

Open Coding

Primary Sources	Conceptualization	Initial Categorization
We also see substantial demand for new consumer goods both domestically and overseas.(a1)	Domestic and overseas demand for new consumer goods(A1)	Personalization and customization of products(B1)
They have some customized needs, so we're also thinking about how we can produce these customized, small-batch, multi-variety products for them at the lowest possible cost. That's why we're partnering with JD.(a2)	Customized production and collaboration(A2)	
In the first half of this year, China witnessed robust momentum in consumption recovery, accompanied by a growing trend toward personalized and diversified consumption.(a3)	Consumption recovery and the trend toward personalization (A3)	
Meanwhile, driven by precise consumer insights, the development of the company's new graphene ski goggles has also been accelerated.(a4)	Consumer insights accelerate product development(A4)	
Through deep collaboration with major internet enterprises, we gain consumer insights and leverage AI and big data capabilities to understand what types of products consumers prefer. This information is then translated into product definitions, effectively supporting early-stage design and decision-making.(a5)	Consumer insights and product design decisions(A5)	
From definition, tooling, implementation to production, we effectively connect the development of new products favored by consumers with the premium production capacity of our backend collaborative factories, delivering them at the most optimal cost and quality.(a6)	Consumer demand-driven product development and production capacity coordination(A6)	
The Super Virtual Factory leverages this cross-regional, capacity-coordinated, and digitally intelligent innovation platform to scientifically define product concepts and guide design based on user needs.(a7)	User requirements guide design(A7)	
Successful products should be user-centric, driven by user needs, and implemented incrementally to deliver tangible value.(a8)	User-driven product development(A8)	
I analyzed this product—for instance, the washer-dryer combo that was quite popular a few years ago. What do buyers of washer-dryers care about? We found that factors like age, gender, region, occupation, and personal preferences all play a role.(a9)	Product analysis and consumer preferences(A9)	
We partnered with JD.com, which provided us with some consumer data. So what exactly is this consumer data? It means that through consumer insights, I can analyze certain consumer behaviors. In fact, we've also produced some samples.(a10)	Consumer data and sample development(A10)	Analysis of consumer behavior characteristics (B2)
Take floor scrubbers as an example: the proportion of male versus female consumers or the demographic breakdown of users in a given country determines the machine's weight; living space dictates the product's battery life, and so on.(a11)	Consumer characteristics influence product design(A11)	
It is understood that multiple niche consumer segments, including small-town youth and female consumers, have each entered the trillion-yuan market.(a12)	The enormous scale of niche market segments(A12)	
In Changzhou's industrial smart manufacturing innovation model, JD Cloud has partnered with China Mobile Changzhou and Zhiyun Tiangong to jointly build a 5G+AI industrial smart manufacturing cloud platform for Zhonglou District in Changzhou.(a13)	5G+AI industrial smart manufacturing cloud platform cooperation(A13)	
On October 19, 2021, the Jiangsu sub-venue of the National Mass Entrepreneurship and Innovation Week was held in Changzhou. At the event, the “5G Industry Slicing + AI Super Virtual Factory Project” was officially launched, achieving the integration of “consumer internet” and “industrial internet.” (a14)	5G+AI project launch and internet integration(A14)	
This project is operated by Jiangsu Zhiyun Tiangong Technology Co., Ltd., a local enterprise based in Changzhou. Leveraging the super virtual factory built on the “Changzhou Industrial Cloud,” the company has successfully bridged the gap between the “consumer internet” and the “industrial internet.” (a15)	Integration of consumer and industrial internet(A15)	(B3)

This division of labor and collaboration, enabled by 5G+AI technology, has facilitated the digital and intelligent transformation of specific enterprises across design, production, manufacturing, and marketing processes.。 (a16)	5G+AI technology empowers enterprises in their digital and intelligent transformation(A16)	
Among them, Changzhou Mobile leveraged its strengths in 5G and edge cloud to build a high-quality, reliable cloud-network infrastructure.(a17)	5G and edge cloud infrastructure development(A17)	
JD Smart Manufacturing Cloud is JD Cloud's end-to-end digital and intelligent solution for the industrial manufacturing sector, leveraging its application of digital and intelligent technologies.(a18)	JD Smart Manufacturing Cloud digital intelligence solutions(A18)	Digital intelligence technology(B4)
By integrating next-generation digital intelligence technologies and methods—including artificial intelligence, machine vision, big data analytics, and consumer data insights—we digitize existing manufacturing capacity and consumer demand. This approach simultaneously unleashes enterprises' production, innovation, and customization capabilities while coordinating and balancing capacity utilization. It enables the production of premium goods for consumer markets and empowers brands to create products with formidable competitive strength.。 (a19)	Digital intelligence technology convergence(A19)	
Our Zhonglou District Government has established an initiative called the Industrial University Cloud Platform.(a20)		
Government departments in Changzhou, Jiangsu Province conducted extensive research on this matter and decided to leverage the local information industry's strengths to build an open industrial big data platform, thereby driving the intelligent and digital transformation of manufacturing.(a21)	Government helps establish industrial big data platform(A20)	Helping to build a “Super Virtual Factory” (B5)
The government has established an information platform through flexible approaches, which not only helps businesses overcome difficulties arising from multiple pressures such as the pandemic but also opens up broader prospects for their long-term development.(a22)	The government establishes an information platform.(A21)	
From their practices, we can see that in serving and assisting enterprises, the government must not only innovate methods and leverage digital tools effectively, but also innovate approaches and identify the right angles.(a23)	Government innovative service approaches(A22)	
To get this “super virtual factory” up and running, the local government has adopted a service procurement approach.(a24)	Government procurement of services(A23)	Government measures(B6)
Today we'll head to Jiangsu to see what innovative measures the local government has implemented to help businesses overcome difficulties.(a25)	The government is adopting innovative approaches to assist enterprises.(A24)	
To build this “super virtual factory,” Zhonglou District in Changzhou City partnered with multiple telecom operators to establish 5G communication base stations and allocated 60 million yuan in special funds for digital infrastructure development.(a26)	Allocate special funds(A25)	Policy guidance and financial support (B7)
This holds significant importance for both the enterprise and the local economic development.(a27)	Impact of government measures on businesses and the economy(A26)	
With the support of relevant policies, the cost of adopting artificial intelligence for businesses may be as low as a few thousand yuan, not to mention that we have orders to back them up.(a28)	Policy support lowers the barrier to AI adoption(A27)	
GreeBo is an export-oriented enterprise specializing in garden machinery products, primarily targeting the European and American markets. Its lawn mowers alone account for 27% of sales in these regions.。 (a29)	Corporate market positioning and share(A28)	
To address the crisis, enterprises are considering shifting their focus to the domestic market, but they still have some reservations.(a30)	Concerns regarding corporate market transformation(A29)	
We've been deeply troubled by the prospect of rushing into domestic sales. If we were to produce products without proper market research, they might not sell well, inevitably leading to a large amount of unsold inventory piling up. This could result in losses even greater than if we hadn't pursued it at all.(a31)	Domestic product adaptation risk(A30)	Enterprise transformation needs(B8)
However, for China's manufacturing sector as a whole, the reality is that it faces the challenge of uneven digital and intelligent capabilities, as well as varying levels of willingness to pursue transformation and upgrading.(a32)	Uneven digital and intelligent capabilities in manufacturing and disparities in transformation willingness(A31)	
Especially in recent years, a single mask—by 2020, as post-90s and post-00s entered the workforce, no one was willing to take on this job. This directly impacts production capacity.(a33)	Labor market changes impact production capacity(A32)	

