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EUROPEAN EMS TOUR 2023

Outline of Insights

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TOUR OVERVIEW

- Dieter Weiss of in4ma and Eric Miscoll of EMSNOW conducted their third tour of European based EMS companies.
- The tour began on June 12, 2023 in London, England
- The tour ended on June 30, 2023 in Frankfurt, Germany.
- The tour encompassed visits to 19 EMS company facilities in 6 countries (UK, Switzerland, Austria, Slovenia, Hungary, and Germany).
- They attended an IPC EMS Event in London on June 15, and an EMS Forum in Munich hosted by in4ma on June 22.
- The tour covered about ~3200 kilometers by car, plus a flight from London to Munich.
- They stayed in 14 different hotels and crossed the national boundaries of 9 European countries.
- During the tour, they recorded 14 podcasts.
 - All podcasts and video interviews are available on www.EMSNOW.com

EMS Companies Visited: (listed in order visited):

InCap UK

Tioga Ltd.

Escatec Mechatronic Ltd.

AsteelFlash (Bedford) Ltd.

Jaltek Systems Ltd.

Texcel Technology plc

Hengartner Elektronik AG

Variosystems AG

Ginzinger electronic systems

Digital Elektronik GmbH

SG Automotive d.o.o.

Becom Electronics GmbH

Melecs EWS

Videoton Ipari Park

Deltec Electronics

Cicor Rhe

Prettl Electronics

Krüger & Gothe

Tectron Worbis GmbH

A profile of each EMS company can be found on [EMSNOW.com](https://www.EMSNOW.com) under the EMS Profiles tab.

TOUR SPONSORS

EMSNOV wishes to thank this year's tour sponsors. Their support allowed us to conduct this tour and provide our insights on the European EMS industry.



elisa company

CalcuQuote, a global leader in quoting and supply chain software for electronics manufacturers.



Mycronic – Smart solutions for flexible manufacturing.



TrustedParts.com – Genuine electronic components from only authorized sources

in4ma also thanks their sponsors for their continued support to make electronics market data better.

EMS SCOUT
Your guide to Electronic Manufacturing Service providers

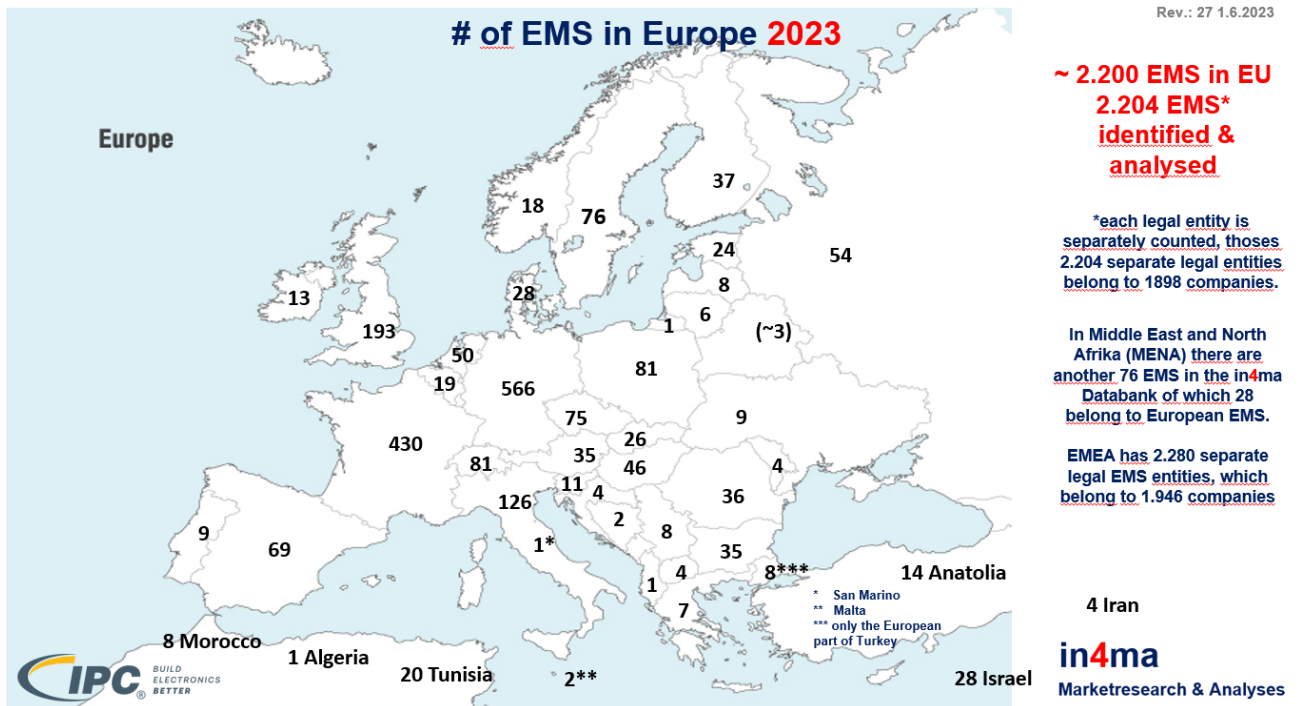
The inner circle: Sponsors and cooperation partners of in4ma

