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OVERVIEW OF GLOBAL SMART DEVICE MANUFACTURING INDUSTRY

The Evolution of Smart Device Manufacturing

Industrialization of smart device manufacturing is becoming increasingly forward-looking, with comprehensive cross-sector coverage: At the beginning of the 21st century, smart devices represented by smartphones emerged rapidly as enabled by breakthroughs in mobile computing, touch interaction and other key technologies. Designing, producing, processing and assembling these complex, high-precision whole machine and functional modules required wireless communication technology, structural design technology and other related technologies, gradually forming the innovative implementation platform. Subsequent advances of wireless RF, artificial intelligence (AI) and other technologies progressively expanded boundaries of smart device manufacturing from smartphones to broader fields. In the early stage of technological evolution, smart device manufacturing primarily focused on consumer electronics products such as smartphones, tablets, laptops, and AIoT devices. This technological maturation broadened applications into residential, commercial, and industrial ecosystems. Notably, smart vehicles evolved from basic mobility tools into multifunctional platforms integrating commute, business and entertainment, while smart robots transitioned from industrial settings to residential, commercial, healthcare and educational environments. The deepening convergence of electrification and intelligence in smart vehicle and smart robotic products urgently necessitates manufacturing platforms with agile deployment response capabilities, promoting the forward-looking approach of smart device manufacturing from consumer electronics towards ubiquitous ecological manufacturing.

Analysis of smart device manufacturing participants: Currently, participants of smart device manufacturing mainly include Original Design Manufacturing (ODM) and Electronic Manufacturing Service (EMS) providers. ODM providers offer brand owners full-stack smart device services, including R&D, design, production and delivery. EMS providers focus on meeting the large-scale manufacturing and supply chain requirements of brand owners. As ODM providers deliver end-to-end solutions from product definition, industrial design, hardware and software development to manufacturing and delivery, they can also serve as EMS suppliers to brand owners. Meanwhile, leading market participants are building co-developed ODM and EMS models and flexible manufacturing systems to meet brands' end-to-end needs from prototype development to mass production.

As the core concepts and innovation implementation platform for smart devices, leading ODM providers will grasp more business extension opportunities: Currently, as the types and demand of smart devices evolve, brand customers' cooperation with ODM providers continues to deepen and diversify. Leading ODM providers, such as our Group, are no longer just responsible for product design and manufacturing, but have become key strategic partners for brand owners throughout the entire process from conceptualization, design and development, to mass production, delivery and market feedback tracking. This close cooperation mechanism enables ODM providers not only to assist customers in developing their existing product, but also to proactively propose forward-looking innovation directions. This helps customers achieve product innovation and mass production, continuously enhancing product value. In this process, leading ODM providers, as key strategic extensions of brand owners, will seize more business opportunities as global top brands diversify their smart device ecosystems.

In the context of AI-era, leading ODM providers enable brand owners to deliver efficiently by utilizing their sharp market insights and streamlined, platform-based solutions: Leading ODM providers have become crucial partners for brand owners seeking to expand their smart device lines as AI rapidly integrates into various industries. These ODM providers leverage their keen market insights and mature platform capabilities to facilitate this growth. Through deep collaboration with brands across multiple industries and product categories, leading ODM providers have established systematic, multi-dimensional market insight and feedback mechanisms. Their understanding of AI allows them to accurately identify diverse consumer trends and technological advancements. This enables them to extract common patterns, providing forward-looking support for product planning and technical decision-making, ultimately helping brand owners develop products with strong market potential. Further, ODM providers' years of experience in modular platforms and efficient, controllable design capabilities significantly shorten development cycles. This boosts the speed from concept to launch, adapting to the rapid changes in product forms and iteration driven by AI. ODM providers with comprehensive market judgment, integrated industry resources, and platform capabilities are becoming core to the smart device ecosystem. As brand owners accelerate their AI-era product strategies, these manufacturers will play a pivotal role in enabling efficient commercial delivery, fostering industrial collaboration, reshaping the value chain, and securing a proactive stance in future competition.

Building Growth-oriented Product Matrix through ODM's Integrated Hardware and Software Capabilities

- ***Scalable hardware manufacturing:*** Leading ODM providers leverage their scaled manufacturing, flexible production systems, and comprehensive supply chain to form a digital manufacturing platform. This enables breakthroughs in smart manufacturing, including product mounting and inspection. They also optimize hardware performance by integrating new AI hardware with core technologies like audio, display, camera, materials, and simulation.

- ***Mature software R&D and testing system:*** ODM providers possess mature software customization capabilities. Their underlying architecture is deeply adapted for smart device OS development and optimization across hardware platforms. Systematic software testing, automated analysis, and debugging tools ensure overall system functionality, fluidity, and task management.

- ***Integrated hardware and software capabilities:*** As crucial partners from concept to market, ODM providers excel at integrating hardware and software. This enhances product performance and user experience while accelerating development and time-to-market. Brand owners increasingly collaborate with leading ODM providers to jointly develop new products.

