*The information and statistics set out in this section and other sections of this document were extracted from different official government publications, available sources from public market research and other sources from independent suppliers, and from the independent industry report prepared by China Insights Consultancy (the "***CIC Report***"). We engaged CIC to prepare the CIC Report, an independent industry report, in connection with the* [**REDACTED**]. *Information and statistics from official government sources have not been independently verified by us, the Joint Sponsors, the* [**REDACTED**], *the* [**REDACTED**], *the* [**REDACTED**], *and the* [**REDACTED**], *any of the* [**REDACTED**], *any of our or their respective directors, officers or representatives or any other person involved in the* [**REDACTED**] *and no representation is given as to their correctness or accuracy.*

OVERVIEW OF GLOBAL PCB INDUSTRY

Against the backdrop of the continuous deepening of the global digitalization process, AI technology has emerged as a core driver of socioeconomic development. PCB, as a critical component of electronic devices, performs essential functions such as interconnecting chips, transmitting signals, and supporting computing power, forming a key hardware basis for the large-scale deployment of AI technologies. With the deep penetration of AI into both cloud computing and edge application scenarios, the PCB industry is ushering in significant opportunities for a new round of production capacity expansion and technological upgrades. In the field of cloud computing, the sustained growth in demand for large-scale AI model training and inference is accelerating the construction of data infrastructure, thereby fueling strong demand for high-performance PCB products characterized by high-speed, high-layer-count, and high-density interconnect capabilities. On the edge side, sectors such as automotive electronics, smart devices, and industrial control are rapidly advancing their intelligent evolution towards deeper AI integration, further stimulating market demand for high-end PCB products. Particularly within the automotive electronics sector, the trends of electrification and intelligence are significantly increasing the PCB usage and value per vehicle, providing sustained momentum for the growth of the PCB industry.

Definition and Classification of PCB Industry

PCB refers to a functional board with predefined conductive pathways or printed components formed on copper-clad laminate or insulating substrates. It provides multi-dimensional performance including precise circuit interconnection, low-loss signal transmission, and stable mechanical support, serving as a fundamental component in electronic devices for carrying and interconnecting electronic components. PCB can be categorized by technical specifications into single- and double-sided PCB, MLPCB, HDI PCB, FPC, and package substrates.

- ***Single- and double-sided PCB:*** Single-sided PCB features circuits on one side of the substrate, typically applied in simple electronic devices such as calculators and basic remote controls. Double-sided PCB incorporates circuits on both sides, with plated through-holes enabling interlayer connections to support moderately complex circuit requirements.

- ***MLPCB:*** MLPCB refers to a printed circuit board with four or more layers. It accommodates additional circuit layers, provides larger routing space to achieve higher circuit density, and consequently supports more complex functionalities while integrating more components within a limited space. Multilayer PCB can be categorized by layer count into mid-low-layer-count PCB (four to six layers) and high-layer-count PCB (eight layers and above).

- ***HDI PCB:*** HDI PCB utilizes blind via and buried via technologies to enhance wiring density, enabling the integration of more components within a limited space while reducing signal interference and loss. Based on the build-up layers and process complexity, HDI PCB can be categorized into low-build-up HDI PCB, high-build-up HDI PCB and anylayer HDI PCB.

- ***FPC:*** FPC is manufactured using a bendable flexible substrate, characterized by high wiring density, light weight, and excellent bendability. It is suitable for devices with specific shapes or space constraints.

- ***Package substrate:*** Package substrate serves as a core carrier connecting bare chips to external circuits, providing electrical interconnection, thermal dissipation, and protection for chips. Featuring high density, high precision, and thinness, it represents a key enabler in advanced packaging.

Application Scenarios of PCB

- ***Automotive electronics:*** The popularization of EVs and the enhancement of automotive intelligence place stringent requirements on automotive electronics PCB. It must meet the high-voltage and high-reliability requirements of the three-electric system (battery, motor, electronic control), and possess characteristics such as high frequency and low latency. These features are critical to supporting high-speed signal transmission and data processing of sensors such as cameras and millimeter-wave radars in ADAS.

- ***Data infrastructure:*** To support the efficient operation of GPU/CPU clusters, data infrastructure PCB typically adopts high-speed materials and integrates high-layer-count designs with high-density interconnect technologies, is required to feature high speed, high layer counts, high-density interconnect, and excellent thermal dissipation performance.

- ***Telecommunication:*** The comprehensive deployment of 5G technology imposes stricter requirements on telecommunication PCB for high-frequency and high-speed signal transmission. Its materials and manufacturing processes must ensure low signal loss and high stability to adapt to complex network environments and ensure data transmission efficiency.

- ***Smart devices:*** With the in-depth empowerment of AI technology and iterative innovation in product forms, smart device PCB is required to accommodate the development of smart devices toward lightweight and multi-functional designs. It must further meet the criteria for high-speed signal transmission, low power consumption and favorable electromagnetic compatibility, leading to a sustained growth in the demand for HDI PCB and FPC.

- ***Industrial control:*** The intelligent transformation of the industrial sector requires industrial control PCB to demonstrate strong anti-interference capability, high-precision signal transmission, and wide temperature range adaptability. These characteristics are essential for supporting the stability and reliability of real-time control, equipment collaboration, and data interaction in manufacturing processes.

Market Size of Global PCB Industry

The global PCB industry has demonstrated a relatively stable growth trend in recent years. In terms of revenue, the market size of global PCB industry grew from US$65.2 billion in 2020 to US$81.7 billion in 2022, with a CAGR of 12.0%. In 2023, the industry experienced a temporary downturn amid weaker downstream demand, with market size declining from US$81.7 billion in 2022 to US$69.5 billion, representing a year-on-year decrease of 15.0%. Such decline was primarily attributable to global macroeconomic volatility, including elevated inflation and regional geopolitical tensions, which weakened demand for downstream end products and in turn reduced PCB procurement by downstream customers. Meanwhile, elevated inventory levels across downstream industries continued to constrain new orders for PCB products. Since 2024, the global PCB industry has sustained its recovery momentum from the downturn in 2023. The market size of global PCB industry, in terms of revenue, grew from US$69.5 billion in 2023 to US$85.2 billion in 2025, representing a CAGR of 10.7% from 2023 to 2025. The recovery was supported by a gradual improvement in downstream demand, the progressive digestion of excess inventory, and continued investment in data infrastructure, which together contributed to a recovery in PCB