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Marketresearch & Analyses

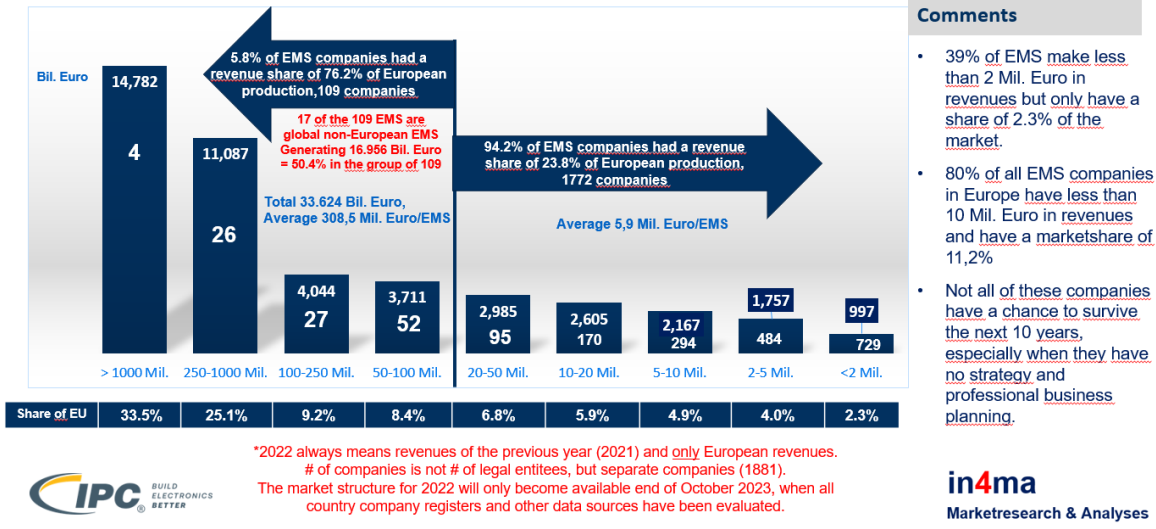
IN4MA DATA

The following data sets are provided by Dieter Weiss of in4ma. At most EMS companies we toured, Dieter shared some select market research for the country/region we were visiting. This data was always the basis for great conversations about the EMS industry in the specific region.

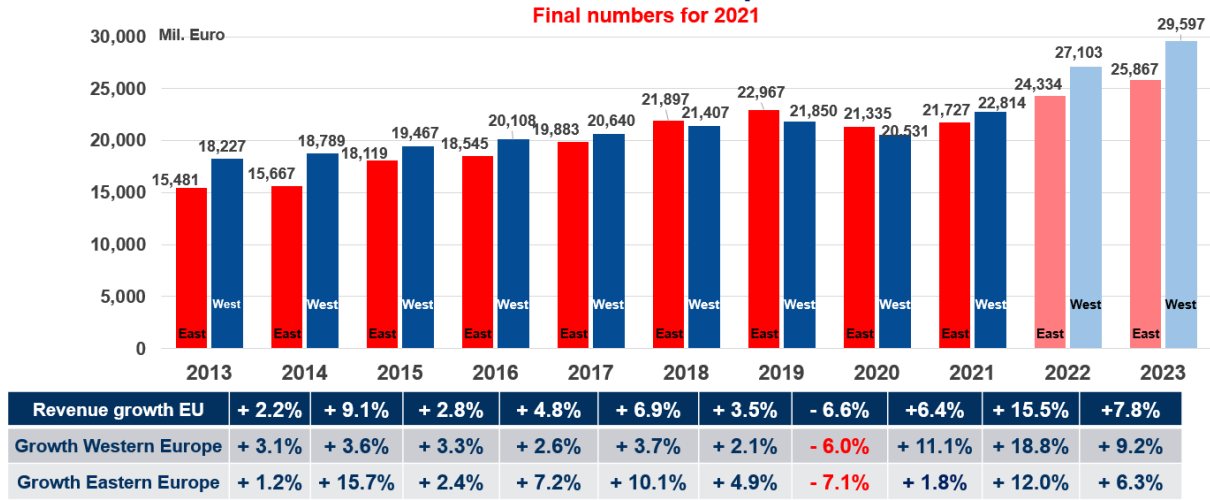
These do not represent the full set of data slides presented on the tour.



of EMS/ODM by Revenue Group in Europe 2022*



EMS / ODM Outlook Europe 2020-2023



We encourage anyone who is interested in a more comprehensive understanding of the European EMS industry to reach out to in4ma and purchase their most recent EMS industry report or become a sponsor of the in4ma work. They produce the best and most comprehensive market research on the European EMS industry based on a deep understanding of the industry and the companies involved. (www.in4ma.de)

OBSERVATIONS & TRENDS

In addition to touring the EMS facilities, we also spent time with executives from each company discussing their company's business and the issues impacting the EMS industry. Based on these conversations, we compiled this list of issues and trends impacting the EMS industry. This list does not include all of our observations, but only the main themes we thought noteworthy.

Europe continues to be a vital and developing region for the global EMS industry. While it is impacted by the same challenges that the industry at large faces in all regions, it also possesses some unique characteristics and challenges that we hope to highlight in this report.

