



DESIGN CHAIN ASSOCIATES

Avoiding Design Chain Land Mines in the High Tech Startup

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The new supply chain structure that many Electronic Original Equipment Manufacturers (EOEMs) have knowingly or unknowingly put in place by outsourcing procurement and production has not lived up to expectations. Part of the reason is that EOEMs often fail to plan their supply chains prior to the product design phase of a project. Omitting this planning, part of the Electronic System Level (ESL) "Design Chain", results in problems like these real life examples:

- **LAND MINE ONE:** A start-up brings a network switch to market that optimizes product performance but fragments the supply chain with seven different types and configurations of memories from five different suppliers.
- **LAND MINE TWO:** A start-up's first product goes into production with a single source for every component on the Bill-Of-Materials (BOM), including resistors and capacitors. This costs the EOEM several million dollars in potential sales because the product is successful, but ramp-up is severely constrained by component allocation issues. They spent nearly a million dollars more to go back and fix the design.
- **LAND MINE THREE:** Design engineers save physical space in a new storage device by selecting a single sourced ferrite bead. While placing orders for prototype builds, Procurement finds they cannot get any allocation of these unique components because the bulk of the production goes to a cell phone manufacturer. They catch the problem before production but delay time-to-market to re-layout the board for a multi-sourced replacement.

Common Design Chain land mines like these don't occur because of CAD tool limitations, PDM / PLM / ERP system incompatibilities, or lack of an internet-based

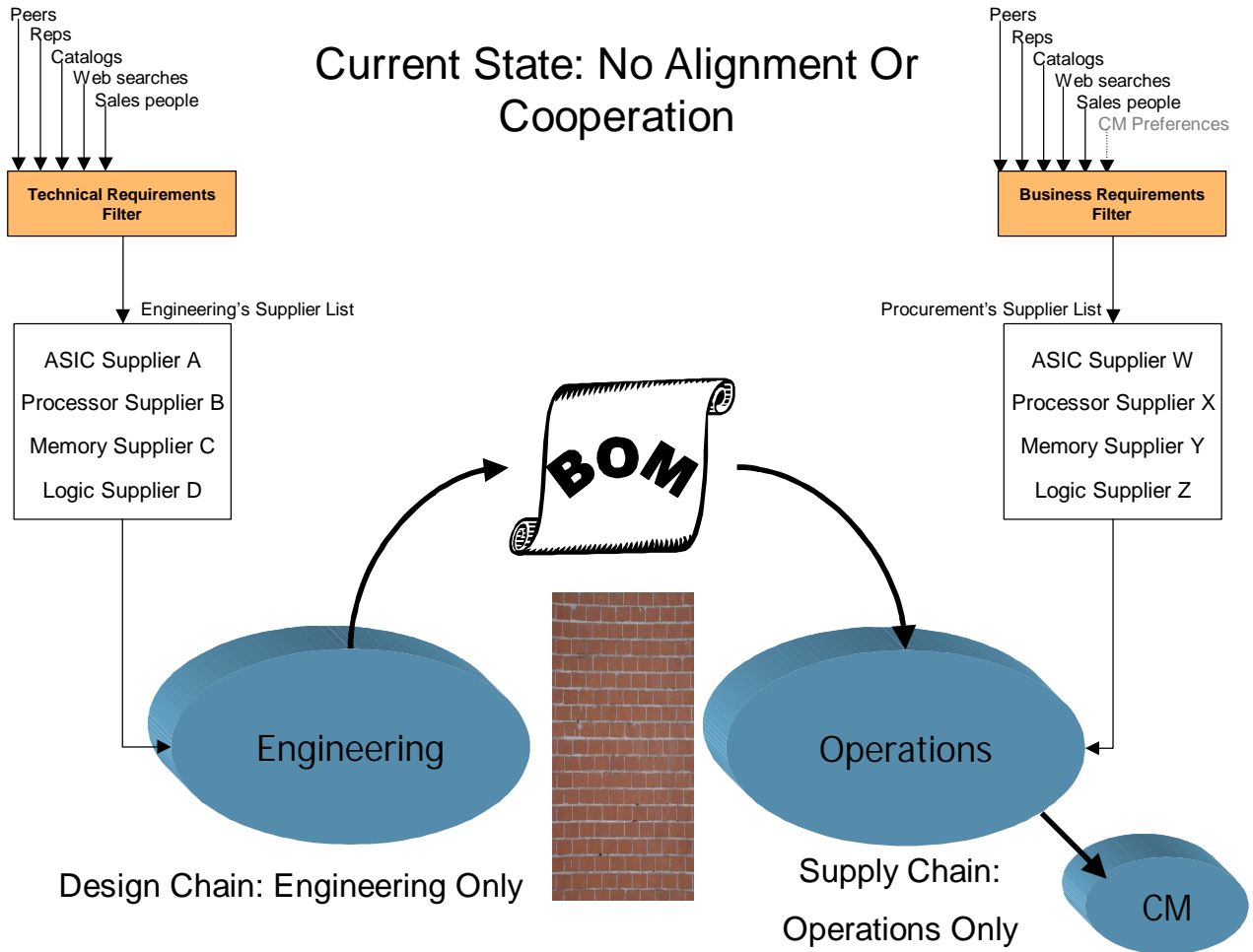
collaboration tool. Poor or non-existent business processes for managing risk cause them. When EOEMs set the course to define and develop a product, they often fail to optimize, or have a strategy to optimize, component and supplier selection. Start-ups are particularly prone to these sorts of problems because they rightly perceive their value proposition to be the product design, rather than their manufacturing prowess. Operations and production personnel are thus typically not part of the founding team, and may not be brought in until too late in the development or test phase of the product lifecycle.

