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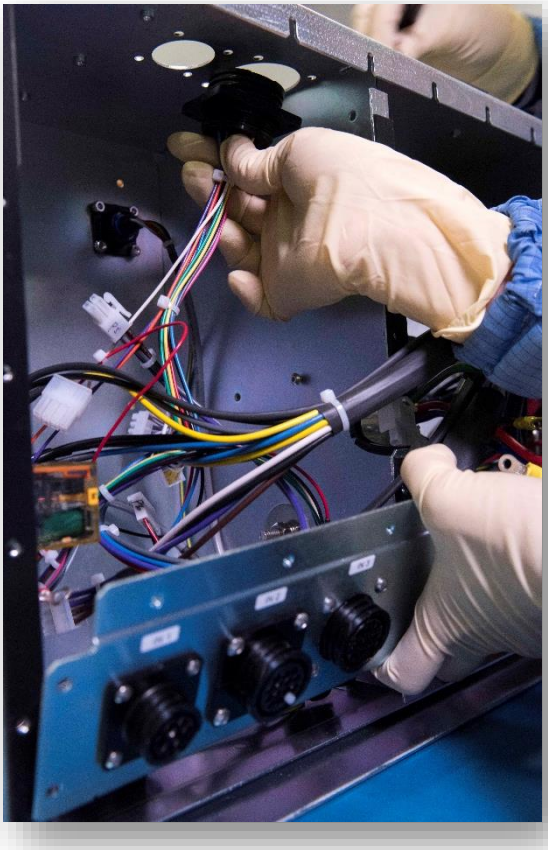

Getting the Most Value From Your Outsourcing Strategy: Four Areas to Review

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Getting the Most Value From Your Outsourcing Strategy: Four Areas to Review

By Curtis Campbell

The last three years have placed unprecedented stress on the outsourcing model. Market conditions are beginning to normalize. However, the transition from a highly allocated materials situation to better availability comes with its own set of challenges. Some costs have improved but inflation is still a factor. Outsourcing with the right partner helps hold the line on unnecessary costs. This whitepaper looks at four areas where a contract manufacturer well aligned with its customers' outsourcing goals can add value and eliminate inefficiency:

- Contract manufacturer's willingness to address unique needs
- Appropriateness of location choice
- Continuous improvement process
- Real-time systems visibility.

Contract Manufacturer's Willingness to Address Unique Needs

According to Henry Ford's autobiography, "My Life and Work," he held a meeting with his company's salespeople who wanted more model variety and announced: "Any customer can have a car painted any color that he wants so long as it is black." His goal was to reduce production costs and optimize throughput on his new automated production lines. The same inflexible mindset exists in some contract manufacturing business models. In those cases, higher mix products which drive frequent line changeovers, products with design or qualification constraints that make changes impractical or difficult to cost justify or products with specialized production needs may not be a good fit. In the best case, those projects are turned away. In the worst case, they are accepted and used to fill downturns in production volumes.

Fortunately, there are a variety of options available in the electronics manufacturing services (EMS) industry. SigmaTron focuses on a scalable solution approach and offers customers the ability to build different product lines in different facilities when their requirements do not fit a single facility option. Forecasting and production layout are optimized for those projects. For example, SigmaTron's facility in Elk Grove Village, IL has a box build area that has been optimized for smaller volume box build production enabling unrelated products to share the efficiencies and economies of scale of a standardized work cell arrangement, even though project volumes do not justify a dedicated work cell. Workstations are designed for easy changeover and a dedicated team supports the area, ensuring correct materials are stocked point of use as needed and everything is in place to support the products being built that day. This can be helpful with projects that will never have the volumes to make a nearshore or offshore solution viable. It also provides a scalable approach which allows for production transfer to a nearshore facility when product volumes reach a point where migration to a lower cost labor market makes sense. SigmaTron's facilities in China and Vietnam have been optimized for high

volume production. Its facilities in Mexico support both medium and high volume production. U.S. facilities support a range of project volumes, as well.

Questions to ask include:

- What elements are evaluated in determining potential issues in project transfer?
- Does the contract manufacturer have experience with the product/production qualification processes used in the OEM's industry?
- What type of feedback is provided on lessons learned in pre-production runs?
- What resources does the contract manufacturer have in place to support efficient production scalability should product demand increase significantly beyond forecasted volumes?
- What examples can the contract manufacturer give of solutions that have been provided to other customers with unique production requirements?
- Would having the contract manufacturer more involved in design support or post-manufacturing services help reduce cost?

