

Fabless semiconductor companies gain supply chain excellence through distributed manufacturing

Today's supply networks are faced with rapid changes in the global business environment and the quest to identify and implement competitive differentiators. Yet, savvy companies know that supply chain improvements are one of the highest potential areas to establish a competitive advantage. Fabless semiconductor companies in particular are challenged to support new and changing business environments as they require additional services from more supply chain partners, visibility into the vast supply network, and decision support tools to insure the highest profitability.

As more semiconductor companies adopt the fabless model, a shift in business strategies is necessary in order to survive this highly competitive segment. To make the most of the fabless model, companies must have the best product designs, understand their target market, and demonstrate supply chain excellence. Companies who design and sell electronic devices, referred to here as brand owners, can leverage supply network excellence as a key competitive differentiator.

Supply Chain Trends

Some of the more established supply chain trends include outsourcing manufacturing to lower cost regions, dealing with sub-contractors at an arm's length relationship, and using negative re-enforcement to improve supply chain performance. Today, most brand owners consider contract manufacturers as strategic partners rather than mere suppliers. Fabless semiconductor companies recognize the need to integrate partners into a single, tightly integrated supply network with information flowing freely across company boundaries and across the globe. Although labor rates remain the primary driver for outsourcing, brand owners are requiring more services, such as component procurement and logistics, from their contract manufacturers.

The fabless semiconductor model has proven itself as an agile method of doing business. This model allows fabless companies to focus on core competencies such as product design and marketing while maintaining a flexible manufacturing cost structure. Due to the high cost of entry, the fabless business model is attractive to start-up companies and traditional integrated device manufacturers (IDMs) alike. Many IDMs are spinning off their wafer fabs and adopting the fabless or "fab-lite" model.

Transitioning from fab to fabless requires a different way of looking at the enterprise and evolving from a manufacturing-centric approach to a customer-centric approach. This change in business strategy finds traditional supply chain practices insufficient. Even established fabless semiconductor companies face

new supply chain trends bringing about the need to adapt to new business conditions.

Brand owners are demanding more services, such as product design and logistics, from their supply chain partners. In addition, to insure product quality and supply, more contract manufactures are being employed to assure product availability. This requires fabless semiconductor companies to bring on board and manage an ever growing number of partner relationships.

As supply networks are re-engineered, new metrics are being developed to direct supply network resources. Profit is emerging as the primary driver for allocating capacity and profitable-to-promise is overtaking available-to-promise (ATP) as the primary strategy for fulfilling customer demand. Profit velocity measures a product's contribution to the amount of consumed capacity, allowing fabless semiconductor companies to align the right product mix to sales, dramatically increasing total profitability.

Supply Network Challenges

Today's supply networks typically do not apply advanced metrics and are not responsive to volatile demand. Major gaps in supply network performance include: lack of visibility into critical manufacturing and logistics activities, the inability to integrate multiple data models from contract manufacturers, and the disruptive flow of information from supply network partners and the enterprise. Success requires the ability to direct manufacturing capacities and resources to the most profitable orders, insure availability of high profit products to meet demand, and reduce obsolete inventory by allocating capacity more effectively.

Forecasting customer demand is becoming more complex. Customers want more products specific to their needs and applications, and shorter cycle times from order to delivery. Consumer demand is inconsistent and difficult to predict. This makes it hard to forecast future demand based on previous patterns. Forecasts by nature are inaccurate and forecasting new products is even more difficult. Consequences of conservative forecasts can be missed sales and lost revenue, while optimistic forecasts tie up resources and produce excess and obsolete inventory.

Competitive Supply Network Strategies

A superior supply network is clearly a competitive differentiator. Companies that are leaders in supply networks become more reliable suppliers to their customer base and can meet market demand at a lower cost. How does a fabless semiconductor company achieve supply network superiority? First, each company must insure that internal departments are aligned. In many cases, sales, engineering and supply chain are not in synch with each other. An

important and often overlooked element of supply network excellence is the integration of engineering with sales and supply chain.

Product launch is critical to a company's growth and is the primary source of high profits. Often, product launch is not coordinated with supply and not aligned with inventory levels of current products. Launching product too early can result in cannibalization of current sales and unacceptable levels of obsolete inventory. Launching product too late means missed sales and lost revenue. How can fabless semiconductor companies increase their success rate when introducing new products? This is addressed by the concept of the "perfect product launch." The perfect product launch is characterized by: creating demand and exciting the market, meeting or exceeding customer expectations, optimizing available resources, and having product available to maximize profitability.

The next step in supply chain superiority is to evolve from a supply optimization strategy to align more closely with customer demand. The best approach is an event-driven sales and operations planning process (S&OP). Event-driven S&OP is a structured process that integrates sales, engineering and supply chain. Once the internal departments are integrated, the fabless semiconductor company must rapidly expand its S&OP scope to include customers and suppliers, creating a highly visible distributed supply network.

