

ZVEI pager

Printed circuit boards and electronics manufacturing (EMS) as a necessity for the development of a microelectronics ecosystem

In order to remain competitive in the high-tech sector, the European Union has adopted the European Chips Act and is thus facing up to the global competition for funding - an important and correct step. However it remains to be criticised that the EU has so far paid far too little attention to the development of the entire microelectronics ecosystem. Other regions of the world are far ahead of us in this respect and have recognised the importance of the **interconnection technology of printed circuit boards and electronic manufacturing services (EMS)**. Without such technologies chips cannot be further processed, and have provided appropriate support. Put simply, semiconductors are the brains of electronics, which can only function with a nervous system and a framework of printed circuit boards. Electronics manufacturing systems (EMS), on the other hand, combine both to form a functioning body with a shell, bringing electronics to life. To achieve a truly **resilient microelectronics ecosystem**, it is therefore imperative for Europe to maintain and expand **domestic production along the entire electronics supply chain**. This would strengthen important sectors such as the automotive, energy supply and production, data technology, semiconductors, telecommunications and media, building technology, measurement and control technology, automation and process technology, medical and military technology sectors that are important for Europe.

Our positions

- In the USA, there are explicit subsidies for printed circuit boards and the industry as well. The Defense Production Act provides more than \$150 million for printed circuit boards and IC substrates (highly miniaturised printed circuit boards). The entire industry is supported by measures such as the IRA Inflation Reduction Act (\$389 billion) and the IJJA Infrastructure, Investments and Jobs Act (\$1.2 billion). This will primarily benefit electronics manufacturing companies (EMS) that produce products for climate-friendly technologies, electricity infrastructure or electromobility.
- In China and other Asian countries, the entire microelectronics ecosystem is also subsidised by the government. Companies receive financial aid, tax breaks, favourable loans, government funding or discounted access to energy and water.
- In view of this aggressive subsidisation policy, many companies are facing tough competition from manufacturers in these regions and are therefore faced with essential economic decisions: To **remain** competitive, European PCB manufacturers and electronics manufacturers must make **additional investments in research and development** in order to develop the innovative technologies and solutions needed for the future in the EU. **Targeted funding programmes** should increase the competitiveness of PCB manufacturers and electronics production in international competition.
- **The Net-Zero Industry Act (NZIA)** proposed by the EU Commission aims to improve the regulatory framework and investment conditions for "net-zero technologies" in Europe. The aim of the NZIA is to strengthen Europe's industrial resilience and reduce dependencies on foreign production for components or parts of strategically important technologies defined as net zero. The Council and EP are currently making different demands in this regard, which is to be negotiated in trilogue with the EU Commission by March 2024. The production of printed circuit boards and the use of electronics manufacturing in Europe should also be counted towards the EU target and thus made eligible for funding. To date, these technologies have not been listed in detail in the scope of strategic or net-zero technologies but are included in the value chain approach provided for in the regulation. According to the ZVEI, **PCBs, IC substrates and electronics manufacturing (EMS)** should be listed **even more clearly here as net-zero or strategic net-zero technologies**. **This is** because the **expansion of renewable energy** is only possible with PCBs and electronics manufacturing. In combination with microchips, they are indispensable for the generation of solar and wind energy.
- These components are also urgently needed for increasing connectivity. The topic of **cyber security** plays a particularly important role here, which requires the use of **security-critical electronics**. This includes the use of encryption and authentication technologies to ensure the integrity and security of data. Examples include radio technologies in the 5G network, products and services to safeguard national security, data sovereignty over production and test data in the EU production environment and hardware and infrastructure for cloud facilities. The technology of the future of **artificial intelligence** and the associated use of the

necessary microelectronics cannot work without printed circuit boards and electronics production either. IC substrates in particular, an advanced packaging technology, are used as powerful connection solutions in high-tech performance computing, data centres, 5G applications and artificial intelligence, among other things.