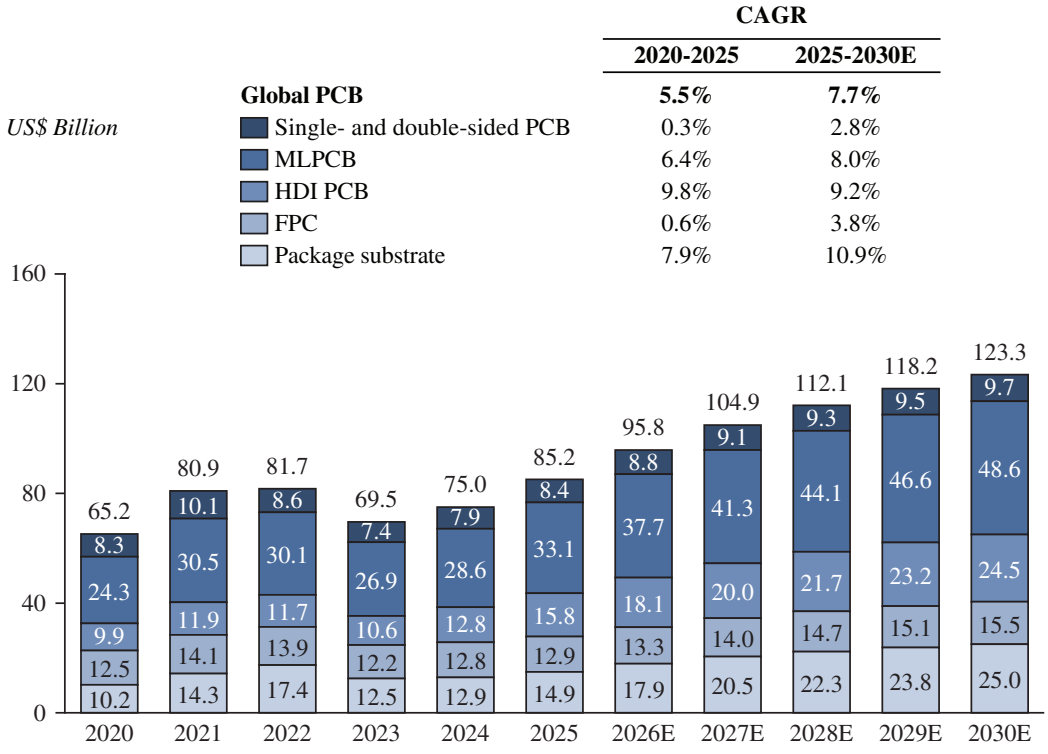
demand. Driven by multiple factors such as the accelerated advancement of automotive intelligence and electrification and the booming AI computing demand, PCB, as a core component of electronic devices, is expected to maintain robust market demand. In terms of revenue, the market size of global PCB industry is projected to reach US$123.3 billion by 2030, with a CAGR of 7.7% from 2025 to 2030.

Breakdown by Product Types

By product types, the market sizes of all PCB product categories experienced negative growth in 2023. Among them, package substrates experienced the most substantial decline, with a year-on-year decline of 28.2%, primarily attributable to the downturn in the semiconductor industry and prevailing excess inventory and oversupply. Meanwhile, due to sluggish end-market demand and excess inventory, other PCB product types also saw varying degrees of year-on-year declines. The market sizes of global single- and double-sided PCB, MLPCB, HDI PCB, and FPC dropped by 14.0%, 10.8%, 10.0%, and 12.2% year-on-year respectively.

Since 2024, the global PCB industry has experienced an overall recovery, with all product types achieving growth. In terms of revenue, the market sizes of global single- and double-sided PCB, MLPCB, HDI PCB, FPC, and package substrates reached US$8.4 billion, US$33.1 billion, US$15.8 billion, US$12.9 billion, and US$14.9 billion, respectively, in 2025. The ongoing technological upgrades in downstream applications continue to drive the high-end transformation of the PCB industry, with products featuring high technical barriers and high added value such as HDI PCB and package substrates becoming primary growth contributors. By 2030, in terms of revenue, the market sizes of global single- and double-sided PCB, MLPCB, HDI PCB, FPC, and package substrates are projected to reach US$9.7 billion, US$48.6 billion, US$24.5 billion, US$15.5 billion, and US$25.0 billion.

Market size of global PCB industry, in terms of revenue, by product types, 2020-2030E



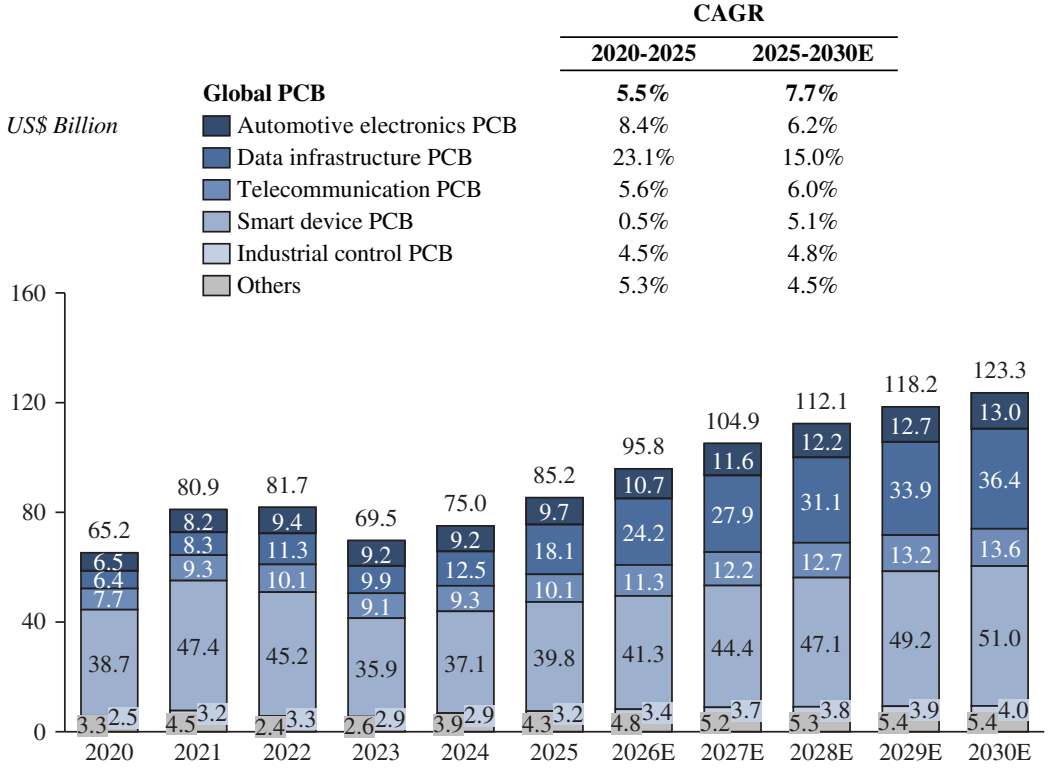
Sources: Expert interviews, Industry publications, CIC

Breakdown by Applications

By applications, the market sizes of all PCB application sectors experienced negative growth in 2023. Among them, the smart devices segment experienced the most substantial year-on-year decline of 20.5%, primarily attributable to the decrease in shipments of end products such as smartphones, personal computers and tablets. Meanwhile, other application sectors also saw varying degrees of year-on-year declines. The market sizes of global PCB in the automotive electronics, data infrastructure, telecommunication, and industrial control sectors dropped by 2.6%, 12.4%, 10.5%, and 13.4% year-on-year respectively.

Since 2024, the market sizes of global PCB across all application sectors have grown as the industry has experienced an overall recovery, with the growth trend continuing into 2025. In terms of revenue, the market sizes of global PCB in the five major application sectors, namely automotive electronics, data infrastructure, telecommunication, smart devices, and industrial control, reached US$9.7 billion, US$18.1 billion, US$10.1 billion, US$39.8 billion, and US$3.2 billion, respectively, in 2025. Driven by the increased PCB usage and value per vehicle amid the trends of automotive intelligence and electrification, alongside robust demand for PCB in servers and switches fueled by booming AI computing demands, the market sizes of PCB in the automotive electronics and data infrastructure sectors are projected to reach US$13.0 billion and US$36.4 billion by 2030, achieving CAGRs of 6.2% and 15.0%, respectively, from 2025 to 2030. The telecommunication, smart devices, and industrial control segments are expected to maintain steady growth. The market sizes of PCB in these three application sectors are projected to reach US$13.6 billion, US$51.0 billion, and US$4.0 billion by 2030.

Market size of global PCB industry, in terms of revenue, by applications, 2020-2030E



Sources: Expert interviews, Industry publications, CIC

ANALYSIS OF GLOBAL AUTOMOTIVE ELECTRONICS PCB INDUSTRY

Development Background of Global Automotive Industry

With the deep integration of frontier technologies such as AI, 5G and autonomous driving, the automotive industry is undergoing a profound transformation. This shift is advancing along two key technological pathways: firstly, the energy revolution centered on electrification, restructuring automotive powertrains through breakthroughs in batteries, electronic controls, and motors; secondly, the functional revolution centered on intelligent interconnection, which endows vehicles to perceive their environment, process information intelligently, and enable human-machine interaction, thereby advancing automobiles toward comprehensive intelligence.