Value Chain of Global Smart Device ODM Industry

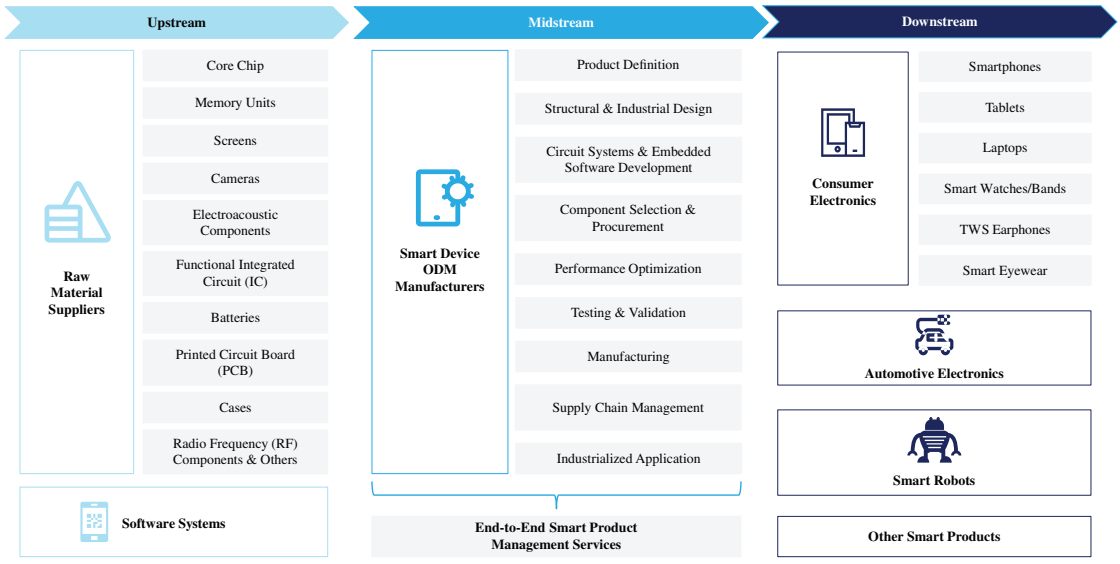
Pioneering companies are instrumental in driving the construction of robust industrial value chain: Leading ODM providers of smart devices have built comprehensive, end-to-end service system covering R&D, design, manufacturing, supply chain management, and global delivery. This has been achieved through deep ecological collaboration and strong supply chain integration capabilities. By working closely with upstream component suppliers and downstream brand clients, leading ODM providers forged a symbiotic and mutually beneficial industrial chain, significantly improving product market responsiveness and innovation capabilities.

Upstream — leading ODM providers are tightly integrated with their supply chains: The upstream primarily consists of suppliers of chips, sensing and interaction hardware, electronic components, software systems, and structural parts. Leading smart device ODM providers, relying on close collaboration with the supply chain, quickly respond to market changes, launch competitive products, and provide superior services to customers. For instance, they deeply engage in the selection and development of semiconductor components, promoting and accelerating the introduction of new products.

Midstream — smart manufacturing drives efficiency gains for leading ODM providers: In the midstream, smart device ODM providers offer a comprehensive suite of services including product definition, structural and industrial design, circuit system and embedded software development, component selection and procurement, testing and validation, manufacturing, supply chain management, etc. Leading providers distinguish themselves through rapid product iteration, robust intelligent manufacturing systems, and digitized supply chain management, allowing them to meet the demands of multi-brand, multi-category products for large-scale production while achieving high yield rates and short delivery cycles through refined processes and stringent quality control.

Downstream — product definition capabilities expand the range of scenarios covered by smart devices: The downstream consists of global smart device brand owners, including smartphones, tablets, laptops, various AIoT terminals, automotive electronics, smart robots and other smart devices. As one of the core manufacturing modes in the consumer electronics sector, penetration rate of ODM mode in consumer electronics products grew from 40.3% in 2020 to 46.2% in 2024, and is expected to reach 56.3% by 2029. The ODM mode will also continue to penetrate emerging fields like automotive electronics and smart robots. Leveraging their technological expertise and market demand forecasting, ODM manufacturers provide product definition solutions to clients, helping them continuously and efficiently launch more competitive smart devices and expand their coverage across the smart device industry chain.

Smart Device ODM Industry Value Chain



Source: Frost & Sullivan

Market Drivers and Trends of Global Smart Device ODM Industry

New opportunities for smart device ODM providers presented by AI wave

The AI wave is driving a comprehensive revolution in the functions, forms, and user experience of smart devices, leading to rapid industry iteration. Smart device ODM providers, with their mature modular design capabilities, agile supply chain response systems, and extensive experience in multi-category, large-scale product manufacturing, are helping new products efficiently transition from AI technology prototypes to mass-produced products, ushering in new development opportunities. Core AI smart devices include AI smartphones, AI PCs, AIoT devices, AI robots, etc. Smart device ODM providers' efficient, cost-effective, hardware-software integrated platform solutions are accelerating the commercialization of these product categories.

