



**On- or Offshore:
13 Things to Consider When Deciding Where to Manufacture**

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As electronic contract manufacturers, we are often asked our opinions about offshore production. When it comes to our customers, we are agnostics. The only thing that matters is economics—the full economics—of producing in alternative locations. There is no “good” or “bad,” only more or less economical alternatives. Our advice is simple:

- conduct a thorough analysis,
- set realistic expectations on timing, and
- don't lose sight of the critical success factors for your business.

For the purposes of this discussion, we will exclude consideration of factors not directly related to production. These factors may, in fact, dominate the decision one way or the other, but they are not normally in our scope of responsibility. An example would be local market opportunity. If there is a chance to sell into a country's market from a local base, it could easily justify off-shore production entirely for that purpose. Any lower-cost product coming back home would be gravy. Another example would be political risk. Some of this is in the eye of the beholder, but it should be your eye, not ours.

So how should we think about moving production around globally? We've had our own experiences over the years and we've also heard stories from customers. Here is a summary of some of the elements to consider:

1

Labor rate. Clearly there are many developing nations where labor rates are below those in the U.S. Many Asian venues fall into this category, with some of the most popular being China, India, Thailand and Malaysia. In this hemisphere, Mexico and the Caribbean offer opportunities.

There are other locations that may have offered very attractive rates in the past, but are not as competitive as they were perhaps ten or fifteen years ago. Singapore, Taiwan and Korea come to mind. Today, these latter places still offer rates below those of the U.S., but often not enough to justify a move. On the other hand, they may offer relative bargains on certain more highly skilled workers. In any case, one must do a very careful analysis of the raw rate, as well as other elements of compensation, benefits and factory overhead that must be considered in the decision.

For example, in some Asian locations, it is traditional to offer a thirteenth month of pay as an annual bonus. In others, there are large statutory retirement benefits to consider. In the overhead category, it is not unusual to see managerial employees paid at U.S.-type rates, especially if they are multilingual.

So, whether you own your facility or operate via a partner, contractor or other structure, careful analysis of the hourly rate and associated overheads must be done to be sure of your product's overseas economics. Everyone sees and hears about the famous \$1.00-an-hour labor, but it is very difficult to actually deliver that rate to the bottom line.

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Labor content. It may seem obvious, but sometimes people become so excited by the promise of lower labor costs that they don't calculate the net bottom-line benefit. If you have only 5 percent of ex-factory cost in U.S. labor, it is unlikely that any offshore labor savings will ultimately reach your bottom line, even if there is a factor of a ten-rate differential. Other costs, which we'll discuss later in this paper, will typically swamp the savings in labor rate and lead to disappointment. Pick products with relatively high labor content as candidates for offshore.

3

Process. Do people at the proposed location have skills to run the requisite process? Is it better to go lower tech overseas? Can you or your vendor operate the correct process? There are many considerations in this area. Some of these may not be your focus if you are using a contractor, but even then, capability and flexibility may become issues if they are not properly meshed with your requirements.

In the past, U.S. firms may have considered using older technology overseas and perhaps actually shipped obsolescent processes offshore. This can still be a viable approach. However, as electronic products have commonly become denser, smaller—and as life-cycles accelerate—older, processes that are less flexible can become a liability, regardless of who runs them or where.

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Quality. It is always best to visit a vendor's operation and make a hands-on assessment of their quality system, regardless of location. In the case of some offshore locations, however, this can present both a physical and economic challenge. It is probably a case of, "If it's worth doing, it's worth doing it right."

If management is reluctant to send someone to inspect an offshore venue, that may say something about the perceived economic benefits. Surely there are ways to screen vendors by assessing their credentials, equipment list, customer references and so on. But given the sensitivity of the role of a system supplier, it is best to not cut corners here. Better safe than sorry.

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Parts availability and cost. People are sometimes surprised about material cost savings of offshore economics. Much of what is written focuses on labor. But for electronics, Asia is where many manufacturers produce components. And, delivered component costs benefit from lower labor content, raw materials savings (the silicon in semi-conductors, for example) and shipping economies. So it is not unusual for material cost savings to be greater than labor savings as a percent. The only reliable way to evaluate this is to price a bill of materials with actual production quantities.

However, this is another area where timing can become critical. With currency and local market factors both volatile, this year's bargain can be next year's burden. So, prudence dictates ongoing testing to protect against large unrecognized, unfavorable cost swings.

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Shipping. One of the hardest things to get one's arms around is the dead time associated with ocean freight. If you're used to having a vendor down the block, it takes a while to learn how to deal with ocean freight originating 8,000 miles away. Any decision about production has to be made between one and two months earlier than before. There is no expediting—what is on the boat is coming at 15 knots and there is absolutely nothing you can do about it but wait. Customs cycles at both ends are not in your hands. You can do much to minimize delays for sure, like doing fastidious paperwork and carefully picking forwarders, port of entry, and a shipping company.

But if your load is the one that outbound customs wants to inspect in detail today, patience is the only answer. If this delay is untenable, you may have to resort to air freight to avoid a service disaster. But that will just turn it into a financial disaster. If your economics are premised on sea freight, air will rapidly erode any anticipated savings.