Global sales of EVs increased from 3.0 million units in 2020 to 23.7 million units in 2025, with a CAGR of 50.9%. Their sales are expected to reach 53.5 million units by 2030, with a CAGR of 17.7% from 2025 to 2030. Compared with internal combustion engines (ICEs), EVs feature innovations in electrical and electronic architecture. The upgrading of core components such as BMS and electric drive systems imposes higher requirements on the reliability, power density, and thermal dissipation management of in-vehicle electronic systems.

Global sales of smart vehicles grew from 28.0 million units in 2020 to 66.8 million units in 2025, with a CAGR of 19.0%, and are projected to reach 111.6 million units by 2030, with a CAGR of 10.8% from 2025 to 2030. The wider adoption of intelligent driving functionalities is leading to a notable increase in electronic components such as onboard sensors and domain controllers. This imposes higher requirements on the data processing capability, connection reliability, and system integration of in-vehicle computing platforms, driving automotive electronic systems toward higher performance and greater integration.

Definition and Application Scenarios of Automotive Electronics PCB

Automotive electronics PCB is designed to operate under demanding automotive operating environments, and deliver circuit interconnection, signal transmission, and power support for automotive electronics systems. By integrating chips, sensors, and other electronic components, automotive electronics PCB enables core vehicle functions such as intelligent driving, power control, infotainment, and body control. As a key hardware carrier, it plays a pivotal role in advancing vehicle electrification, intelligence, and interconnection.

- ***ADAS:*** PCB is mainly used in domain controllers and millimeter-wave radars. As the vehicle decision center, domain controllers rely on HDI PCB to support the efficient integration and real-time computing of multi-sensor data. Millimeter-wave radars require high-frequency PCB materials with precise impedance control and anti-interference design, to ensure detection signal accuracy and stability under complex environments, thereby providing reliable perception for intelligent driving.

- ***Automotive power control systems:*** PCB plays a critical role in BMS, motor controllers, and vehicle control unit (VCU). BMS adopt heavy-copper MLPCB, leveraging its high conductivity and temperature resistance to achieve precise battery status monitoring and charge-discharge protection. To adapt to high-voltage, high-current operating conditions, motor controllers typically adopt high-thermal-conductivity materials such as ceramic substrates to ensure thermal dissipation efficiency. VCUs utilize high-reliability multi-layer designs to ensure stable coordination and efficient data transmission across the vehicle's powertrain.

- ***In-vehicle infotainment systems:*** With intelligence advancement, in-vehicle infotainment systems impose higher PCB requirements. High-resolution displays require advanced PCB to support high-definition video output. Furthermore, the system relies on high-temperature tolerance and electromagnetic-interference resistant PCB designs to ensure stable audio-visual signal transmission and system reliability under long-term operation and wide temperature variations.

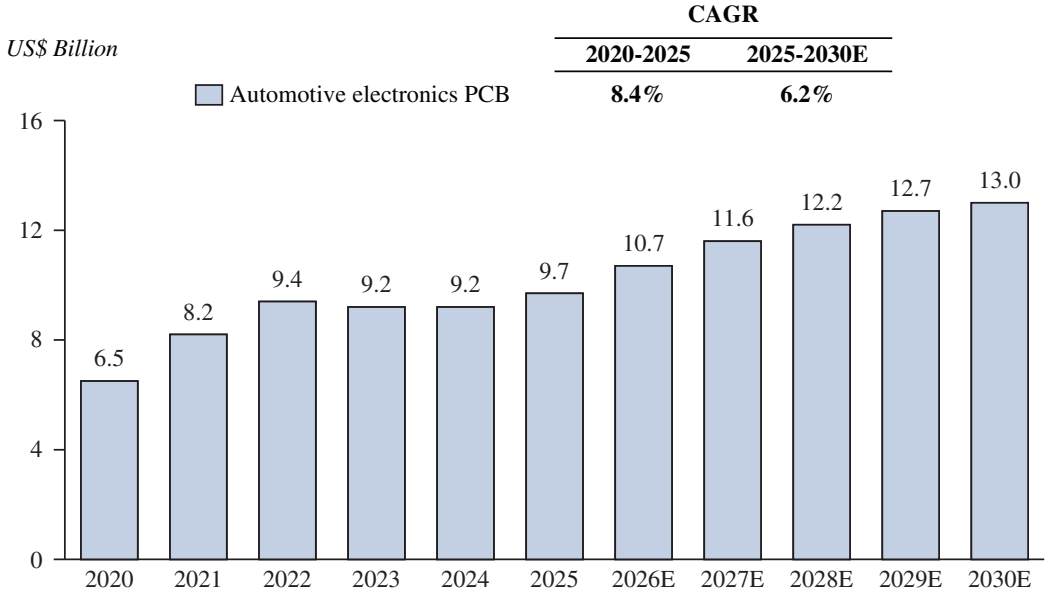
- ***Body control systems:*** PCB is widely used in modules such as lighting control, door and window control, and seat adjustment. Lighting control boards adopt aluminum-based PCB, where aluminum's high thermal conductivity enables rapid thermal dissipation, maintaining light intensity and extending service life. Modules such as door, window and seat adjustment extensively use FPC. Their flexibility enables installation in confined or irregular spaces inside vehicles, reducing weight while enhancing control precision and long-term reliability.

Market Size of Global Automotive Electronics PCB Industry

Driven by the dual trends of electrification and intelligence in the global automotive industry, the automotive electronics PCB industry is embracing new growth opportunities. The core electronic control systems in EVs impose higher requirements on PCB reliability, thermal dissipation, and current-carrying capacity, significantly increasing PCB usage volume and value per vehicle. Concurrently, the substantial increase in sensors, domain controllers, and infotainment equipment in smart vehicles further fuels demand for high-end PCB products, elevating the PCB value per vehicle to multiples of that in traditional vehicles. In terms of revenue, the market size of global automotive electronics PCB industry grew from US$6.5 billion in 2020 to US$9.7 billion in 2025, with a CAGR of 8.4% during this period.

Looking ahead, the deepening automotive electrification and intelligence, combined with technological upgrades and product optimization, will sustain growth in the automotive electronics PCB industry. Electrification, introducing high-power application scenarios, will drive the adoption of high-reliability PCB such as heavy-copper PCB and ceramic substrates. Meanwhile, rising levels of intelligent driving promotes millimeter-wave radars and domain controllers, further boosting demand for HLC PCB and HDI PCB. In terms of revenue, the market size of global automotive electronics PCB industry is projected to reach US$13.0 billion by 2030, with a CAGR of 6.2% from 2025 to 2030.

Market size of global automotive electronics PCB industry, in terms of revenue, 2020-2030E



Sources: Expert interviews, Industry publications, CIC

Growth Drivers and Development Trends of Global Automotive Electronics PCB Industry

- ***Vehicles as a core edge AI application unlock new growth space for PCB:*** Vehicles are emerging as a core application for the implementation of AI technologies on the edge side. Intelligent functions including interaction and scenario-based service recommendations in smart cockpits, real-time environmental perception and decision-making in intelligent driving, and vehicle health predictive maintenance, are fully unleashing AI value. These AI applications impose stringent requirements on the computing power support and data processing efficiency of in-vehicle hardware, which in turn is driving the upgrading of PCB toward higher layer counts, better signal integrity, and stronger thermal dissipation capabilities. Meanwhile, it is also creating an incremental PCB market featured by high reliability and complex manufacturing processes.

