

INDUSTRY OVERVIEW

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SOURCES OF INFORMATION

We commissioned a report from Euromonitor to conduct an analysis of, and to report on, the consumer EMS industry in China, the EU (including the UK) and the US. A total fee of US\$90,000 was paid to Euromonitor for the preparation of the report.

The Euromonitor Report has been compiled after thorough and diligent research conducted by Euromonitor which included: (i) primary research involving interviews with a sample of leading industry participants and experts for the latest data and insights into future trends; (ii) secondary research involving the review of published sources, including national statistics and official sources, such as specialist trade press and publications from associations, company reports, independent research reports, and data based on Euromonitor's own research database; (iii) projected data was obtained from a historical data analysis plotted against macroeconomic data with reference to specific industry-related drivers; (iv) review and cross-checks of all sources and independent analysis to build final estimations, including the size, shape, drivers and future trends of the EMS industry in China, the EU (including the UK) and the US, to prepare the final report.

FORECASTING BASES AND ASSUMPTIONS

Euromonitor based the Euromonitor Report on the following assumptions: (i) the economies of China (excluding Hong Kong, Macau and Taiwan), the EU (including the UK) and the US are expected to maintain steady growth over the research period; (ii) the social, economic, and political environments in China, the EU (including the UK) and the US are expected to remain stable during the research period; (iii) key market drivers, such as growing consumer demand for electronic products, and growth in the IoT are expected to boost the development of the EMS industry; (iv) key drivers, such as consumer appliances and consumer electronics, the advancement of technologies, the growing wealth of global population are expected to drive the future growth of the consumer EMS industry.

ABOUT EUROMONITOR

Established in 1972, Euromonitor is the world leader in strategy research for both consumer and industrial markets. Comprehensive international coverage and leading-edge innovation make our products essential resources for companies large and small, national and global. With offices around the world and analysts in 80 countries, Euromonitor is a leading provider of global market intelligence. Euromonitor's services are held in high regard by the international business community, and it has 5,000 active clients, including 90% of the Fortune 500 companies.

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DIRECTORS’ CONFIRMATION

Our Directors confirm that, after taking reasonable care, there is no material adverse change in the market information since the date of the Euromonitor Report which may qualify, contradict or have an impact on the information in this section.

THE EMS INDUSTRY

Electronic Manufacturing Services (EMS) Industry (電子代工服務產業) is defined as the industry that involves design and co-development; engineering solutions; selection and procurement of materials; testing; manufacturing; distributing and logistics management; and providing return/repair services for electronic products. An electronic product is a manufactured or assembled product which, when in operation, contains or acts as part of an electronic circuit.

The key values offered by the EMS providers around the world are the efficiency and productivity they bring to the electronics industry. By aggregating demand from various clients, they are able to consolidate their resources and achieve economies of scale in manufacturing to bring costs down for the industry as a whole. At the same time, with their focus on a particular area of the value chain, they are able rapidly to gain expertise in manufacturing best practices, as well as industrial design. Finally, they provide value-added services, such as warranty and repairs.

The EMS industry can be classified into either consumer or industrial EMS depending on the end-use applications of the electronic components and/or products.

- *Industrial EMS* focuses on the manufacturing of PCBAs, modules and/or finished electronic products which are intended for industrial use; for example, EMS products used for industrial equipment, military defence equipment, telecommunications equipment, etc.
- *Consumer EMS* focuses on the manufacturing of PCBAs, modules and/or finished electronic products that are intended for end-consumer use; for example, EMS products used for consumer appliances products, vapour products, commercial controls, HVACs, consumer electronics goods, etc.

This study will focus on **consumer EMS** and the following consumer electronic products:

- *Finished electronic products*: These are products that are at the end of the manufacturing process, or purchased in a complete form, but have not been sold to the end-consumer.
- *Electronic Components and Modules*:
 - *Components*: These are designed for a specific task and are typically used in the manufacturing and assembly of modules and finished electronic products. It is common for electronic components manufacturers to assemble modules with a specific function due to simplistic assembly of parts. These are known as “specific-functioned modules” and are classified under “electronic components”.
 - *Specific-functioned modules*: These products are designed to perform a specific function or task such as enabling the generation of electrical or signal output through mechanical or environmental changes and/or relaying data feedback through sensors. However, standalone, they cannot sufficiently facilitate the overall function of the finished electronic products.