Globalized end-to-end supply chain collaboration

Smart device ODM providers are accelerating their global strategic expansion to better meet the large-volume, widespread global supply chain demands of clients in industries such as consumer electronics, automotive electronics, and smart robots. Currently, leading companies in the sector are enhancing market competitiveness by establishing multinational R&D, production, and sales networks. On one hand, they are establishing smart manufacturing bases in key regions like Southeast Asia, India, and North America. On the other hand, they are continuously optimizing their global supply chain collaboration systems to achieve globalized R&D, production, and sales. Smart device ODM manufacturers are fully leveraging their core technologies and economies of scale while significantly shortening product delivery cycles through localized production, thereby realizing a full-chain collaborative service.

Growing demand for end-to-end services and diversified needs in smart device manufacturing

Due to intensifying market competition and accelerated product iteration, smart device brand owners are experiencing an increase in demand for integrated design, manufacturing, and delivery services across the entire process, as well as diversified needs. In light of this trend, smart device manufacturers must build an end-to-end service system encompassing product definition, innovative design, production management, and logistics delivery to enhance product realization efficiency and market responsiveness. Leading smart device ODM providers are actively deploying supply chain resources that align with their strategic development, constructing capabilities for synergistic ODM/EMS mode development and flexible manufacturing systems. This approach allows them to meet the diverse needs of brand owners, thereby strengthening their comprehensive service capabilities and market competitiveness in the smart device manufacturing sector.

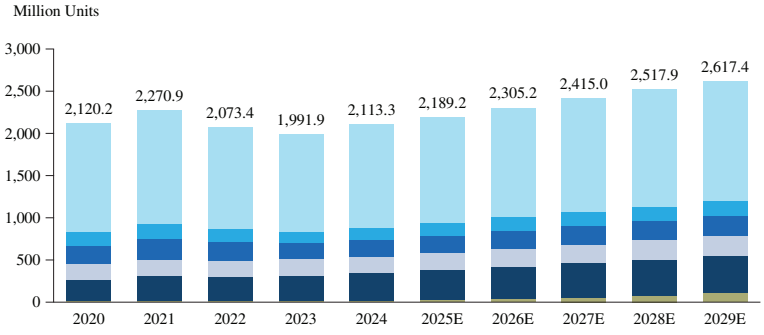
OVERVIEW OF GLOBAL CONSUMER ELECTRONICS ODM INDUSTRY

Consumer electronics refer to smart electronic products used by consumers in their daily lives. They are typically easy to operate and feature characteristics such as entertainment and portability. Consumer electronics products include smartphones, tablets, laptops and AIoT devices (smart watches/bands, TWS earphones, smart eyewear).

Market Size of Global Consumer Electronics Industry

Global shipments of consumer electronics are expected to grow from 2,113.3 million units in 2024 to 2,617.4 million units in 2029. As human-computer interaction methods evolve, smart eyewear is set to become the category with the greatest development potential in the consumer electronics industry, with the shipments expected to grow from 9.6 million units in 2024 to 106.3 million units in 2029, representing a CAGR of 61.8% during this period. Leading companies in the consumer electronics industry will intensely focus on end-device technology evolution trends, building differentiated product portfolios through forward-looking R&D to continuously solidify their leading positions.

Global Shipments of Consumer Electronics by Product Types, 2020-2029E



	2020	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	CAGR 2020-2024	CAGR 2024-2029E
Smartphones	1,292.2	1,354.8	1,205.9	1,164.1	1,238.8	1,251.5	1,301.6	1,347.2	1,387.6	1,422.3	-1.0%	2.8%
Tablets	164.0	168.8	161.6	128.5	140.1	151.0	160.7	169.2	175.3	180.0	-3.9%	5.1%
Laptops	210.1	250.3	226.3	192.7	201.2	208.0	214.7	221.1	227.3	233.2	-1.1%	3.0%
Smart Watches/Bands	189.5	193.0	182.8	194.1	191.4	200.8	210.2	219.7	229.1	238.5	0.2%	4.5%
TWS Earphones	257.6	292.8	287.7	303.6	332.2	359.7	384.6	406.9	423.6	437.1	6.6%	5.6%
Smart Eyewear	6.8	11.2	9.1	8.9	9.6	18.2	33.4	50.9	75.0	106.3	9.0%	61.8%
Total	2,120.2	2,270.9	2,073.4	1,991.9	2,113.3	2,189.2	2,305.2	2,415.0	2,517.9	2,617.4	-0.1%	4.4%