- ***Rising penetration of intelligent driving drives demand for high-performance PCB:*** With accelerated automotive intelligence, intelligent driving penetration continues to increase and is advancing towards higher levels (Level 2+ and above). To enable more advanced intelligent driving features, demand for millimeter-wave radars and LiDAR, as well as high-performance domain controllers, is expanding significantly. This results in an exponential growth in computing power requirements per vehicle, imposing higher demands on layer count, circuit density, and signal transmission performance of PCB. Specifically, sensors require high-frequency PCB for stable signal transmission, while the PCB for domain controllers is upgrading towards higher layer counts (18 layers and above) and advanced HDI processes for high-density computing power. Collectively, these factors boost substantial growth in demand for high-end PCB.

- ***Electrification trend drives higher PCB value per vehicle:*** EVs widely use PCB in core components such as BMS, motor controllers, and on-board chargers. This significantly increases both the value of PCB per vehicle and the overall PCB usage volume compared to ICEs, serving as a key driver of market growth.

- ***The shift toward higher-end products promotes adoption of advanced processes and materials:*** Advanced processes such as anylayer HDI and stacked microvias are being increasingly adopted to support finer circuit designs and faster signal transmission speeds. Furthermore, high-power scenarios driven by electrification are boosting demand for PCB with excellent thermal dissipation performance, including heavy-copper PCB, metal-core substrates, and ceramic substrates, to address the heat management challenges in high-voltage and high-current environments.

- ***Expanded applications of FPC and rigid-flex PCB:*** Driven by the demands for lightweight design, space optimization, and assembly flexibility, the application scenarios of FPC and rigid-flex PCB are continuing to expand. FPC is widely used in in-vehicle sensors, display modules, and body control modules to adapt to confined or irregular spaces. While rigid-flex PCB is employed in high-end automotive systems to achieve higher functional integration, enhancing the overall performance of the vehicle's electronic systems.

ANALYSIS OF GLOBAL DATA INFRASTRUCTURE PCB INDUSTRY

Development Background of Global Data Infrastructure Industry

Market Size and Development Background of Global Data Infrastructure Industry

Data infrastructure runs through the entire process of data generation, transmission, storage, and analysis, providing essential support for the digital operation and services of various industries. It mainly includes computing and network equipment within data infrastructure, such as servers and switches. In recent years, rapid advancement of technologies such as AI, the Internet of Things (IoT), and cloud computing is significantly accelerating global digital transformation, leading to

explosive growth in data traffic, directly driving substantial growth in data infrastructure demand. In terms of revenue, the market size of global data infrastructure industry grew from US$120.1 billion in 2020 to US$487.0 billion in 2025, with a CAGR of 32.3% during this period. It is projected to reach US$1,438.9 billion by 2030, representing a CAGR of 24.2% from 2025 to 2030.

AI servers are a critical data infrastructure category built for complex AI computations and deep learning tasks. The explosive growth in AI computing demand is positioning AI servers as the fastest-growing segment in the data infrastructure market. In terms of revenue, the market size of global AI server industry expanded from US$15.9 billion in 2020 to US$232.7 billion in 2025, with a CAGR of 71.1% during this period. It is expected to reach US$1,054.4 billion by 2030, with a CAGR of 35.3% from 2025 to 2030.

Switches are core network equipment in data infrastructure that undertake the functions of routing, distributing, and scheduling data traffic. With the substantial increase in the frequency of data interactions and the scale of data traffic, there are higher requirements for switch port rates, forwarding performance, and network flexibility. These demands are directly driving the continued growth of the switch market. In terms of revenue, the market size of global switch industry increased from US$28.1 billion in 2020 to US$52.4 billion in 2025, with a CAGR of 13.3% during this period. It is projected to grow to US$78.4 billion by 2030, with a CAGR of 8.4% from 2025 to 2030.

Value Chain of Data Infrastructure Industry

The upstream of the data infrastructure industry includes PCB as a key component. As core foundational carrier material, PCB enables electrical interconnection and functional coordination among hardware components, and is deeply integrated into the data infrastructure hardware ecosystem. Specifically, the server PCB includes CPU motherboards, GPU motherboards, AI server accelerator boards, universal baseboards, switch boards, and power supply boards. The switch PCB comprises switch unit boards, interface boards, main control unit boards, routing engine boards, and power supply boards. The midstream of the industry assembles upstream components into systems, including AI servers, general-purpose servers, and switches to support computing power deployment. Downstream application customers primarily include cloud service providers, telecom operators, and enterprise clients.

Definition and Application Scenarios of Data Infrastructure PCB

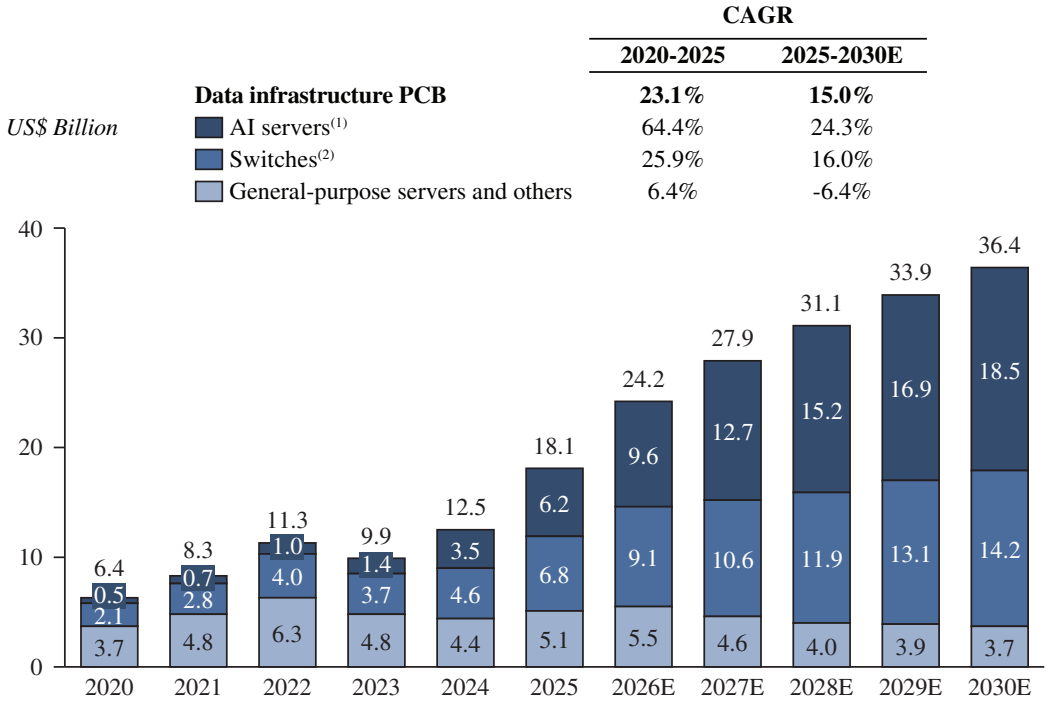
Data infrastructure PCB is a key component in core computing devices such as servers and switches. As the physical support and interconnection carrier for electronic components, it enables signal transmission, power distribution, thermal management, and physical protection. It must meet high-speed, high-layer-counts, high-density interconnect, and strong thermal dissipation requirements, and is critical to the efficient, stable operation of data infrastructure. Different devices impose differentiated PCB performance needs in specific applications. For AI servers, PCB must support high-speed interconnect of accelerator chips such as GPUs, ASICs, and FPGAs. It typically utilizes HDI technology and low-dielectric-constant materials to ensure the stability of high-frequency signal transmission, enabling full leverage of heterogeneous computing power. For switches, PCB relies on high-layer-count designs and high-speed signal transmission technologies to achieve high-bandwidth, low-latency data forwarding between devices. For general-purpose servers, PCB adopts high-density wiring and low-loss designs to ensure efficient internal data.