Under the new dual-circulation development paradigm, digital and intelligent transformation has become a driving force for China's economic growth. A new wave of industrial transformation is accelerating the deep integration of the real economy and the digital economy, with the digital and intelligent upgrading of manufacturing attracting particular attention.(a34)	Digital intelligence transformation of manufacturing under the dual circulation strategy(A33)	
We have a weakness: we haven't penetrated the domestic market.(a35)	Challenges in domestic market development(A34)	
However, most factories are accustomed to large-scale, extensive production methods and are unable to meet the personalized, small-batch, and short-lead-time production demands brought about by consumption upgrades.(a36)	Challenges in production model transformation(A35)	
In the long run, it will also help drive corporate transformation and upgrading, thereby promoting high-quality development of the local economy.(a37)	Long-Term economic and corporate transformation promotion(A36)	
How can we bridge supply chain gaps, clear bottlenecks in industrial chains, and address pain points for businesses? How can we leverage new technologies like big data to help companies better connect with markets and upstream/downstream enterprises? Local governments across the country are exploring solutions.(a38)	Optimization of corporate supply chains and industrial chains(A37)	
Some enterprises have been forced to halt production due to supply chain disruptions and insufficient raw material supplies.(a39)	Supply chain disruptions impact production(A38)	Supply chain disruption(B9)
Some enterprises, however, have been forced to halt production lines due to a complete absence of orders.(a40)	Order shortages have caused production to stall.(A39)	
However, this is only the first step in the transformation. The most crucial question is: Where will the orders come from?(a41)	Challenges in securing orders after transformation(A40)	
This case study describes how Jiangsu Zhiyun Tiangong Technology Co., Ltd., a local enterprise in Changzhou, addressed the challenge of “excess capacity” in traditional manufacturing by bridging the gap between the “consumer internet” and the “industrial internet.” (a42)	Transformation of surplus capacity in traditional manufacturing(A41)	
In stark contrast to the booming consumer market, traditional manufacturing industries grapple with the problem of “excess capacity.” Many factories are still fighting tooth and nail for orders, even resorting to price wars.(a43)	Overcapacity in manufacturing and market competition(A42)	High idle capacity utilization rate (B10)
According to publicly available data such as the “2016-2022 China Market Operation Trends and Development Prospects Analysis Report,” the idle capacity rate among China's seven major consumer goods manufacturers—covering 3C products, home appliances, cosmetics, snacks, and home furnishings—reaches as high as 22.1%. This equates to surplus production capacity valued at 1.49 trillion yuan.(a44)	Idle capacity rate in the consumer goods industry high(A43)	
The pain points for industrial AI service providers include a scarcity of negative samples on-site, extended delivery cycles, high difficulty in switching production lines, elevated on-site deployment costs, and substantial model maintenance expenses.(a45)	Pain points for industrial AI service providers(A44)	
Even though industry players have already entered the market and triggered intense competition, the penetration rate of industrial AI quality inspection remains relatively low. Significant challenges persist in industrial AI that warrant serious attention.(a46)	The current state and challenges of industrial AI quality inspection(A45)	Difficulties in implementing industrial AI projects (B11)
The pain points for factories include lengthy project implementation cycles, opaque technology, slow changeovers and line switching, high subsequent maintenance costs, and expensive equipment.(a47)	Pain points in factory industrial AI applications(A46)	
However, in China, there are also numerous small and medium-sized manufacturing enterprises with low operating profits. Even though they recognize that digital and intelligent capabilities can help businesses improve quality and efficiency, they perceive the barriers to entry as high and lack sufficient funds to drive transformation.(a48)	Digital intelligence transformation barriers for small and medium-sized manufacturing enterprises(A47)	Impact of the pandemic and response measures (B12)
We observe that many factories are relatively small in scale. Given the high barriers to traditional digital and intelligent transformation, their willingness to upgrade and transform remains limited.(a49)		
How was this product manufactured before? A small lens was cut into individual pieces, then CNC-machined. This process was both time-consuming and material-intensive, resulting in extremely high costs.(a50)	Traditional manufacturing processes are costly.(A48)	

In recent years, competition in China's manufacturing sector has intensified. Driven by demographic shifts, rising living standards, escalating labor costs, and increasingly personalized customer demands, manufacturers now face significant pressures regarding costs and operational efficiency.(a51)	The manufacturing sector faces intense competition and cost pressures.(A49)	
Previously focused on foreign trade, but in recent years, securing foreign trade orders has become increasingly challenging. This has resulted in a significant portion of high-quality production capacity remaining underutilized. Simultaneously, rising domestic production costs have left enterprises walking on thin ice in their operations.(a52)	Challenges in foreign trade and cost pressures(A50)	
Then, in recent years, we've seen the rise of the influencer economy. This trend has led to customized products, which are typically produced in small batches rather than large quantities. However, the cost of creating molds for small-batch production is extremely high.(a53)	Customized small-batch production costs high(A51)	
Significant cost increases have led to thinner profit margins for businesses. Meanwhile, these months are traditionally the slow season for the company's products, resulting in a substantial drop in orders.(a54)	Impact of rising costs and the off-season(A52)	
For each device I have, it's as if I need to place a case server under every machine just to run my model. However, the actual cases utilized only take up about 65% to 70% of each device's capacity, meaning the remaining 30% is wasted.(a55)	Waste of computational resources(A53)	
However, amid the pandemic's impact, domestic production and sales also face challenges.(a56)	Impact of the pandemic on domestic production and sales (A54)	
Since March, the resurgence of the pandemic has exceeded expectations, and downward pressure on the economy has continued to intensify, with many enterprises encountering various difficulties.(a57)	The Impact of the pandemic on the economy and businesses(A55)	
However, the pandemic also plunged Greece into a predicament.(a58)		Impact of the pandemic and response measures (B13)
Since mid-March, outbreaks have occurred in multiple regions across the country. Numerous factories have suspended operations, transportation between regions has been disrupted, and various raw materials essential for production have failed to arrive on time. Existing orders cannot be fulfilled, leaving enterprises at risk of breaching contracts.(a59)	Supply chain disruptions caused by the pandemic(A56)	
Chen Yin, Chairman of GreeBow (Jiangsu) Co., Ltd., stated: "Due to the pandemic, raw material and shipping costs have surged dramatically. Currently, our logistics expenses account for nearly 20% of our sales revenue." (a60)	Cost increases caused by the pandemic(A57)	
Amid the pandemic, some factories have orders but cannot guarantee production, while others have no orders, leaving their workforce and production lines largely idle.(a61)	Production imbalance caused by the pandemic(A58)	
It can accurately identify which equipment can produce specific products, which equipment is idle, and which production lines have excess capacity. This enables rapid aggregation of regional production capacity, organic allocation of production resources, and effective optimization and enhancement of the production capacity structure, thereby achieving industrial restructuring and upgrading. (a62)	Capacity optimization and industrial structure upgrading(A59)	
Strengthen coordination and comprehensive utilization of production capacity among enterprises.(a63)	Production capacity coordination and resource optimization(A60)	
We utilize our "super virtual factory" to deconstruct production capacity, breaking down these products into individual components. Through production process tag matching, we identify available capacity locally and in other regions like Zhejiang and Guangzhou, while helping other enterprises fully utilize their idle capacity.(a64)	Production capacity breakdown and optimized allocation(A61)	Production capacity coordination(B14)
Then, I'll have access to his production capacity data. With this information, I can provide him with the optimal recommendation for manufacturing this product.(a65)	Capacity assessment and optimal recommendations(A62)	
Since we have a clear understanding of each company's basic production capacity, we know which factories have surplus capacity. I can then allocate this surplus capacity to them for production. This essentially involves leveraging high-quality surplus capacity to help certain enterprises monetize their resources, enabling them to manufacture such products.(a66)	Allocation and realization of surplus capacity(A63)	