Source: Frost & Sullivan

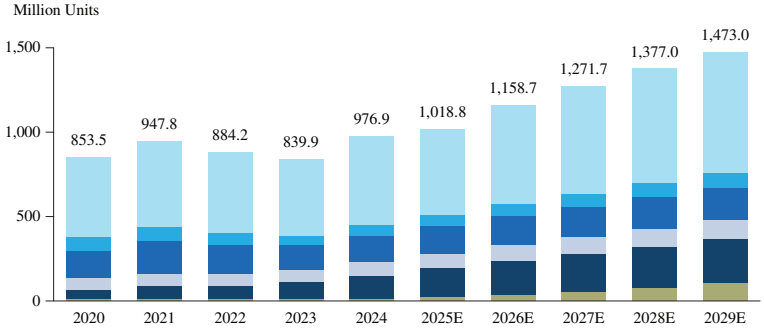
Consumer electronics ODM refers to the manufacturer with full-stack R&D and manufacturing capabilities, which can independently complete the entire cycle from product definition, design and development, to production and delivery.

Platform-based capabilities enable full-chain empowerment in consumer electronics: The consumer electronics industry is characterized by its immense scale and diverse product portfolios. Intricate upstream and downstream supply chains for individual products are also notable, with a prevalent trend towards fine-grained specialization within the industry. As this professional division of labor progresses, leading ODM providers leverage their comprehensive capabilities and extensive technological expertise. They serve as vital collaborators for brand owners, demonstrating significant economies of scale in aspects like product solution design, supply chain enablement, and management.

Market Size of Global Consumer Electronics ODM Industry

Consumer electronics ODM providers leverage their established technological capabilities, economies of scale, and efficient supply chain management to deliver end-to-end solutions for the consumer electronics sector. This strategic approach refines the global division of industrial labor, enabling highly efficient resource integration across the industry. As a result, global ODM shipments of consumer electronics grew from 853.5 million units in 2020 to 976.9 million units in 2024. Smartphones are the core category of consumer electronics ODM industry, accounting for 54.3% of overall ODM shipments in 2024. Currently, the major manufacturing modes for smartphones and tablets are ODM and EMS, while laptops are predominantly manufactured through the ODM model. It is anticipated that the ODM mode will continue to expand into various product categories in the future, driven by the increasing popularity of smart devices, shortened product iteration cycles in the AI-era, and the expected further growth of ODM global shipments of consumer electronics to 1,473.0 million units by 2029.

Global ODM Shipments of Consumer Electronics by Product Types, 2020-2029E



	2020	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	CAGR 2020-2024	CAGR 2024-2029E
Smartphones	476.3	511.2	484.8	455.9	530.0	508.9	585.2	637.9	682.6	716.7	2.7%	6.2%
Tablets	80.6	84.7	70.5	51.8	62.4	68.4	73.9	79.0	83.1	86.7	-6.2%	6.8%
Laptops	162.7	195.6	173.8	147.1	158.7	165.6	172.2	178.5	184.7	190.7	-0.6%	3.7%
Smart Watches/Bands	73.0	71.3	67.3	74.9	78.6	85.0	91.7	98.8	106.2	114.0	1.9%	7.7%
TWS Earphones	54.1	73.8	78.7	101.3	137.6	172.7	202.3	226.6	245.4	258.6	26.3%	13.4%
Smart Eyewear[(1)]	6.8	11.2	9.1	8.9	9.6	18.2	33.4	50.9	75.0	106.3	9.0%	61.8%
Total	853.5	947.8	884.2	839.9	976.9	1,018.8	1,158.7	1,271.7	1,377.0	1,473.0	3.4%	8.6%

Source: Frost & Sullivan

Note:

(1) *The manufacturing cooperation for smart eyewear is characterized by a blended and evolving landscape, including models such as ODM and EMS. This diversification and integration, driven by ongoing product iterations, makes it challenging to distinctly segment the various cooperation types.*

Market Drivers and Trends of Global Consumer Electronics ODM Industry

Consumer electronics market rebounds and AI technology adoption accelerates

Global consumer electronics shipments grew by 6.1% in 2024, returning to a growth trajectory, as user demand for smart devices recovers. AI technology is accelerating its on-device implementation in smartphones, laptops, smart eyewear, etc., driving consumer electronics products toward intelligence and connectivity. As a new feature in consumer electronics, AI continues to transform product forms and create new opportunities for the supply chain and consumer electronics ODM providers. AI-powered consumer electronics products, including AI smartphones and AI PCs will offer broad growth potential in the future. Among sub-categories of consumer electronics products, smartphones and laptops are core product forms, with their combined shipments accounting for 68.1% of total consumer electronics shipments in 2024. Global shipments of AI smartphones are expected to grow rapidly from 235.0 million units in 2024 to 1,069.8 million units in 2029, representing a CAGR of 35.4%. And global shipments of AI PCs are expected to increase rapidly from 34.2 million units in 2024 to 186.8 million units in 2029, with a CAGR of 40.4%. In the future, brand owners will leverage AI computing power for enhanced features such as image recognition, voice interaction, and personalized recommendations, improving user experience and encouraging shorter replacement cycles. This will continuously expand the overall consumer electronics market size, bringing new product design and manufacturing demands for ODM providers.