Market Size of Global Data Infrastructure PCB Industry

Rapid development of AI, cloud computing and IoT, boosts demand for data transmission and computing, driving the accelerated construction, iteration, and upgrading of data infrastructure. As key carriers and interconnection components in data infrastructure hardware, data infrastructure PCB maintains a rapid development momentum. In terms of revenue, the market size of global data infrastructure PCB industry grew from US$6.4 billion in 2020 to US$18.1 billion in 2025, with a CAGR of 23.1%.

Looking ahead, the sustained demand for high speed, high layer counts, high-density interconnect PCB from AI servers is expected to continue to propel the data infrastructure PCB industry toward higher-end, higher-value-added development. Furthermore, to meet the high-bandwidth and low-latency data exchange requirements of large-scale GPU clusters, switches are continuously enhancing their port density and bandwidth, which will further drive demand for high-end PCB. In terms of revenue, the market sizes of global AI server PCB and switch PCB industry are expected to reach US$18.5 billion and US$14.2 billion in 2030, with a CAGR of 24.3% and 16.0% respectively from 2025 to 2030.

Market size of global data infrastructure PCB industry, in terms of revenue, by applications, 2020-2030E



Notes:

(1) The market size of AI server PCB industry refers to the market size of all types of PCB used in AI servers, including CPU motherboards, GPU motherboards, AI server accelerator boards, universal baseboards, switch boards, and power supply boards.

(2) The market size of switch PCB industry refers to the market size of all types of PCB used in switches, including switch unit boards, interface boards, main control unit boards, routing engine boards, and power supply boards, but excluding switch boards used in AI servers.

Sources: Expert interviews, Industry publications, CIC

Growth Drivers and Development Trends of Global Data Infrastructure PCB Industry

- ***AI computing power surge drives demand for PCB featuring high speed, high layer counts, and high-density interconnect:*** In AI servers, to meet large-model training and inference requirements, accelerator chips such as GPUs, ASICs and FPGAs rely on high-speed interconnection protocols, imposing extreme demands on PCB layer count, wiring density, and signal integrity. This fuels demand for HLC PCB and HDI PCB. To address the high-bandwidth, low-latency data exchange needs within large-scale GPU clusters, network architectures are evolving toward fully interconnected models. This evolution drives improvements in the port density and bandwidth capacity of individual switches, which in turn fuels demand for high-speed PCB.

- ***Development toward higher frequency and higher speed:*** The rapid development of AI computing clusters and global data traffic has raised demand for faster data transmission. Network interface rates are accelerating from 400G to 800G and even 1.6T, imposing stricter PCB signal integrity standards. Under this trend, PCB must adopt new substrate materials with low dielectric constant and loss, alongside stricter impedance control and wiring optimization to ensure high-speed signal transmission quality.

- ***Continuous optimization of thermal dissipation performance:*** Data infrastructure equipment, especially high-performance servers and switches, generates significant heat during operation, making thermal dissipation critical for stable operation. Future developments of PCB are expected to focus on adopting advanced thermal materials and technologies, including substrates with higher thermal conductivity, heat pipe cooling technologies, and liquid cooling technologies, to improve thermal dissipation efficiency. Additionally, PCB design will emphasize optimized thermal dissipation layouts via rational wiring and strategic component placement to minimize heat accumulation and enhances the overall thermal dissipation management.

- ***Emergence of new PCB products:*** The surge in AI computing power and data traffic has led to new PCB products tailored to emerging needs. For example, in the AI server sector, high-end PCB with high-layer-count architecture, low signal attenuation, and HDI characteristics can effectively improve data transmission efficiency and stability between multi-GPU clusters, adapting to terabit-level bandwidth demands. They are expected to become one of the interconnection solutions for AI computing clusters.

- ***Accelerated domestic substitution:*** Amid global supply chain uncertainties, domestic substitution in data infrastructure sector is accelerating. The rise of domestic server and switch manufacturers is driving PCB supply chains localization, offering critical opportunities for domestic PCB providers to enter the high-end market. With sustained investment in upstream materials and high-layer-count processes, leading domestic PCB providers have achieved breakthroughs in high-end products such as AI server boards and high-speed switch backplanes, with their market share expected to grow steadily.

ANALYSIS OF GLOBAL TELECOMMUNICATION PCB INDUSTRY

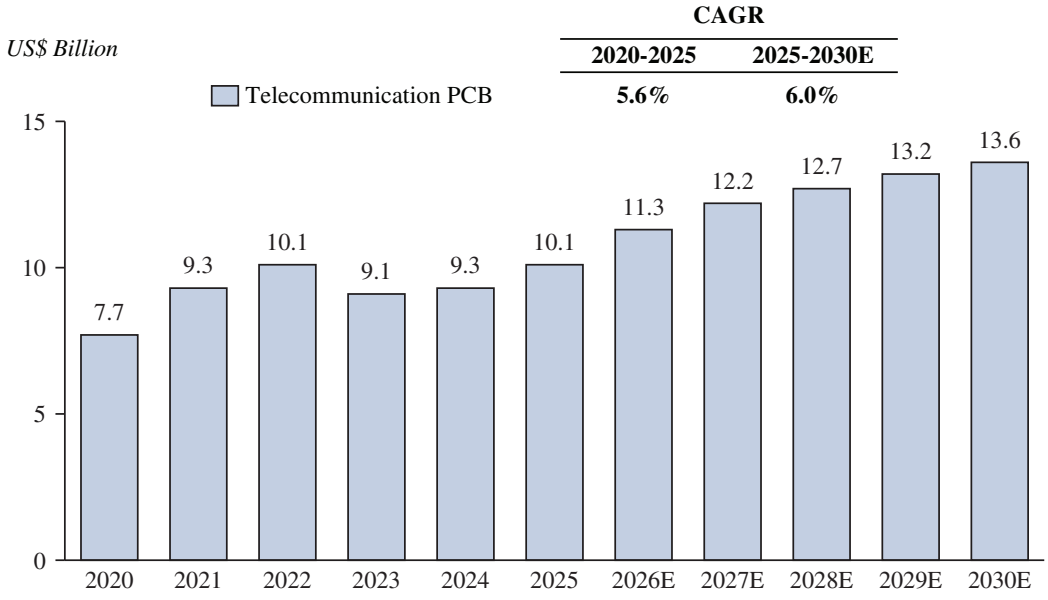
Definition and Application Scenarios of Telecommunication PCB

Telecommunication PCB is a core component for circuit interconnection, signal transmission and functional integration in telecommunication devices. Given high demands for signal quality and transmission efficiency, it must meet low-loss, high-frequency, high-speed and high-stability requirements. Main application scenarios for telecommunication PCB include 5G and 6G base station antenna and baseband units, satellite communication on-board payloads and ground receiving stations, as well as routers and optical fiber communication equipment.

Market Size of Global Telecommunication PCB Industry

The global communication PCB industry has expanded steadily. In terms of revenue, the market size of global telecommunication PCB industry increased from US$7.7 billion in 2020 to US$10.1 billion in 2025, with a CAGR of 5.6%. This growth was mainly driven by large-scale 5G deployment, which boosted demand for telecommunication PCB. As 5G construction evolves from widespread to deep coverage, intensive deployment of small base stations continues to drive demand for high-frequency and high-speed PCBs. Meanwhile, accelerated commercial deployment of low-orbit satellite communications and progress in 6G R&D are also spurring high-performance PCB applications, injecting new momentum into the industry. By 2030, the market size of global telecommunication PCB industry is projected to grow to US$13.6 billion, with a CAGR of 6.0% from 2025 to 2030.

Market size of global telecommunication PCB industry, in terms of revenue, 2020-2030E



Sources: Expert interviews, Industry publications, CIC

Growth Drivers and Development Trends of Global Telecommunication PCB Industry

- ***5G evolution and 6G R&D drive the iteration of high-frequency and high-speed PCB:*** As 5G networks expand from initial wide coverage to deep coverage scenarios such as indoor environments and industrial IoT, base station density continues to rise, imposing higher requirements on PCB high-frequency signal transmission and anti-interference performance. Meanwhile, the forward-looking layout of 6G technology is gradually advancing with demand for higher transmission rates and wider frequency bands driving PCB iteration toward finer line widths and spacing, and better signal integrity.