Event-driven S&OP utilizes demand signals to synchronize supply. The more pure the demand signal, the better the results. Pure demand consists of real-time demand signals that have not been modified or changed. Real-time actual customer or consumer demand signals increase the ability of the supply network to flexibly and profitably respond. For planning, the best approach is to combine pure customer forecasts with the internal marketing plan and use the consensus process to generate the final forecast. The final forecast is then matched to supply, allocating resources based on profitability.

Pure customer demand is made up of demand signals sent in real time when customers pull products off the shelf, and through tracking sell-through activities. These real-time signals can identify customer trends and help to predict product stock-outs. Predetermined forecast and inventory tolerances are defined, and supply chain disruptions that violate these tolerances bring about the initiation of formal S&OP meetings. Real-time S&OP meetings allows fabless semiconductor companies to formulate and trigger immediate response which has shown to reduce inventories by 45 percent and decrease costs of goods sold (COGS) by 10 percent.

Segmenting the supply network provides the fabless semiconductor company the ability to respond to demand at lower cost. The supply network is segmented with inventory postponement points strategically placed. The points of postponement provide flexibility against demand variation, and two-way information flow

between customers, suppliers and the enterprise allows the supply network to take advantage of variable situations.

Emerging best practices not only share forecast and replenishment plans with customers and suppliers, but include logistics providers as well. Sharing plans with logistics providers provides visibility into the entire supply network helping to optimize transportation costs and insure on-time delivery to the customer.

The distributed supply network will enable companies to see demand with minimal distortion, incorporate multi-stage demand signals, and provide the ability to dynamically reconstruct the supply chain to address supply and demand variability.

How to Build A Distributed Supply Network

Developing a distributed supply network encompasses three key ingredients: business process improvements, a scalable and flexible technology framework, and motivation to change. Part of the motivation to change is establishing a strong customer-centric approach and supporting this strategy from the highest levels of management.

Technology – The Enabler

Critical to success is the implementation of an open, flexible and powerful technical infrastructure to run advanced business processes. The technology infrastructure should be selected based on built-in capability available with standard applications, and more importantly, the ability to rapidly implement and deploy new technology to meet changing business demands. Some specific examples of delivered functionality are support for radio frequency identification (RFID), an application development framework that leverages current available technology and applications, and one that can be implemented, maintained and adapted to new business requirements at a reasonable cost.

A practical approach to implementing an advanced distributed supply network begins with identifying and prioritizing the business process improvements. Prioritization should be based on profitability potential. Cost reduction is important; however, cost alone should not drive which business process improvements are implemented.

Once the new processes are selected, a technology infrastructure is necessary to run the new processes. A systems infrastructure that delivers functionality to run advanced supply network processes should be evaluated and selected based on its ability to deliver, presence and vision for the semiconductor and fabless semiconductor industry, and strength and financial viability of the company itself. A technology investment with the ability to deliver is defined as a systems infrastructure that provides the backbone with deep applications across all domains, as well as the capability to build composite applications across functions for process enablement.

Clean Master Data – The Foundation

From a technical perspective, prioritization of projects should include harmonization and alignment of master data within a service-oriented architecture. Most companies have disparate and redundant master data spread across systems, suppliers and customers. The basis for a solid operating infrastructure is clean and manageable master data. Implementing a service-oriented architecture provides the foundation of future business processes that can detect, identify and utilize services to provide real-time automated business processes. Service-oriented architectures deliver encapsulated services using open standards to allow for the rapid deployment of new business scenarios.

Demand and Supply Visibility – The Drivers

A demand-driven sales and operations planning process connects real-time customer demand to a dynamically responsive supply chain. An effective and well-engineered sales and operations planning process integrates suppliers and customers, providing a common platform with visibility to demand signals and available supply. Using profitability as a key metric, production and logistics resources are allocated to support the highest profitable demand at the lowest possible cost. The sales and operations planning process is automated and “run everyday,” which means the principles and plans agreed upon during the formal S&OP meetings are run order-by-order, day-by-day. When disruptions or major variations occur in supply or demand, all operational personnel know exactly how to respond based on previously run simulations of various scenarios.

A superior distributed supply network is built on visibility to uninterrupted demand, profitable allocation of resources and supply, and synchronization of product launch with supply network operations and sales. These principles serve as the foundation of a highly profitable and customer-focused distributed supply network attainable through business process improvements, executive management sponsorship, and the utilization of a cost-effective technical infrastructure capable of rapid deployment and flexible configuration to meet changing business conditions.

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Biography –

Gregory Ertel is a solution manager with SAP's High Tech Industry Business Unit and is responsible for the semiconductor industry segment. Greg has 20 years of experience in the high tech industry, including manufacturing, supply chain, software development and internal operations. Greg has a master's degree in software engineering from Regis University in Denver, Colorado.