Surge in demand for AIoT device ODM

The expanding IoT ecosystem encompasses from wearables and in-car terminals to various smart home components. AIoT devices requires higher standards for device-edge-cloud collaboration, low-power communication, and system security, making ODM providers with multi-category, integrated R&D, and mass-delivery capabilities indispensable partners in industrial, consumer, and commercial scenarios. Advancements in edge computing and increased scenario intelligence are driving exponential growth in AI-powered AIoT devices. Smart eyewear, leveraging a system-level integration of hardware architecture and intelligent algorithms, have not only broken through traditional interaction paradigms but have also explored a new market, with shipment volume projected to reach 77.1 million units by 2029. The highly integrated and customized nature of AIoT devices prompts ODM providers with capabilities in hardware-software co-development, AI algorithm adaptation, and supply chain expertise to become a critical link in the industry. This trend will drive a rapid increase in demand for AIoT device ODM mode, leading to a scaled and highly efficient industrial division of labor.

Increasing ODM penetration rate

Driven by cost-effectiveness and supply chain optimization, more brands are outsourcing design and production of their main best-selling and mature products to ODM providers. As ODM providers enhance their customization capabilities and delivery reliability, they are

evolving into a core platform within the consumer electronics industry chain. Their penetration in the global market is expected to rise steadily. For example, the ODM penetration rate by shipment volume for smartphones, tablets, laptops, smart watches/bands, and TWS earphones are projected to increase from 42.8%, 44.5%, 78.9%, 41.1%, and 41.4% in 2024 to 50.4%, 48.2%, 81.8%, 47.8%, and 59.2% by 2029, respectively. Looking ahead, as the adoption of AI and manufacturing automation technologies increases among ODM manufacturers, their technological intensity will grow, leading to overall industry efficiency improvements and continuous expansion of their product coverage.

Rising technical threshold

Next-generation smartphones require better network performance, optical imaging systems, thermal management, and system integration. For instance, 5G SA RF circuit discrete design technology can optimize RF antenna layout, fully unleashing device performance. Thermal simulation technology, through thermal simulation models, enables the design of heat dissipation structures, ensuring the thermal performance of consumer electronic products. Therefore, based on continuously enhancing their technological reserves, ODM providers need to prioritize investment in R&D areas such as RF antenna layout, efficient heat dissipation structures, and embedded software optimization. This will allow them to consistently introduce the latest technologies and features into mature product price segments, thereby boosting product competitiveness. Furthermore, in the face of the high complexity and rapid iteration demands of AI smart hardware, ODM providers need to possess leading capabilities in intelligent manufacturing cost optimization and scaled production. By leveraging their advantages in supply chain management, customized development, and rapid iteration, they can maintain stable customer relationships. Consequently, rapid, efficient, and high-quality R&D and design capabilities are crucial for ODM providers, making their R&D and design prowess one of their core competencies in consumer electronics.

Consolidation among leading ODM providers

As the technological barrier for smart devices rises, brand owners which master core technologies are showing a trend towards centralization among top-tier participants. This consolidation trend is already evident in the fields of smartphones, tablets, and other consumer electronics. The pattern is expected to extend to the AI product sector. ODM providers, with extensive experience and technical strength gained from long-term collaborations with leading tech companies, are well-positioned to participate in the technological layout and innovation breakthroughs of emerging products. This collaborative model allows ODM providers to quickly enter new technological fields, maintaining a competitive advantage during industrial upgrades, and the trend of strengthening leading enterprises is becoming increasingly significant.

Entry Barrier of Global Consumer Electronics ODM Industry

- ***Customer resource barrier:*** Leading brands impose extremely stringent qualification reviews on their suppliers. Only ODM providers that successfully navigate complex product validation and production capability assessments can be added to their approved vendor lists. The long-standing collaborations between brand owners and their mature ODM partners have fostered stable demand forecasting and collaboration mechanisms, from concept to final product realization. New participants, often lacking industry reputation and a track record of fulfilling large orders, typically find it difficult to secure trial orders and ongoing partnership opportunities.

- ***Technical expertise barrier:*** The consumer electronics ODM industry spans a multidisciplinary range of fields, including antenna design, baseband processing, optical modules, embedded software, thermal management, and simulation testing. This necessitates that ODM providers possess comprehensive technical expertise across the entire product development lifecycle, from product definition to integrated hardware and software debugging. Furthermore, it requires collaboration among experts in various domains such as project management, supply chain, and quality assurance. New entrants must rapidly establish a profoundly skilled R&D team and a robust testing and certification system. Failing to do so will make it challenging to meet brand owners' dual demands for innovation and quality.