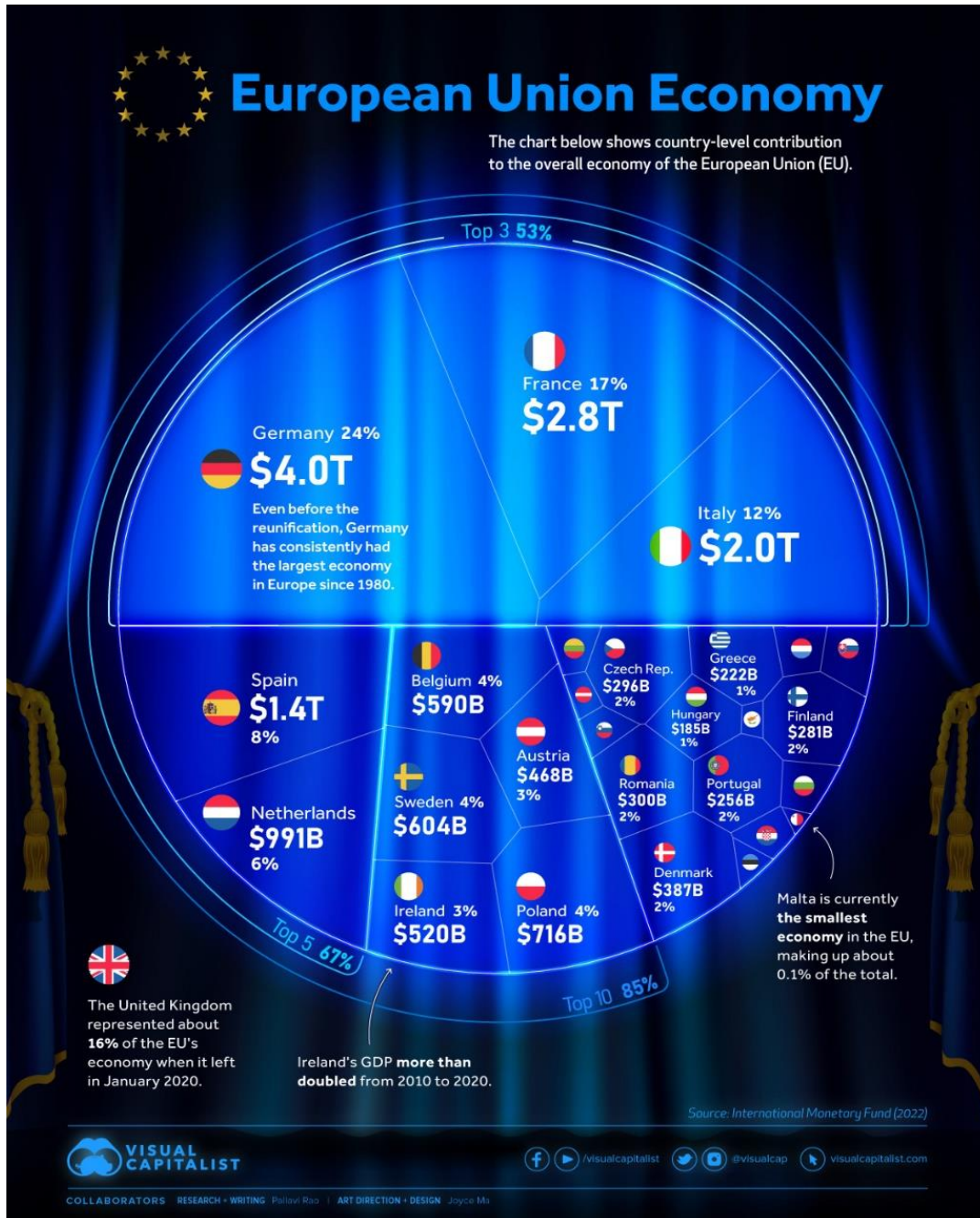
It is hard to speak of any one of these trends in isolation as they are all interrelated, so please consider the full tapestry of these trends rather than one in isolation when assessing the EMS industry in Europe.

EUROPE – THE MARKET

It is important to first characterize the European economy, its size and makeup as this is the main market that the European EMS companies serve.

- **Europe:**
 - Europe is a continent comprising the westernmost peninsulas of Eurasia, located entirely in the Northern Hemisphere and mostly in the Eastern Hemisphere.
 - Population: 745,173,774 (in 2021)
 - Europe comprises 45 countries; this includes Russia.
- **European Union (EU):**
 - The EU was created by the Maastricht Treaty, which entered into force on November 1, 1993.
 - The European Union is a multinational political, economic, and security union of 27 member states that are located primarily within Europe.
 - The United Kingdom is the only former member state to have withdrawn from the European Union, an event known as Brexit.
 - Norway and Switzerland are not member states.
 - The EU encompasses a total geographic area of 4,233,255 km² and an estimated total population of over 450 million people.
 - Germany, France and Italy are the largest three countries by population.
 - The EU is in demographic decline, as is true for many countries globally.
 - The EU is the 3rd largest economy in the world.
 - The EU had a collective GDP of almost 16 trillion Euros in 2022.
 - Germany is largest at 3.87 trillion Euros.
 - The next largest in order are UK and France, Italy and Spain.

- The event known as “Brexit” adds additional challenges to the EMS companies doing business there.
 - It restricts the availability of foreign labor and adds additional bureaucracy to the international customs function when transacting with entities in other countries, even if those entities are subsidiaries of the same company.