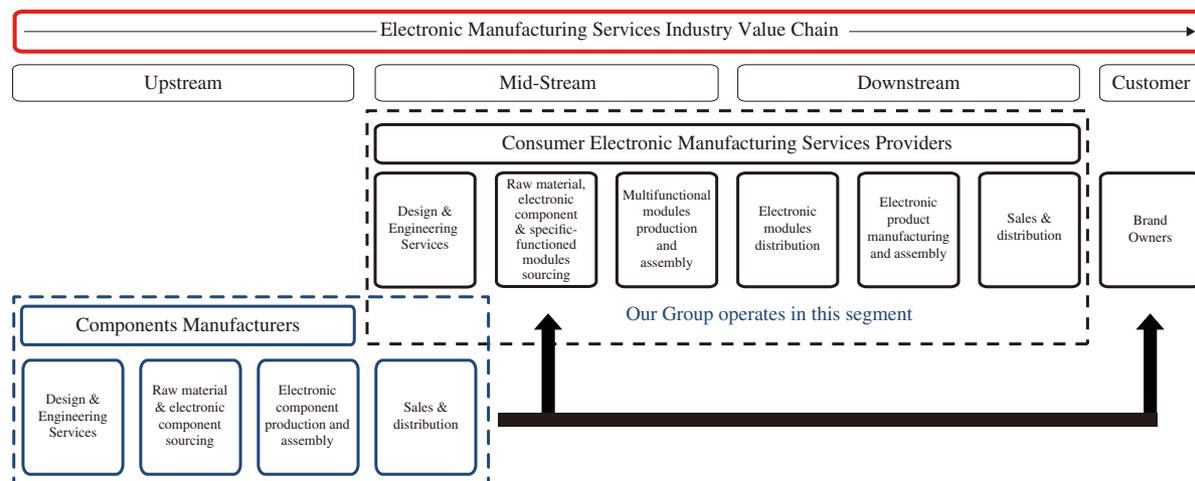
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- Multifunctional modules:** These are products that are designed to be able to collect the information and data transmitted from specific-functioned modules, process such data and provide further analysis and subsequently activate further actions to facilitate the overall function of the finished electronic products. Multifunctional modules are typically manufactured through the assembly of electronic components, mechanical components, electromechanical components, specific-functioned modules and/or parts.
- Printed Circuit Board Assembly (PCBA):** This is defined as the printed circuit board after mounting various components, such as resistors, integrated circuits and capacitors, depending on the application and desired characteristics of the board.

Period Coverage

Market review for this report has been carried out for the period covering 2014-2018, unless otherwise stated. Specifically, the 2014-2018 period will be termed the historical or review period, and 2019-2023 will be deemed the forecast period for this section.

THE CONSUMER EMS VALUE CHAIN



Source: Euromonitor

The upstream of the value chain involves the suppliers of materials and electronic components. Material suppliers are responsible for providing the inputs required by the entire consumer EMS industry, including metals and other rare materials. Since there is a limited number of suppliers with an increasingly limited supply of rare materials such as palladium and tantalum metals, consumer EMS providers must build a strong and reliable supply chain. It is critical that the supply chain is efficient and transparent, as weaknesses or gaps are very likely to have adverse impact on the entire value chain at some point in time. Building a strong supply network sets the foundation of sustainable competitive advantage for an EMS player in the industry.

Consumer electronic components manufacturers also operate within the upstream where they specialise in the manufacturing of electronic components. These components are relatively simple and designed to serve a specific function. Components are usually placed in the next step of the value chain where they are assembled into electronic modules either by other EMS manufacturers or the brand owners.

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The scope of responsibilities of the consumer EMS providers is widening. Previously, the consumer EMS industry was highly valued for the cost-effectiveness it brought. With increased global competition, consumer EMS players must improve every part of their processes, from procurement of high-quality supply at the best prices, to accurate demand forecasting for inventory management, and applying the best technologies in their production. In addition, many consumer EMS providers have been focusing on developing their value-added services, especially on design and engineering services to increase profit margins. Compared to upstream players, mid and downstream players are able to secure higher profit margins due to a more comprehensive service offering for more complex consumer electronic products.

Further downstream would be the key activities such as the distribution of manufactured electronic goods to electronic product manufacturers for product manufacturing and assembly. In this part of the value chain, the PCBAs and modules are assembled as finished electronic products. At the same time, they work with brand owners to distribute the end products in various markets.

CONSUMER EMS INDUSTRY IN CHINA

Market Overview of the EMS Industry as a Whole in China

China is the most important global electronics manufacturing base, and one of the largest exporters of electronic products. In addition, China itself has gradually developed into an important consumer market, which has further facilitated the development of the EMS industry. In 2018, the EMS industry reached a value of RMB1,461.3 billion, having posted a CAGR of 9.6% between 2014 and 2018.

Under the stable macroeconomic environment, the EMS industry is expected to grow from a total value of RMB1,582.6 billion in 2019 to RMB2,090.8 billion in 2023. The rate of growth is expected to slow down, with a CAGR of 7.2% between 2019 and 2023. With the increasing variety of consumer electronic products and accelerated product updates, the consumer EMS industry is expected to grow slightly faster than the overall EMS industry, with a CAGR of 7.6% between 2019 and 2023. The value share of the consumer EMS industry in the overall EMS industry is predicted to reach 57.5% by 2023.

