*Peter Grundy*

# An Alternative to Cheap Labor

## Low-cost regions play a major role, but they do not have all the answers.

Outsourcing to low-cost regions has had a profound effect on the manufacturing bases of Europe and the Americas. Many products have a relatively high labor content, and if they are to be built in volume the scale of operations in Asia offers better margins. But does this apply universally? Let us explore some other possibilities.

A stable product that does not require much engineering input during its lifetime of manufacture can be successfully built at extremely long range. This does not mean that the product must be simple, and Asian manufacturers are now very capable of building sophisticated assemblies. However, if regular design re-issues occur or if constant process changes are necessary, there needs to be close cooperation between the design team and manufacturing unit. If sound DfM rules are in place, the difficulties abate but do not go away.

When product is built remotely, response times for a design change can have a severe impact on the time to market and can necessitate dispatching a team of designers or engineers to the remote build area. This, of course, increases costs. It may be necessary for an OEM to organize a team of expatriates on rotating shifts – typically two months away followed by two months at home. Unfortunately, this means that the costs of keeping the away team remain high but the effectiveness of the team when on home duty is diluted because they cannot properly tackle anything with greater than two months' duration.

In Asia, the lowest cost sites are being pushed farther afield. In one case, the costs of manufacture on the seaboard of China, near Shanghai, were lower than elsewhere in Asia, but not as much as expected. Chinese authorities offered another possibility which involved building a manufacturing complex complete with airport and hotels in a remote area and with a huge pool of low-cost labor. The huge labor pool was, of course, untrained at the time and the site was far from any road or rail infrastructure so the initial costs, although attractive, started to rise significantly once shipping, training costs and time delays were factored in. Not all operations have such extreme consequences, but it is necessary to seriously evaluate the need to manufacture offshore rather than simply to follow the stampede abroad.

The availability of highly trained local engineers that speak the appropriate languages is improving but, in time, they will seek a higher standard of living and drive up wages. This has happened in Singapore, which is still slightly cheaper than Europe or America but much more expensive than most of the rest of Asia.

Countries actively seeking electronics assembly work are also aware that they must provide fully trained personnel; they also acknowledge that there is a time delay between capturing the new large volumes of business and providing that necessary trained workforce. The cost of all this training is not free and it must be amortized across a variety of tax and business structures. One of the great attractions to manufacturing in Ireland in the 1970s through 2001 was that nation's investment in an educational system. Although the nation's population is low, the proportion of highly trained engineers was, and is, high. The advent of the European Union and a gradual hike in wage rates to the levels of the rest of Europe made Ireland less attractive to outside investors. In Europe and America today there remain large numbers of skilled and trained engineers who are more than capable of building high-tech products.

Much has been written about counterfeiting and horror stories about poor quality car brake linings resonate. Occasionally the subject makes headlines when there is a major impact on trade somewhere, for example, pirated copies of CDs and games emanating from Southeast Asia. The governments affected usually move quickly to stamp out such practices but they are difficult to police. Counterfeiting occurs in mature manufacturing environments too, but to a much lesser extent. Counterfeiters are extremely good at their work: it usually is not possible to detect fake components or parts under normal incoming inspection routines. Indeed, it is not uncommon for substandard parts to find their way into assemblies. This may result in the occasional product failure but can, *in extremis*, cause an entire batch to fail. While counterfeiting can often be controlled, it is still a significant factor when choosing to build products in new and expanding areas.

There will always be products with a relatively high labor content that will suit low-cost manufacturing areas regardless of geographical issues. But, many products have low-labor content or can be automated such that labor is negligible. Even if the volumes are high and the design is stable with very few changes, one can build a case for automating the whole assembly to a very high level and some interesting possibilities emerge.

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**Labor.** It may be possible to automate assembly to the point where only three operational staff are required per shift to run the line: an electronics/electrical operational technician, a mechanical assembly/test engineer and a supervisor capable of handling both tasks. Clearly, these people need to be highly trained and capable. Many such personnel exist in Europe and the U.S. Although the individual staff costs will be high per person, the overall staff cost for the build operation will be very small, even insignificant, once the operation runs at high volumes.

**Equipment.** The equipment costs for high levels of automation will be very high at Day One but can be easily amortized over a perceived run lifetime. Usually, volume increases can be handled by the addition of extra modules if the original line specification was thought out properly and the cost of extra modules can be built into business models for future facility expansion. Adding extra labor in a low-cost area would permit the manufacturer to react to increased volumes, but there are always training, time and quality implications.

**Quality.** Once the automated line has been specified, installed and commissioned, and the required staff fully trained, the product quality will be consistent to a predetermined level. Process variations can be handled by staff or by designing into the line automated checking and closed-loop feedback systems to instantly and automatically correct minor defects before they have a chance to create scrap or volumes of rework.

**Customer geography.** While the suggestions indicate a large manufacturing operation, that does not need to be the case. Production volumes could be broken down into sizes that suit particular customers and highly efficient but compact operations could be sited close to the end customer. For example, the concept of design in Britain, build in Vietnam and ship to North America could be replaced by a concept of design in Britain and build in North America

**Change response.** When building at long range and using low levels of automation, the response time to a change instigated by a customer will be lengthy and may need teams of expatriate professionals to handle the change. If the automated manufacturing site is next door to the end customer and the staff running it are high-level professionals, the response time will be minimal with no need to send out engineers to plan and implement the change.

**Shipping.** Obviously, the shipping time is virtually zero if the manufacturing site is close to the customer and the shipping costs are correspondingly low. Insurance costs should be lower, as should the risks.

Low-cost regions have a major part to play in volume production but they do not have all the answers. ■