Source: Visual Capitalist

THE EUROPEAN EMS INDUSTRY

The European EMS Industry is comprised of both domestic and foreign EMS companies. The largest EMS operating in Europe is Foxconn, as it is in every region. The largest indigenous EMS in Europe remains Zollner Elektronik AG. The EMS we visited represented a wide range of revenue sizes and market sectors.

- In 2022 the European EMS industry:
 - Totaled €51.5B
 - Accounting for roughly 9% of the global EMS industry.
 - Included 2,203 legal entities belonging to 1,880 companies.
 - Employed ~245,0000 people.
 - Included 4 EMS with revenues greater than €1B.
 - Included 1,600 EMS with revenues under €10M.
 - The minimum revenue size to be included in the list of top 5 European EMS was €844M.
- The top 5 countries in the European EMS market (by %) are:

1. Germany	17.8%
2. Czech Republic	14.3%
3. Hungary	14.1%
4. France	7.7%
5. Poland	7.2%

 - *Based on 2021 revenues. Numbers for 2022 will only be available end of October.*
- In4ma forecasts that the industry will grow by a CAGR of 6.9% between 2022 and 2030 to revenues of €87.8B.
- Most EMS we met reported a strong book of back orders. There is some concern that OEM customers might pull back on some orders based on economic conditions later in the year, but the general theme was for continued growth.

Here is some specific EMS industry characteristics for some of the countries we visited:

- United Kingdom/England
 - 191 EMS companies in the UK
 - Generated just under €2 billion in revenue in 2022.
 - Most are smaller.
 - Only two over 100 million in revenue; no Tier 1 present.
 - Germany
 - 565 EMS
 - €9.6B in 2022
- Austria
 - €1.1B in 2022
 - 36 EMS
 - Includes Flex and Jabil
- Switzerland
 - €1B in 2022

- 81 companies

According to in4ma, western Europe is expected to grow at a higher rate than Eastern Europe in 2022 and 2023.

- **European EMS Growth Drivers:**

The main growth drivers for the EMS industry in Europe, as reflected by most of the companies we met, are:

- More outsourcing by OEMs
 - The general sentiment of all EMS we met was that European OEMs will be outsourcing more.
 - More on this in the next section.
- The megatrend of increased electrification of the world in which we live and operate
 - This is especially true in the industrial sector with IIoT.
 - Also, the increase in sensors that proliferate in the world today.
 - In Europe the drive to increased sustainability also underscores this trend.
- Utilization of more EMS services by OEMs
 - Once OEMs successfully outsource PCBA, they tend to be receptive to utilizing more of the services EMS has to offer.
 - EMS are selling more of their services to OEMs (e.g., design, box build, fully system integration, fulfillment, aftermarket services).
 - Box build is a specific service that we discussed with the EMS companies we toured, and all expressed optimism at growing this service in the years ahead.
- Reshoring
 - Most EMS we met shared examples of reshoring from Asia/China back to Europe.
 - This is mainly in the form of increased RFQs, but there were also some examples of actual work transferred into Europe from Asia/China.

OEM OUTSOURCING POTENTIAL

The percentage of electronics manufacturing that OEMs have outsourced in Europe is estimated by in4ma to be about 41%. This is forecasted to increase to 46% by 2030.

- This means that there is still most of the electronics manufacturing being done internally by European OEMs and indicates the potential for EMS growth.
- The EMS industry in Europe has matured and OEMs are increasing the amount they outsource as evidenced by the organic growth being experienced by EMS companies there.

- There is a definite trend and increased potential for EMS to do more box build work for their OEMs customers. This would be a significant growth driver for the industry.
- The more that OEMs outsource, the more that EMS become their true manufacturing partners and the less manufacturing knowledge that is retained within the OEMs.
- Most OEM customers in Europe are located within several hundred kilometers of their EMS providers facility, even if it is the office of a major international brand.
 - Relationships begin with a local office.
 - Engineers like to be local/close to their EMS provider.
 - Speed matters in terms of response and delivery to customers.

INDUSTRY SECTORS SERVED BY EMS IN EUROPE

We saw many interesting new products being brought to market. This speaks to a very innovative environment and a high number of start-up companies seeking to develop new products based on electrification.

- These companies generally do not have a history of internal manufacturing, so the EMS industry is seen as a natural manufacturing partner for them.
 - More on start-ups later in this report.
- The products being assembled by EMS companies no longer categorize easily into the traditional industry sectors of automotive, communications, computer, consumer, defense/aerospace, industrial, instrumentation, and medical.
 - Companies have created unique categories which makes it harder to compare and size certain industry sectors.
- Electrification and more electronics in all aspects of our lives is driving development of these diverse sectors.
 - This is especially true in the area of Industrial Internet of Things (IIoT).
- The most common industry sectors we saw reflected were in industrial, medical, automotive, energy, and high-end communications.
 - The UK has a high amount of aero/defense outsourced whereas Germany does not.
 - Quite a bit of the automotive work we saw involved LED lighting and also some subassemblies that were being done by fully automated lines.
- A large portion of the EMS industry in Europe is for regulated industries like aero/defense and medical.
- There is little work being done in the 3C's (communications, computer, and consumer), especially in western Europe where we toured.
- The industry sectors served in Europe influence related characteristics of the industry.

The sector challenge: it is becoming increasingly difficult to categorize products in the traditional sectors the industry has always used. This is mostly true for products that used to be categorized as Industrial but have now emerged as their own sectors (e.g., agri-tech and energy).

