

Charlie Barnhart & Associates LLC

Insights into the world of global electronics manufacturing



True Cost of Outsourcing

“The multimillion\$ question?”



Powered by the:

GPM-TCO-GO TOOL



True Cost of Outsourcing Model

Charlie Barnhart

Co-Founder & Principal

Author of the Outsourcing Navigator Series

and True Cost of Outsourcing Model

True Cost of Outsourcing

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Global Pricing Methodology

*Understanding the elements that make up
price and how the underlying costs are
accrued, factored and charged*

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Pricing Elements



In any “for profit” commercial enterprise Selling Price includes three (3) distinct elements ...

- 1. Cost of Goods Sold (COGS)*
- 2. Corporate related Costs (CC)*
- 3. Applied ‘Mark-up’ to achieve the desired level of Margin*

Selling Pricing



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Global Pricing Methodology

$$\text{Selling Price} = \frac{\text{COGS} + \text{Corporate Costs}}{1 - \text{Mark-up \%}}$$

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Pricing Formulation

 *Let's work out an example together... assuming the following factors:*

- *PCBA Assembly in USA*
- *BOM Materials = \$300 (including ODCs)*
- *Assembly Time = 1/2 Hour*
- *Volume is >100K units/year (for 2 1/2 years)*
- *Outsourced to a CM*



Pricing Formulation

 *Starting with COGS ...*

Material = \$300

Labor & OH + 20 (\$5 DL+\$15 OH)

COGS = \$320

Then let's add in + 16 (5% of COGS)

Corporate Costs =====

Sub-B4 Mark-up = \$336

*Then we need to see what the total dollar value of
this work would be...*

Pricing Formulation

📌 *By referring to the Mark-up chart in the Outsourcing Navigator data-set, we see the minimum EMS target for this level of business (~\$100M) would be approximately 12.5%.*

Pricing Formulation

 *This gives us ...*

<i>Material</i>	=	<i>\$300</i>
<i>Labor & OH</i>	+ <u>20</u>	<i>(\$5 DL+\$15 OH)</i>
<i>COGS</i>	=	<i>\$320</i>
<i>Corporate Costs</i>	+ 16	<i>(5% of COGS)</i>
	=====	
<i>Sub-B4 Mark-up</i>	=	<i>\$336</i>
<i>Add Mark-up</i>	+ <u>48</u>	<i>(\$336/.875)</i>

Estimated Selling Price = \$384/unit!

Pricing Formulation

 *If these numbers look “strange” it may be because you’ve seen them formatted **VERY** differently ...*

Pricing Formulation



The OEM usually sees something like this:

<i>BOM Material</i>	<i>\$304.76</i>
<i>Material OH</i>	<i><u>9.14</u> (at our cost of 3%)</i>
<i>Material Sub-Total</i>	<i>\$313.90</i>
<i>Packaging</i>	<i><u>1.73</u></i>
<i>Material Total</i>	<i>\$315.63</i>
<i>Assembly Labor</i>	<i>\$ 28.00 (1 hr. @ \$28/hour)</i>
<i>ECO adds to PCB</i>	<i><u>2.80</u></i>
<i>Labor Sub-Total</i>	<i>\$ 30.80</i>
<i>Solder/Flux, etc.</i>	<i><u>1.52</u></i>
<i>Labor Total</i>	<i>\$ 32.32</i>
<i>SG&A</i>	<i>\$ 4.68 (at our cost)</i>
<i>Profit</i>	<i><u>\$ 35.26</u> (at a flat 10%)</i>
	<i>\$ 387.89 (Before Rebate!)</i>

Price/unit=\$ 384.01 (After Rebate!)



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Total Cost of Ownership Module

What the typical OEM spends internally to implement and support an Outsourcing program and how these costs can be controlled.

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Total Cost of Ownership

 *An OEM's Total Cost of Ownership for any project includes the sum of their:*

- One Time costs (“Non-recurring”)*
- Recurring costs*

Over the total life or duration of the project.

EMS Insider Insights!

*“One time costs are in fact **very** recurring!”*

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One Time Costs

1. *New Product Introduction*

2. *Interventions*

- *Quality or Reliability Issues*
- *Availability Challenges*
- *Warranty Requirements*
- *ECO/ Engineering Change Related Items*



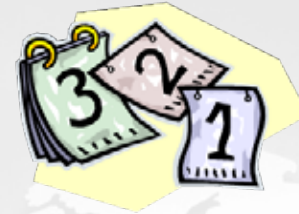
3. *Cost of Initiatives*

- *Company Based (Lean, 6-Sigma),*
- *Industry Based (RoHS, WEEE)*
- *Commerce Based (Virtual vs. Vertical Manufacturing)*

Recurring Costs



Recurring cost includes:



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

Total Cost of Ownership



Therefore, in formulation an OEM's TCO looks like this:

$$\begin{array}{l} \text{Sum of} \\ \text{Total Cost of} \\ \text{Ownership/ Unit} \end{array} = \frac{\begin{array}{l} \text{One Time:} \\ \text{NPI} \\ \text{Intervention} \\ \text{Initiatives} \end{array} + \begin{array}{l} \text{Recurring:} \\ \text{Purchase Price} \\ \text{Logistics} \\ \text{Internal Support} \end{array}}{\text{Total units in the life of} \\ \text{the project}}$$

