This first article in a four-part series looks at the pricing practices of the global electronic manufacturing services industry and the impact on the OEM. Former EMS executive Charlie Barnhart explains how manufacturing costs are accrued and prices formulated, and what specific actions OEMs can take to affect the numbers.

The fundamentals of pricing

BY CHARLIE BARNHART

Product pricing is one of the most important elements of any business, yet few in the electronics industry understand how prices are actually determined.

While shocking, this statement shouldn't come as a surprise, considering how most companies set prices. Despite the fact that functional managers in sales, finance, marketing, procurement and other areas provide input, pricing formulation is the exclusive domain of a select few senior managers. And this practice is standard across the supply chain, from the smallest to the largest company, and from raw-material suppliers to OEMs.

It may be difficult to believe the chief executive officer of a giant company like General Electric or Hewlett-Packard is involved in setting the price for an individual product. But the fact is that financial metrics established by senior executives filter down through the operating units and are the guidelines from which selling prices are set.

Ultimately, of course, the consumer decides what is actually paid for a product—the purchase price. But that is a very different issue than how a selling price is determined.

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Functional managers need to gain a better understanding of selling price if they are to negotiate profitable outsourcing relationships with their EMS providers. This article will explore the fundamentals of selling price through the case study of a fictitious but representative midtier OEM and an EMS provider, which are negotiating on the turnkey manufacture of a printed-circuit-board assembly (PCBA) used in an industrial communications product. In this example, the EMS provider has quoted the OEM a selling price of $1,000 per unit at a monthly quantity of 1,000 pieces.

The OEM manager's first objective is to understand whether this is a good price by drilling down into each element of cost. The second objective is to determine what influence, if any, the OEM can bring to bear to lower the selling price.

Defining price

In any for-profit commercial enterprise, the selling price includes four elements, three dealing with cost and one providing the opportunity for profit.

The three cost elements are:

1. The cost of producing the product, called cost of goods sold (COGS). This includes:
   - (i) The materials necessary to manufacture the product,
   - (ii) The labor required to build the product,
   - (iii) Overhead, which includes everything else required to facilitate operations.
2. Corporate costs, called sales, general and administrative expenses (SG&A), including:
   - (i) Corporate administration (finance, legal, human resources),
   - (ii) Sales and marketing,
   - (iii) Executive management,
   - (iv) Information systems, information technology.
3. Other corporate costs, including:

(i) Research and development,
(ii) Interest (cost of money),
(iii) One-time expenses, such as write-offs),
(iv) Taxes.

The fourth element of selling price is called margin and is applied as a markup to the three underlying cost elements. Therefore, in the simplest of terms, the selling price of a product is the combination of costs plus margin.

Calculating cost

Looking at each of the four elements of price in our example, we see the EMS provider is charging the OEM $800 for COGS. According to the EMS provider, the materials cost represents the largest percentage of COGS, followed by overhead, then labor. The proportions are typical of many products: 80 percent materials, 15 percent overhead and 5 percent labor.

Material	**$640**
Direct labor	**$40**
Overhead	**$120**
Total COGS	**$800**

While the materials category always includes the parts and pieces used to construct the product, there is some variation in how companies account for other costs associated with materials, such as incoming freight, packaging or planned attrition. Sometimes they are included in the materials cost or they may be included in the overhead. In this example, the EMS company includes these costs in the overhead.

Throughout the EMS industry, labor is divided into two categories: direct labor, which is the labor of workers who physically manufacture the product, and indirect labor, the work of those who provide support or supervision. In the labor portion of COGS, only the wages paid to direct-labor employees are included. All other labor-related cost, such as indirect labor and fringe benefits for direct-labor employees, are charged as overhead.

Overhead also includes all the other items required to conduct the operational part of the business, such as facilities, training, equipment, government fees, utilities and many other costs.

One glaring fact in the COGS analysis is the minuscule percentage of selling price represented by direct labor—in our case study, 4 percent. Ironically, many companies point to direct-labor cost savings as a driver for moving manufacturing offshore. This example shows that such a decision is clearly not justified.

Granted, the cost of labor within a specific geography can impact the cost of other things, including materials and overhead, since both contain downstream labor as part of their cost structures. But why not just specify them directly? It certainly would make more sense from a pricing perspective, since without a significant cost saving in materials or overhead, it does not make financial sense to transfer manufacturing to remote regions simply to reap the benefit of low-cost labor.