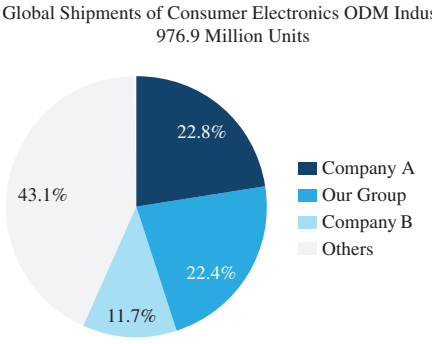
- ***Production and delivery barrier:*** Consumer electronics products are characterized by rapid iteration and global launch and delivery, which requires ODM providers to possess highly flexible production line switching, high yield control, and global logistics network capabilities. Once a design is finalized, it's necessary to complete process optimization, production ramp-up, and quality verification in an extremely short period. Any delay can cause brand owners to miss their market window. New entrants, lacking large-scale smart factories and mature operation and maintenance systems, will find it difficult to compete with experienced manufacturers in terms of delivery cycles and quality stability.

- ***Capital barrier:*** The ODM mode relies on scaled production to amortize R&D and manufacturing costs. This necessitates substantial upfront capital investment for establishing automated production lines, procuring high-end testing and packaging equipment, and maintaining ample work-in-progress and inventory funding. Without stable financing channels and sufficient cash flow, new entrants will struggle not only to build out production lines but also to maintain cost competitiveness when faced with raw material price fluctuations, making it difficult to achieve sustainable economies of scale.

Competitive Landscape of Global Consumer Electronics ODM Industry

Global shipments of consumer electronics ODM reached 976.9 million units in 2024, with combined and concentrated market share of the top three participants being 56.9%. Among them, our Group achieved ODM shipments of consumer electronics, primarily including smartphones, tablets, laptops, smart watches/bands, TWS earphones and smart eyewear, of 219.1 million units in 2024, ranking second in the global market with a market share of 22.4%.

Competitive Landscape of Global Shipments of Consumer Electronics ODM, 2024



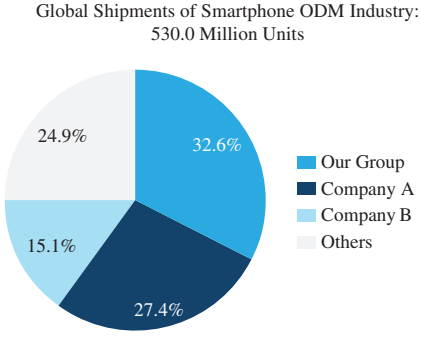
Top 3 ODM Providers in Global Consumer Electronics ODM by Shipments, 2024

Ranking	Company	Shipments of Consumer Electronics ODM Providers (Million Units)	Market Share (%)
1	Company A	222.3	22.8%
2	**Our Group**	**219.1**	**22.4%**
3	Company B	113.9	11.7%

Source: Frost & Sullivan

Global shipments of smartphone ODM reached 530.0 million units in 2024, with combined and concentrated market share of the top three participants being 75.1%. Among them, our Group achieved ODM shipments of smartphone of 172.9 million units in 2024, ranking first in the global market with a market share of 32.6%.

Competitive Landscape of Global Shipments of Smartphone ODM, 2024



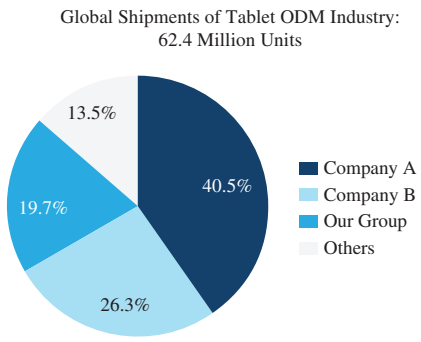
Top 3 ODM Providers in Global Smartphone ODM by Shipments, 2024

Ranking	Company	Shipments of Smartphone ODM Providers (Million Units)	Market Share (%)
1	**Our Group**	**172.9**	**32.6%**
2	Company A	145.0	27.4%
3	Company B	80.0	15.1%

Source: Frost & Sullivan

Global shipments of tablet ODM reached 62.4 million units in 2024, with combined and concentrated market share of the top three participants being 86.5%. Among them, our Group achieved ODM shipments of tablet of 12.3 million units in 2024, ranking third in the global market with a market share of 19.7%.

Competitive Landscape of Global Shipments of Tablet ODM, 2024



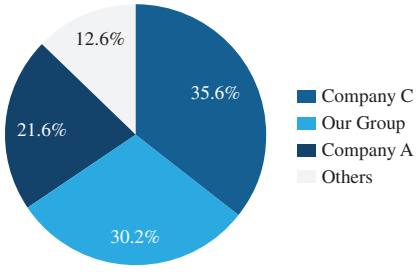
Top 3 ODM Providers in Global Tablet ODM by Shipments, 2024

Ranking	Company	Shipments of Tablet ODM Providers (Million Units)	Market Share (%)
1	Company A	25.3	40.5%
2	Company B	16.4	26.3%
3	**Our Group**	**12.3**	**19.7%**

Source: Frost & Sullivan

Global shipments of smart watches/bands ODM reached 78.6 million units in 2024, with combined and concentrated market share of the top three participants being 87.4%. Among them, our Group achieved ODM shipments of smart watches/bands of 23.7 million units in 2024, ranking second in the global market with a market share of 30.2%.