**Table 1 The EMS Industry in China
– Split by Industrial vs Consumer (2014-2023F)**



Source: Euromonitor estimates from desk research and trade interviews

Overview of the Consumer EMS Industry Products in China

The consumer EMS industry accounted for 56.3% of the total EMS industry revenue in 2018, with a value of RMB822.7 billion. With a CAGR of 10.3%, the consumer EMS industry grew slightly faster than the industrial EMS industry between 2014 and 2018, which registered a CAGR of 8.6%. While both consumer and industrial EMS industries have seen healthy growth between 2014-2018, consumer EMS

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industry has grown quicker due to the increase of consumer demand for electronics and home appliances. With rising incomes and continuous improvements in living standards, consumers pay more attention to comfort, safety and convenience of their living environment. Therefore, they are more willing to spend on consumer electronic products, especially intelligent appliances. In addition, the fast development of internet, along with government support for the smart technology industry, further drives the growth of the consumer electronics and appliances industry.

The consumer EMS industry can be split into three product categories: PCBAs, electronic modules and finished electronic products. In 2018, the value of finished electronic products, electronic modules, and PCBA were RMB478.0 billion, RMB217.2 billion and RMB127.5 billion, respectively.

With further integration of the supply chain, finished electronic products is expected to continue to outperform other product categories, with an anticipated CAGR of 8.5% between 2019 and 2023, reaching RMB729.6 billion by 2023. Electronic modules is expected to post a CAGR of 7.3%, to reach a market size of RMB312.5 billion in 2023. The growth of PCBA is expected to slow down further, due to challenges such as increasing prices of materials and regulatory restrictions.

**Table 2 Consumer EMS Industry in China
– Split by Product Categories (2014-2023F)**



Source: Euromonitor estimates from desk research and trade interviews

Consumer EMS Industry Split by End-Use Applications in China

Home appliances is the largest end-user application, with a value of RMB260.8 billion in 2018. China is one of the world’s largest home appliances markets, with retail value sales of RMB764.3 billion in 2018. The market enjoyed healthy growth between 2014 and 2018, registering a CAGR of 2.8%. Consumers’ pursuit of healthy lifestyles and demand for convenience have resulted in particularly strong performances by some home appliances, such as steam ovens, high-end fridge-freezers and blenders. This segment is expected to continue growing at a year-on-year rate of 4.1% between 2019 and 2023.

Green technology is the second largest end-user application for the consumer EMS industry in China, with a value of RMB140.7 billion in 2018, registering a CAGR of 8.9% between 2014 and 2018. In recent years, with the strong support of the government, the green technology industry has grown rapidly. Green technology-related consumer electronics products, such as energy-saving refrigerators, water heaters and LED lighting, are rapidly gaining acceptance among end-users, which is driving the development of the green technology-related EMS industry. Between 2019 and 2023, this end-user application segment is expected to grow at a CAGR of 13.2%.

With a value of RMB29.6 billion in 2018 and a CAGR of 17.8% between 2014 and 2018, healthcare and medical EMS products is also an important application for the EMS industry. The key

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products for this category are portable medical devices. With the transfer of global manufacturing capacity and the growth in domestic equipment manufacturing capacity, China has become an important exporter of portable medical devices. China is also a large consumer of portable medical devices, due to its large ageing population and rising health awareness among consumers. Between 2019 and 2023, healthcare and medical end-use application category is expected to grow at a CAGR of 13.8%.

Smart home and HVAC application category is the fastest growing end-use application segment in the consumer EMS industry, with a value of RMB26.3 billion in 2018 and a CAGR of 70.3% between 2014 and 2018. Smart home technology and smart home appliances are increasingly popular among both local and global consumers, given the faster pace of life and mounting work pressures. Manufacturers are expected to continue investing in smart devices to meet consumers' demand for smart living. As the largest manufacturing base of home appliances, China has attracted many domestic and foreign manufacturers to establish research and development bases for smart homes, because the development and testing of smart home products require cooperation between developers and manufacturers. Between 2019 and 2023, smart home and HVAC application category is expected to grow at a CAGR of 17.4%.