- ***Low-orbit satellite communication deployment stimulates demand for high-performance PCB:*** The global deployment process for low-orbit satellites is driving rapid expansion of demand for satellite payloads and ground receiving equipment. Operating in high-radiation and extreme temperature environments, satellites require high-performance PCBs with radiation resistance and thermal cycle stability. Furthermore, strict weight limitations on satellites promote the development and implementation of lightweight PCB solutions, further expanding the product range of communication PCB.

- ***Wider application of low-loss materials:*** To meet the demand for high-speed, low-latency communication transmission, equipment requirements for PCB signal integrity continue to rise. Low-loss materials such as PTFE, with their stable dielectric constant and extremely low loss tangent, can effectively ensure signal transmission quality. Their penetration rate in key components of communication equipment is steadily increasing.

ANALYSIS OF GLOBAL SMART DEVICE PCB INDUSTRY

Definition and Application Scenarios of Smart Device PCB

Smart devices integrate next-generation digital technologies and innovative advancements to serve a wide range of user scenarios. Driven by technologies such as AI, IoT, and big data, smart devices are evolving along two primary trajectories: one toward devices with advanced intelligence

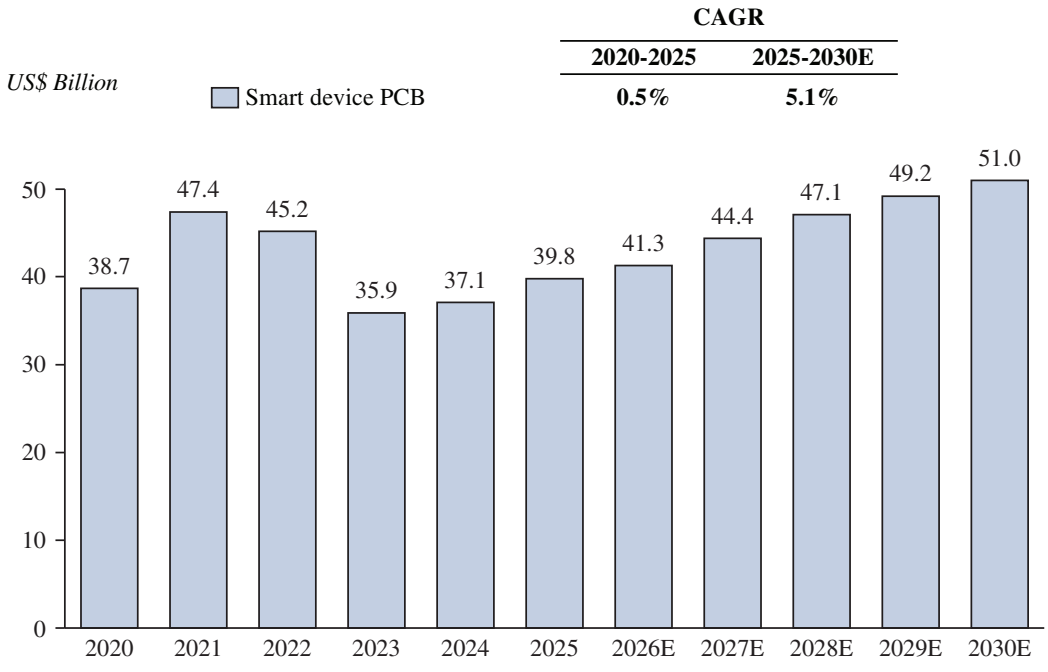
capabilities, represented by AI phones and AI personal computers, and the other giving rise to new product categories such as humanoid robots and drones. Smart device PCB is a core component enabling the lightness, multi-functional integration and high-performance operation of smart devices, mainly applied in smartphones, personal computers, tablets, wearable devices, humanoid robots and drones. As the core hardware carrier, it enables signal transmission, computing support and multi-module coordination within smart devices.

Market Size of Global Smart Device PCB Industry

Smart devices represent the largest downstream application segment in the global PCB industry. In terms of revenue, the market size of global smart device PCB industry reached US$39.8 billion in 2025, accounting for 46.7% of the global PCB market.

Rapid advances in AI, flexible display, and other technologies have raised stringent requirements for product intelligence, thinness and lightness, flexibility, and integration degree, propelling continuous product iteration. Meanwhile, accelerated adoption of new categories such as humanoid robots and drones is injecting new impetus to the smart device PCB industry. Accordingly, the industry's key growth drivers are shifting from traditional segments such as smartphones and laptops to emerging segments such as AI phones, foldable devices, and humanoid robots. These emerging sectors are driving sustained demand for high-value-added PCB, including HDI PCB and rigid-flex PCB, and the PCB providers are ramping up their high-end market deployment to better satisfy market requirements and upgrade their product mix to focus on the premium segment. In terms of revenue, the market size of global smart device PCB industry is expected to reach US$51.0 billion by 2030, with a CAGR of 5.1% from 2025 to 2030.

Market size of global smart device PCB industry, in terms of revenue, 2020-2030E



Sources: Expert interviews, Industry publications, CIC

Growth Drivers and Development Trends of Global Smart Device PCB Industry

- ***Deepening AI applications:*** The integration of AI technologies into smart devices is driving demand for high-speed data processing and real-time interaction, fueling growth in HDI PCB and HLC PCB. Concurrently, accelerated commercialization of emerging product categories, including humanoid robots and drones, is further stimulating demand for advanced PCB products while enhancing their per-unit value.

- ***Development towards thinness, lightweight and flexibility:*** The growing adoption of foldable phones, smartwatches, and true wireless stereo earphones imposes higher requirements on the thinness, lightweight, and bendability of the PCB. FPC and rigid-flex PCB, with strong flexibility and spatial adaptability, are expected to become the mainstream solutions to accommodate product innovations and lightweight design needs.

- ***Enhancement of functional integration:*** Growing functional modules in smart devices demand higher-density circuit interconnection within a limited area, driving HDI technology and miniaturization to mainstream development directions. This trend is also promoting continuous breakthroughs in PCB manufacturing processes, and is moving toward smaller line widths and spaces to achieve higher wiring density in limited space.

- ***Increased demand for production responsiveness:*** Shorter smart device iteration cycles demand greater production responsiveness from PCB providers. To match rapid product updates, PCB providers must possess high flexibility in the design phase while simultaneously optimizing manufacturing processes and compressing delivery timelines.