- In order for **technologies of the future** to continue playing a role in **international competition**, the interaction of supply chains in electronics must be strengthened. At the end of the supply chain stands a product that is used either by the end consumer or the end user (trade, industry). The product consists of many components and systems that are manufactured within a multi-stage supply chain. To become more independent in an economic area (e.g. EU), the entire supply chain, including all producers involved, must be empowered. The following measures are therefore required:
 - Recognising and understanding the supply chain of products
 - Identifying the ecosystems required for the products
 - Defining and implementing programmes for the respective ecosystems - not just for one industry
- In addition to products, innovative **processes and production facilities** should also be **eligible for funding**. Process expertise is key to securing European independence. The electronics manufacturer's product is the production process, as it is for printed circuit boards. The actual product is marketed by the distributor. For this reason, process development and improvement should be equated with product development. To keep pace with the rapidly developing semiconductor technology, particularly high investments are required here. One positive example is the investment bonus in the German Growth Opportunities Act (Wachstumsschancengesetz), which also subsidises systems and processes. This should now be urgently supported by the member states and expanded in a second step.
- To facilitate access to **funding for innovation and investment** for **SMEs**, the classification of companies must be adapted to modern conditions. Based on the current company size classes, even very small companies end up in the large company category. This is because the classification of company sizes has not been adapted to inflationary trends and the splitting up of value chains has led to significant increases in turnover in the supply chain and growing balance sheet totals. The main driver here is the high cost of input materials. Whereas the end products used to be manufactured entirely by one company, electronics manufacturing companies (EMS) now have to pre-finance the production of electronic assemblies by purchasing components and materials. To solve this problem, we recommend **removing the size restriction** on **research funding**.
- In addition, the regulatory framework must be simplified to make it easier for small and medium-sized enterprises to apply for funding. This would reduce the administrative burden, which they can often only manage with additional staff, putting them at a disadvantage compared to larger companies.
- European PCB manufacturers must pay customs duty on base materials that they import. These are not produced in the EU in the required variety or quantity. At the same time, however, PCBs from China are exempt from customs duties. To reduce this competitive disadvantage, base materials for PCB production must be exempt from customs duties. This involves the following customs tariff numbers: 7410210090 - copper clad laminates (duty rate: 5.2%), 3921905590 - rolls of epoxy resin impregnated glass fibres (prepregs) (6.5%), 70197300000 - FR4 prepreg (5.0%), 74091900000 - copper clad epoxy impregnated glass fabric (4.8%), 7410 1100 400 - copper clad simple laminates (5.2%), 70196100290 - non-clad laminate (7.0%).
- In order to strengthen their competitiveness in the international environment, **companies** need internationally competitive **energy costs**. To this end, the electricity market design must urgently be reformed and the energy supply must be expanded.

Background: Facts, figures and data

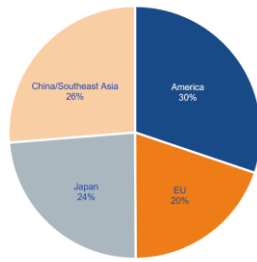
The market for printed circuit boards and electronic assemblies

A **printed circuit board** is a carrier for electronic components. It is used for mechanical attachment and electrical connection. Almost every electronic device contains one or more individual printed circuit boards. **IC- Substrates**, as an advanced packaging technology, offer extremely powerful connection solutions between the nano-world of highly complex microchips and the micro-world of printed circuit boards. They have only recently started to be manufactured in Europe.

An **electronic assembly** produced by **electronics manufacturers (EMS)** is a constructive and usually also functional unit consisting of integrated and/or discrete and passive components that are electrically and mechanically connected by a network of wires, usually on a printed circuit board.

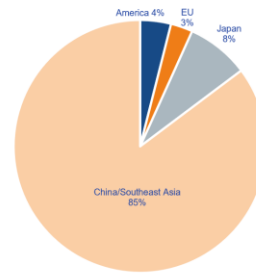
Global Market - Printed Circuit Boards Comparison 2000/2022

Global Market - Printed Circuit Boards by region
2000 = 41.824 Million \$



• America • EU (EMEA) • Japan • China/Southeast Asia

Global Market - Printed Circuit Boards by region
2022 = 78.593 Million \$



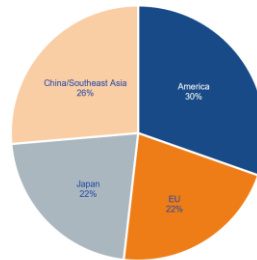
• America • EU (EMEA) • Japan • China/Southeast Asia

- The global market for printed circuit boards was worth USD 78.6 billion in 2022. China/Southeast Asia accounted for the largest market share at 85 %. This is followed by Japan with 8 %, America with 4 % and Europe (EMEA) with 3 %.
- This is a massive decline compared to the year 2000, when the market share in Europe (EMEA) accounted for 20 % of global production. The number of manufacturers also fell by two thirds to 160 companies during this period.
- Over 75 % of companies generate an annual turnover of less than € 10 million.

(Source: ZVEI)

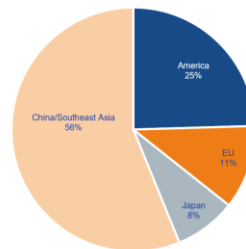
Global Market – Electronic Assemblies Comparison 2000/2022

Global Market - Electronic Assemblies by region
2000 = 466.046 Million \$



• America • EU (EMEA) • Japan • China/Southeast Asia

Global Market – Electronic Assemblies by region
2022 = 1188.573 Million \$



• America • EU (EMEA) • Japan • China/Southeast Asia

- The global market for electronic assemblies reached a volume of USD 1,189 billion in 2022. China/Southeast Asia accounted for the largest share at 56 %. The Americas followed with 25 %, followed by Europe (EMEA) with a share of 11 % and Japan with 8 %.
- For Europe (EMEA), this means that its share of the global market has halved compared to 2000, when it still accounted for 22 %.
- Electronic assemblies are manufactured in-house by European original equipment manufacturers (OEMs), but many outsource their production to EMS electronic manufacturing services providers. Of the approximately 2,200 EMS companies active in Europe, around 80 per cent have a turnover of less than €10 million.

(Sources: ZVEI; in4ma)

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