Turning to SG&A and other costs, EMS providers do not always make these publicly available. That is the case in this example, as the EMS provider argues that these costs are spread across many customers.

There are a limited number of ways for OEMs to approximate these costs, one of which was developed by Technology Forecasters Inc. in its Global Pricing Workshop. By referencing the GPW database, we see that in this case 7.5 percent of the EMS provider's selling price would be a reasonable approximation for SG&A and other corporate costs. Therefore, the cost to the EMS company for manufacturing the PCBA is:

COGS	**$800**
SG&A/other	**$75**
Cost to the EMS provider	**$875**

The elusive margin

The final step in breaking down the selling price is to determine how the EMS provider came up with $125 of margin, which is typical for an outsourcing project of this scale and scope.

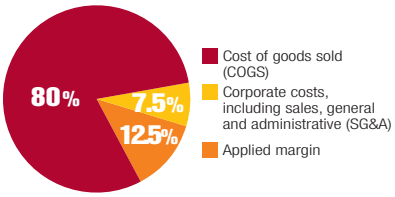
Unlike the three cost elements, margin is more art than science, and will fluctuate based on a number of factors, including:

- The type of work being done,
- The strategic value of the transaction to the seller,
- The amount of work being done.

Starting with the type of work being done, management at the EMS company would ask themselves a number of questions such as: "Is the work to manufacture the PCBA one of my core competencies?" and "Do I have available ca-

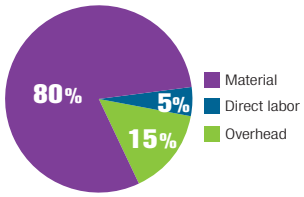
COGS represents the majority of selling price. . .

The three components of the price an EMS provider charges its OEM customer for manufacturing a product. Figures are representative, based on averages across many EMS providers



. . .and materials accounts for the majority of COGS

Cost of goods sold (COGS) is the largest portion of the price an EMS provider charges its OEM customer and materials is by far the largest portion of COGS.



When OEMs negotiate with their EMS providers, it's best to focus first on reducing materials cost, as materials represent the lion's share of the total cost.

SOURCE: TECHNOLOGY FORECASTERS INC.

pacity to perform the work?"

In this case, the EMS provider's assembly capacity is primarily surface-mount-technology and the PCBA is predominantly SMT, so there is a good fit with resources.

Then there is the issue of the strategic value of this OEM to the EMS provider. That is, "How important is this customer to our business?" and "Does this work open new opportunities, perhaps in another industrial sector or with a large customer?"

In this case, the PCBA is for a communications product, a market sector in which the EMS company specializes and wants to expand. So a yes to the strategic-value questions drives the EMS company to set a lower margin.

How much lower, however, depends on the degree to which the incremental OEM business opens up future opportunity. So the EMS provider evaluates the relative importance of this OEM customer vs. another and the relative value of follow-on business in a new sector or with a larger, more strategic customer. A 10 to 15 percent reduction in margin would not be out of the question if the opportunities are significant.

The last, and often the most important, question has to do with economies of scale. Think of it this way: The less a company has to spend on each incremental unit it produces, the less overall margin it needs to apply to each unit to be profitable.

In our case study, the demand for this particular PCBA is moderate—1,000 units per month, or $1 million in monthly revenue. At this level of business, the EMS provider determines that a 12.5 percent margin takes into account all the questions asked above.

However, if the terms, conditions and requirements expressed by the OEM to the EMS provider were inconsistent with industry norms, this number could easily vary by as much as 50 percent either way.

The bottom line is that the OEM's $1,000 PCBA could range in price from a low of $918.75 per unit—if the OEM plays all its cards right—to a high of $1,081.25 per unit if it doesn't.

In addition, the OEM might be able to save even more if it worked with the EMS provider to reduce the materials subfactor of COGS. At $640 for materials, there is the potential for considerable savings for both parties.

Course of action for the OEM

How can an OEM apply this knowledge? Using the four pricing elements as a guide, there are a number of issues OEMs can explore to seek out opportunities for cost savings.

1. Focus on materials, the single largest element of both cost and price. Ask:
   - Has everything been done to secure the best possible price on every line item? When is the last time this process was audited?
   - Am I relying on my EMS provider to find, and pass on, cost savings in the area of materials—even on components where the OEM has more influence with the supplier than the EMS provider?
   - Are there multiple approved suppliers for every component part number on the bill of materials? If not, what motivation does the supplier have to be genuinely competitive?

