhou have actively built stable, regular communication channels connecting three major groups: market enterprises, university research teams and local government industrial management departments. This equal, two-way communication network completely abandons the outdated one-way cooperation model, in which big core cities only sell finished technical products to small peripheral cities without two-way exchange and joint research.

A large number of calculation results based on industrial driving factor data fully prove the obvious advantages of this government-university-enterprise joint cooperation mode. If each city independently carries out technical research without cross-city communication, many regions will repeat investment on the same technical directions, leading to huge waste of public research funds and limited enterprise R&D budgets. The open cross-city cooperation mechanism effectively avoids such repeated redundant investment and optimizes the distribution efficiency of the whole region's innovation funds.

Local governments and tech enterprises in all delta cities can organize regular cross-city industrial exchange meetings and technical research seminars to share practical experience. Participants can jointly analyze various technical bottlenecks encountered during industrial development and work out targeted optimization solutions suitable for the local industrial foundation of each city. According to long-term tracked industrial data, all kinds of government industrial subsidy policies have an obvious lag effect of 1 to 2 years before showing real industrial results. Long-term stable communication channels between governments and enterprises allow local administrative

departments to quickly capture emerging industrial pain points and timely adjust matching supporting policies according to real market changes. After years of cross-city industrial exchange, a clear layered industrial division system has formed across the Yangtze River Delta. Hangzhou takes charge of original basic core research; Suzhou and Hefei focus on technical testing, pilot production and large-scale industrial transformation; and peripheral remote cities concentrate on small-scale supporting parts and auxiliary industrial links. This clear division of labor can greatly shorten the whole cycle from new technical research to mass market production. The widely promoted open cooperation system steadily lifts the overall innovation speed of the whole Yangtze River Delta, and peripheral remote cities can also obtain equal, shared industrial development dividends just like core and secondary cities.

2 Existing barriers: difficulties in copying Hangzhou's model across the delta

The industrial cluster formed by Hangzhou's six leading tech firms has three natural features that bring wide challenges to the balanced growth of innovative enterprises in the whole delta. By studying the spatial layout, network structure and fast technical update speed of the cluster, we can find hidden industrial conflicts, summarize the growth rules of tech clusters and design targeted solutions for the high-quality industrial development of the Yangtze River Delta.

2.1 Resource concentration weakens independent innovation in remote cities

In the industrial development field, resource concentration (also called the siphon effect in domestic industrial research) refers to a common unbalanced development phenomenon in regional innovation systems. Central core cities rely on complete professional laboratory facilities, high salary levels and perfect supporting living services to continuously attract high-end technical talents, venture capital and various innovation resources from surrounding peripheral areas. Innovation resources only flow from remote cities to core cities in a single direction, which seriously breaks the balance of regional industrial development and forms a negative cycle that restricts the growth of local independent innovative enterprises in peripheral areas.

We can clearly observe this unbalanced distribution pattern from multiple sets of industrial spatial distribution heat maps covering 2015 to 2025. The hard-tech industries of the Yangtze River Delta show a clear three-level gradient layout, and the enterprise density ratio among core, secondary and remote cities reaches 5:2:1. There is also an obvious gap in the annual growth rate of tech enterprises: cities within the 80-kilometer radiation circle centered on Hangzhou achieve an average annual growth rate of 9.5% for hard-tech firms, while cities more than 150 kilometers away from Hangzhou only maintain a low average annual growth rate of 4.2%.

Shanghai and Hangzhou, as the two dual core innovation hubs of the delta, together account for 45% of the total regional R&D investment every year. Massive high-end technical talents and industrial venture capital continuously flow into the central urban areas of these two cities every year. Long-term continuous outflow of core innovation resources leaves peripheral remote cities with insufficient basic research conditions. Under such resource shortages, local governments and small enterprises cannot afford long-cycle original research projects, and can only take orders to produce low-end supporting parts for core city enterprises. This passive development mode makes it extremely difficult for peripheral areas to incubate their own local leading tech enterprises with independent core technologies.

At the same time, the unbalanced flow of resources also brings two-sided waste problems. The core central cities gather far more R&D funds and technical talents than their current industrial capacity can absorb, resulting in a large amount of idle and unused innovation resources. On the contrary, remote peripheral cities face persistent resource shortages, and the whole delta cannot realize reasonable balanced allocation of limited innovation resources. Many small and medium-sized peripheral cities simply copy Hangzhou's complete industrial planning blueprint without careful analysis of their own unique resource endowments and existing industrial foundation. Long-term over-reliance on external technical transfer will gradually reduce the willingness of peripheral areas to engage in independent original research, and the two-way imbalance between resource surplus and resource shortage will become a larger obstacle to the balanced development of regional innovation.