Procedures are required to set the requirements for, and goals of, the collaboration required for managing the tasks of supplier and component selection, including who, when, what, why, and how. They must capture and drive the EOEM's corporate Design Chain and Supply Chain strategies and requirements for component/supplier selection, qualification, and management for new product development. Tools alone will not guide a dysfunctional development process onto safer ground.

The Design Chain precedes and defines the Supply Chain, and includes core processes, business logic, systems, and tools that span product lifecycle phases of discovery, development, launch, and ramp-to-volume. Whereas the Supply Chain deals with materials and logistics, the Design Chain deals with information and knowledge. In order to ensure that the Design Chain is aligned with the right Supply Chain requires supply chain-related knowledge to be applied during the earliest stages of product development. If the wrong supplier or component is selected and put into production, no tool will right it. For instance, if an obsolete or allocated component is used in a new design, it may indeed be obtainable but more time will be spent trying to find it or a replacement (reactive fire-fighting), more money will be spent for it (affecting profitability), and still more (engineering) time will be expended designing it out. In fact, early

identification of this problem, then selecting a different component and/or other suppliers during development would have saved both time and money. For this reason, OEM start-ups must align

their design chain practices and systems with downstream supply chain resources and requirements.

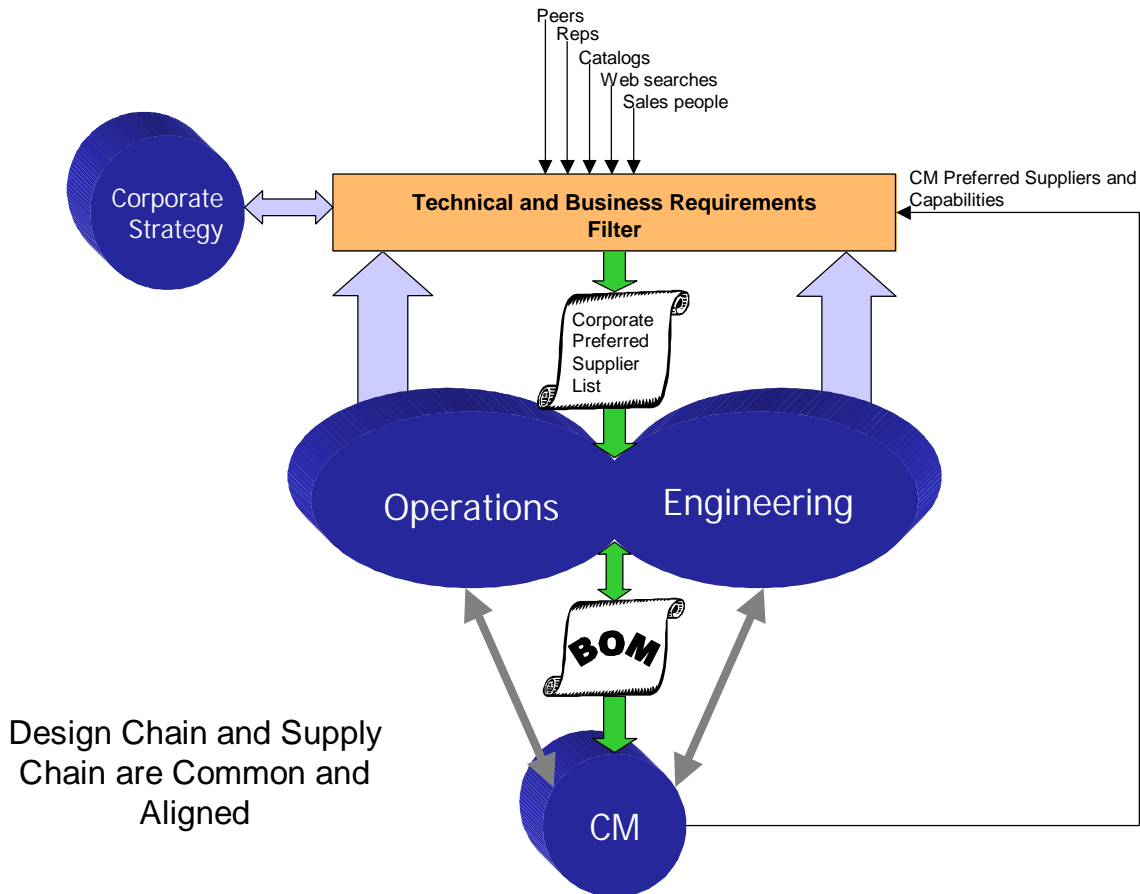


The figure above demonstrates the typical situation in a startup, and even in some mid-size OEMs. Engineering bases their supplier preference on technical requirements. Operations/Procurement bases their supplier preference on business requirements. The two sets of requirements have little overlap, so the preferred suppliers of each may be very different. This means the preferred supply chain has little to do with what is being designed, which results in problems like those described above.

On the other hand, the figure below demonstrates the preferred state of collaboration between all New Product Development (NPD) and New Product Introduction (NPI) stakeholders. The OEM creates

and maintains a preferred supplier list that takes into account technical and business requirements, as well as corporate product strategy since this too will affect supplier and component selection. With critical stakeholder organizations involved in supplier/component selection and BOM creation, risks and poor choices can be identified early and rapidly, and quickly mitigated. While this may appear to be a more cumbersome process than letting engineering do what they want, it ultimately speeds Time To Market (TTM), improves ramping capability, and reduces costs. Employing the right tools can actually improve TTM even further.

Best Practices State: Complete Alignment and Cooperation



The perceptive start-up will employ three collaborative strategic avenues to implement this vision and align Design and Supply Chains: Supplier Oversight, Design Oversight, and Component Oversight.

Supplier Oversight