Appropriateness of Location Choice

One lesson of the pandemic was the challenges posed by long supply chains when transportation capacity cannot meet demand. Part of the OEM response has been a large shift from Asia to Mexico. However, there is no universal best answer for production location choice. It is highly dependent on product volumes, end markets, supplier capability requirements, demand predictability and product maturity.

From an evaluation standpoint, several questions should be asked:

- Does product immaturity, volumes, mix or end market local content requirements impact the location selection decision?
- Is cost, responsiveness or on-time delivery being impacted by the current location choice?
- Would total cost of ownership be lowered by a change in location?
- If production was transferred to a different region, what is transfer cost impact?
- Are there any tooling change costs or regional supply chain capability issues that need to be factored into a change in production location?
- Does my current contract manufacturer have a facility in the region I am considering transferring production to?

This latter question highlights a key point in supplier selection. Product requirements evolve over time which means that optimum location may change as well. Selecting a contract manufacturer capable of supporting manufacturing in multiple regions adds flexibility to outsourcing strategy. It can also facilitate a multi-regional strategy for products best served with multiple manufacturing locations.

SigmaTron's facilities in China and Mexico regularly support customers selling into those countries as well as customers whose products ship to other regions. In some cases, the facilities are building subassemblies to supply customer final assembly facilities within the same country.

Regionalization strategies can also be adjusted to supply multiple end markets. As an example, corporate headquarters in fast food and fast casual restaurants dictate menu items and the equipment

needed to support those items by region. Franchisees have choices in equipment configuration and a timeframe in which they need to buy it, but typically they order small quantities. SigmaTron has helped one industrial food manufacturer address this challenge by manufacturing their products in Elk Grove Village, IL; Suzhou, PRC; and Acuna, Mexico to provide manufacturing local to each end market.

Common components are sourced centrally via SigmaTron's purchasing organization and shipped to each facility. In the event demand is increasing in a specific region, these shipments can be redirected to the area of high demand. Regionally-specific components related to power and language-specific control overlays are sourced regionally.

SigmaTron's test engineering team has developed a standard test set capable of testing all product configurations and shipped test sets to all facilities.

The result is that the customer has the standardization benefits and purchasing power of working with global manufacturer, yet a localized, configure-to-order (CTO) solution to support end markets where their customers are ordering small quantities of CTO product and want short lead-times. The localized solution eliminates the logistics pipeline that would be necessary if all products were built in a single location. Local sourcing of regionally-specific parts reduces logistics lead-time.

SigmaTron has two U.S. facilities, three facilities in Mexico and facilities in China and Vietnam to support its customer's needs for offshore, nearshore and U.S.-based manufacturing.

Continuous Improvement Process

Another area of value in an outsourcing relationship is the ability of a contract manufacturer to apply its expertise in optimizing production to eliminate defect opportunities or reduce cost. In some cases, these recommendations may involve a printed circuit board assembly (PCBA) re-layout. In other cases, it may be possible to increase automation, modify production flow layout or improve process efficiency.

Questions to evaluate in considering this option include:

- Have there been changes in volume that would reduce assembly cost per unit if a change in automation or process flow were made?
- Are there unadopted recommendations from the contract manufacturer for manufacturability or testability improvements?
- Has the contract manufacturer recommended changes to customer-supplied test programming or fixtures?
- Does the contract manufacturer have continuous improvement methodologies in place that have not been used to evaluate my product?
- Does the regulatory or end customer environment limit the changes that can be made without cost-prohibitive product re-qualification steps?

These questions also drive a larger strategy question: What processes are in place at the contract manufacturer to identify improvement opportunities? If the answer is that improvements are not made because the resources are not in place to do this analysis, changing contract manufacturers might be an option worth considering if changes in product volumes or requirements have made the current supplier a bad fit.

At SigmaTron International, each facility's continuous improvement methodology is aligned with the industries and typical volumes it serves. Lean Six Sigma is one of the methodologies used. As an example, its Tijuana, Mexico facility utilizes Lean Six Sigma as one of the primary frameworks for driving continuous improvement.

One tool utilized is the Gemba Walk. The term, Gemba, comes from the Japanese word for "the real place." Taichi Ohno, a Toyota engineer and leader, is often credited with developing the concept of the Gemba Walk or the idea that leaders should regularly and frequently be present to observe the work of their organization when and where it takes place.

In a Gemba Walk, leaders visit the work area to glean first-hand knowledge regarding:

- How products are built
- How services are provided
- Current challenges
- Opportunities for improvement.

One of the benefits of Gemba is its role in identifying opportunities for improvement, enabling corrections of any potential issue before they represent a risk for the product. This interaction also enables leaders to learn more about each operator's experiences and knowledge over the process. Gemba and a 5S work environment are fundamental in sustaining any Lean Six Sigma project.