Vapour products occupy a small market size of RMB1.6 billion in 2018, but as an emerging category, it is growing fast with a CAGR of 30.6% between 2014-2018. China is the largest manufacturer of vapour products, and around 90% of vapour products sold in the global market are produced in China due to relatively lower manufacturing costs. In 2018, the average manufacturing cost of low-end vapour products were as low as RMB80 and high-end vapour products can reach up to RMB200. Manufacturers typically sell the manufactured vapour products at a margin between 25% to 50%, representing the average manufacturing selling price per unit of vapour device ranged from approximately HK\$122 to HK\$365 depending on the sophistication of the products. Such wide range of average manufacturing selling price per unit of vapour device in the market was primarily attributable to the fact that vapour products of different price ranges were sold to target different consumers. In addition, similar to other consumer goods, vapour products can be categorised into mass segment and luxury segment. The mass segment offers low cost vapour products with basic functions while the luxury segment offers high-end vapour products with a variety of functionalities and customisation options such as higher range of voltage output, temperature control for adjustment, flavour customisation option and added aesthetics in product design. In 2018, the US represented 24% of the total global sales of vapour products and is expected to continue leading it by registering a CAGR of 30.1% between 2019 and 2023. However, vapour product retail sales in other markets are starting to grow at a more moderate pace, causing the consumer EMS industry's revenue realised by the manufacturing of vapour products to slow down between 2019 and 2023. Nonetheless, vapour products is still expected to be the fastest growing end-use application category due to the continued growing demand globally, registering a healthy CAGR of 20.1% between 2019 to 2023. Mobile phones and computers and other consumer electronics accounts for 44.3% of the consumer EMS industry in terms of sales value.

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Table 1 Consumer EMS Industry in China – Split by End-Use Applications (2018)

Industry revenue realised by consumer EMS industry in China, with revenue split by end-use application:	Industry revenue realised in 2018 (RMB billion)	Market share in 2018	CAGR 2014-2018	CAGR 2019-2023
Home Appliances	260.8	31.7%	2.8%	4.1%
Green Technology	140.7	17.1%	8.9%	13.2%
Healthcare and Medical	29.6	3.6%	17.8%	13.8%
HVAC/Smart Home	26.3	3.2%	70.3%	17.4%
Vapour Products	1.6	0.2%	30.6%	20.1%
Others (e.g. computers, communication and consumer electronics)	363.6	44.2%	n/a	n/a

Source: Euromonitor estimates from desk research and trade interviews

Key Market Drivers and Opportunities of the Consumer EMS Industry in China

The use of consumer electronics products worldwide continues to expand. This is primarily driven by the popularity of various types of smart electronic devices, creating strong demand for consumer electronics products. China has become the manufacturing centre of the world’s consumer electronics industry. At the same time, the steady increase in Chinese consumers’ incomes and the rising penetration of consumer electronics, such as mobile phones, have made China one of the world’s largest markets for consumer electronics. The scale of China’s consumer electronics industry is still expanding.

Optimisation of operations and resources through industry consolidation. As the EMS industry requires high levels of investment, and return on investment can be slow, smaller manufacturers will find it difficult to compete with the major players in meeting clients’ demand. Therefore, some small-sized consumer EMS providers that lack advanced technology and proper management protocols will be phased out or acquired, allowing industry resources to be re-allocated to major players in the market. In the near future, larger players will continue acquiring smaller players, which will help optimise the production and operation of the local consumer EMS industry.

Continuous support from national industrial policies. The EMS industry is classified within the computer, communication and other electronic equipment manufacturing industry, which is listed as a strategic industry in China’s 12th Five Year Plan. Therefore, many policies and regulations were published to support the development of the industry. For example, in January 2017, the National Development and Reform Commission (NDRC) issued “Guidance Catalogue of Key Products and Services in Strategic Emerging Industries”, which listed new generation mobile communication equipment, cloud computing equipment, new generation mobile terminal equipment and other key products as strategic emerging industries.

Key Market Constraints and Challenges of the Consumer EMS Industry in China

Lack of product qualification standards reduces the competitiveness of electronic products. Compared with the number of international standards for the consumer electronics industry, China’s standards are still lagging behind or even missing in some areas. The number of standards in China’s consumer electronics industry is less than 5% of the total international consumer electronics industry standards. The lack of standards will lead to low overall technology levels and long development cycles, which will directly affect the competitiveness of domestic manufacturers in the global market.

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Innovation and design capabilities are still lagging behind. Although China is a manufacturing hub for consumer electronics, it is still not known as an innovation centre. The main reason is that domestic enterprises have weak research and development capability, as well as limited product design capabilities. Although China’s EMS industry has improved its innovation capability in recent years, the gap with developed countries such as the US is still significant. Due to the difference in these capabilities, core technologies are still controlled by more developed countries, and this has been one of the main constraints on the development of consumer electronic products in China.

Historical Price Trend of Operational Costs: Wages of Manufacturing Workers and Materials

With the economic development and rising income levels in China, labour costs have been rising in recent years. Based on data from the National Bureau of Statistics of China, the average monthly wage of employees in the manufacturing sector rose from RMB4,281 in 2014 to RMB5,371 in 2017, corresponding to a CAGR of 7.9% over 2014-2017. As a result, China’s competitiveness as a destination for low-cost manufacturing is gradually declining. Many EMS providers are starting to shift their production hubs to other ASEAN regions such as Vietnam and Malaysia, after taking into account the lower labour costs, established infrastructure and strong supply network.