To truly enable backend operations to rapidly embrace digital and intelligent transformation during manufacturing, we categorize enterprises' surplus capacity based on factors like equipment and processes. This helps factories effectively connect and utilize their spare capacity, quickly finding outlets for it.(a67)	Labeling and effective utilization of surplus production capacity(A64)
Upon entering the production phase, Zhiyun Tiangong aggregates regional surplus capacity in the cloud to rapidly match production demands. This is complemented by dynamic capacity management and production process monitoring services, ensuring flexible production and quality manufacturing.(a68)	Order aggregation and demand matching(A65)
The ‘Super Virtual Factory’ aggregates consumer purchasing demands in the cloud by directly linking various online and offline channels, consolidates orders on the platform, and centrally dispatches them to factories.(a69)	
Driven by orders, it has attracted a large number of manufacturing plants. By employing lightweight artificial intelligence, it helps traditional enterprises improve quality, reduce costs, and enhance efficiency, thereby creating high-quality production capacity and ultimately promoting regional industrial upgrading and transformation.(a70)	Order- driven and industrial upgrading(A66)
All these machines are at WeiYi Company. I can label each injection molding machine to indicate it's already in production.(a71)	Equipment labeling(A67)
The “Super Virtual Factory” enables regional production capacity to achieve a closed-loop process encompassing “raw data collection, factory capacity analysis, regional capacity analysis, capacity trading, and capacity transaction analysis.” It transforms surplus capacity through five steps: real-time capacity integration, consumption data analysis, precise capacity matching, multi-factory collaborative manufacturing, and multi-round marketing initiatives. This model can replicate the “Changzhou Model” across different regions, facilitating the integration of more regional production capacity into the “Super Virtual Factory” network and accelerating industrial upgrading across broader areas.(a72)	Production capacity conversion of the super virtual factory(A68)
At its core, Zhiyun Tiangong can rapidly aggregate regional production capacity, organically allocate production resources, and effectively optimize and enhance capacity structures. This facilitates industrial restructuring and upgrading, comprehensively elevating the value of Chinese manufacturing.(a73)	Cloud-based production capacity aggregation(A69)
The ‘Super Virtual Factory’ aggregates the production capacity of various manufacturing enterprises in the cloud.(a74)	
This is based on a different model we use. For instance, with that enterprise on Weibo, I only handle the design for them. They have their own production capabilities, so I essentially serve as their designer—it's a platform plus my service model.(a75)	Design service model for enterprises(A70)
If the price is high enough, you'd be willing to invest in tooling, undertake production work, and evaluate the profitability.(a76)	Product revenue assessment(A71)
We designed three products and scored them using our engine. We later discovered that the shape, battery capacity, and ratio of dirty wastewater were the most suitable, yielding the highest scores and offering the best value for money.(a77)	Product design and scoring feedback(A72)
When it comes to tracking down the source, I usually look for the most common one—my sales channels. And as I mentioned earlier, many small appliance companies would rather replace the product than repair it.(a78)	Product traceability and after-sales strategy(A73)
With this product design in place, I then proceed to break it down. That is, when manufacturing this product, what individual components are required? How should these components be sequenced? What materials are used, and what processes are applied? These processes constitute the equipment.(a79)	Product component breakdown(A74)
Many small appliance manufacturers in places like the Pearl River Delta region operate on a gamble when producing goods. They bet on how often you'll use the product in a year—typically, it's designed to break down after about seven uses, right? If you don't use it seven times within a year, it won't break. But once the year is up, it's past its prime, right? So they'd rather replace it than repair it, because repairs cost more.(a80)	Production strategy for small appliance manufacturers(A75)

Product
coordination(B15)

To be honest, industrial design is actually quite challenging. From the initial design phase all the way to mass production, there are still many hurdles to overcome.(a81)	Challenges in industrial design and production transformation(A76)	
The design is structured this way. We have our own industrial design engineers because we originally collaborated with JD.com, whose highly skilled industrial design team joined us.(a82)	Industrial design team collaboration(A77)	
Manufacturers of crude oil extraction machines possess complete production lines, including injection molding and motor manufacturing capabilities. However, some enterprises lack these production capacities. Therefore, I need to distribute these components through the platform to various enterprises, enabling assembly at dedicated assembly plants.(a83)	Assignment and assembly of production tasks(A78)	
With the support of the “super virtual factory,” new production lines and orders are now in place. Trial production of the new product began in April, with an official launch expected in August.(a84)	Production launch and product launch schedule(A79)	
JD Cloud leverages comprehensive network data to generate precise consumer-side market insights, enabling capacity breakdown and precise order matching.(a85)	Data-driven market insights and order matching(A80)	
On the consumer side, the Super Virtual Factory collaborates closely with major internet companies like JD.com and ByteDance, leveraging “AI + big data analytics” to gain the most accurate and timely consumer insights.(a86)	Consumer insights and internet collaboration(A81)	
Leveraging the “Super Virtual Factory” to model and analyze consumer-end big data, GreeBao successfully penetrated the domestic market by developing its new brand “One-Chip Home” washer-mop combo unit, while simultaneously resolving supply chain challenges on the platform.(a87)	Consumer-end big data analysis(A82)	Consumption coordination(B16)
In terms of distribution channels, Zhiyun TianGong has achieved comprehensive coverage across all domestic e-commerce platforms while simultaneously offering Amazon cross-border e-commerce services for overseas markets, particularly major markets such as the United States and Japan.(a88)	Sales channels(A83)	
Currently, the “Super Virtual Factory” has integrated production capacity data from over 1,000 enterprises across 18 regions, connecting more than 70,000 pieces of equipment.(a89)	Enterprise access platform(A84)	
Last month, Mirang Industrial Design, China's largest seating research institute, officially joined the platform.(a90)		
Manufacturing enterprises accessing the platform are even more numerous.(a91)		
On the surface, these two platforms act as matchmakers, but in reality, they operate by leveraging information flows.(a92)	Information flow management (A85)	
On one hand, we leverage industrial artificial intelligence, machine vision, and big data technologies to help manufacturing enterprises enhance quality, reduce costs, and improve efficiency by collecting data on-site through cameras or IoT devices. (a93)	Industrial ai and data acquisition empower quality improvement, cost reduction, and efficiency gains(A86)	
Currently, the “Super Virtual Factory” has integrated production capacity data from over 1,000 enterprises across 18 regions, connecting more than 70,000 pieces of equipment.(a94)	Platform scale and device connectivity(A87)	Data source(B17)
Open to small and medium-sized enterprises for free access, connecting businesses of all sizes through data to form a “super virtual factory.” (a95)	Access corporate data(A88)	
On this platform, we will integrate the operational data of our manufacturing clients who utilize our services.(a96)	Access manufacturing customer information(A89)	
This is also one of our data implementation products. It is precisely through these products that I have access to more data. With this data, we can then establish a comprehensive pipeline for big data integration.(a97)	Data products collect data(A90)	
However, this introduces a new challenge: data transmission. Since I need to take one or two photos for each product inspection, the volume of data transferred is substantial.(a98)	Data transmission challenges(A91)	
Whether it's a good or bad product, or any other type of defect, I can categorize them all. Once these categories are established and the data is collected, I then integrate it with the entire production line. Since I've installed sensors at every critical point along the line, I gather data from each specific section.(a99)	Intelligent data acquisition(A92)	