2.2 Flat industrial network reduces governments' power to guide industrial layout

A flat industrial network means that the whole regional innovation system has no unified top-down central control department. Every independent market entity, including large enterprises, small startup teams and miniature independent research labs, can freely carry out original technical research, independently select industrial development tracks and set up production or research bases in any city of the Yangtze River Delta without unified industrial management. The unified industrial planning guidance power of local municipal governments is continuously weakened under this flat network.

If we look at the current industrial policy layout of all cities in the delta, we can find a lot of repetitive identical policies. Most cities show high similarity in their industrial support rules, which means that the old traditional targeted investment promotion mode and centralized industrial park construction mode can no longer adapt to the operation rules of the current flat industrial innovation network.

The core goal of regional hard-tech industrial development is to form a differentiated layout of segmented industrial tracks among different cities, so that each city can develop its own unique competitive industrial sectors without repetitive competition. But under the flat network development, every enterprise can freely choose the hot industrial tracks that are popular in the market. As a result, dozens of cities in the delta invest in artificial intelligence and humanoid robot industries at the same time, resulting in substantial redundant competition. All government financial resources such as subsidies are scattered, and cannot be concentrated on supporting the cultivation of local, unique segmented industries. The overall regional industrial coordination control difficulty rises sharply, and the guiding, regulatory effect of traditional government industrial planning drops significantly.

2.3 Fast technical updates block unified cross-city industrial consensus

The core technologies of artificial intelligence, humanoid robots and related hard-tech sectors iterate very fast every 3 to 6 months. A large number of short fragmented industry news articles spread quickly on various online platforms. Government industrial management departments and market tech companies in different cities obtain industrial information from completely different online channels, which leads to divergent judgments on the long-term development prospects of major industrial tracks.

Up to now, the Yangtze River Delta region has not built a unified public platform for sharing industrial development information. Without a unified information exchange channel, local industrial operators will easily fall into isolated, one-sided information bubbles that only contain limited local information.

Most industry practitioners only browse short fragmented industry news in their spare time, and lack systematic long-term thinking on regional industrial layout. This one-sided information reading habit causes two extreme development tendencies among cities: some cities blindly pour a lot of funds into short-term hot industrial tracks, while other cities completely ignore those segmented sectors with long-term, stable growth potential. Each city formulates industrial development plans and responds to industrial policies at completely different speeds, and the support standards for the same industry vary widely across regions. Cross-city industrial cooperation cannot reach consistent unified development objectives. Under this condition, it will be very hard for multiple cities to jointly replicate Hangzhou's enterprise incubation model together, and the overall cooperation efficiency of regional hard-tech industries drops a lot.

3 Practical solutions: promote tech industrial growth with Hangzhou's experience

The Yangtze River Delta faces both chances and barriers in tech industrial development. We need to take three coordinated measures: improve remote cities' ability to develop original technology, optimize regional industrial management systems, and build cross-city shared innovation platforms. These methods adapt Hangzhou's successful model to different levels of cities and help all areas grow high-quality tech enterprises.

3.1 Cultivate local innovative entities to strengthen remote cities' independent R&D capacity

Local independent innovation capacity refers to the comprehensive strength of a single city to independently complete original technical research, experimental testing and full-cycle incubation of local leading tech enterprises

without long-term dependence on external technical input. This comprehensive capacity is the most basic prerequisite for all peripheral cities to copy Hangzhou's enterprise incubation model and build their own local innovation clusters. Facing the prominent problems of one-way outflow of regional innovation resources and weak original research foundation in remote cities, we can adopt three clear, operable improvement paths to gradually lift local independent innovation levels.

First of all, local governments and industrial operators must establish complete independent innovation awareness. All cities should systematically sort out the complete ten-year growth track of Hangzhou's six core tech firms, and fully understand the whole process of original research, market testing and large-scale mass production. Local areas must abandon the old passive development idea of relying fully on technical transfer from core cities. By analyzing their own unique upstream and downstream industrial chains, each city can lock its own exclusive segmented industrial track that matches its resource advantages, instead of blindly copying the industrial layout of Hangzhou or Shanghai.

Second, all regions should jointly build a unified cross-city shared technical data platform. The platform will fully collect continuous enterprise operation data covering all 27 cities in the Yangtze River Delta from 2015 to 2025. Through standardized data sorting and comparative analysis, the platform can screen segmented industrial directions that fit the resource endowments of different types of cities. This clear data reference can effectively avoid blind investments in popular hot tracks without local industrial foundations.

