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Making the Most of NPI's: Today's Revenue Centers for Manufacturers

Competition in the electronics industry is as fierce as ever -- especially in today's gloomy economy -- making many manufacturers re-adjust their strategies for bringing products to market.

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By

Manufacturers are pulling out all the stops to truly stand out, and break away from the competition. This means doing all they can to create the next best thing: The newest and brightest product that draws the eyes of a perked up consumer.

The key to this lies with consistent, predictable New Product Introduction (NPI's) cycles, which carry much heavier weight for manufacturing success today. Innovative product launches can break open new markets, deepen and existing customer relationships -- and win over new customers -- for added revenue, profit and shareholder returns.

The Perfect NPI: A Lot Easier Said than Done

Despite the immense business value NPI's deliver manufacturers, today's product launches are more complex and prone to failures than ever before. To remain competitive, electronics OEMs are introducing products at an expanding rate to grow their business. Shorter product lifecycles are becoming the norm in many verticals, which increases the number of NPI cycles and places even more of pressure on creating the "perfect product launch" -- especially as the windows for profit and revenue making shrink, with shorter selling windows.

It just takes one small hiccup, at any point in the process, to carry the biggest financial consequences. This includes frequent quality missteps, which construct major roadblocks to realizing return on innovation. And when hard lessons learned from products past are ignored, more fuel is added to the fire -- and opportunities to enrich future product development are lost.

Anyone Can Miss the Mark

Two examples of product-launch failures lie with two of the most prominent electronic manufacturers: Palm and Motorola. Palm suffered significant financial losses back in 2001 after it

aggressively promoted a new hand-held device but encountered supply problems resulting from design challenges. Motorola, for its part, blamed a decline in fourth-quarter 2003 revenue on its inability to launch several new cell phones because of difficulties associated with supply readiness. In both cases, the lesson to be learned is that the greatest innovations may never provide business benefits if the supply chain is unable to deliver. Today's NPI's are just too brittle.

The situation leads not only to time-to-volume needs going unmet, but to the generation of a high amount of scrap and rework costs. In fact, AMR Research estimates that 65% of costs due to manufacturing problems for any given electronics product line occur in the first three weeks after release to manufacturing.

On the flip side of the coin, missing the mark on product availability can also cause disastrous financial results. Nothing's more frustrating than putting together the design and processes for a successful product introduction -- only to lose it all over simple inventory shortages.

Real-Time Data Analysis at Each Step

The new product introduction process can be seen as consisting of various steps or phases. Not all electronics manufacturers approach them in the same way due to product and internal process variations, but in general, the steps are similar across many different verticals.

Release to Manufacturing (RTM) -- This step validates the manufactured product against a design specification, prior to ramping up to full volume production. Activities leading up to this hand off include monitoring test results of the initial board build vs. a gold standard and adjusting test programs, assembly and test fixtures, correcting assembly issues, etc.

Gathering and analysis of parametric data should be used as part of the qualification process against the design specifications. The product must meet minimum functional standards at the conclusion of RTM to complete the handoff from product design to manufacturing, but yields and cycle times are typically sub-optimal. Most manufacturers perform RTM on a single production line at a single manufacturing location.

Initial Optimization -- This phase is focused on getting yields and cycle times to meet the target for full-volume production and involves heavy use of parametric data and correlation analysis to determine operational performance in many areas and adjust to the center sweet spot. Steps here should include close inspection of internal manufacturing repair data and correlation to identify poor design fits on the part of some components, design and/or manufacturing tweaks to center the performance of certain product elements, and tester or test sequence modifications to optimize performance at each test gateway in the flow of production.

Where appropriate, this hardening process can even include establishment of rules to allow dynamic optimization of the testing process, which will enable non-failing tests to fall back into sampling mode unless and until certain test criteria are violated in some specific manner. This phase can also include starting production on multiple production lines and with multiple manufacturing locations. The process benchmarks established during the RTM process at a single location can be used to get the new production lines up and running quickly by identifying and fixing process and yield deficiencies.

Once production volumes are within the target for a particular product, production can be placed into a sustaining phase, which is concerned with maintaining yields, reducing bone piles (scrap) and keeping the manufacturing line operational.

Activities can include minor modifications to the test equipment to reduce failures, increase speed of testing, modifications to support faster line change-out times and improving line layout. This

phase will generally require somewhat less parametric monitoring unless one of two situations arises: Design changes driven by either capability tweaks or warranty issues, or component changes driven by issues with component availability. Both types of changes can require re-qualification, and thus will require both operational and parametric support similar to the RTM and Initial Optimization phases.

Analysis Leads to Insight and Results

Like many efficiencies in manufacturing, better insight into NPI performance can be driven by manufacturing and process data.

For example, quality, test and process data automatically gathered and organized in a single database creates a complete quality record providing actionable analysis to be performed, improving many aspects of a product's quality and time to market. This analysis can also be used to create more efficient and faster NPI cycles for the next product.

Component quality data also plays a prominent role. It can be measured to ensure that key performance and margin specifications are verified before the production process begins, saving valuable time and money. Component quality related failures are limited to material and development time since typically low numbers of products are built during in the pilot phase of production. Rework is a normal part of the NPI process and products are not exposed to the general public, so costs and public exposure are contained. At the far end of the product lifecycle, failures and recalls of field installed products are hugely costly in light of shipping, material, labor costs and brand damage.

Manufacturing and testing data analysis identifies process and mechanical design issues early in the process. Final system testing can be performed to verify that the products designed are built and operated the way intended.

Striking the Elusive Balance

Achieving a balance between cost, time-to-market and quality is the key to success in bringing new products to market. Today's rapid rates of globalization, outsourcing and volatile customer demand -- as well as the continual push for innovation -- have placed a myriad of pressures on manufacturers' NPI processes. Delivering low cost and optimal quality products to market in shorter timeframes is no longer an option; it's a must. In the face of shrinking product lifecycles, customers want affordable products, the minute they are requested -- and they want them to work, without any deficiencies or failures.

Managing the NPI process by diligently analyzing real-time data and rapidly addressing start-up problems provides the best way to realize lifecycle quality and cost benefits, while rapidly getting new products to market -- as close as possible to the "perfect product launch."

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