Table 4 Average Monthly Wage of Employed Persons in Urban Units, Manufacturing (2014-2018)

RMB	2014	2015	2016	2017	2018*	CAGR 2014-2017
Average monthly wage in manufacturing	4,281	4,610	4,956	5,371	n/a	7.9%

Source: National Bureau of Statistics of China

* Figure is not available from official and publicly available sources

Despite the drop of material prices between 2014 to 2016, copper, plastics, and metals rebounded, recovering to RMB44,372.3 per tonne, RMB13,295.4 per tonne, and RMB51,789.7 per tonne, respectively in 2018. The decline in material prices was due to a series of factors including China’s economic slowdown, lower oil prices which drove down the price of production and a large inventory of materials globally. However, copper prices, in particular, has been showing strong recovery due to the continued growth in multiple industries such as automotive (electric vehicles) and IoT-related industries.

Table 5 Pricing Fluctuations of Selected Material Types (2014-2018)

RMB	2014	2015	2016	2017	2018	CAGR 2014-2018
Copper (RMB per tonne)	42,160.5	34,321.3	32,334.0	41,906.8	44,372.3	1.3%
Plastics (RMB per tonne)	12,240.97	10,102.0	14,377.9	15,203.2	13,295.4	2.1%
Metals* (RMB per tonne)	53,011.8	40,301.8	42,021.0	49,688.8	51,789.7	-0.6%

Sources: Shanghai Metal Market (SMM); Euromonitor estimates from desk research and trade interviews

* Includes base metals such as aluminium, copper, tin, lead, nickel and zinc.

Competitive Landscape of the Consumer EMS Industry in China

The consumer EMS industry in China is still very fragmented. While the top players hold relatively large market shares, the remaining players are very small. China’s consumer EMS industry is led by

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multinational players. The top two players currently hold 33.1% share of the total market. Local manufacturers are still relatively small, with the largest local player, accounting for a 4.1% share. However, some of the leading local consumer EMS enterprises have been closely following the global trends in the electronics manufacturing industry, and are gradually gaining the advantages of rapid response to market demand, lower costs and stable product quality. By utilising their operating advantages, leading local players compete and interact with large international EMS enterprises, undertaking part of the electronic products manufacturing services business of some well-known international brands and major local brands, and are gaining market share. In the future, with the increasing market demand for all kinds of electronic products, local consumer electronic companies will continue to grow. Local EMS enterprises are expected to seize the development opportunities, further enhance their manufacturing service capabilities, expand the scope of their businesses and strengthen customer relationships, thus further narrowing the gap with international EMS enterprises to win more market share.

In view of the requirements for greater depth and breadth of EMS services from electronic brand companies, industry integration is essential. Many international consumer EMS enterprises have accelerated the pace of mergers and acquisitions in order to expand their market and scope of services. Local consumer EMS enterprises will face challenges to improve their manufacturing capability in line with international standards and obtain overseas orders.

**Table 6 Ranking of Leading Consumer EMS Providers
in Terms of Revenue in China, 2018 (Top 15)**

Ranking	Company Name	Listing Status	Market Share by Revenue in 2018
1	Company A	Listed	24.1%
2	Company B	Listed	9.0%
3	Company C	Listed	4.1%
4	Company D	Listed	3.4%
5	Company E	Listed	2.1%
6	Company F	Listed	1.7%
7	Company G	Listed	1.6%
8	Company H	Listed	1.2%
9	Company I	Listed	0.4%
10	Company J	Listed	0.3%
11	Company K	Listed	0.3%
12	Company L	Listed	0.2%
13	Company M	Listed	0.2%
14	Our Group	Private	0.1%
15	Company N	Listed	0.1%
	Others		51.2%

Source: Euromonitor estimates from desk research and trade interviews

Note: Audited data if available are usually not market specific and include other products/services. Market ranking will therefore be estimated on publicly available data and trade opinion surveys (not just the companies themselves).

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Engagement of sales representatives by EMS providers in China

Over the past decade, the EMS industry has become increasingly competitive with EMS providers seeking to increase their value-added services in hopes of securing more business and higher profit margins. The use of sales representatives or third-party sales agents have long been within practice and increasingly important for small-medium sized EMS providers. Sales representatives could be companies or individuals that are within the EMS industry or outside of it, as long as they are present in the target market. There are a range of reasons why EMS providers engage sales representatives, which include but not limited to:

- (i) ***Increasing global presence with limited investment.*** Unlike the tier one EMS providers who are able to establish sales and marketing divisions globally, small-medium sized EMS providers lack a global presence in key markets such as US and the EU, where consumer electronics and appliances brand owners are usually based. In order to compete with the tier one EMS providers, it is common for these smaller players to establish relationships with sales representatives in the key markets to assist in the introduction, referral and communication in exchange for commission on a case-by-case basis. It is common for small-medium sized players to eventually invest in the development of overseas offices once enough relationships have been built with multiple end-clients to manage these client relationships internally and therefore restrict the usage of sales representatives to control overall costs.
- (ii) ***Exploring new business opportunities and immediate access to market.*** To increase competitiveness and mitigate risks of over-reliance on any one product segment in the industry, it is common for EMS providers to seek to break into new product segments to diversify their product portfolio. With the assistance of sales representative with established network and local market intelligence, EMS providers can be introduced to the end-clients with assurance from the sales representative, thus securing new businesses. It is also due to this reason that large EMS providers also engage in the assistance of sales representatives on a one-off basis at times. In addition, the engagement of a sales representative requires less time and monetary investment compared to executing a greenfield investment strategy.

Key Barriers of Entry to the Consumer EMS Industry in China

Significant investment and capital required for market entry. The provisions of EMS are capital intensive, with a high threshold for initial investment. EMS providers not only need to invest significantly to purchase equipment, and build factories and supporting facilities, they also need to purchase materials, establish warehousing and transportation services, and employ relevant production and technical personnel. With the technological upgrading of electronics products, the costs of equipment and labour are also increasing. In addition, the EMS industry has a relatively high demand for liquidity in order to meet the daily operational costs.

Customer relationship and supply management are vital for market entry. Customer relationships represent a barrier for new players. Customers for the EMS industry are usually well-known brand companies, and they have exhaustive and strict selection and evaluation processes for their suppliers. To work with these companies, EMS providers usually need to go through one to two years of rigorous examination and verification, for example, whether a provider has a sound financial position, standardised quality management systems, advanced production and testing equipment. Once an EMS provider passes the selection process and establishes cooperation with brand companies, the relationship is not likely to be changed readily, which represents a high entry barrier for new players.

Emphasis on design and manufacturing value-added services. According to Euromonitor's research findings, the product lifecycle of electronic goods is becoming shorter due to the rapid

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advancement of technologies globally. As consumer electronic products evolve quicker, end-clients expect higher quality of engineering services and lower production lead time from the EMS providers to meet the ever-growing consumption demand of the market. The ability to develop strong engineering design team in China is still a challenge due to a shortage of talent. New entrants that do not have a decent engineering design team may find it difficult to compete effectively against the established EMS providers.

CONSUMER EMS INDUSTRY IN THE EU

Market Overview of the Consumer EMS Industry in the EU

Total revenue of the consumer EMS industry in the EU reached EUR5.2 billion in 2018. The consumer EMS industry in the EU is forecast to grow slightly faster between 2019 and 2023 than it did between 2014 and 2018, at a CAGR 1.2%, to reach EUR5.5 billion in 2023. The industry will be driven by strong consumer demand for electronics in the EU, and strong performances by consumer EMS companies in Central and Eastern Europe.

Import of Consumer EMS Products into the EU

Total import value of consumer EMS components, modules and finished electronic products into the EU reached EUR267.6 billion in 2018 and posted a CAGR of 2.8% between 2014 and 2018. China accounted for 56% of the total value of imports of consumer EMS products into the EU, at EUR151.1 billion in 2018. Imports from China posted a CAGR of 7.2% between 2014 and 2018, which is only slightly below the corresponding CAGR for total imports into the EU. Electronic components and modules for computers, in particular, printed circuits boards, is a key segment driving growth within Chinese EMS product imports into the EU. Despite rising labour costs, China has been able to maintain its position as a leading source of imports of consumer EMS products into the EU by focusing on higher value-added manufacturing and moving away from low-value product assembly.

Table 7 The Import of Consumer EMS Products in the EU (2014-2018)

Import value of consumer EMS products (EUR billion)	2014	2015	2016	2017	2018	CAGR 2014-2018
From all destinations						
worldwide (CIF value)	239.3	236.2	233.1	253.1	267.6	2.8%
From China (CIF value)	114.3	117.6	117.5	131.4	151.1	7.2%

Source: Euromonitor estimates from desk research and trade interviews

Imports of EMS components, modules and finished products from China into the EU are forecast to grow rapidly compared with other global trade partners, at a 7.4% CAGR over 2019-2023, to account for 69% of the total value of global imports by 2023. This will be driven by China’s growing focus on more advanced production of electronic components, and its move away from lower value-added manufacturing, such as the assembly of consumer electronics. This shift is being motivated by the “Made in China 2025” government initiative, targeted at preparing the manufacturing sector for the Industry 4.0 revolution. The Made in China 2025 initiative positions China to take full advantage of the growing market for the IoT in consumer electronics (e.g. connected appliances and smart homes) which requires more advanced, high-tech electrical components. As part of the initiative, the Chinese government has set a goal of reaching USD305 billion in output for semiconductors by 2030, an increase from USD65 billion in 2016. As an essential part of all electronic equipment, semiconductors are used as key components

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across a wide range of consumer electronics, including smartphones, connected appliances, computers, tablets, digital televisions, game consoles and audio for home theatre systems. China’s focus on increasing its semiconductor production can be expected to boost imports of EMS components into the EU. China has been maintaining its position as a leading source of imports of consumer EMS products into the EU.