This is because Factory Management Master can be deployed in a lightweight manner on the production floor without modifying existing production lines. It enables the integration of various data sources, including visual data, and combines artificial intelligence models, machine vision, big data analytics, and cloud-based elastic computing power to empower on-site factory management.(a100)	Lightweight digital intelligence solutions(A93)	
Since equipment needs to be moved around frequently, using a wired network results in extremely low efficiency across the board. In contrast, 5G networks offer high bandwidth and low latency. Without 5G, while download speeds may be fast, upload speeds remain very slow.(a101)	5G network optimization(A94)	
China Mobile also leveraged a frequency band called 4.9 GHz. Within this band, it significantly expanded its upload capacity. For download speeds, it only requires a single interface for downloading, thereby achieving the entire parameter set and utilizing MEC's selection distance to accomplish this.(a102)	MEC technology(A95)	
Within this government-established “super virtual factory,” a large screen provides a clear overview of which equipment can produce what products, which equipment is idle, and which production lines have surplus capacity. This system breaks geographical barriers, enabling rapid and efficient coordination.(a103)	Production capacity visualization and cross-regional coordination(A96)	
By transmitting such privatized data over public networks, we also achieved data security ~~considerations.~~<u>Therefore</u>~~considerations.~~ <u>Therefore</u>, our solution won the national first prize in the Ministry of Industry and Information Technology's Blossom Cup 5G Competition that year.(a104)	Public network data transmission security(A97)	
Our traditional network simply couldn't handle the load, so we partnered with the local mobile operator. They built base stations directly within the entire factory complex, enabling seamless data transmission through a 5G network.(a105)	The base station is located inside the factory(A98)	Data processing(B18)
At a critical juncture, the “super virtual factory” leveraged big data search and analysis to identify a breakthrough point within the industrial chain.(a106)	Big data-driven industrial chain optimization(A99)	
Aggregate core capabilities and data from different regions, enterprises, and processes through a platform approach, connecting the dots to form a cohesive whole and enabling holistic coordination.(a107)	Platform-based resource integration and coordination (A100)	
Next, through this big data analysis, I can pinpoint which step caused defects in which specific area.(a108)	Data analysis product defect sources(A101)	
Bring in a professional operations team to conduct in-depth analysis of data such as user demographics and market size across different industries and enterprises. Develop tailored solutions for each enterprise and provide precise production guidance.(a109)	Data-driven decision-making(A102)	
The ‘Super Virtual Factory’ analyzes consumer-end big data through modeling.(a110)	Consumer data analysis(A103)	
This approach significantly reduces computational examples, as 30% of the cost for a single device is attributed to computational examples. Consequently, it immediately helps businesses save a substantial amount of money.(a111)	Cost savings in the example(A104)	
As a product of the industrial internet era, Zhiyun Tiangong's Super Virtual Factory leverages industrial artificial intelligence and big data technologies to achieve resource reallocation.(a112)	Optimal allocation of resources(A105)	
It depends on the material. Our current solution primarily focuses on 3D exterior designs. This one I have here is for Apple. I'll provide it, but we also need to incorporate the anti-counterfeiting code. The anti-counterfeiting code was added in 2021. At that time, we were working on the mid-frame for the Mate 60. The Mate 60 uses the Xuanwu architecture, right? It has a mid-frame in the middle. For this mid-frame, all the external packaging components produced for this product are entirely made by our own product line. . (a113)	Application of 3D appearance inspection and anti-counterfeiting technology(A106)	Intelligent detection and quality control
This is an OCT technology that employs high-precision analysis for detection. It works by projecting a laser beam onto the surface, which then reflects back. This reflection captures the entire internal structure as an image, generating what's called a 3D point cloud. I analyze this 3D point cloud to obtain the results—essentially, curve detection.(a114)	OCT technical inspection(A107)	(B19)

This product is also disposable, meaning it cannot be reprocessed.(a115)	Quality of single-use processed products risk(A108)
Previously, inspection was done manually by people sitting there, which actually causes damage to the human eye. ~~Moreover~~ eye. Moreover, people experience emotional fluctuations, so the results of each product inspection vary.(a116)	Limitations of manual quality inspection(A109)
Below is my machine. A camera with lighting, driven by a six-axis robotic arm, takes photos of it. This product requires monthly photography.(a117)	Six-axis robotic arm for visual inspection(A110)
Because, in fact, the primary purpose of this model is to capture its dynamic information display.(a118)	Dynamic information capture model(A111)
We can also adjust these parameters. After each adjustment, I'll use it to predict the future quality level.(a119)	Parameter optimization and quality prediction(A112)
So, if I adjust one or two points today, the yield rate for this batch of products might increase by one or two points—or it's possible that the entire batch will end up scrapped.(a120)	Parameter adjustment and quality fluctuations(A113)
Every piece of equipment here corresponds to an actual unit on the factory line, as the status of each unit can be monitored in real time on the production line.(a121)	Real-time monitoring of equipment status(A114)
In the past, a batch of products from a single production line relied on manual inspection. Every day, you'd meticulously record data onto sheets of paper. Then, a week later, you'd suddenly discover that the yield rate for that batch had dropped by one or two percentage points. By the time you traced back to investigate those one or two percentage points, a significant number of defective products had already accumulated over the week. This resulted in enormous cost waste. Now, we provide daily quality data reports.(a122)	Real-time quality data reports(A115)
Industrial AI, in the context of quality inspection, essentially represents the final outcome. However, precisely because it operates at the very end of the production process, I can obtain comprehensive quality data.(a123)	Industrial AI quality inspection and comprehensive quality data(A116)
Through a camera, I captured footage of his movements during the process—his actions and rhythms at each workstation. I observed his daily workflow, such as the process of assembling this equipment.(a124)	Workstation monitoring and motion analysis(A117)
What types of products have been manufactured, what existing production equipment is available, what are the primary process capabilities, and what is the real-time status of spare capacity.(a125)	Factory production capacity and real-time production monitoring(A118)
This is a defect. Within a second of taking the photo, I can process it, get the results, determine whether it's good or bad, identify the specific defect, and categorize everything.(a126)	Rapid flaw detection and classification(A119)
The production process for our smartphone lenses involves coarse grinding, fine grinding, and polishing. After polishing, the lenses undergo coating. Even with precise temperature control during coating, the color may vary upon exposure to light, potentially rendering the entire batch unusable.(a127)	Quality control challenges in mobile phone lens production(A120)
At the same time, I can also provide him with recommended parameters. I tell him, “Under these recommended parameters, this is what your future quality will look like.” (a128)	Recommended parameters and quality prediction(A121)
We have this model, which significantly reduces the time required for quality inspection.(a129)	Enhance quality inspection efficiency(A122)
These new energy vehicles come equipped with numerous cameras—often as many as ten to twenty. Traditionally, the lenses for these cameras were inspected manually. Manual inspection involved using magnifying glasses with over ten times magnification. Even Apple's lenses still face an issue: under certain lighting conditions, they may exhibit white spots—a problem that remains unresolved.(a130)	New energy vehicle camera lens inspection(A123)
This is also made possible by artificial intelligence—it's called intelligent curve detection. While many companies are now developing this technology, back in 2020 we were the first and only ones to achieve mass deployment within corporate environments.(a131)	Intelligent curve detection technology has been the first to achieve mass deployment.(A124)