ANALYSIS OF GLOBAL INDUSTRIAL CONTROL PCB INDUSTRY

Definition and Application Scenarios of Industrial Control PCB

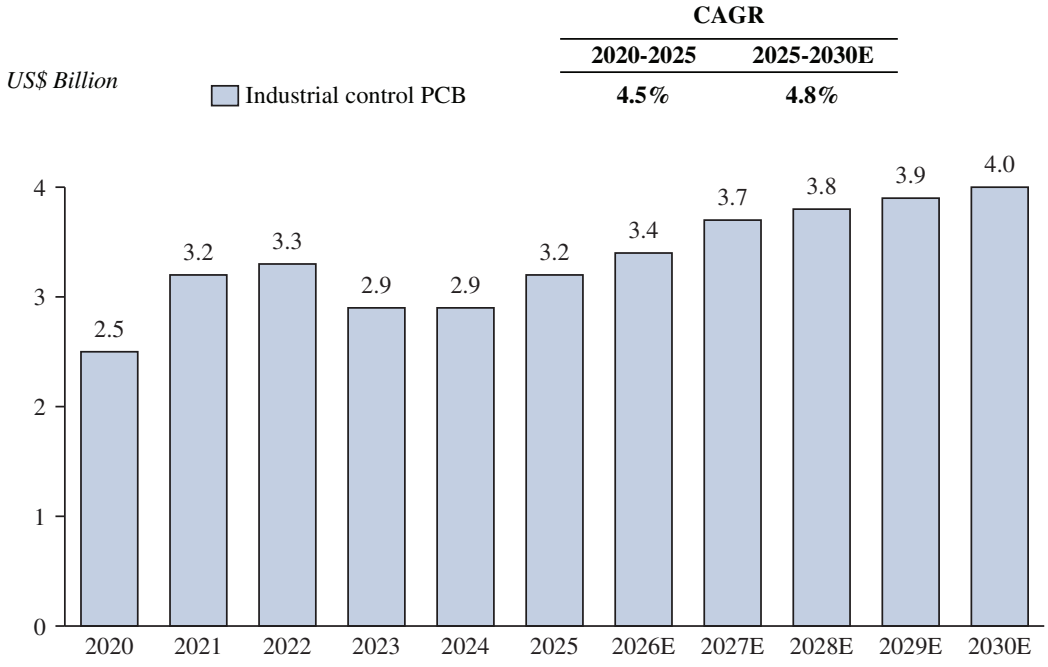
Industrial control PCB is a high-reliability component for industrial control applications, enabling precise control, equipment coordination, and data exchange in industrial manufacturing. To ensure long-term stable operation in harsh environments, features high precision, reliability, strong anti-interference capabilities, wide temperature tolerance, and a long service life. The primary application scenarios for industrial control PCB encompass core control units, signal processing modules, and motion control systems within industrial automation systems, industrial robots, and intelligent manufacturing equipment.

Market Size of Global Industrial Control PCB Industry

As a critical component of industrial control systems, PCB enables signal transmission, equipment interconnection, and stable operation under complex conditions, playing an indispensable role in precise control, equipment coordination, and data acquisition for industrial manufacturing. Driven by global smart manufacturing and rising industrial automation, the market size of global industrial control PCB industry has demonstrated steady growth. In terms of revenue, the market size of global industrial control PCB industry grew from US$2.5 billion in 2020 to US$3.2 billion in 2025, with a CAGR of 4.5% during the period.

Accelerated digitalization, automation, and intelligence transformation in global industrial sector have driven rapid growth in industrial automation and smart manufacturing applications, sustaining steady growth in the industrial control PCB market. In terms of revenue, the market size of global industrial control PCB industry is projected to reach US$4.0 billion by 2030, with a CAGR of 4.8% from 2025 to 2030.

Market size of global industrial control PCB industry, in terms of revenue, 2020-2030E



Sources: Expert interviews, Industry publications, CIC

Growth Drivers and Development Trends of Global Industrial Control PCB Industry

- ***Popularization of industrial automation and smart manufacturing:*** Acceleration of industrial automation and smart manufacturing is generating sustained and stable demand. Industrial control systems, as the core hub of automation systems, place increasingly higher requirements on PCB layer count, wiring density, and signal integrity. Particularly in critical equipment such as robotic joint controls and intelligent sensors, the application proportion of HLC PCB is rising rapidly, providing reliable hardware support for the stable operation of industrial automation systems.

- ***Enhanced reliability and safety standards:*** Complex and variable environments impose high standards for PCB performance, including heat resistance, vibration resistance, and corrosion prevention. Stricter global industrial safety standards and certification requirements drive higher reliability demands. This trend compels PCB providers to establish more comprehensive quality management systems across material selection, process control, and quality inspection phases.

- ***Domestic substitution and industrial upgrading:*** Driven by supply chain security and self-reliance strategies, domestic PCB providers have entered the high-end industrial control supply chain through sustained R&D, technological advancement and certification breakthroughs. Leveraging strengths in cost control, rapid responsiveness, and stable supply, they are breaking the supply chain monopoly of overseas brands, advancing the localization and value enhancement of the industrial control PCB value chain.

ANALYSIS OF COMPETITIVE LANDSCAPE OF GLOBAL PCB INDUSTRY

Competitive Landscape of Global PCB Industry

The competitive landscape of global PCB industry is relatively fragmented. In terms of PCB revenue in 2025, the combined market share of the top 15 global PCB providers reached 48.8%. Overall, the competitive landscape of global PCB industry exhibits three core characteristics, namely resource concentration toward leading providers, the accelerated rise of domestic Chinese providers, and the continuous expansion of advantages among top players.

In 2025, the Company's PCB revenue reached US$2,107.1 million, ranking eleventh among all PCB providers and fifth among PCB providers headquartered in Chinese mainland, with a market share of 2.5%.

Ranking of global PCB providers, in terms of PCB revenue, 2025

Ranking	PCB providers	Headquarter	Revenue	Market Share
			(US$ million)	*(%)*
1	Company A[1]	Taiwan, China	5,895.5	6.9%
2	Company B[2]	Taiwan, China	4,239.1	5.0%
3	Company C[3]	Jiangsu, China	3,615.3	4.2%
4	Company D[4]	Guangdong, China	3,150.7	3.7%
5	Company E[5]	the United States	2,906.3	3.4%
6	Company F[6]	Jiangsu, China	2,560.2	3.0%
7	Company G[7]	Guangdong, China	2,551.8	3.0%
8	Company H[8]	Taiwan, China	2,454.7	2.9%
9	Company I[9]	Taiwan, China	2,370.8	2.8%
10	Company J[10]	Japan	2,273.0	2.7%
11	**The Company**	**Guangdong, China**	**2,107.1**	**2.5%**
12	Company K[11]	Austria	1,976.6	2.3%
13	Company L[12]	Taiwan, China	1,929.2	2.3%
14	Company M[13]	Taiwan, China	1,848.4	2.2%
15	Company N[14]	Hongkong, China	1,709.7	2.0%
	Sub total		**41,588.5**	**48.8%**

Notes:

(1) Company A is a public company founded in 2006, listed on the Taiwan Stock Exchange, and headquartered in Taiwan, China. It is mainly engaged in the R&D, manufacturing and sales of diversified PCB.

(2) Company B is a public company founded in 1990, listed on the Taiwan Stock Exchange, and headquartered in Taiwan, China. It is mainly engaged in the R&D, manufacturing and sales of diversified PCB.

(3) Company C is a public company founded in 1998, listed on the Shenzhen Stock Exchange, and headquartered in Jiangsu, China. It is mainly engaged in the R&D, manufacturing and sales of PCB, precision components, touch panels and liquid crystal display modules, and optical transceivers.

(4) Company D is a public company founded in 1984, listed on the Shenzhen Stock Exchange, and headquartered in Guangdong, China. It is mainly engaged in the R&D, manufacturing and sales of diversified PCB.

(5) Company E is a public company founded in 1978, listed on the NASDAQ, and headquartered in the United States. It is mainly engaged in the R&D, manufacturing and sales of PCB, radio frequency and microelectronic components, as well as providing system integration services.

(6) Company F is a public company founded in 1992, listed on the Shenzhen Stock Exchange, and headquartered in Jiangsu, China. It is mainly engaged in the R&D, manufacturing and sales of diversified PCB.

(7) Company G is a public company founded in 2006, listed on the Shenzhen Stock Exchange and Hongkong Stock Exchange, and headquartered in Guangdong, China. It is mainly engaged in the R&D, manufacturing and sales of diversified PCB.

(8) Company H is a public company founded in 1973, listed on the Taiwan Stock Exchange, and headquartered in Taiwan, China. It is mainly engaged in the R&D, manufacturing and sales of diversified PCB.

(9) Company I is a public company founded in 1991, listed on the Taiwan Stock Exchange, and headquartered in Taiwan, China. It is mainly engaged in the R&D, manufacturing and sales of diversified PCB.