The Import of Consumer EMS Products in the EU (2019F-2023F)

Import value of consumer EMS products (EUR billion)	2019F	2020F	2021F	2022F	2023F	CAGR 2019F-2023F
From all destinations worldwide (CIF value)	279.6	289.4	298.7	307.0	314.7	3.0%
From Mainland China (CIF value)	164.0	178.7	193.0	296.6	217.9	7.4%

Sources: Euromonitor estimates from desk research and trade interviews with leading EMS providers and the relevant trade associations in the EU

Market Drivers and Opportunities of the Consumer EMS Industry in the EU

Growing consumer expenditure in developing EU market drives market growth. Growth in final consumption expenditure of households in the EU between 2014 and 2018 acted as a strong driver for the consumer EMS industry, supporting increased consumer spending on consumer electronics. Within the EU, several developing EU markets, including Romania, Bulgaria, Hungary and Poland, experienced average annual growth in final consumption expenditure of households well above the EU average of 2.5% per year between 2014 and 2017, at 8.5%, 5.3%, 4.8% and 3.5%, respectively. These countries have similarly experienced an increase in total retail sales of consumer electronics between 2014 and 2018, led by Romania with 11.5% average annual growth, followed by Poland at 6.7%. Home appliances and portable consumer electronics are the key categories driving growth in consumer electronics in these countries.

Recovery of consumer electronics demand boosts industry growth in the EU. Following an annual average decline of 0.6% between 2014 and 2018, total retail value sales of consumer electronics in the world market are expected to turn positive, growing by a CAGR of 2.5% between 2019 and 2023, creating strong downstream demand for consumer EMS products in the EU. A similar trend is expected for Europe and the UK markets, with CAGRs of 1.2% and 0.8%, respectively, between 2019 and 2023. While demand for consumer electronics in the EU’s largest economy by GDP, namely Germany, is expected to remain in a slight decline of 1.3%, the UK and France, which make up the EU’s second and third largest economies by GDP, are forecast to grow positively at 0.6% and 1.7%, respectively, between 2019 and 2023.

Market Constraints and Challenges of the Consumer EMS Industry in the EU

Major consumer appliances are approaching saturation in Western Europe. The major appliances market in Western Europe was the third largest globally in volume terms in 2018, accounting for 13.9% of the world market for major appliances. The positive trend in built-in appliances is expected to continue to be a key driver of growth in major appliances in Western Europe through 2022 as the trend towards open-plan kitchens and shrinking living spaces continues to gain strength. Penetration rates of major appliances are high in all countries in Western Europe, making the market mature and increasingly saturated.

Brexit creates uncertainty in the EU’s single market trading zone. After Brexit, the UK will no longer be able to participate in the EU’s single market. Research by the Netherlands Bureau for Economic

INDUSTRY OVERVIEW

Policy Analysis suggests that Brexit is likely to reduce bilateral trade between the UK and the EU. This would lead to significant reductions in GDP across EU countries and in real income per capita, as the higher costs of trade between the UK and the EU would translate into the less efficient allocation of resources across industries.

CONSUMER EMS INDUSTRY IN THE US

Market Overview of the Consumer EMS Industry in the US

The consumer EMS industry in the US remained largely stable between 2014 and 2018, except for a dip in 2016. With total sales value of USD51.9 billion in 2018, its market size in 2018 was nearly same as that in 2014. Revenue of consumer EMS products will continue to be driven by demand for more advanced technologies and products related to smart homes, the IoT, healthcare, mobile phones, computers and other smart devices. The consumer EMS industry is expected to grow from USD52.7 billion in 2019 to USD57.4 billion in 2023, registering a CAGR of 2.2%.

Import of Consumer EMS Products into the US

The import of consumer EMS products into the US has been steadily increasing to meet domestic demand, growing from USD304.2 billion in 2014 to USD440.8 billion in 2018 at a CAGR of 9.7%. Within the global imports of consumer EMS products, China continues to be the main market source for the US, followed by Mexico, Germany, Japan and Malaysia. In 2018, China accounted for 37% of total imports of consumer EMS products into the US, down from 41.5% in 2014. Imports from China grew at a CAGR of 6.8% between 2014 and 2018. Around 50% of the consumer EMS industry revenue is generated by EMS products sourced from China and distributed in the local market.