2. Avoid paying for services you do not use. Ask:
   - If a supplier offers services such as design engineering and all you need is manufacturing, are you paying to support capabilities you don't need?
   - Are you doing business with people who build primarily what you need or have you avoided them because of fears of conflict of interest with competitors, loss of intellectual property or some other reason? If you have been avoiding them, you may be missing opportunities for cost savings. However, be vigilant about protecting your assets.

3. Avoid becoming myopic or obsessed with labor cost or rates:
   - At a ratio of 1:20 of direct labor to overall product cost, direct labor is one of the least important elements in the pricing equation. It does not justify the level of scrutiny it frequently gets.
   - Since the labor on any specific operation is the product of rate multiplied by time, and as you will never know the actual rate or actual time a manufacturing task consumes, it is not worth worrying about.

4. Select EMS and component suppliers that meet not only your technical requirements but also are reasonably aligned with the scope of your business. Ask:
   - Are you a little fish in a big pond? If so, you risk paying too much and getting too little.
   - Do your suppliers support large corporate activities like global IT networks or worldwide sales offices that add no value for you?

5. Avoid borrowing money from either EMS or component supplier in the form of extended payment terms. Ask:
   - Is your cost-of-money lower than theirs?
   - Has an actual comparable-cost analysis ever been performed?

6. Make sure the level of service and support you receive from your supplier's sales staff meets your expectations. Ask:

9 Action items

Here's a checklist of some of the most important actions, objectives and issues on which OEM and EMS managers need to focus when determining their product's selling price:

1. **Reduce materials cost.** It's typically the largest percentage of the cost of a product's selling price.
2. **Avoid paying overhead for services you don't use.** Try to find out what your EMS provider includes in its overhead.
3. **Do not become obsessed with labor cost or rates** because labor represents a small fraction of cost of goods sold.
4. **Select suppliers that are aligned with the scope of your business.** Do your due diligence before signing the contract.
5. **Extended payment terms can be dangerous,** as it is the equivalent of borrowing money from your suppliers. Evaluate all possible sources for a loan.
6. **Use your supplier's sales staff** since you are already indirectly paying for them.
7. **Be a valued customer** to your EMS providers and component suppliers to assure continuity of supply and as leverage to reduce your overall cost.
8. **Leverage your unique business requirements with the supply base**. Can you help your EMS providers penetrate new business opportunities or new markets and, thus, increase your value in their eyes?
9. **Maximize purchasing volume while minimizing risk.** Aggregate purchases where you can with trusted, credible suppliers.

- Are you dealing with different salespeople on different items?
- If so, who is in charge of your account? Does anyone actually know?
- Are you leveraging your salesperson's skills, experience, resources and abilities to your advantage?

7. Be a valued customer to assure continuity of supply. Consider this:

- If you are not being treated as a valued customer, perhaps it is because your EMS provider or component supplier considers your business expendable.
- Even the most challenging and demanding customers get treated with respect when their business is profitable to a supplier.
- Have you negotiated prices so low your suppliers would be better off without you?

8. Leverage whatever unique business elements you possess with your supply base to lower margins. Ask:

- Does doing business with you help them penetrate new markets or opportunities?
- Are you working with them to help make that happen?

9. Maximize purchasing volume while minimizing risks. Ask:

- Is your procurement strategy supportive of supportive suppliers?
- Does your design group dictate who you will buy from on future products?
- Do you communicate with your suppliers in clear, unambiguous ways or do you expect them to become fluent in your institutional nuances?

Fitting the pieces together

How do supply and demand, globalization or even monetary policy, fit into all of this? They don't apply, as each is an element of economics, not of the pricing equation. Do they impact prices? Of course they do. But they do not change how pricing is formulated.

In good times or bad, locally or globally, whether the cost of money is high or low, four simple elements always determine the price of products and services. The pricing equation is a constant. And it is an opportunity for competitive advantage to those who understand its structure and learn how to apply the knowledge to their business strategies and practices. ■

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The second in the four-part series on pricing is titled "Three ways to reduce cost without compromising quality, flexibility or responsiveness." Look for it in the July issue of *Electronics Supply & Manufacturing*.