- The best example of this is the infrastructure required by electric vehicles (EVs). We saw this categorized as Automotive, Mobility, Energy, and Industrial

TYPE OF MANUFACTURING PERFORMED

Most European EMS are performing higher mix, low to medium volume product builds. This generally involves smaller product run rates and more line changeovers each day.

- We saw run rates as low as single digit to as high as hundreds of thousands.
 - On rare occasions where product runs are in the millions, these are performed by highly automated processes.
- A presentation at the EMS Forum in Munich by a representative of Raymond James stated that HM/LV work also generates higher margins for EMS companies.
- There is still a lot of pin-through-hole (PTH) parts being assembled onto boards.
 - Past predictions that PTH will go away are not proving true.
 - This is reflective of the sectors these companies serve.
 - This is especially true for power electronics.
 - Many EMS we met voiced a preference for hand assembly of PTH due to the low volumes being produced and the higher equipment cost associated with automating these functions.
- High Volume work is generally automated and/or being done in Eastern Europe.

Equipment Sets

- We saw 65 SMT lines during our tour.
 - This ranged from a company having only 1 line to a company with 12 lines.
- Since most EMS did primarily HV/LM builds involving multiple daily changeovers, efficiency of process is critical as is having many feeders and trollies available.
- We witnessed a variety of equipment brands and strategies during our tour.
 - Most EMS have standard equipment sets across their facilities and see this as an important characteristic/differentiator.
 - Some did not have a stated preference.
 - Some companies used different brands of AOI and SPI on the same SMT line, while most were standardized.
 - We saw a few screen printers with SPI built in which eliminated the need for a separate SPI machine.

- While there was a preference for new equipment expressed by most companies we visited, there also are some companies who see the value in used equipment.
- Increased automation is spoken about by most companies, but some still consider human labor as cheaper for the amount of post reflow work they do.
- In terms of post reflow automation, there is not much appetite due to the lower volumes which does not make that equipment very cost justified with the exception of those EMS working for the automotive industry, where smart actuators, fluid controls, driveline controls, chassis electronics and power electronics (48V and 400V) are manufactured. Here potting and module assembly were common, with some of the machines even developed by the EMS.
- We heard a strong emphasis on growing box build business.
- We saw a large number of conformal coating and potting machines, and also heard that finding more such machines is currently a challenge.
- We saw a large number of component towers.
 - The most impressive display was a factory that had 22 component towers in a single aisle of a factory.
 - We also witnessed some operations that would benefit from having some towers, but for whom the cost is still too high considering their cash flow limitations.
- There appears to be a preference for laser marking over traditional paper labels. Most of the paper labels are due to OEM request rather than EMS preference.

CHALLENGES PERSIST

Materials

Most companies we visited stated that the material situation in terms of availability and lead times has improved. But this does not mean that the problem has been fixed. The component supply chain challenge is generally seen as the new normal or just part of the fabric of the industry now. Companies must adjust their approach and reset to this reality.

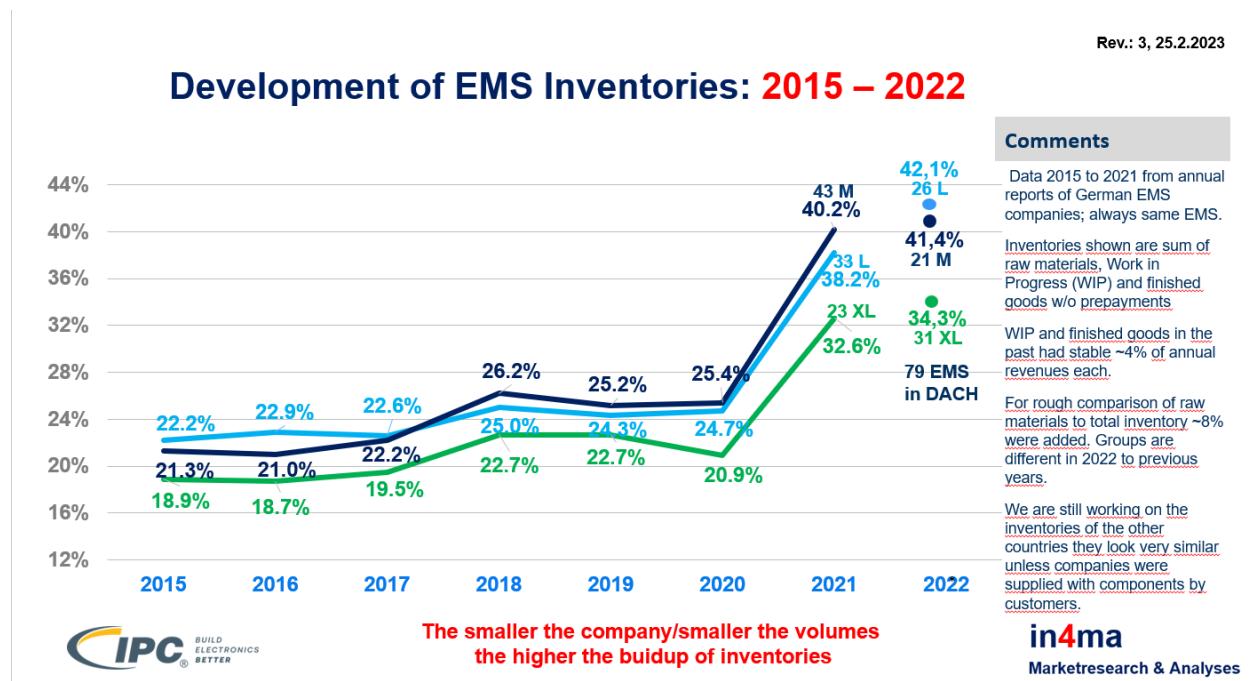
- Most companies are still waiting for “golden screws” so they can clear out their excessive inventory.
- The most cited missing or problem parts are:
 - Analog devices
 - Micro controllers
 - Micron and TI
 - Power components
 - Microchips/ semiconductors