Total imports of consumer EMS products into the US registered a significant uptick in 2018. Under the potential US-China trade war, the threat of adding 25% of tariff on imported products coming from China in July 2018 created a rush to deliver products to the US before the new tariff take places. Products impacted by the new tariff will mainly be consumer EMS products and materials. This resulted in a surge of consumer EMS products imports from China and worldwide in July 2018, as US EMS providers and brand owners are increasing material and electronic components supply to minimise the potential impact of the upcoming tariff increase. For 2018 as a whole, the US’s imports of consumer EMS products from all destinations worldwide and from China rose by 27.9% and 10.1%, respectively.

**Table 8 The Import of Consumer EMS Products
in the US (2014-2018)**

Import value of consumer EMS products (USD billion)	2014	2015	2016	2017	2018	CAGR 2014-2018
From all destinations						
worldwide (CIF value)	304.2	317.8	319.7	344.6	440.8	9.7%
From China (CIF value)	126.2	133.4	130.3	149.0	164.0	6.8%

Source: Euromonitor estimates from desk research and trade interviews

INDUSTRY OVERVIEW

U.S. Importers sourcing EMS Providers through Sales Representatives

As the U.S. continues to lead in its innovative designs of consumer electronics, there has been a continuous demand for retail brand owners, distributors and manufacturers in the U.S. to source for EMS providers overseas, largely due to cost reasons. Due to the highly fragmented nature of the industry and the sheer number of EMS providers worldwide, it is difficult to determine which EMS providers would be the best fit for them, hence they require the assistance of sales representatives to refer EMS providers who could accommodate their demands. Leading retail brand owners, distributors and manufacturers in the EMS industry including vapour product suppliers in the U.S. use sales representatives when procuring EMS providers. In fact, the use of sales representatives is so prominent that there are trade associations founded with the objectives of connecting EMS providers with retail brand owners and distributors and to develop the sales representatives network across the industry.

Market Drivers and Opportunities in the Consumer EMS Industry in the US

Popularity of vapour products has shown large potential in the US market. Between 2014 and 2018, vapour products, otherwise known as vaporisers, have gained popularity. According to Euromonitor Report, total retail sales value of vaporisers grew from USD2.7 billion in 2014 to USD6.8 billion in 2018 at a CAGR of 26.5%. The strong performance of vaporisers was driven by the growing trend of healthy living which sees consumers seeking smoking cessation options. Due to growing awareness of vapour products and its popularity among consumers, vapour products have contributed significantly to the growth of the consumer EMS industry in the US over the review period. Towards the end of the review period, vapour products industry was met with head winds from the FDA due to growing public concerns on the product's influence on youth. Despite this, FDA regulatory efforts are not expected to impact the sales of vapour products, but instead vapour products brand owners' sales and marketing strategies. The impact of potential regulations varies depending on the size of the brand owners. For example, vapour products are now required to submit a premarket tobacco application (PMTA), which could entail costs up to USD300,000. Between 2019 and 2023, the fragmented vapour products market is expected to consolidate with smaller players unable to keep up with the regulatory costs. The demand for vapour products will continue to grow as healthy living and smoking cessation trends stay prevalent. Retail value sales of vapour products in the U.S. is expected to reach USD24.8 billion by 2023, registering a CAGR of 30.1% between 2019 to 2023.

Consumer electronics set to come into healthcare and other areas, stimulating industry growth. With the diversification and emergence of new verticals and segments, consumer EMS products will see wide-ranging applications in an increasing number of areas, such as healthcare, education, agriculture and automotive. Newly-built condominiums and houses and the conversion of existing homes into smart homes will spur demand for smart home products. Industry experts have projected that at least 38% of American households will have some kind of smart technology integrated into their homes, up from 13% in 2013.

Market Constraints and Challenges in the Consumer EMS Industry in the US

Short consumer electronic product lifecycles. As consumer demand for end-user products increases rapidly, the demand for consumer EMS components and modules has increased simultaneously to meet end-client expectations, as such EMS providers compete on technological advancements. To keep up with the rapidly changing landscape, EMS providers have to incorporate efficient and effective supply chain processes to adapt to new product introductions.

Increasing costs within the overall supply chain. Overall cost within the supply chain is continuously growing for the entire EMS industry. These costs include production outsourcing, logistics and import, material prices, and research and development for new product development.

INDUSTRY OVERVIEW

Uncertain trade relations between China and the US. The potential US-China trade war is expected to disrupt the supply chain strategy of EMS players. Between 2019 and 2023, it is expected that China's dominance as a source market for materials and EMS products will diminish, accounting for 34% of all consumer EMS imports in the US by 2023. The potential tariffs will cause a slowdown in the importing of materials and other goods and result in higher costs of imports which would directly impact the manufacturing of consumer EMS goods.