



White Paper

Strategic Reorientation of Electronics Manufacturing

From Plant Relocation to EMS Reshoring

Outsourcing, Relocation and International Manufacturing Models – How the Terms Are Connected

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1. Strategic Context: The Complexity of Modern Electronics Manufacturing

In a market environment characterized by high uncertainty, strong fluctuations and geopolitical changes, global supply chains are under constant pressure. For Original Equipment Manufacturers (OEMs), the ability to flexibly adapt production sites and manufacturing models is now more than an operational advantage. It can be critical to long-term competitiveness. Management must clearly distinguish between the terms used in order to avoid wrong decisions and unnecessary investments. In practice, terms such as “outsourcing” and “relocation” are often incorrectly equated. While outsourcing describes an organizational decision (Who produces?), relocation describes a geographical change (Where is production carried out?). This distinction is important in order to correctly assess the scope and investment requirements of a project.

To sharpen the strategic focus, each production project should be clearly defined based on three key questions:

- **Who?** (Who performs the manufacturing activity? In-house production, an EMS partner or a hybrid model?)
- **Where?** (Where does production take place? In the home country, in a nearby region or farther away abroad?)
- **What?** (What exactly is to be changed? Manufacturing model, location, number of partners or the overall production structure?)

Only answering the “What?” question reveals the actual scope of the project – for example, whether only a partner is being changed or whether the entire manufacturing structure needs to be rebuilt.

2. The Foundation: The Two Dimensions of the Manufacturing Decision

The complexity of a production decision can be reduced by considering the manufacturing model and location separately. This approach enables OEMs to assess both the question of internal or external production and the choice of production location independently.

Strategic Manufacturing Decision Matrix

Dimension	Domestic / Onshore (Home Country)	Foreign / Offshore (Other Country)
In-house production (internal)	Conventional own production in the home country. High level of control over manufacturing and know-how.	Production in an own plant abroad. Geographical relocation without outsourcing.
EMS partner (external / outsourcing)	Onshore outsourcing: Manufacturing is assigned to an external EMS partner in the home country.	Offshore outsourcing: Manufacturing is assigned to an external EMS partner abroad.

The matrix results in four scenarios that occur in electronics manufacturing:

1. **In-house production in Germany:** The company retains production and control over manufacturing at its own site.
2. **In-house production in Poland (Offshoring):** Production is geographically relocated but remains within the company.
3. **EMS partner in Germany (Outsourcing):** The “Who?” is changed, while the production location in Germany is largely retained.
4. **EMS partner in Poland (Offshore-Outsourcing):** Production is assigned to an external partner and simultaneously relocated abroad.

A geographical relocation therefore does not automatically mean a new manufacturing model (outsourcing). Conversely, outsourcing can also take place without any significant geographical relocation. Considering both dimensions separately makes it possible to plan the next steps more clearly.

3. Glossary of Relocation Models: Clear Terms for Planning

A common language between procurement, production and management is an important prerequisite for a successful transfer project. The following definitions are based on the commonly used definitions of the OECD:

- **Outsourcing:** The focus is on the external assignment of an activity. An activity is performed by an external company, regardless of whether it was previously performed internally or outsourced externally from the outset.
- **Onshoring:** Describes the manufacturing or performance of an activity in the company's home country. In the context of relocation, onshoring means that an activity previously performed abroad is relocated back to the home country. In this case, it is also referred to as reshoring.
- **Offshoring:** Describes the manufacturing or performance of an activity abroad. This can take place in an own plant or through an external partner. If an activity previously performed in the home country is relocated abroad, this is a relocation abroad.
- **Nearshoring:** Refers to the establishment or relocation of an activity to a geographically nearby region. For German OEMs, this could, for example, mean manufacturing in Eastern Europe instead of Asia. Objectives may include shorter transportation routes and shorter delivery times.
- **Reshoring:** Describes the return of an activity previously performed abroad to the company's home country. Reshoring is therefore a form of onshoring if the activity was previously performed abroad.

Strategic example: If an OEM moves the manufacturing of a product from an EMS partner in China to an EMS partner in Germany, the manufacturing is relocated back to the home country. The outsourcing model remains in place, while both the location and the manufacturing partner change.

This distinction provides the basis for the question of who performs the manufacturing and where it takes place.

4. Plant Relocation vs. Manufacturing Order Transfer: An Important Comparison

The impact of a relocation depends substantially on who is responsible for the production equipment and manufacturing. Physically relocating an own plant involves different tasks and risks than transferring a manufacturing order to an EMS.

Comparison of Relocation Types

Criterion	Plant relocation (own factory)	Manufacturing order transfer (to EMS)
Investment requirements (CAPEX)	High (buildings, SMT lines, infrastructure)	Lower (use of existing EMS equipment)
Ownership of equipment	OEM owns the machinery and equipment	EMS partner generally owns the equipment and is responsible for their operation and maintenance
Equipment responsibility	With the OEM	With the EMS service provider
Flexibility	Rather lower due to long-term commitment to own capacities	Generally higher through the use of existing EMS capacities
Personnel management	OEM is responsible for personnel and organization	Personnel management is handled by the EMS

While a plant relocation gives the OEM full control over its own SMT manufacturing and intellectual property, transferring a manufacturing order to an EMS can provide greater financial flexibility. Reshoring projects in the electronics industry can therefore also be implemented as manufacturing order transfers in order to shorten the time until production starts and reduce the company's own investments.

