

# HOW TO CALCULATE THE TRUE COST OF GLOBAL ELECTRONICS OUTSOURCING

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## ABSTRACT

The outsourcing of electronics manufacturing has become a common business solution for many OEMs. Unfortunately, conducting an accurate True Cost of Outsourcing analysis is less common. OEMs and EMS alike need to be able to do so in order to determine when the use of outsourcing to specific geographies is the best viable business solution.

The true cost of electronics outsourcing for an OEM includes these three elements:

- 1) The price paid to the EMS;
- 2) The costs accrued by the OEM internally in support of the outsourcing; and
- 3) The cost of geographic risk depending on where in the world the manufacturing facility is located and the destination of the end product.

Key words: electronics manufacturing, EMS, geographic risk, OEM, outsourcing, TCO, true cost of outsourcing.

## INTRODUCTION

As the outsourcing of electronics manufacturing by OEMs has grown into a global industry over the last few decades, it has become increasingly important that OEMs analyze the total cost of their outsourcing initiatives and not focus just on the price paid to their EMS and ODM suppliers. A proper True Cost of Outsourcing (TCO) analysis involves consideration of costs both inside and outside of the OEM. This paper will present the variables that are involved in such an analysis.

## THE METHODOLOGIES

Charlie Barnhart & Associates (CBA) has developed three specific methodologies, collectively referred to as the Outsourcing Navigator Series (ONS), which work in unison to accurately assess the true cost of outsourcing electronics manufacturing. These methodologies are:

1. *Global Pricing Methodology*: Understanding the elements that make up price and how the underlying costs are accrued, factored, and charged.
2. *OEM Internal Spend (OIS)*: What the typical OEM spends internally to implement and support an Outsourcing program and how these costs can be controlled.
3. *Global Risk Module (GRM)*: Understanding and monetizing geographic risk.

## GLOBAL PRICING METHODOLOGY (GPM)

In any 'for profit' commercial enterprise, Selling Price includes three (3) distinct elements:

- Cost of Goods Sold (COGS)
- Corporate related Costs (CC)
- Applied mark-up to achieve the desired the margin.

COGS are comprised of the costs for Direct Labor (DL), Overhead (OH), and Materials. The DL includes the wages in cash and cash equivalents paid directly to DL workers in the geographic region that the manufacturing is being conducted. This rate is then multiplied by a time factor assigned to a specific task or set of tasks.

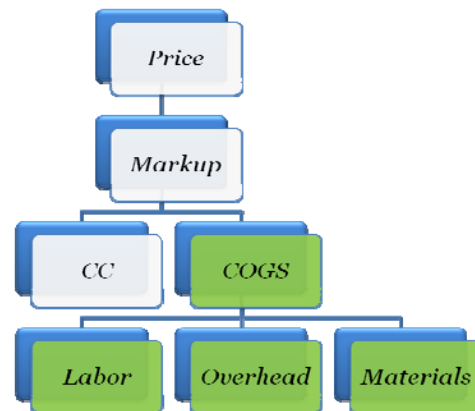


Figure 1. GPM Organization of Costs

## OEM INTERNAL SPEND (OIS)

Most OEMs do not understand the total amount they spend in support of their outsourcing initiatives. It is more than just the sum of the salaries of the people supporting the initiative and their travel expenses. A proper True Cost of Outsourcing (TCO) analysis assesses the total cost over time to have a product built. As such, it is not a snapshot, but a movie.

An OEM's TCO for any project includes the sum of their one-time costs (sometimes called "non-recurring") and recurring costs, over the total life or duration of the project. However, one-time costs do in fact recur quite often.

The elements that constitute one-time costs are:

- New Product Introduction
- Interventions:
  - Quality or Reliability Issues

- Availability Challenges
- Warranty Requirements
- ECO/ Engineering Change Related Items
- Cost of Initiatives:
  - Company Based (e.g., Lean, 6-Sigma),
  - Industry Based (e.g., RoHS, WEEE)
  - Commerce Based (Virtual vs. Vertical Manufacturing)

Recurring costs include these items:

- Purchase Price – FOB Price to Supplier
- Logistics Costs – Freight, Duty, Fees, etc.
- Standard Support and Management Costs – Internal Costs at OEM for baseline Personnel, Administration, PP&E, Travel & Entertainment, Training, Cost of Money, etc.

In formulation, an OEM’s TCO looks like this:

$$\text{Total Cost of Ownership/ Unit} = \frac{\left( \begin{array}{c} \text{OneTime:} \\ \text{NPI} \\ \text{Intervention} \\ \text{Initiatives} \end{array} \right) + \left( \begin{array}{c} \text{Recurring:} \\ \text{Purchase Price} \\ \text{Logistics} \\ \text{Internal Support} \end{array} \right)}{\text{Total units in the life of the project}}$$

Figure 2. OIS in formulation

The elements of both one-time and recurring costs are in turn impacted by these independent variables:

- SCALE of a Project
- APPROACH Selected for a Project
- COMPLEXITY of a Project (i.e. requirements)

By far the most significant of these factors is SCALE as economies of “scale” are achieved when the overall volume or size of a project increases, and this must be assessed over the life of the project.

The APPROACH and COMPLEXITY variables include many sub-factors, these being the most significant:

APPROACH:

- Relative Geography
- Start-up Procedure
- Level of ECO Activity
- Warranty Process

COMPLEXITY:

- Lot size/Mix

- Lead-time/Flexibility
- Compliance Issues

Each of these independent variables has the potential to increase the TCO analysis and the outsourcing solution selected. OEMs can attempt to calculate these variables themselves, or CBA provides charts based on actual electronics manufacturing industry data to simplify the assessment of each main variable.

**GEOGRAPHIC RISK MODULE (GRM)**

One of the jobs of management is managing risk. This is a complex and difficult task but one that CBA has simplified so that OEMs can monetize the risk associated with a given Outsourcing solution.

Looking beyond external price and internal spend, an OEM needs to consider 4 critical risk elements when designing or selecting a cost effective Outsourcing solution:

1. Geographic Options
2. Alignment of Internal Expectations
3. Assessment of Internal Resources
4. Capabilities of the Supply Solution

Simply put, to implement a cost effective and risk appropriate Outsourcing solution there needs to be an alignment between the Expectations & Internal Resources of the OEM and the Capabilities of the Supply Solution!

$$\text{Risk Factor} = \frac{\text{Geographic Constant} \left( \frac{\text{Resources} \times \text{Expectations}}{\text{Capabilities}} \right)}$$

Figure 3: GRM in formulation

**INDUSTRY CASE STUDY**

The presentation that will accompany this paper at the SMTAI Conference in Fort Worth, Texas will provide a comparison of costs from the various geographies in which the electronics manufacturing industry operates, utilizing industry case study analysis derived from thousands of actual OEM quotations, from a wide range of end markets and engagement sizes, and representing both PCBA and box-build.