- Deliberate management of the supply base in light of current and future product requirements. Making sure your supply chain is the right one for your products reduces the supply base, maximizes your leverage, and enables alignment of your roadmap with that of key suppliers. **Commodity Teams** are the industry standard mechanism for implementing this.
- An effective means of assessing supplier capabilities and, ultimately, performance, and
- Communication of the resulting preferred supply base to the product development team.

Design Oversight

- Early component/supplier selection management via collaborative/concurrent engineering and procurement involvement (e.g. "BOM Reviews"),
- Formal risk assessment and mitigation procedures, and
- Accurate and complete transcription of new component information into the company's System Of Record (e.g., PDM/CPCM system).

Component Oversight

- Due diligence for components to ensure they meet Design and Supply Chain requirements from the onset,
- Continued, accurate, and timely management of components throughout their lifecycle including methods of managing change and obsolescence, and
- Reuse management, to minimize both issuing (and therefore having to maintain) unnecessary redundant part numbers, and

selection of inappropriate existing internal parts for new designs.

Start-ups usually do not build their own products, nor do they buy the components that go into these products; the selected Contract Manufacturer normally provides these functions. Selecting the right Contract Manufacturer, and getting on a component suppliers' radar screen can be extremely difficult due to lack of a success and volume track record. This challenge is further complicated by any special support needs that the company may have (such as custom firmware drivers, etc.).

Today's OEM start-up must understand the required collaborative touch points and institute a set of business processes that establishes and

aligns corporate Design Chain and Supply Chain strategies in order to achieve the highest possible efficiencies. Alignment enables a development process that consistently results in the best component and supplier decisions for the product, company, and supply chain from the myriad of possible tradeoffs and alternatives. This, in turn, can generate robust, production-worthy, supply chain-ready products while improving time-to-market and profitability. Choosing the right tools that support these processes and your particular Design Chain, Supply Base, and Supply Chain strategies can drive substantial improvements in efficiency, collaboration effectiveness, and profitability. Setting up the right process foundation and business logic can pave the way for success.

About DCA

Design Chain Associates, LLC provides consulting services to Electronics Original Equipment Manufacturers. We focus on the Electronic System Level (ESL) **Design Chain**, which defines and sets up the Supply Chain. The Design Chain includes core processes, business logic, systems, and tools spanning product discovery, development, launch, and ramp-to-volume. We bring strategic value to our clients through "Best Practice" process and methodology guidance on supplier and component selection, qualification, and lifecycle management. We also provide other core services relating to corporate acquisition integration; "womb-to-tomb" Component Engineering support; software tool assessment and configuration guidance; and Design Chain education.