5. Focus on Reshoring: Returning EMS Manufacturing Orders

Reshoring can be a way of making international supply chains less dependent on distant production sites and simplifying communication and cooperation. A distinction must be made: Reshoring can take place as “**insourcing**” (return to the company's own plant) or as “**onshore outsourcing**” (switch from a foreign EMS to an EMS in the home country).

Possible reasons for this step include:

- **Supply chain and logistics:** Reduction of transportation distances, freight costs, customs duties and the risk of transportation disruptions.
- **Communication:** The same time zones and shorter geographical distances can facilitate technical coordination.
- **Protection of know-how:** Depending on the country, legal frameworks and proximity to the company may facilitate the protection of know-how.

However, the success of such a return also depends on technical data, materials and processes being transferred completely and in a controlled manner to the new production site.

6. Operational Reality: The Transfer of a Manufacturing Order

A change between EMS partners is not a fundamental first-time entry into outsourcing. The company essentially remains within the outsourcing model. The focus is instead on transferring manufacturing that has already been outsourced to a new partner. In doing so, both the manufacturing partner and the geographical location may change simultaneously.

Checklist for the Transfer of an Electronics Project:

1. **Knowledge transfer:** Transfer of practical manufacturing knowledge from the previous partner to the new partner. This includes process flows, critical process parameters, practical experience, known failure modes, test procedures and product-specific characteristics. This knowledge transfer is often one of the most complex and critical parts of a transfer and should be provided with sufficient time and resources.
2. **Technical documentation:** Complete transfer of Gerber data, assembly drawings, ODB++ data and manufacturing drawings.
3. **Bill of materials (BOM) and material supply:** Clarification of material inventories at the previous partner, requalification of distributors and securing components with long lead times.
4. **Transfer of production equipment and tooling:** Physical transfer of specific test adapters, tools and fixtures for the box-build process (system assembly).
5. **Test and inspection concepts:** Coordination of In-Circuit Tests (ICT), Flying Probe and Functional Tests (FCT) at the new site.
6. **Quality assurance:** Release of production processes and verification of SMT quality at the new partner.
7. **Securing series production supply:** Active inventory management and planning of safety stock to bridge the ramp-up phase.

A professional transfer is intended to reduce the risks during production ramp-up. The key is the complete coordination of materials, technical data and production processes.

Equally important is the transfer of knowledge from the previous to the new manufacturing partner. This involves not only the handover of documents, but also practical experience, process knowledge, known failure modes, critical process parameters and product-specific characteristics. This knowledge must be understood by the new partner and incorporated into the production process. This part of the transfer in particular is complex, time-consuming and should not be underestimated.

7. Conclusion and Strategic Decision Framework

The strategic reorientation of electronics manufacturing requires a clear consideration of the questions **“Who?”** and **“Where?”**. Only when these two dimensions are considered separately can a production structure be developed that combines economic, operational and strategic requirements.

The following points are particularly relevant for the strategic assessment:

1. **Technology Check:** Products with particularly sensitive know-how and proprietary manufacturing processes may make in-house production or local onshore outsourcing appropriate.
2. **Scaling Check:** In the case of strongly fluctuating order volumes, transferring the manufacturing order to an EMS may offer greater flexibility than relocating an own plant.
3. **Transfer Check:** When changing the production location or EMS partner, not only technical data, materials and production equipment must be transferred. The practical manufacturing knowledge of the previous partner must also be established at the new partner and incorporated into production.
4. **Resilience Check:** Companies can consider different approaches to risk diversification. This includes dual sourcing, i.e. splitting production between two EMS partners. Another option is a multi-location or dual-region approach, in which production is distributed across several geographical locations. Both approaches can reduce dependence on a single partner or location.

A future-proof electronics manufacturing setup therefore does not have to be tied to a single manufacturing model or a specific region. Companies can combine in-house production and outsourcing, own and external sites, as well as regional and international production structures. What matters is that manufacturing model, location, partner structure and transfer effort are considered together.

About the Author

Dirk Kaussen is Founder and Managing Director of EMS Strategy Group. With around 40 years of experience in the electronics industry — including founding and managing his own electronics manufacturing company in Germany — he brings deep expertise in manufacturing processes, EMS partner selection, supply chain stability, relocation projects, and risk management. His approach combines practical solutions with a direct connection to industrial reality.

About the EMS Strategy Group

EMS Strategy Group supports industrial enterprises in the strategic and operational advancement of their electronics manufacturing. Our core expertise lies in the strategic relocation of manufacturing volumes, the selection of qualified EMS partners, the establishment of new production capacities, and the expansion of existing manufacturing structures.

Furthermore, we design resilient supply chain frameworks, conduct comprehensive risk assessments, and guide dual-sourcing strategies, with operational support through to a successful series production ramp-up.

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