- ASICS

High Inventory Levels

Most EMS still have a high amount of money tied up in inventory. This serves as a restraint on their ability to make desired and sometimes necessary investments in their ongoing operations.

- According to in4ma's annual survey, the average for European EMS is 25-35% of annual revenues, with some reporting over 50%.
- This puts severe constraints on the EMS's activity and ability to invest in other desired equipment, systems and facilities.



Distributors – a love / hate relationship

- The general dissatisfaction with authorized distributors that was so intense last year has abated.
- The distribution channel is doing better and is again the preferred source, especially the authorized channel.
- The largest concern related to purchasing is that many key parts are still unavailable, and these are needed to flush out high inventory levels.
- The authorized or franchised distributors seem to be getting back to fulfilling their traditional role of buying and holding inventory.
- Brokers are still active but doing less business and are actively calling on EMS companies.

- All of the EMS we met reported that their use of Brokers over the last few years was always with their OEM customer's approval.
- Catalog distributors (i.e., Mouser, DigiKey) are preferred due to the LV type of business done in Europe.

EMS companies are all aware that distributors made large profits while their businesses were stuck with too much inventory.

- Some EMS we met were in difficult financial condition, mostly due to the high inventory levels they are still holding.
- Most companies stressed the importance of the knowledge and experience of their people over becoming too dependent on digitized purchasing solutions. They like the benefits that APIs provide, but still want people involved working their networks and to make decisions based on their experience.
- Going directly to component manufacturers when possible is desirable.
- NCNR (non-cancellable, non-returnable) terms from material suppliers and passed through by distributors are still seen as undesirable and negatively impacting the industry.
 - We heard some discussion that pulling back on these terms is being considered.
- Counterfeits
 - Many EMS shared stories of having caught bad parts at incoming inspection.
 - Several referenced using testing services like White Horse Labs to screen parts acquired through a broker.

Workforce / Labor

While component shortages remain the top industry challenge, this is followed closely by persistent concern over workforce availability.

- The availability and cost of labor were issues mentioned by all companies we met.
- This is the result of many issues including Covid, the war in the Ukraine, and a degree of historic industry complacency.
- Efforts to promote and elevate the industry are starting and must continue.
 - The EMS industry is invisible to many and therefore not considered as a career option.
 - We heard an example from the UK where they asked students what an engineer was, and the response was "the guy who fixes your car."
- For many of the EMS we visited they are the main employer in their town/region.
- Increased recruiting at schools is happening, and we heard numerous examples of efforts to attract younger workers.
 - As one EMS told us, they got complacent and should have been doing it all along.

- Apprenticeship programs and school outreach/training programs are common in Austria.
- Two companies we visited in Germany and UK had a workforce made up of 14 and 12, respectively, different nationalities, including workers from the Ukraine and the Philippines, and in UK they had the different flags hanging in the factory.
 - Ukrainian workers are primarily female who fled the war. The concern is that once the war is over, most of these workers will return home.
- Annual increases to the minimum wage in various countries are also impacting the ability to recruit and retain workers.
 - UK minimum wage is up 10% in 2023; and was up 9% in 2022.
 - Austria: plus 9.1%, increase of minimum wage raising cost to >10%.
 - Hungary: plus 14% increase for workers and minimum wage plus 16%. Inflation in Hungary is at 20% in present.
- Some EMS reported that it was hard to get their OEM customers to accept labor cost increases during a contract.
 - EMS should have a cost increase clause in their contracts if not already.
- These workforce challenges are often addressed by an increase in factory automation, but this is limited by a company's financial situation related to excessive inventory levels, and the lower lot sizes of the products being built.

Energy

Energy costs are generally up 1-6% in Europe, and the countries need to invest more in infrastructure.

- Energy sources vary from nuclear to renewables and still include oil and gas.
 - Countries with mostly nuclear energy seem to be the least impacted.
- The fortunate companies are those that signed energy contracts lasting several years that provide them with a set rate. However, once these contracts end the companies will be faced with negotiating new contracts at higher market rates thus increasing their operating costs.
- Sustainability is also a big initiative in Europe, which includes solar panels on buildings, reducing energy use in facilities, and the increased use of sensors in increasingly smart factories.

Sharing Rising Business Costs

Most EMS have been able to pass along to their customers the increased material and energy costs but seem less able to do so with increased labor costs.

- These elements should all be considered in the contracts signed between the parties, but we heard several examples where they were not.