Competitive Landscape of Global Shipments of Smart Watches/Bands ODM, 2024



Top 3 ODM Providers in Global Smart Watches/Bands ODM by Shipments, 2024

Ranking	Company	Shipments of Smart Watches/Bands ODM Providers (Million Units)	Market Share (%)
1	Company C	28.0	35.6%
2	**Our Group**	**23.7**	**30.2%**
3	Company A	17.0	21.6%

Source: Frost & Sullivan

Notes:

1. Founded in 2005 and headquartered in Shanghai, China, Company A is a listed company specializing in the design and manufacturing of smart devices, including intelligent terminals, high-performance computing devices, and AIoT solutions.

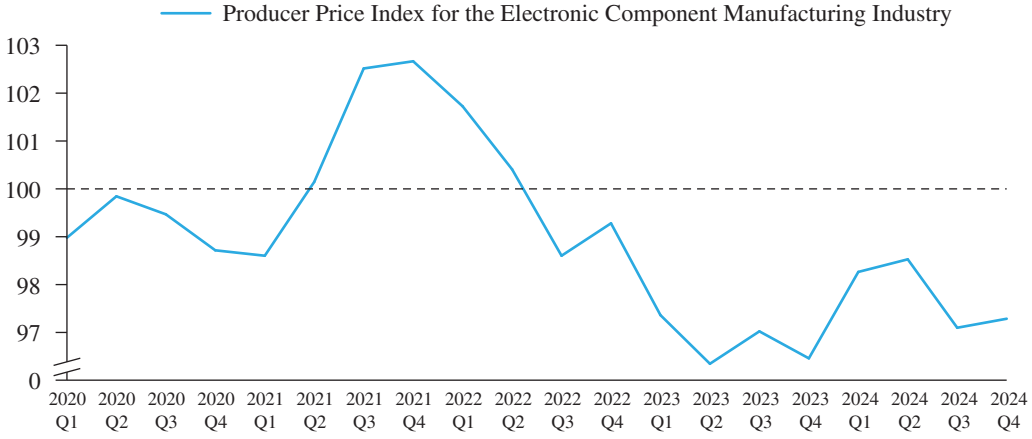
2. Founded in 2006 and headquartered in Zhejiang Province, China, Company B is a listed company specializing in ODM of consumer electronics and semiconductor solutions across multiple application domains.

3. Founded in 2001 and headquartered in Shandong Province, China, Company C is a listed company with core business operations encompassing precision components, intelligent acoustic systems, and smart hardware solutions.

Raw Material of Global Consumer Electronics ODM Industry

China's producer price index for the electronic component manufacturing industry is a key indicator reflecting fluctuations in raw material costs associating with the consumer electronics ODM industry. Driven by factors including volatility of global supply chain, fluctuation of raw material costs, and acceleration of technological advancements, this producer price index has experienced intermittent declines in recent years. Specifically, between 2022 and 2023, the price index saw a downturn, largely attributed to the mitigation of electronic component shortage and slowdown in consumer electronics demand. In 2024, as the consumer electronics industry recovered, the price index was stabilizing and gradually showing an upward trend.

China's Producer Price Index for the Electronic Component Manufacturing Industry, 2020-2024



Source: National Bureau of Statistics (NBS) of China, Frost & Sullivan

Note: China's producer price index for the electronic component manufacturing industry reflects the overall trend and magnitude of change in the factory gate prices of electronic component manufacturing enterprises' products when they are first sold within a given period.

OVERVIEW OF GLOBAL AUTOMOTIVE ELECTRONICS INDUSTRY

Automotive electronics are crucial components of the automotive industry and intelligent vehicle technology solutions. They primarily encompass automotive electronic control systems and in-car electronic and electrical systems. The automotive electronic control systems include engine electronic systems, chassis electronic systems, driving assistance systems, and body electronic systems. The in-car electronic and electrical systems cover safety and comfort systems, as well as infotainment and connectivity systems.

ODM Mode Accelerates the Reshaping of Automotive Electronics Supply Chain

The software and hardware manufacturing segments of the automotive electronics industry are attracting more leading consumer electronics ODM providers. They are primarily entering with intelligent automotive electronic products such as smart cockpit domain controllers, chassis domain ECUs, vehicle communication modules, LiDAR, and AR-HUD. Traditional suppliers have only recently entered the emerging smart vehicle industry, and the competitive landscape is still dynamically adjusting. Amidst this trend, manufacturing models are progressively evolving towards a more specialized and customized collaborative division of labor. The ODM mode, already mature and widely applied in the massive and established consumer electronics sector, represents a more efficient way of industrial chain division.