(10) Company J is a private enterprise founded in 1969 and headquartered in Japan. It is mainly engaged in the R&D, manufacturing and sales of FPC.

(11) Company K is a public company founded in 1987, listed on the Vienna Stock Exchange, and headquartered in Austria; It is mainly engaged in the R&D, manufacturing and sales of diversified PCB.

(12) Company L is a public company founded in 1981, listed on the Taiwan Stock Exchange, and headquartered in Taiwan, China, It is mainly engaged in the R&D, manufacturing and sales of diversified PCB.

(13) Company M is a public company founded in 1989, listed on the Taiwan Stock Exchange, and headquartered in Taiwan, China, It is mainly engaged in the R&D, manufacturing and sales of diversified PCB.

(14) Company N is a public company founded in 1988, listed on the Hong Kong Stock Exchange, and headquartered in Hong Kong, China, It is mainly engaged in the manufacturing and sales of laminates and PCB.

Sources: Public filings of listed companies, Expert interviews, Industry publications, CIC

Competition Landscape of Global Automotive Electronics PCB Industry

The competitive landscape of global automotive electronics PCB industry is relatively fragmented, with leading providers occupying a dominant market position by virtue of their accumulated strict automotive-grade certification credentials and profound technical capabilities. In terms of automotive electronics PCB revenue in 2025, the Company ranks first in the global automotive electronics PCB industry with a market share of 10.6%.

Ranking of global automotive electronics PCB providers, in terms of automotive electronics PCB revenue, 2025

Ranking	PCB providers	Headquarter	Revenue	Market Share
			(US$ million)	*(%)*
1	**The Company**	**Guangdong, China**	**1,019.4**	**10.6%**
2	Company O[(1)]	Japan	616.7	6.4%
3	Company P[(2)]	Japan	554.5	5.7%
4	Company J	Japan	477.3	4.9%
5	Company I	Taiwan, China	450.1	4.7%
	Sub total		**3,118.0**	**32.3%**

Notes:

(1) Company O is a public company founded in 1975, listed on the Tokyo Stock Exchange, and headquartered in Japan. It is mainly engaged in the R&D, manufacturing and sales of diversified PCB and other electronic related businesses.

(2) Company P is a public company founded in 1961, listed on the Tokyo Stock Exchange, and headquartered in Japan. It is mainly engaged in the R&D, manufacturing and sales of diversified PCB.

Sources: Public filings of listed companies, Expert interviews, Industry publications, CIC

Entry Barriers of Global PCB Industry

- ***Customer certification and supply chain barrier:*** The quality of PCB directly impacts end-product performance and service life. Downstream customers have established a mature collaborative system with existing PCB providers through long-term cooperation. New entrants face lengthy, resource-intensive certification procedures and must maintain a consistent and reliable supply of products to establish stable cooperative relationships with customers.

- ***Technology and process barrier:*** PCB industry is highly technology-intensive with complex, multidisciplinary manufacturing processes. As electronic devices evolve towards higher precision, density and performance, PCB technical requirements continue to rise. Leading PCB providers offer customized solutions and master process technologies such as microvias and deep micro-blind vias, thereby establishing competitive advantages in thermal dissipation performance and product stability.

- ***Capital Investment Barrier:*** PCB industry is a capital-intensive sector, on the one hand, PCB providers are required to inject substantial capital to procure high-end automated production equipment, construct cleanroom manufacturing facilities and integrate supporting systems for the establishment of initial production capacity. On the other hand, to respond to rapid technology iteration and upgrading downstream demand, continuous invest capital in equipment upgrading, R&D of new materials and production capacity expansion are needed.

Challenges within Global PCB industry

- ***Intensifying market competition:*** PCB industry has a large number of participants and a relatively fragmented competitive landscape. As market competition intensifies, downstream customers are imposing increasingly stringent requirements on PCB providers in terms of product quality stability, delivery capability and technical proficiency. To maintain their competitiveness amid such intensifying market competition, PCB providers must continuously invest capital and resources in upgrading product quality, enhancing delivery efficiency and advancing technical proficiency.

- ***Rising technical requirements amid rapid downstream technological iteration:*** PCB industry is a typical technology-intensive sector. With the rapid technological iteration in downstream application sectors such as automotive electronics, data infrastructure and smart devices, market requirements for the performance, process precision and material adaptability of PCB products are rising consistently. If PCB providers fail to keep pace with the industry's technological trends, and thus are unable to meet the new product demands of downstream customers, the market competitiveness of their products will diminish gradually, exposing them to the risk of market share loss.

- ***Industry development constraints from trade and policy changes:*** The operations and development of PCB providers are subject to the impact of global trade policies and industry regulatory policies of various jurisdictions. Adjustments to international trade policies and export control measures may restrict PCB providers' global layout and impede the cross-border exports of their products. If PCB providers do not take effective measures, such as expanding overseas production capacity and strengthening supply chain management, they may face difficulties in maintaining global delivery capabilities and supply chain resilience, which could limit their ability to effectively respond to challenges arising from changes in trade policies and industry regulations.

ANALYSIS OF RAW MATERIALS OF PCB INDUSTRY

The main raw materials of PCB, including copper-clad laminates, copper foils and copper anode balls, all take copper as their core component. Accordingly, fluctuations in copper prices have a material impact on the cost structure of PCB.

In 2021, the global economic recovery drove a rapid rebound in copper demand in sectors such as infrastructure and new energy. However, growth in copper supply was limited due to the pandemic impact on copper production and transportation, resulting in a supply-demand mismatch. Consequently, the global annual average copper settlement price increased from US$6,180.6 per ton in 2020 to US$9,317.5 per ton in 2021. In recent years, the global copper settlement price has continued to fluctuate. In 2025, the global annual average copper settlement price reached US$9,944.9 per ton. Looking ahead, as the world undergoes a profound industrial upgrading that shifts toward high-value, technology-intensive manufacturing, coupled with the increasing promotion of renewable energy and infrastructure development, copper prices are expected to remain relatively stable within a relatively high range.

SOURCE OF INFORMATION

In connection with the [**REDACTED**], we engaged CIC, an independent market research consultant, to conduct an analysis of, and to prepare a report about global PCB industry. The CIC Report has been prepared by CIC independent of the influence of our Group and other interested parties. We have agreed to pay CIC a total fee of RMB680,000 for the preparation and use of the CIC Report, and we believe that such fees are consistent with the market rate. CIC is a consulting firm founded in Hong Kong and provides professional industry consulting services across multiple industries. CIC's services include industry consultancy services, commercial due diligence and strategic consulting.

CIC conducted both primary and secondary research using a variety of resources. Primary research involved interviewing key industry experts and leading industry participants. Secondary research involved analyzing data from various publicly available data sources. The market projections in the commissioned report are based on the following key assumptions: (i) given China's enduringly stable political system, effective social governance and robust economic foundation, it is anticipated that the overall social, economic and political environments in China will remain stable during the forecast period; (ii) according to the National Bureau of Statistics of China, key economic indicators such as gross Domestic Product ("GDP"), industrial added value, and urbanization rate have shown an upward trend in China over the past decade. Therefore, we believe that the economic and industry development in China is likely to maintain a steady growth trajectory during the forecast period, accompanied by continuing urbanization; (iii) related key industry drivers such as the expansion of demand in downstream application sectors, the advancement of AI technologies and the continuous upgrading of advanced technologies are likely to propel continued growth in global PCB industry throughout the forecast period; and (iv) there will be no extreme force majeure event or unforeseen industry regulation that may significantly or fundamentally affect the relevant market and industry.

Unless otherwise specified, all data and forecasts contained in this section are derived from the consultancy report of CIC. The Directors, upon acting with reasonable prudence, confirmed that there has been no occurrence of adverse change in the overall market information that would subject the data to significant restrictions, contradiction or negative effects since the date of the consultancy report.