



Strategic Brief

The TCO When Awarding Manufacturing Orders to an EMS

Why the lowest unit price does not automatically mean the lowest total cost

Dirk Kaussen | EMS Strategy Group | Rev.: 1.3 | September 29, 2026

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Initial Situation

When OEMs are deciding whether to award a manufacturing order to an EMS partner – whether for a new product or when switching to a new service provider – the unit price is often the first factor considered when comparing offers. At first glance, the lowest manufacturing price appears to be the most economical solution.

However, the unit price represents only part of the actual costs incurred. A sound decision therefore requires a Total Cost of Ownership (TCO) assessment that takes all costs over a defined evaluation period into account.

Why the Unit Price Is Not Sufficient

The National Institute of Standards and Technology (NIST) describes Total Cost of Ownership as an assessment of visible and hidden costs along the supply chain. These include procurement, transportation, warehousing, financing and transaction costs, among others. NIST also points out that evaluating suppliers solely on the basis of unit price can result in a higher TCO.

When awarding a manufacturing order to an EMS, additional costs may therefore arise beyond the quoted manufacturing price. Which costs are relevant and to what extent they occur depends, among other factors, on the product, manufacturing location, supply chain and scope of the cooperation.

For a reliable comparison, these costs should be captured over a defined evaluation period and compared with the respective EMS quotations.

Cost Categories in an EMS TCO Assessment

The following cost categories should at least be considered when evaluating an EMS quotation.

Direct Manufacturing and Material Costs

The EMS partner's unit price, including component costs, manufacturing services and agreed markups.

These costs are directly visible in the EMS partner's quotation and are therefore usually the easiest to compare.

Logistics and Customs Costs

Transportation costs, packaging, insurance, customs duties, import charges and the associated customs clearance.

International supply chains may also involve longer transportation times and additional intermediate storage. The location of an EMS partner therefore affects not only the manufacturing price but also the downstream costs of the supply chain.

Quality Assurance and Quality Costs

Costs for incoming inspection, on-site audits, ongoing quality monitoring, as well as complaint handling, rework, scrap and additional testing.

The OEM's internal resources for quality management and supplier management should also be taken into account.

Ramp-Up, Transfer and Introduction Costs

Starting a manufacturing order with a new EMS generally involves one-time expenses.

These include, among other things, partner qualification, technical preparation, initial sampling, process approvals and support through to stable series production.

When switching from an existing EMS partner, additional measures such as parallel production, relocation of tools and equipment, additional safety stock or other measures to safeguard supply continuity may be required.

Knowledge Transfer and Manufacturing Support

The transfer of implicit operational knowledge is often underestimated when awarding manufacturing orders to an EMS. In addition to formal manufacturing documentation, practical experience relating to critical processes, potential failure modes, test limits and specific manufacturing requirements must also be communicated and assessed.

For new products, the early identification of potential manufacturing and testing issues is particularly relevant. This support and evaluation effort by experienced OEM and EMS personnel represents a relevant cost item that is usually not visible in the original quotation.

Contract Expiry and E&O Material

After a production change, the previous EMS may still hold components, assemblies or customer-specific materials.

Potential costs for Excess & Obsolete (E&O) inventory, minimum order quantities, no longer required special components, as well as the transfer or purchase of remaining inventory should therefore be taken into account.

BOM Transfer and Component Approvals

Changing EMS partners may require additional work on the Bill of Materials (BOM).

This may include reviewing alternative and second-source components, technical evaluations, sampling and approval processes. Potential changes to sourcing channels and supplier structures should also be considered.

IP Transfer, NRE and Test Equipment

Costs associated with transferring manufacturing documentation, test programs and other production-related data should be taken into account.

Additional costs may include NRE (Non-Recurring Engineering), adaptation or redevelopment of test programs, as well as new test fixtures, test adapters or ICT and FCT equipment.

Coordination and Travel Costs

An international EMS partner may create additional internal workload.

This includes ongoing coordination, project management, site visits, travel and additional communication effort resulting from different time zones, languages and organizational structures.

Buffer, Inventory and Flexibility Costs

Longer supply chains may require additional safety stock and longer lead times.

This results not only in inventory costs but also in tied-up capital and potentially higher inventory risks. Additional costs may also arise if short-term volume changes or production adjustments are more difficult to implement.

Foreign Exchange and Country Risks

In international EMS structures, exchange-rate fluctuations as well as political, regulatory, infrastructure-related or trade-policy changes can affect actual costs.

Not every risk can reasonably be assigned as a fixed cost item. Such factors should therefore be incorporated into the assessment through scenarios and sensitivity analyses.

How TCO Can Be Calculated

A TCO assessment should initially distinguish one-time ramp-up and transfer costs from the ongoing costs of series production.

For a defined evaluation period, the relevant costs can then be consolidated:

TCO = ongoing costs over the evaluation period + one-time costs + quantifiable risk costs

The quantitative weighting of these factors and the development of a company-specific TCO simulation matrix require an individual assessment of the OEM's manufacturing and supply chain structure.

Actual costs can change due to exchange rates, transportation costs, scrap, safety stock or expected production volumes. Relevant influencing factors should therefore also be assessed through sensitivity and scenario analyses.

Conclusion

Awarding a manufacturing order to an EMS involves more than the manufacturing price of a PCB assembly. Depending on the manufacturing and supply chain structure, additional costs may arise for logistics, quality, inventory, internal resources, knowledge transfer, technical services and other factors.

A robust TCO assessment makes these factors visible and enables different EMS quotations to be compared not only on the basis of unit price, but also according to their actual total costs over the selected evaluation period.

This turns a simple price comparison into a sound economic assessment of the manufacturing decision.

Sources

[1] National Institute of Standards and Technology (NIST): How U.S. Manufacturers Can Take Advantage of Reshoring. 2025.

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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