We provide an intelligent machine vision inspection solution that enables us to collect extensive quality data during the inspection process.(a132)	Intelligent machine vision inspection solution(A125)	
Different types of testing require different machines. We've invested quite a bit in research and development.(a133)	R&D costs for detection technology(A126)	
In the sintering process, the raw material is subjected to high-temperature sintering at 1500 degrees Celsius. During this phase, no sensors can function properly. Therefore, only the initial and final data points are available, with the intermediate stage effectively acting as a black box.(a134)	Black-box issues in the sintering process(A127)	
I'm setting up the factory layout so I can train my model on how to implement it.(a135)	On-site layout and model training (A128)	
When the defect of under-injection occurs, the factor that may influence it is the numerical strength you need to monitor. The higher the value, the greater the correlation coefficient. For instance, sintering density may affect defects like those on the front side, while shrinkage rate may be more significantly impacted by higher red data values.(a136)	Defect correlation analysis and key indicators(A129)	
Apple has extremely high standards for quality. Every single product you produce must undergo 100% inspection.(a137)	Apple's high standard quality control(A130)	
We also observed through cameras the idle status of equipment and the resulting strong demand for orders from manufacturing enterprises.(a138)	Equipment idle monitoring and order demand analysis(A131)	
So, by mining its data through a quality application mining model—after building this model—I discovered that the primary factors influencing its quality are as follows.(a139)	Analysis of quality influencing factors(A132)	
Especially in places like factories, it can also handle remote site selection.(a140)	Remote factory management(A133)	
Our colleagues have established this relationship between attributes and defects, which also involves extensive modeling.(a141)	Investigating the relationship between properties and defects through modeling(A134)	
Through testing, I can obtain comprehensive quality data. I categorize these curves before tracing back to identify the root cause.(a142)	Analyze the root cause of the problem using quality data(A135)	
He brought this model to our facility. Now, after customers make payments, we assist the factory in optimizing their specific formula—a model that excels at formula optimization.(a143)	Application of formulation optimization models(A136)	
So the production standards for these lenses are still extremely stringent, with very strict quality requirements. And with such a large volume, recruiting quality control workers is actually quite challenging. Nowadays, it's mostly veteran technicians—skilled veterans who are truly exceptional, capable of inspecting three rows at a glance.(a144)	Lenses undergo rigorous quality inspection requirements upon leaving the factory(A137)	
Every time you take a photo, there are 100 points to record, and I need to log 100 pieces of information. This cycle is extremely time-consuming. That's why we built our own simulation environment. Within this simulation environment, I now have a CD drawing. With this CD drawing, I can automatically generate the entire point grid. For instance, in this area, each horizontal plane corresponds to a vertical plane above it, and that's where the photo capture point is located.(a145)	Simulation environment and automatic point generation(A138)	
For instance, regarding employee wear compliance—such as whether dust caps and masks are worn—real-time management and supervision are achieved through video data collection and model analysis.(a146)	Intelligent monitoring of employee safety and compliance (A139)	Production automation
Weiyi Intelligent Manufacturing and Zhiyun Tian Gong's philosophy of “foundation first, then intelligence” emphasizes that practitioners must consider restructuring the entire industrial AI workflow—from data collection to model training and deployment—to enable AI to autonomously learn from vast amounts of effective production data on actual production lines. This approach reduces the need for “accompanying production” testing processes on test	End-to-End optimization and autonomous learning for industrial AI(A140)	and intelligence (B20)

lines and minimizes waste of raw data during this period.(a147)	
Over the past four years, Weiyi Intelligent Manufacturing and Zhiyun Tian Gong have pioneered over 80 application scenarios, delivered more than 400 intelligent devices and 600 AI algorithm software packages, and developed over 700 industry-specific application models. They have implemented artificial intelligence solutions across more than 1,200 production lines for clients, successfully helping enterprises reduce staffing requirements by over 10,000 personnel.(a148)	Industrial AI practice achievements and applications Implementation(A141)
On January 6, 2023, Weiyi Intelligent Manufacturing and Zhiyun Tian Gong—specializing in the “Industrial Internet + Industrial AI” sector—held their first major product launch event in Shenzhen following their merger. grandly unveiling a new generation of industrial AI toolkit comprising three “Gong Series” innovation products and three “Ling Series” optical products. This marks a significant step toward standardizing and commercializing solutions, committed to making AI accessible and affordable for small and medium-sized factories and manufacturing enterprises, thereby transforming the landscape of industrial intelligence. (a149)	Industrial AI new product launches and standardized advancement(A142)
It truly involves applying artificial intelligence, big data, and 5G technology to factory production lines.(a150)	digital intelligence of factory production lines(A143)
First, we are undertaking some factory renovations for our clients, specifically smart factory upgrades.(a151)	
This isn't the second floor—I sold him a total of 21 units there. Then, when we got to the third floor, his entire factory was originally arranged in rows of interconnected workstations. But the results were so impressive that he proceeded to completely remodel the entire third floor.(a152)	Factories undergo smart upgrades (A144)
By breaking down core manufacturing processes and precisely assigning them to appropriate factories, we leverage order-driven workflows and lightweight AI solutions to help traditional enterprises enhance quality, reduce costs, and boost efficiency—ultimately building high-quality production capacity.(a153)	
Zhiyun Tiangong leverages the “Changzhou Industrial Cloud” to build a super virtual factory. Utilizing technologies like 5G and AI, it aggregates and categorizes the idle production capacity of regional factories in the cloud. After “deconstructing” the manufacturing processes required by industry demands or brand specifications, it precisely dispatches production orders to corresponding factories.(a154)	Process disassembly and intelligent dispatch(A145)
I have two robotic arms—they interact with each other. In that solution, one arm takes photos while the other rotates. But that's relatively straightforward, right? Because each time you just need to fix it in place and you're good to go. As I mentioned earlier, in many factory assembly lines, the assembly process itself relies on the coordination of two arms. Moreover, you need to identify components—perhaps a dozen or more parts. Our system, just released this year, is what we call the Giant Body Intelligent Industrial Robot.(a155)	Applications of giant-body intelligent industrial robots(A146)
Employing digital tools to guide production and help businesses secure orders.(a156)	Digital production guidance and order acquisition(A147)
Additionally, while Chinese factories possess strong capabilities in the manufacturing process, determining what products to produce and what consumers actually desire requires leveraging digital and intelligent means to effectively integrate the consumer internet with the industrial internet. This integration enables factories to achieve rapid and flexible manufacturing.(a157)	Digital intelligence integration and flexible manufacturing requirements(A148)
Once I've assembled a product here—say, after building this shape—I can then, in my backend, place it within a simulation environment where it can learn this shape. Then it can automatically capture and replicate it exactly. After creating one, it learns the entire assembly trajectory—how the robotic arm moves along this path. Next, it transfers this knowledge to the industrial arm for mass production, achieving higher speed, precision, and efficiency. That's why we call it “watch once, learn once, do once.” It's the complete workflow.(a158)	Robot learning production process (A149)