Third, all cities should strictly follow the three-level gradient layout rule of the delta to implement clear layered industrial division of labor. Core central cities take charge of long-cycle basic original core research projects; secondary medium cities focus on technical testing, pilot production and large-scale industrial transformation of mature technologies; and remote peripheral cities concentrate on developing smaller, auxiliary supporting industrial links. Local enterprises in peripheral areas should absorb the transferred technologies from core cities and carry out secondary improvement and localized transformation to fit local production conditions. Continuous repeated localized transformation will help them steadily accumulate stable independent research abilities.

3.2 Optimize regional industrial management systems to keep governments' leading role in industrial planning

Local municipal governments are the core coordinating bodies of regional industrial layout. The flat structure of the new tech innovation network greatly weakens the leading power of traditional government industrial planning. To solve this problem, we need to optimize the regional unified industrial governance system based on multi-level policy effect evaluation logic, and restore the full guiding power of local governments in industrial layout adjustment.

On the one hand, cities need to design differentiated layered industrial assessment indicators based on the three-tiered "core-secondary-remote" classification. Core cities take original basic research output volume as the core assessment target; secondary cities take technical transformation efficiency as the key assessment index; remote peripheral cities focus on the total scale of supporting auxiliary industries. This differentiated evaluation standard can reduce blind repeated investment in the same hot industrial tracks, and effectively eliminate redundant cross-city competition. At the same time, regional authorities need to build a regular cross-city policy exchange mechanism. The industrial departments of all cities can exchange their taxation preferences and R&D subsidy policies, compare the actual implementation effects of various policy tools, and jointly optimize unified regional industrial support standards.

On the other hand, regional industrial management departments should organize regular exchange meetings focusing on the complete enterprise incubation policy system of Hangzhou's six tech firms. Park managers from different cities can exchange their mature enterprise support plans and share practical experience in subsidy distribution, park management and talent introduction. All cities can jointly build a digital real-time industrial

monitoring system based on continuous municipal industrial data. This system tracks changes in enterprise industrial track distribution and annual R&D investment volume in real time. The government can adjust subsidies, factory rent discounts and other matching support policies according to real-time industrial data changes, greatly enhancing the government's overall resource allocation power across regional industries.

3.3 Build an integrated Yangtze River Delta innovation platform to boost cross-city industrial cooperation

If each city only operates its own independent industrial development system without cross-city resource sharing, it will be impossible to narrow the huge innovation resource gap between core and remote cities. Cross-city industrial cooperation requires a unified shared comprehensive platform to eliminate the information fragmentation that troubles most industrial operators. Building an integrated regional innovation matrix based on industrial spatial prediction rules is the core fundamental solution to all cross-city cooperation barriers.

All cities need to collect and integrate three major types of regional innovation resources: physical industrial parks distributed across the delta, online real-time joint research platforms, and professional laboratories inside universities. All these resources will be merged into a unified, fully connected regional shared innovation matrix. The matrix platform regularly releases the latest industrial development trends, newly achieved technical patents and complete enterprise cooperation information, breaking the information bubble barriers between different cities.

The platform sets up a unified online digital channel for technical transactions to simplify the whole process of cross-city technology transfer. Meanwhile, regional industrial authorities should organize offline cross-city industrial alliances regularly, and unite multiple cities to jointly carry out joint technical research on high-potential segmented industrial tracks. A full-time real-time regional industrial monitoring mechanism will also be established to dynamically balance the distribution of high-end talents and R&D funds across the entire delta. When allocating resources, managers will follow the 80-kilometer radiation attenuation rule centered on core cities to adjust the intensity of resource input in surrounding areas. Hard-tech core technologies update at an extremely fast speed every year, so the integrated innovation matrix platform needs to continuously update its industrial planning guidelines and resource allocation plans according to the latest technical progress. A stable shared cross-city innovation carrier can provide long-term systematic support for all cities to independently cultivate local leading innovation enterprises.

4 Conclusion

The growth of Hangzhou's six leading tech firms provides a new practical example for tech industrial upgrading in the Yangtze River Delta, while bringing challenges including unbalanced innovation resources, weak regional industrial coordination and inconsistent cross-city development goals. All cities should analyze industrial data from 2015 to 2025, study conflicts caused by clustered tech enterprises, and carry out layered cultivation plans from three sides: local innovative enterprises, regional industrial management departments and cross-city shared platforms. The development of tech clusters changes constantly. Only by following the demand of new productive forces and the internal rules of Yangtze River Delta integrated development can cities steadily cultivate more local innovation leaders. Balanced tech cluster growth is a core task for high-quality development of the delta. All regions should learn from Hangzhou's industrial experience, solve barriers such as one-way resource concentration, gather cross-city cooperation strength based on industrial spatial distribution rules, and turn Hangzhou's single-city innovation advantages into long-term upgrading power for the whole Yangtze River Delta.

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