NOTEWORTHY INDUSTRY DYNAMICS

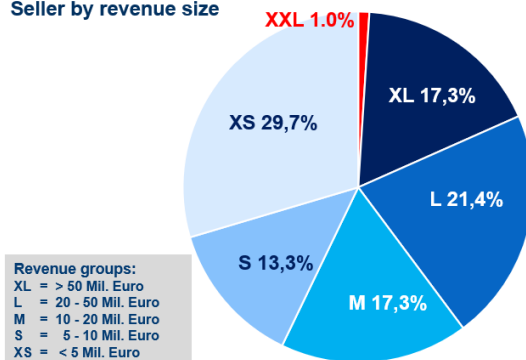
Mergers & Acquisitions (M&A)

There is a vibrant and active M&A environment at play within the European EMS community that is being supported by Private Equity partners.

- There is seemingly a lot of interest in M&A on both the buy and sell side in Europe.
- The EMS companies we met with all recognized that more consolidation of the European industry was inevitable and already occurring.
- European EMS companies have also begun to acquire EMS operations in other global regions, the most noteworthy being North America and Southeast Asia.
- This activity is driven by the desire to become larger, and to acquire customers, workers, and/or equipment.
- According to data from in4ma:
 - 150 EMS facilities changed ownership in the last 8 years.
 - 38 transactions in 2021
 - 35 transactions in 2022
 - 27 transactions already in 2023 (January - July)
 - For comparison, by July 2022 there were 22 transactions, whereas by July 2021 there were 20 transactions.
 - 60% of the deals are for companies under 20 million in revenues.
 - In4ma believes that another 400 EMS will disappear by 2030 either due to M&A or business failure.
 - One EMS (Binder) announced it was shutting down its business during our tour.
 - In4ma actively helps EMS companies on the sell and on the buy side as they have the best EMS market knowledge, as well as Private Equity contacts.
- Some noteworthy EMS companies active in M&A in Europe are:
 - NOTE: Has acquired 5 factories in 5 years.
 - Cicor: Has acquired 5 factories in 2 years.
 - GPV: Has acquired 13 factories in 6 years.
 - Inission: Has acquired 8 factories in 8 years.
 - Alliance Electronics: Has acquired 5 factories in 2 years.
 - Other European EMS active in M&A include: Katek, Connect Group, InCap, and Kitron.
- An interesting dynamic we noticed in Europe was that the original founder(s) when selling their companies express a real concern for who the company is sold to and how it fits into the new company.
 - They want their people to keep jobs in their community.

Mergers & Acquisitions Since 2021

Seller by revenue size



Revenue groups:
 XL = > 50 Mil. Euro
 L = 20 - 50 Mil. Euro
 M = 10 - 20 Mil. Euro
 S = 5 - 10 Mil. Euro
 XS = < 5 Mil. Euro

60% of all M&A transactions are EMS <20 Mil Euro
Big M&A companies cannot help you there

Last 29 months had 98 M&A deal closures

- 46% - market development
Companies buying into existing markets
- 21% - capital investment
Majority from private equity companies
- 20% - market penetration
Companies buying into new markets
- 6% - age succession
Half never come to the market but dealt with privately
- 4% - insolvencies/closures
permanently disappear from the market
- 3% - vertical integration/diversification

70% of all deals further consolidate the market

There are about 20 open M&A deals in present



Capacity Constraints

The EMS industry needs more capacity in Europe. Many EMS are at or approaching full utilization of their existing space.

- Smaller EMS with available capacity are seeking business from larger EMS who need capacity.
- Companies are addressing this issue by considering new facilities in lower cost regions, but the problem of available staffing adds complexity to these decisions.
 - Eastern Europe, Tunisia, Ukraine, and Moldova were most mentioned areas.
 - Eastern Europe is seen as the most desirable, but labor force availability is an acute problem there.
 - Tunisia is an increasingly attractive low-cost region for European EMS.
 - There are already 21 EMS companies with facilities there.
 - In a data point attributed to ASMPT, when they mapped all of the SMT lines in Europe and Northern Africa, the largest cluster appears in Tunisia.
 - The unemployment rate in Tunisia is about 17% so there is an available labor force.
 - The Ukraine is increasingly being considered as a future site for the EMS industry.
 - Two of the EMS we spoke to are considering opening a facility in Ukraine.
 - There is an available workforce, but also recognition that the war must end first.
- This capacity issue is also behind the active M&A environment in Europe and is related to the need for more capacity are rising costs for leasing facilities. Space is at

a premium in Europe and companies will face increased costs when they renew their exiting leases.

OEMs doing EMS

We again heard of OEMs offering outsourced manufacturing services to other OEMs. This time it was Sony in Wales, and two anonymous (to us) OEMs who were working through a sales representative to sell their excess manufacturing capacity. Last year we heard about Bosch doing the same from its facility in France.

This is a trend that was common over a decade ago in the United States. It never proved an effective strategy before, so we are skeptical that it will work now for these OEMs, but we are glad to be proved wrong on our assumption.

China's role and influence

China still matters! Despite a lot of industry discussion about de-risking the supply chain, diversifying from China will not be achieved in whole.

- China's role as a manufacturer, supplier, and market is profound.
- EMS with facilities in China expressed a strategy of "local for local" in China; building in China for the China market, and not exporting product back to Europe.
- We also heard from several sources of Chinese Tier 1 EMS moving into the European market.
 - This was interpreted to signal that their OEM customers will also be moving to Europe in the years ahead.
- One EMS reported to us that a Chinese EMS approached them to build a product for them locally at a target price that was higher than the price in China.