Total Cost of Ownership

 *Now let's apply these elements to a test case and see how to construct an accurate Total Cost of Ownership estimate...*

Using our case-study from the GPM:

- *PCBA Assembly in USA*
- *BOM Materials = \$300 (including ODCs)*
- *Assembly Time = 1/2 Hour*
- *Volume is 100K units/year (for 2 1/2 years)*
- *Outsourced to CM in USA from USA*



Total Cost of Ownership

 *But we'll need to add a little information:*

- *FOB Price = \$384.00*
- *Landing Cost = \$1.00*
- *Start-up & Warranty is supported locally*
- *ECO <1/Week, >2/Month*
- *Moderate Volume/Low Mix*
- *LT<30 days, Flexibility >25%*
- *Standard PCBA used in Computing Product*

Total Cost of Ownership

(as easy as 1, 2, 3!)

1. SCALE

- ⚓ *Purchase Price = \$384.00 x 250K or \$96M*
- ⚓ *Logistics Costs = \$1.00 x 250K or \$.25M*
- ⚓ *Sub-Total Direct = \$96.25M* *Sub- Total 9.500%*

2. APPROACH

- ⚓ *Relative Geography = 0.000%*
- ⚓ *Start-up Procedure = 0.000%*
- ⚓ *Level of ECO Activity = 0.375%*
- ⚓ *Warranty Process = 0.000%* *Sub-Total 0.375%*

3. COMPLEXITY

- ⚓ *Lot Size/Mix = 0.500%*
- ⚓ *Lead-time/Flexibility = 1.000%*
- ⚓ *Compliance = 0.000%* *Sub-Total 1.500%*

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Grand Total = 11.375%

Total Cost of Ownership

*TCO/Unit = Sum of One Time + Recurring
Number of Units in Life of Project*

*TCO/Unit = \$96,250,000 * 1.11375
250,000 Units*

*TCO/Unit = \$107,198,430 = \$428.79/Unit!
250,000 Units*

An adder of \$43.79/unit to the Direct Cost for this relatively straightforward outsourcing approach.

Total Cost of Ownership

TCO Analysis	USA
FOB Price/unit	\$384.00
Landing cost/unit	\$1.00
Total Direct Cost over 250,000 units	\$96,250,000
SCALE (9.5%)	\$9,143,750
APPROACH (.375%)	\$360,938
COMPLEXITY (1.5%)	\$1,443,750
Cost Elements of TCO	\$10,948,438
TCO Cost adder/unit	\$43.79
TCO per unit	(\$428.79)



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Global Outsourcing Tool

*Using the 'GO Tool' to make cost effective
outsourcing decisions by understanding and
monetizing geographic risks*

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Global Outsourcing Tool

 *Looking beyond external price and internal spend, what other factors should an OEM consider 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*

Global Outsourcing Tool

 *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!***



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Global Outsourcing Tool

⚓ *The level of risk in any Outsourcing Project is equal to the level of Resources available to support Expectations applied over the supply solution's Capabilities when factored by the attributes of the geography selected.*

Or to put it another way...

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

GPM Case

PCBA in USA Example

$$.83 = .20$$

$$\left(\frac{10 \times 10}{24} \right)$$

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

True Cost of Outsourcing

TCO Analysis	USA
FOB Price/unit	\$384.00
Landing cost/unit	\$1.00
Total Direct Cost over 250,000 units	\$96,250,000
SCALE (9.5%)	\$9,143,750
APPROACH (.375%)	\$360,938
COMPLEXITY (1.5%)	\$1,443,750
Cost Elements of TCO	\$10,948,438
TCO Cost adder/unit	\$43.79
TCO per unit	\$428.79
Risk adjustment from GO Tool (.83% * \$428.79)	3.57
Risk adjust Total Cost of Ownership	\$432.36

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True Cost of Outsourcing

(GPM \$384 PCBA built in USA)

Risk Adjusted Total Cost of Ownership*

Geo	TOTAL	Project Total	MVA
USA	\$432.36	\$108,091,757.81	\$33,091,757.81
Mexico	\$425.26	\$106,314,993.81	\$31,314,993.81
EE non-Euro	\$507.59	\$126,897,950.27	\$53,022,950.27
SE Asia	\$438.56	\$109,640,489.80	\$38,390,489.80
China	\$430.56	\$107,639,092.41	\$37,889,092.41

** Net of duties and taxes*

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Outsourcing Navigator Council

Council Membership Includes:

- 🚩 Four (4) exclusive, interactive quarterly webinars reporting on current trends, opportunities and risks in the global electronics manufacturing industry.***
- 🚩 Four (4) Quarterly Pricing reports including all the Outsourcing Navigator and True Cost of Outsourcing data-points (a \$6,000 value.)***
- 🚩 Attendance at a public Outsourcing Navigator workshop for up to three of your company's employees per year (a \$1,500 value) and a 20% discount for any additional employees wishing to attend.***
- 🚩 Major research reports each year on issues critical to OEMs (a \$5,000 value.)***
- 🚩 Annual retainer for 8 hours of consulting time with CBA (a \$2,000 value.)***

***Cost: Council Membership is \$7,500/year, a savings of \$7,000!
(Multiyear membership discounts are also available.)***

Thank You!

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