In the smart vehicle sector, as market competition intensifies, OEMs are shifting their strategy from emphasizing full-stack capabilities to prioritizing cost and efficiency. Vehicle manufacturers are increasingly entrusting development and manufacturing to automotive electronics producers. Under the backdrop of vehicle manufacturers' "technology architecture authorization", the ODM mode will become an increasingly important partnership for vehicle manufacturers seeking rapid, customized delivery. Among these, ODM/EMS providers whose core business is consumer electronics, after entering the automotive electronics field, can leverage their robust precision manufacturing, supply chain, and modular platform integration capabilities to achieve rapid mass production and cost control. They are gradually forming comprehensive solution-based service capabilities in core smart vehicle elements like smart cockpits and intelligent chassis. In the future, the penetration rate of ODM/EMS providers primarily focused on consumer electronics is expected to rise rapidly in the automotive electronics industry.

Market Size of Global Automotive Electronics Industry

Continuous advancement of technologies such as AI, cloud computing, big data, 5G communications, and vehicle-to-everything (V2X) is further driving the upgrade of intelligent cockpit, intelligent driving, and intelligent connected solutions, leading to sustained growth in the automotive electronics market. The market size of global automotive electronics industry grew from RMB1,880.0 billion in 2020 to RMB2,493.4 billion in 2024, representing a CAGR of 7.3%. Looking forward, the development of automotive intelligence is expected to further drive the demand for automotive electronics and hence push the market growth. The market size of global automotive electronics is expected to grow further to RMB3,330.3 billion in 2029, representing a CAGR of 6.0% from 2024 to 2029.

Market Drivers and Trends of Global Automotive Electronics Industry

Technical platform integration capabilities accelerate the scaled delivery of automotive electronics

The rapid advancements in electrification and intelligent technologies are reshaping the trajectory of the automotive industry, fostering the integration of traditional components with emerging innovative technologies. For instance, modern smart cockpit domain products are progressively adopting intelligent multi-modal interaction methods like touchscreens, voice recognition, and gesture control, replacing conventional buttons. This provides seamless interaction with vehicle functions, entertainment systems, and navigation. Leading enterprises possess the capability to integrate technology platforms, thereby enhancing industry production efficiency. They are also building a responsive, cost-controllable, and supply-chain-optimized platform for the large-scale delivery of automotive electronics, bridging the gap from product design to commercialization. In the future, leading consumer electronics ODM providers, leveraging their efficient and cost-effective product platform capabilities to enter the automotive electronics sector, are expected to form deeply interdependent business cooperation models with vehicle manufacturers, enabling the scaled delivery of automotive electronic products.

Consumer electronics ODM providers possess cross-domain synergy advantages

ODM providers with extensive experience in mass production within the consumer electronics sector can significantly empower the automotive electronics industry by accelerating iteration, reducing costs, improving efficiency, and ensuring consistent product quality control. Simultaneously, leading clients in the consumer electronics ODM industry are rapidly expanding into the smart vehicle domain. This strategic extension will directly drive the migration of the mature consumer electronics ODM mode to the automotive electronics sector. Long-term cooperating ODM providers, leveraging their mature modular design capabilities, large-scale production experience, and existing supply chain collaborative advantages, will be among the first to seize opportunities in the automotive electronics arena, thereby reshaping the competitive landscape of the automotive electronics industry.

SOURCE OF INFORMATION

We commissioned Frost & Sullivan to conduct market research on global smart device manufacturing, consumer electronics ODM and automotive electronics industries and prepare the Frost & Sullivan Report. Frost & Sullivan is an independent global consulting firm founded in 1961 in New York that offers industry research and market strategies. We have contracted to pay RMB450,000 to Frost & Sullivan for compiling the Frost & Sullivan Report.

In preparing the Frost & Sullivan Report, Frost & Sullivan conducted detailed primary research which involved discussing the status of the industry with certain leading industry participants and conducting interviews with relevant parties. Frost & Sullivan also conducted secondary research which involved reviewing company reports, independent research reports and data based on its own research database. Frost & Sullivan obtained the figures for the estimated total market size from historical data analysis plotted against macroeconomic data as well as considered the above-mentioned industry key drivers. Its market engineering forecasting methodology integrates several forecasting techniques with the market engineering measurement-based system and relies on the expertise of the analyst team in integrating the critical market elements investigated during the research phase of the project. These elements primarily include expert-opinion forecasting methodology, integration of market drivers and restraints, integration with the market challenges, integration of the market engineering measurement trends and integration of econometric variables.

The Frost & Sullivan Report is compiled based on the following assumptions: (i) the social, economic and political environment of the globe and mainland China is likely to remain stable in the forecast period; and (ii) related industry key drivers are likely to drive the market in the forecast period.