And, even when air is the right mode, it's not next-day as many of us have come to expect domestically. There are still formalities at both ends. Freight is usually the last priority: passengers first, mail second, your stuff third. We've had experiences in the Caribbean where it took a week to get an approved, inspected load on a plane...not exactly consistent with just-in-time. It all adds up to expanding your planning horizon and being sure to properly capture these factors in your economic analysis.

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Unit volume. This one is sometimes harder than it might seem. In principle, the lower the volume, the more likely a product should be made locally. As volume increases, the prospects for offshore economies should increase. At some point, the curve breaks over and offshore is the answer. But, it depends...

We had a recent customer example where the annual unit volume was several hundred thousand parts. The product was then made in Asia. However, due to a variety of factors, including costs of certain basic commodities like magnetic steel and the decline of the U.S. dollar, these products were actually less costly to make in the U.S. It was somewhat surprising to us, but it goes to show there is no substitute for careful calculation.

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Stable production. Both secular trends and seasonality affect the offshore equation. Given the shipping issues mentioned above, it becomes even more important to carefully analyze requirements because offshore venues are often less flexible than domestic ones.

Frequently, overseas contractors run very lean operations. Their ability to respond to shifting demands can be constrained by this. And, distance and language differences do not make communication easier. So, the premium is on steady, or at least smoothed, requirements.

If the product's unit volume cannot be predicted well, someone is going to have to provide a buffer. That means inventory. And inventory costs money to hold, regardless of where that might be. For safety, and given shipping cycles, it is better here than there. But, the cost of money has to be taken into account.

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Product life cycle. Is the product growing or contracting? Most vendors want to see at least annual commitments. Costs can be higher if they do not feel comfortable with committing to their vendors for full volumes. And, these vendors can get ugly if volumes don't materialize as agreed.

On the other hand, if the product is early in its life cycle, it may be undergoing many modifications and updates. These are especially difficult to manage at a distance.

At the other end of the product's life, obsolescence risk can be substantial. Contractors don't take this kind of risk and will be sure to pass it back to their customer. The question is, how to manage it? Again, this is more difficult the further away you are.

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Tooling. Buying tooling overseas can be a great bargain. Savings of more than half the comparable U.S. cost are not uncommon. The advent of industry standard file structures has made it feasible to do at a distance what used to require intensive interaction between engineers and tool makers. That said, if your engineering process is not one with exceptional discipline, it can still be hard to manage this overseas. Obviously, if you are in a repetitive tool making situation, this can be mitigated. But it is important to be realistic about timetables and plan for over-communication on first-article work.

Another area where tooling can become dicey is if you determine that you want the tools sent back to the U.S. Unless the contractual arrangements were very well documented at the starting point (which could have been many years ago, done by people no longer employed on either side), there is a natural disinclination for the vendor to send back business. Obviously, this is another case where relationship management is key.

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Complexity. Do you need a flying squad of experts designated to teach and monitor the product? If so, it could have substantial economic impact. Travel is expensive in money and time.

One of our managers had experience in the Caribbean where labor costs were quite low in U.S. terms. However, it took twice-monthly visits by U.S.-based engineers to keep the process running satisfactorily. Over many years, total costs, including travel, increased to the point that made the decision to move production a dubious one.

In another, more recent case, a customer contemplated moving a fairly complex product with unit volume of a few thousand parts per year to China. They estimated that it would take at least two factory visits to qualify production. This would cost several dollars per unit, excluding the employees' extra travel time. In our view, this is a product that should stay home.

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Full cost. Have you got everything included? This may be harder than it seems. Direct costs are the easy part. What about all the items that are frequently taken for granted in one's own operation, but are extras for a third party?

One example we've seen is product coming in from overseas that was justified on a zero defect basis. The vendor was capable and ISO-certified. So this was not a crazy assumption. However, actual experience was that product had to be examined 100 percent in the U.S. And, although



the defect rate was not extreme, it was enough to delay shipment to the ultimate customers and incur substantial unplanned costs.

We've seen shipping costs excluded from analyses. Extra packaging costs. Instruction sheets forgotten. Incremental inventory carrying omitted. U.S. storage of container-loads. Subtle damage from container handling, like high temperatures at the dock or aboard ship. Many of these fall into the category of hidden costs, but they must be exposed if we expect to make good location decisions.

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Know your partner. Buying business or pricing as a loss leader, while common marketing techniques, can be very destructive overseas. Manufacturing services are unlike many other products because the switching costs and time are large. Once a product is in production, the vendor's leverage is enhanced and pricing power shifts. Obviously, this can be mitigated, here or overseas, with dual sourcing. However, that may not be practical given unit volumes.

So, no different overseas than here, you have to be comfortable with your vendor. Any contract manufacturer, on- or offshore, is taking operating responsibility for their customer. There has to be mutual trust and plenty of dialog. You have to be sure you are OK with the people.

So where does all this lead? Having someone else make your product requires great attention to detail, regardless of where it's being done. Although there are many rules of thumb, there is no escape from careful, product-by-product analysis to make sure the expected results are delivered to the P&L. Global economic forces change daily and we have to hustle to keep up with these changes to deliver to our customers and stockholders.

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