The key technology lies in the technical aspects of my robotic arm, specifically the control of its motion—this is absolutely crucial.(a159)	Robotic arm motion control technology(A150)
Currently, I have some optical components mounted on top, right? They essentially act as the eyes. By replacing these eyes with a hand—specifically a grinding head—and knowing the exact position of the tool, I can achieve precise grinding. We call this an integrated inspection and grinding solution.(a160)	Search and strike integrated solution(A151)
Take a look at the model I'm running right now—this is one of its waypoints. The vertical line generated here marks the point where it takes a photo. Then, these waypoints need to be planned out to form a path.(a161)	Model point planning and path generation(A152)
For example, in the assembly process during production, identifying the slowest bottleneck and the most prone-to-omission steps enables alerts and optimization. This aids on-site production management, ensuring both production efficiency and product quality.(a162)	Intelligent monitoring and optimization of production processes(A153)
The market potential for this product category is substantial. With minimal modifications to GreeBo's production facilities, this type of product can be manufactured, simultaneously addressing the slow charging and limited battery life issues of existing products.(a163)	Production transformation(A154)
Every beat from everyone here is visible in every aspect, including wearable compliance—whether they wear hats when entering or exiting your factory, or similar requirements like waterproofing for access. These are very low-cost solutions.(a164)	Production monitoring and compliance checks(A155)
GreeBow implemented intelligent upgrades to its production lines based on the “Super Virtual Factory” solution, thereby gaining the capability to manufacture washer-dryer combo units.(a165)	Intelligent upgrading of production lines(A156)
At the same time, we utilize Factory Management Master to gain comprehensive insight into the entire production process and all its details, achieving transparent manufacturing that ensures both quantity and quality.(a166)	Transparency in production processes and quality control(A157)
So every movement of the robotic arm is unique. If you were to manually plan each step during initial training, the computational load would be enormous. That's why we use algorithms to control the entire motion of the robotic arm—essentially giving it a brain.(a167)	Algorithm- driven robotic arm motion planning(A158)
The entire planning process—including point placement and path planning—is fully automated through algorithms. If done manually, it would take at least two to three weeks to achieve comparable efficiency.(a168)	Algorithm- driven planning and efficiency enhancement(A159)
We primarily provide these enterprises with specific equipment, but that particular device is indeed entirely independently developed by us—from its mechanical structure and optical design to the underlying algorithm suite. We hold full intellectual property rights over every aspect.(a169)	In-house developed equipment(A160)
Does this assembly mean that it should be installed in the order of one, two, three?(a170)	Assembly sequence compliance monitoring(A161)
If not, we log it as an alert, because many assembly steps follow a specific sequence. Once the sequence is disrupted, virtually all subsequent steps become incorrect. Therefore, we prioritize immediate detection—essentially performing the role of a workshop team leader.(a171)	Assembly sequence error prompt (A162)
By breaking down the order into component parts, the production of this washer-dryer combo's outer casing remained locally in Changzhou. The manufacturing capacity for the electric water pump and power cord was shared among three small and medium-sized enterprises in Suzhou, while the dust cup orders were assigned to an export-oriented company in Zhongshan, Guangdong.(a172)	Order decomposition and regional capacity matching(A163)
When new orders come in from the market, we can match them to the most suitable factory for rapid production completion.(a173)	Order matching and rapid production response(A164)
It employs a manufacturing process known as metal powder sintering.(a174)	Metal powder injection molding process(A165)

This company employs a technology called metal powder sintering. It involves compressing metal particles, plastic particles, and adhesive into a specific ratio, pressing them into a mold like rubber, and then sintering them at 1500 degrees Celsius. During this process, all the plastic and adhesive vaporize, and upon solidifying, the material takes on this form.(a175)	Metal powder injection molding technology(A166)	
Ultimately, this data is essentially unusable because the way you're handling it in the shared environment is outdated. That's why we later provided this factory with a solution—let me borrow a corresponding example: only by centralizing the management of these examples can we organize them. Originally, they purchased 100 units of equipment. When you use the newly purchased equipment, I'll allocate the examples to you from the cloud.。(a176)	Centralized management and allocation of calculation examples(A167)	
It's just that in Jiangsu, many component manufacturers are quite strong. But when it comes to the finished products themselves, my components still end up going to the Pearl River Delta region, right? That's where the small appliances are made, and even larger electronic products like those are assembled there.(a177)	Distribution of components and complete units production(A168)	
Industrial cameras have a fixed focal length. With this fixed-focus industrial camera, you must position yourself precisely at the sweet spot to capture a clear image. If you're even a fraction too early or too late, or slightly too low or too high, the photo will be blurry. However, the camera's shutter response time is typically just a fraction of a second. Therefore, you must reach the exact point and press the shutter at that precise moment to capture the image. The entire motion process is extremely fast—it doesn't pause or show any lag. That's why we call this technique “fly-shooting.” (a178)	Fly cam technology and industrial camera applications(A169)	
Only when factories begin to enhance their digital and intelligent capabilities will we have a better chance of promptly understanding the status of factories within the region.(a179)	Stay informed about the factory's status in a timely manner(A170)	
Brands can also access real-time production data and quality management reports from the workshop online, enabling efficient and transparent end-to-end management of the factory.(a180)	Real-time production data acquisition(A171)	Information sharing(B21)
Zhiyun Tiangong provides support for preliminary product design decisions, offering comprehensive product reports and application tools to deliver holistic information including concept analysis and design outcome evaluation. (a181)	Design decision support and evaluation(A172)	
Currently, Changzhou's “Super Virtual Factory” platform has connected over 700 enterprises across 18 industries and more than 60,000 pieces of equipment, helping businesses absorb a total of 1.5 billion yuan in excess production capacity.(a182)	Platform scale and capacity utilization(A173)	Resource sharing(B22)
Within less than a year of its establishment, Zhiyun Tiangong has connected over 30,000 pieces of equipment across 302 factories and successfully absorbed nearly 1.5 billion yuan worth of excess production capacity.(a183)	Rapid production capacity integration and utilization of surplus capacity(A174)	
In recent years, products have returned to delivering value and connecting with genuine consumer needs.(a184)	Commodity value restoration and demand alignment(A175)	Personalized customization(B23)
From concept to finished product and ultimately to market launch, a single item requires collaborative efforts from both front-end and back-end teams to address a series of challenges including quality, cost, and efficiency.(a185)	Full-cycle product empowerment and issue resolution(A176)	Consumer participation(B24)
At the same time, we also provide preliminary assistance in product design decision-making and help clients expand sales in both domestic and overseas markets.。(a186)	Product design and marketing support(A177)	
This has led to increased production capacity, as everything was previously done manually. Now, all our equipment operates in this manner.(a187)	Production capacity increase(A178)	
Zhiyun Tiangong leverages the industrial internet platform to facilitate the establishment of a closed-loop chain encompassing raw production capacity data collection, factory-level capacity analysis, regional capacity analysis, open capacity trading, and capacity transaction analysis.(a188)	Closed-loop chain construction of industrial internet platforms(A179)	Capacity sharing(B25)
Within just six months, Zhiyun Tiangong's super virtual factory has expanded to cover 18 industries, connecting over 20,000 pieces of equipment across 186 factories, with absorbed production capacity valued at more than 1.5 billion yuan.(a189)	Rapid expansion in scale(A180)	