At SigmaTron, weekly Gemba Walks involve a multidisciplinary group. Findings and opportunities are posted on a central Key Performance Indicator (KPI) board and changes in trends drive further analysis. For example, a Gemba walk identified the potential for improvement in a program experiencing significant volume increases.

The Green Belt teams use a DMAIC (Define, Measure, Analyze, Improve, Control) methodology to identify each improvement opportunity and strategize the appropriate solution. They are mentored in their continuous improvement projects by their facility's Yellow Belts.

In the Define phase teams develop a problem statement, identify critical to quality (CTQ) and defect metrics, create project objectives, determine the business case and financial impact of the desired improvement, determine customer impact, set milestones and a timeline, define the project scope and boundaries, and assign team responsibilities. In the Measure phase, the teams measure the variances they associate with the problem they have identified, utilizing core tools such as cause and effect diagrams and Gage R&R measurements. In the Analyze phase, the teams analyze the data they have collected to determine trends and possible corrective actions. In the Improve phase, the teams implement improvements and then utilize design of experiments (DoEs) to determine if the proposed solutions are correcting problem. In the Control phase, measures to ensure continued achievement of desired metrics are implemented.

In the DMAIC project performed in this example, the key goals identified in the Define phase included improving throughput and operator productivity.

The team utilized a SIPOC (Suppliers, Inputs, Process, Outputs, Customers) diagram during the Define phase to create a high level process map of all inputs and outputs, similar to the mapping done in value

stream analysis. They mapped the process and then created the current state production layout. This exercise did two things. First, it ensured a high level understanding of the scope of the production process they were evaluating. Second, it helped them identify process elements that could be improved. Time studies were performed on specific production steps to determine areas of line imbalance. A steady-state production layout was created that reflected an improved, better balanced production layout. In the current state layout, printed circuit board assembly (PCBA) arrays were separated into individual pieces prior to the conformal coating inspection step. In the steady-state layout, arrays were inspected prior to the depaneling step. As part of the DMAIC Control phase, electronic pacemakers were added to track units completed by hour to ensure that production operators were aware of output vs goal on an hour-by-hour basis.

Takt time, or the average time interval between the start of production of one unit and the start of production of the next unit, was cut by more than half in the steady-state process, improving throughput and operator productivity. The entire project took less than a week.

Real-Time Systems Visibility

Material constraints and unpredictable demand patterns over the last three years have led to changes in forecasting and on-hand raw materials and finished goods inventories that do not reflect the best fiscal policy. That said, material constraints in some commodities still exist, so a complete return to lean supply chain practices remains a formula for shortages. The most critical skill a contract manufacturer can bring to the table right now is the ability to help its customers draw down raw material inventories on parts with improving availability while ensuring continuing availability of constrained parts. That requires both supply chain management expertise and company-wide systems that provide real-time visibility in raw material status, work-in-process, finished goods inventory and shipped inventory.

Questions to ask include:

- Does the contract manufacturer have a process in place for collaborating with customers to adjust inventory levels as part availability improves?
- Is there real-time visibility in current inventory levels across the production process?
- What ability does the contract manufacturer have to liquidate or transfer excess inventory our projects will not need?

SigmaTron uses a combination of proprietary and internally-developed systems for enterprise and shop floor management. All facilities utilize a common ERP system plus third-party Product Lifecycle Management (PLM) tools.

The combination of an industry-standard ERP software with an internally-developed iScore suite of supply chain management tools enable all stakeholders to track demand, material on order, inventory, work-in-process, finished goods and shipments. An MRP Share program provides suppliers with complete customer forecast visibility, plus current inventory and material on order. This level of visibility can help significantly during a project transfer. In addition, SigmaTron's Taiwan-based International Purchasing Office (IPO) can help identify new suppliers in cases where fabricated parts suppliers will not easily transfer with a new customer's program. The team is also skilled at working with trusted non-franchised distributors for constrained parts. This combination of systems and expertise enables

program management to collaborate with customer teams on sizing appropriate inventories for their project's forecasts.

SigmaTron's ability to provide a tailored solution for its customers that can be as limited as PCBA manufacturing and as complex as system integration, fulfillment to end market and repair depot support enables it to evolve its solutions as its customers' needs evolve. The ability to stay with a contract manufacturer as requirements change helps eliminate significant non-recurring costs. Similarly, the ability to optimize production without redesign and maintain inventory levels appropriately sized to market conditions are additional areas that help hold the line in an inflationary environment.

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