



Speaking of Business Management

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Building High Volume electronics in High Labor Cost Regions, For Less

Automation is the key to unlock the door to domestic high volume manufacturing.

For many years we have all accepted the premise that high volume manufacturing is built in low labor cost regions of the world and low volume assembly is performed close to the design center and end user (in the high labor cost areas). In a way, this seems rather ironic in that low volume assembly has higher labor hours per unit than automated high volume. The difference is in logistics. Timing and flexibility is the primary driver in low volume services, such as fast food orders that must be custom, immediate, and taste right. All competition is local, you want it your way and you want it now.

To reduce labor cost you have two options: you can reduce the labor rate or you can reduce labor content. Scaling the workforce upwards to align with production volumes is practical where labor rates are small and the labor pool is huge. It is easier to bring in lots of inexpensive people than it is to invest in design and fully automated equipment. High volume production that is labor intensive will always go to the cheapest labor rate countries, with a cost of doing business of greater logistics expenses and less flexible response time.

So what is the secret for high volume assembly that is close to the end market?

Start by selecting products that are designed and ready for full automation. This means no test, inspection, rework, or manual assembly. Determine the logistics costs of shipping products from overseas to the end customer. When the labor cost to build the product is less than the logistics cost of shipping from overseas, an opportunity exists for local production. "If we automate and 'just let the line run', doesn't the off-shore low-cost-labor advantage asymptotically drop to zero?" (1). Next it is time to restructure how you approach burdened labor rates.

Traditionally the cost of capital & overhead is loaded into the shop labor rate. In this approach, as labor content approaches zero, the burden rate goes through the roof. Start by eliminating the link between burden and labor. Cost of goods sold is material plus direct labor only.

What functions can be eliminated in automated high-volume production?

Think about a "lights-out" factory approach where labor approaches zero. Going with a few highly skilled individuals rather than lots of lower skilled workers is the key to productivity and success. Monitoring the high yielding process parameters is far more valuable than inspecting and handling products. Reducing the number of people reduces variation and error. All the touch labor and human inconsistency that is typically injected into products through manual add-parts, visual inspection, testing, and rework must be eliminated. All supervisors and middle managers are eliminated resulting in a very flat organization. The second level of the organization is engineering, purchasing, shipping, receiving, and accounting. That's it.

Generally speaking, equipment and material costs are the same regardless of where you are building around the world. This is dependant on where the equipment and material is made along with the capital tax structure of the country. These variations are minimal and overshadowed by logistics and labor considerations.

Engineering and prototyping needs to be as close as possible to the product design center to facilitate a rapid design cycle. The production locations are dependant on labor content and logistics costs. If automation is less expensive than labor and shipping, then build it next to the consumers.

"We need a corporate model that focuses on the assembly of the customer's products and not on the technical disciplines or departments within the organization. We have evolved into an industry of indirect labor specialists. We have a corporate structure that puts each of us into our own silos" (2) and departments that constantly struggle to justify their existence.

We live in a world of instant electronic communications, so it is easy to design a product and build it anywhere in the world for consumption in that region. Physically moving parts around the world takes more work and costs money. There are costs of doing business on the other side of the world like: shipping, training the workforce, multiple languages, time in customs, and executive downtime while traveling.

Clearly not every product is fully automatable, but commercial products exist with high enough yields to eliminate the need for testing and inspection along with the indirect support infrastructure. Labor that simply "adds-value" may not be optimized to eliminate labor.

If you share in this vision, join us in a webcast on **Wednesday, March 18th** at 11:00 am EST for a dialog. Send me an e-mail and I will send you the details.

Inspiration for this article came from two articles by Tom Borkes of the Jefferson Project: (1) "PAPER OR PLASTIC? Choosing to Move Offshore" (*SMT Magazine April 2006*) and (2) "HOLDING THE WOLF BY THE EARS, The key to regain electronic production marketshare" (*SMTA-International 2008*). If this is a topic of interest for you, I suggest you read these articles for additional insights.

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