The new wash-and-mop combo machine has received over 50,000 orders within just a few months, with projected sales reaching 120 million yuan.(a190)	Order growth and sales forecast (A181)	
Zhiyun Tiangong will further accelerate the construction of a new intelligent manufacturing platform characterized by cross-regional integration, coordinated production capacity, and digital intelligence. This initiative will rapidly expand its business footprint, enabling global consumer markets to benefit from China's high-quality production capabilities. It will enhance the competitiveness of the industrial chain and fundamentally promote industrial upgrading and transformation.(a191)	Cross-regional capacity coordination and global sharing(A182)	
Zhiyun Tiangong's business logic integrates marketing, design, and manufacturing to precisely match and balance supply and demand, gradually realizing an integrated industrial ecosystem for original design brand products.(a192)	The business logic and industrial ecosystem of the integration of the three elements(A183)	
It has also helped the entire industrial cluster achieve comprehensive coordination of all factors, synergy across the entire industrial chain, and optimization throughout the entire value chain.(a193)	Full-chain optimization of industrial clusters(A184)	
We have established the brand of the Industrial and Energy Internet, leveraging our industrial strengths to continuously advance the integrated development of industrial digitalization and digital industrialization.(a194)	Industrial digitization and digital industrialization integration(A185)	
To date, Zhiyun Tiangong has successfully incubated two designer brands and 45 innovative products through this integrated industrial ecosystem.(a195)	Industrial ecosystem incubation outcomes(A186)	
To ensure the smooth operation of industrial and supply chains, strengthen coordination among enterprises, markets, and upstream and downstream partners, and promote the resumption of work and production.(a196)	Industrial chain and supply chain coordination(A187)	
Enhanced control and competitiveness across the entire industrial chain, leveraging the digital economy to leapfrog ahead, propels Changzhou toward its goal of becoming a renowned digital city.(a197)	Enhancing industrial chain competitiveness and digital transformation(A188)	
JD Smart Manufacturing Cloud enhances industrial chain collaboration and elevates service quality. It optimizes operations through a “three-wheel drive” effect centered on three core business streams: “product lifecycle flow,” “value creation flow,” and “production manufacturing flow.” These streams interact seamlessly to accelerate product innovation cycles.(a198)	JD Smart Manufacturing Cloud: three-wheel drive optimization(A189)	
Building upon the public cloud infrastructure currently provided by the Changzhou government, the computational costs associated with artificial intelligence have been significantly reduced.(a199)	Reduced costs of artificial intelligence computing power (A190)	Supply chain optimization(B26)
Therefore, Zhiyun Tiangong has developed a step-by-step product and solution suite—Factory Management Master—enabling factories to launch projects at minimal cost. After verifying tangible returns, they can progressively advance their digital and intelligent transformation based on their evolving needs.(a200)	Low-cost startup with gradual digital intelligence upgrades(A191)	
Through the “supply chain integration management” model, we achieve refined production scheduling and intelligent production management. This ultimately resolves supply-demand mismatches, accelerates industrial restructuring, and comprehensively elevates the value of “China Intelligent Manufacturing.” (a201)	Supply chain management and industrial upgrading(A192)	
Achieve genuine, effective enhancement through an integrated approach encompassing marketing, design, and manufacturing.(a202)	Full-Path optimization enhancement(A193)	
By breaking down geographical and physical barriers, we resolve supply-demand mismatches and provide a fully integrated service chain—from industrial design and smart manufacturing to supply chain management and channel development.(a203)	Closed-loop service and supply-demand mismatch resolution(A194)	
This approach has significantly reduced both production management costs at the factory and brand quality control expenses, enabling us to achieve our goal of producing higher-quality products at lower costs.(a204)	Cost reduction and quality improvement(A195)	
Following the optimization adjustments, the client's overall production costs decreased by 15%.(a205)		
This technology, known as the metal powder eye technique, has also been awarded the Second Prize of the National Science and Technology Progress Award. By drastically reducing production costs, this enterprise secured substantial orders from Apple.(a206)	Technical awards, increased orders(A196)	

Leveraging digital capabilities and information technology to build a super virtual factory, breaking through geographical and physical constraints in production, systematically organizing and scaling up the entire production process.(a207)	Digital production organization and scale(A197)	
Traveling all the way from Guangdong to Jiangsu, brand founder Ao Lian told reporters that under the traditional model, collecting customer feedback and other data for just one “designer-style” chair would take at least half a year. Now, this cycle has been reduced to seven days, boosting efficiency by nearly 25 times.(a208)	Data collection acceleration(A198)	
Zhiyun Tiangong leverages Factory Management Master to rapidly deploy digital and intelligent capabilities within factories. By aggregating regional surplus production capacity for effective manufacturing coordination and utilizing digital-intelligent technologies to ensure quality during production, the company enables factories to achieve rapid reductions in production costs.(a209)	Digital intelligence technology implementation and cost control(A199)	
With the support of the intelligent supply chain in the super virtual factory, sales of ski goggles have surged significantly.(a210)	Smart supply chains boost sales growth(A200)	
Whether it's the lightweight Factory Management Master embedded in production sites or the new product creation engine developed through deep collaboration with major internet companies, all leverage these core technologies—and the benefits have been remarkably significant.(a211)	Core technology application and significant benefits(A201)	
This approach significantly enhances the efficiency of the entire production process while maintaining flexibility and adaptability, enabling delivery times to align perfectly with marketing windows.(a212)	Production efficiency enhancement and market window alignment(A202)	
He saves approximately 200 million yuan in labor costs annually, as this single piece of equipment can replace roughly 15 to 20 workers.. (a213)	Reduce labor costs(A203)	
The market sales of washer-dryer combo units surged from over 2 billion yuan in 2020 to over 5 billion yuan in 2021.(a214)	Sales growth(A204)	
More efficient supply chains enable greater flexibility in production systems, helping the manufacturing sector address critical challenges such as inadequate top-level design capabilities, low data assetization, poor connectivity of production equipment, and weak coordination between R&D, production, and supply. By leveraging regional operational capabilities, these solutions foster the creation of star products, lighthouse factories, and industrial internet demonstration cases, thereby safeguarding local industrial innovation and operational excellence.(a215)	An efficient supply chain enhances the flexibility of production systems(A205)	
Some high-end manufacturing enterprises are willing to invest budget and resources into digital intelligence transformation to optimize production efficiency and enhance product quality.(a216)	Digital intelligence investment in high-end manufacturing enterprises(A206)	
Wang Nan, Vice President of JD.com, believes that ecosystem collaboration represents industrial synergy and mutual benefit driven by comparative advantages.(a217)	Industrial synergy and a win-win ecosystem(A207)	
Both of these sharing platforms featured on today's program have been a huge help to businesses.. (a218)	Shared platforms empower enterprise growth(A208)	
Building upon Changzhou's industrial digitalization foundation, the Super Virtual Factory lowers the digitalization threshold for enterprises, enabling Changzhou's SMEs to achieve early digitalization deployment.(a219)	Helping lower the barriers to digital adoption(A209)	Synergistic symbiosis(B27)
JD Cloud's core strength lies in its digital and intelligent supply chain capabilities. We will open up our foundational capabilities in “technology + industry,” driving the social division of labor within the ecosystem through integration and being integrated. By complementing partners' value propositions, we serve customers and achieve collaborative win-win outcomes.(a220)	Digital intelligence supply chain and ecosystem collaboration(A210)	
To enhance overall competitiveness, many manufacturing enterprises are opting for digital intelligence transformation. Advanced next-generation technologies will enable these enterprises to gain significant competitive advantages.(a221)	Digital intelligence transformation enhances competitive advantage(A211)	
As a pilot cluster for robotics and intelligent equipment innovation approved by the Ministry of Science and Technology, Changzhou Wujin National Hi-Tech Industrial Development Zone encompasses a complete industrial chain ranging from key components to complete machine production and system integration.(a222)	Changzhou boasts a complete industrial chain(A212)	Possesses a complete industrial chain (B28)