Startups

- Startups represent a "double edged sword" of risk and reward since all brands began as startups at one point in time.
- We heard from many EMS about an active environment for startups in Europe.
- Startups are considered risky partners, and companies reported the need to vet the funding, management, and product potential of the startups with whom they choose to engage.
- We heard of several different approaches for engaging with startup companies for the EMS we met:
 - One EMS limits it to only 2 startups being supported each year.
 - Another has rule: only 1 risky startup per year.

- Another considered their ties with the startup community as a key differentiator. They consider the transition from design to prototyping to series builds as a growth driver.
- Design houses are also working with startups and need EMS to build the products.
- The potential positive impact of startups for the overall European industry was expressed by one EMS executive who stated: “More European innovation will result in more local manufacturing.”

The Challenge of “differentiation”

How do you separate yourself from the competition when all companies are perceived as offering the same services? This has been a challenge for the EMS industry since its inception and is captured perfectly by this image from *The Far Side* by Gary Larson.



- A common theme in almost all our discussions with companies, especially with the smaller EMS, was the challenge of finding their unique selling proposition (USP) or market niche.
 - This is also a theme that in4ma stresses to its clients and helps them to define.
- A USP can be developed around industry sectors, technologies, service offerings and other issues. EMS companies are embracing the importance of identifying their real differentiating competencies and leveraging these to grow their business.
- This is especially true for smaller EMS companies with under 10 million euros in annual revenues.

- These companies are being very innovative in their approach to the market, but many are still struggling.

THE FUTURE FOR THE EUROPEAN EMS INDUSTRY

The EMS industry in Europe has realized the risk inherent in its supply chains being overly dependent on Asia/China. As a major proponent of globalization, Europe had embraced the risks and rewards of supply chains spanning the globe. The Covid epidemic, war in the Ukraine, and lingering fear of Taiwan being taken over by China have caused a rethinking of these dependencies.

- The local supply chain in Europe is lacking and is unable to produce any electronic product based solely on a European supply chain.
- The discussion in Europe now is about supply chain resilience and risk adjusting the elements involved.
- Europe must invest to develop this, and this will involve public and private collaboration.
 - One example of this is with printed circuit boards where Europe's percentage of global production is estimated to have fallen to 2%.
- Developing the indigenous European supply chain will take time and money, and the EU has already passed its own Chips Act with a budget of 43 billion Euro to encourage development of semiconductor fabs in Europe, increasing manufacturing in Europe from today's 10% to 20% by 2030.
- The result should be an increase in the amount of reshoring of electronics manufacturing back to Europe.
- The prevailing mood in the EMS industry in Europe is optimistic.
 - There is recognition of the need to elevate and promote the EMS industry more, and also a desire for more community within the industry.
 - "Built in UK/Germany/Europe" is seen as desirable marketing.

EMS industry is focused and active

- The EMS industry, to its credit, is actively engaged in improving its position to better serve its customers.
- All EMS we met had initiatives to continually improve their efficiency and flexibility through the application of lean principles.
- We visited one EMS that is always one of the most profitable EMS in Europe. This is due to their internal disciplines and customer focus, which stresses value over volume.
- Many EMS service offerings now begin with design rather than PCBA.
- Many listed the number of engineers from various disciplines they had on staff.
- Some EMS are also providing ODM (original design manufacturing) and JDM (joint design manufacturing) services.

- There is a real embrace of sustainability and optimizing facilities and supply chains for lowered environmental impact.
- EMS stress their “sticky relationships” with customers.
 - The proximity of EMS facilities to customers allows for optimal response and delivery times.
 - Once an EMS facility becomes a certified manufacturing site for an OEM it is hard to move the work.
- **in4ma** is still the most respected EMS market research firm in Europe.
 - The EMS we met with all validated the in4ma numbers, analysis, and forecasts.
 - I intend this to be a blatant marketing pitch for our partner. They produce the best market research in the EMS industry available today.

CONCLUSION:

- The EMS industry in Europe is at a critical inflection point post-Covid, but is comprised of dynamic companies with modern capabilities, and should be poised for growth.
- It faces challenges common in the industry but seems to be managing through these with creativeness and determination.
- Reducing the current inventory levels at EMS is critical to the health of the industry. This must be done in collaboration with distribution partners and OEM customers for whom the inventory was acquired.
 - Once achieved, policies should be implemented to ensure that such a situation does not recur in the future. This will require agreement among the three parties involved.
- The EMS industry is comprised of for-profit companies and must be allowed to earn a fair profit so that it can continue to build products for its customers.
 - Most OEM customers are not in a position to reestablish their internal manufacturing capabilities to the level at which the EMS performs today. They therefore should be fully invested in the industry's continued health and success.
- Increased outsourcing by OEMs of more services, especially box build; reshoring of manufacturing from Asia/China; and the continued development of new products by European entrepreneurs will fuel the growth of the industry.
 - Establishing a healthy and complete European supply chain is critical to achieving this.
- More industry consolidation is inevitable and necessary. This will result in more EMS companies with revenues of more than €1B, and with more extensive global footprints to include Asia and North America.
- Europe possesses some of the richest global economies and many international brands in the electronics industry. There are huge opportunities for the EMS industry in Europe.

Stay tuned for updates on next year's tour and which region(s) we will be investigating next.

Thank You!