The Yangtze River Delta region accounts for 21% of China's total vehicle production capacity, with its automotive parts enterprises representing over 40% of the nation's total in both quantity and output. The region holds nearly 30% of the new energy vehicle market share. The biopharmaceutical output value approaches 30% of the national total, with 29 companies ranking among China's top 100 pharmaceutical enterprises. Among them, Jiangsu Yangtze River Pharmaceutical Group has topped the list for three consecutive years. The integrated circuit industry accounts for 45% of the national scale, clustering leading enterprises such as SMIC and Hua Hong Semiconductor to form a complete industrial chain encompassing design, manufacturing, and packaging/testing.(a223)			The Yangtze River Delta boasts a complete industrial chain(A213)	
During the 14th Five-Year Plan period, Changzhou will actively seize the critical window of opportunity for the development of its high-end equipment manufacturing industry. The city will focus on developing intelligent manufacturing equipment, agricultural and construction machinery, rail transit, and new-generation power equipment, while also supporting the growth of environmental protection equipment.(a224)			Changzhou focuses on developing high-end equipment manufacturing industries(A214)	
The park accounts for nearly 70% of the province's robotics production capacity, having attracted and nurtured leading domestic and international robotics enterprises such as Yaskawa Electric, Nabtesco Precision Machinery, Quick Soldering, Jinshi, and Ming Sai.(a225)			Gathering substantial robot production capacity(A215)	
Leveraging Jiangsu and Anhui, we will focus on developing intelligent energy-saving and environmentally friendly variable-frequency home appliances, health-oriented kitchen and bathroom appliances, smart toilets, air-source heat pump air conditioners, large-capacity refrigerators, and washing machines.(a226)			The Suzhou-Anhui region will focus on developing the home appliance industry(A216)	
Focusing on Jiangsu and Anhui as key regions, we will strengthen home appliance production bases. Guided by the development directions of intelligence, environmental sustainability, and health, we will enhance the industrial chain and accelerate breakthroughs in core technologies such as smart technology, inverter technology, energy-saving and environmental protection technology, application of new materials and new energy, and upgrading of key components. Priority will be given to developing smart, energy-efficient, and environmentally friendly inverter home appliances; health-focused kitchen and bathroom appliances; smart toilets; air-source heat pump air conditioners, large-capacity refrigerators, and washing machines. This will propel home appliance brands from domestic recognition to global prominence.(a227)			Focuses on developing the home appliance industry (B29)	
Among Changzhou's top ten advanced manufacturing clusters, the high-end equipment cluster has surpassed 200 billion yuan in output value.(a228)			High-end equipment clusters generate substantial output value(A218)	

Axial Coding		
Main Category	Subcategory	Typical Example
Consumer Insight(C1)	Personalization and customization of products(B1)	Through deep collaboration with major internet companies, we gain consumer insights and leverage AI and big data capabilities to understand what types of products consumers prefer. We then translate this information into product definitions, effectively supporting early-stage design and decision-making.
	Analysis of consumer behavior characteristics(B2)	
Technological Drive(C2)	Industrial intelligence cloud platform construction(B3)	By integrating next-generation digital intelligence technologies and methods—including artificial intelligence, machine vision, big data analytics, and consumer data insights—we digitize existing manufacturing capacity and consumer demand. This approach simultaneously unleashes enterprises' production, innovation, and customization capabilities while coordinating and balancing capacity utilization. It enables the production of premium products for the consumer market and provides robust product strength for brand innovation.
	Digital intelligence technology(B4)	
Government Support (C3)	Helping to build a “Super Virtual Factory” (B5)	To build this “super virtual factory,” Zhonglou District in Changzhou City partnered with multiple telecom operators to establish 5G communication base stations and allocated 60 million yuan in special funds for digital infrastructure development.
	Government measures(B6)	
	Policy guidance and financial support(B7)	

Enterprise Challenges(C4)	Enterprise transformation needs(B8) Supply chain disruption(B9) High idle capacity utilization rate(B10) Difficulties in implementing industrial AI projects(B11) Cost pressures(B12) Impact of the pandemic and response measures(B13)	How to bridge supply chain gaps, clear bottlenecks in industrial chains, and address corporate pain points? How to leverage new technologies like big data to help businesses better connect with markets and upstream/downstream enterprises? Local governments across the country are exploring solutions. In stark contrast to the booming consumer market lies the plight of “excess capacity” in traditional manufacturing. Many factories are still fighting tooth and nail for orders, even resorting to price wars.
Changzhou Home Appliance Industry Cluster(C5)	Possesses a complete industrial chain(B28) Focuses on developing the home appliance industry(B29)	As a pilot cluster for robotics and intelligent equipment innovation approved by the Ministry of Science and Technology, Changzhou Wujin National Hi-Tech Industrial Development Zone encompasses a complete industrial chain ranging from key components to complete machine production and system integration.
Coordination Mechanisms (C6)	Production capacity coordination(B14) Product coordination(B15) Consumption coordination(B16)	Since we understand each company's basic production capacity, we know which factories have surplus capacity. I can then allocate this surplus capacity for production. This essentially involves leveraging high-quality surplus capacity to help certain enterprises monetize their resources, enabling them to manufacture such products.
Data Integration (C7)	Data source(B17) Data processing(B18)	Aggregate core capabilities and data from different regions, enterprises, and processes through a platform approach, connecting the dots to form a cohesive whole and enabling holistic coordination.
Smart Manufacturing(C8)	Intelligent detection and quality control(B19) Production automation and intelligence(B20)	It's an OCT technology that uses high-precision analysis for this detection. When a laser beam hits its surface, it creates a reflection that reveals the entire internal structure. This generates what's called a 3D point cloud map. I analyze this 3D point cloud map to obtain the curve detection.
Sharing Information and Resources(C9)	Information sharing(B21) Resource sharing(B22)	Brands can also access real-time production data and quality management reports from the workshop online, enabling efficient and transparent end-to-end management of the factory.
Value Co-creation between Enterprises and Consumers (C10)	Personalized Customization(B23) Consumer Participation(B24)	In recent years, products have returned to delivering value and connecting with genuine consumer demand.
Value Co-creation among Enterprises(C11)	Capacity sharing(B25) Supply chain optimization(B26) Synergistic symbiosis(B27)	More efficient supply chains enable greater flexibility in production systems, helping the manufacturing sector address critical challenges such as inadequate top-level design capabilities, low data assetization, poor connectivity of production equipment, and weak coordination between R&D, production, and supply. By leveraging regional operational capabilities, these solutions foster the creation of star products, lighthouse factories, and industrial internet demonstration cases, thereby safeguarding local industrial innovation and operations.