

PRODUCT DEVELOPMENT

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CONCURRENT PRODUCT DEVELOPMENT AT TN TECHNOLOGIES: THE SMALL COMPANY CHALLENGE

Until a few years ago, TN Technologies' process for selecting and developing new products was extremely informal. A fairly small, functionally-organized company, the Round Rock, TX-based manufacturer designs and makes measurement instruments used in process industries. They also make portable X-ray fluorescence analyzers and flow equipment. With the old process, sales & marketing came up with an idea tied to perceived market needs and their best hunch about payoff. Engineering asked questions about specs. After sales and marketing replied (they didn't have a full-fledged marketing department) – they went to management for a go-ahead.

Assuming it was a go, engineering hit the deck running designing a product suited to sales and marketing's specs. Of course, things got added as the development process moved along. Design complete, the product was passed off to manufacturing to do a test run. At this point, manufacturability problems frequently surfaced. It was change order time. Eventually, the product got out the door.

Despite the waste, the process was adequate until TN Technologies bought two new companies, resulting in an explosion of new product possibilities. The old, small-company habit of sharing critical information around the water cooler was no longer good enough. Moreover, with the larger world zeroing in on cycle time, the need for tighter discipline was inevitable. TN decided to implement concurrent product development (CPD).

Says R&D Director Andrew Makare, *"Time to market was the buzz word then and we saw CPD as a way to help us improve on that score. We also knew we were engineering-driven and decided we needed to become market-driven. We also knew that we had created unproductive barriers between sales and marketing, product engineering, and manufacturing. We had no metrics in place to judge the worth of past projects. One might have been able to use subjective judgment. But that's all. Moving forward, we realized we didn't really have clear product development processes."*

Start With the Management Team

Working with external consultants, the entire senior management team – including finance – met every Tuesday night over pizza in the president's conference room for several months to get a clear picture of where they wanted to go, and how to get there. Makare, who had held a staff position up till then, was tapped to be CPD project leader.

Brad Goldense, of Cambridge, MA-based Goldense Group, one of the principal consultants, says Makare's inclusion was mission critical: *"If the big boys are doing strategy and the guy who's in charge of implementing is not privy to that, you've got a major disconnect. Not only was Andy in the room, but his vote counted as much as anyone else's. In fact, as the project advanced, his vote often counted more because he had more of the detail."*

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Makare says the company wanted to do four things:

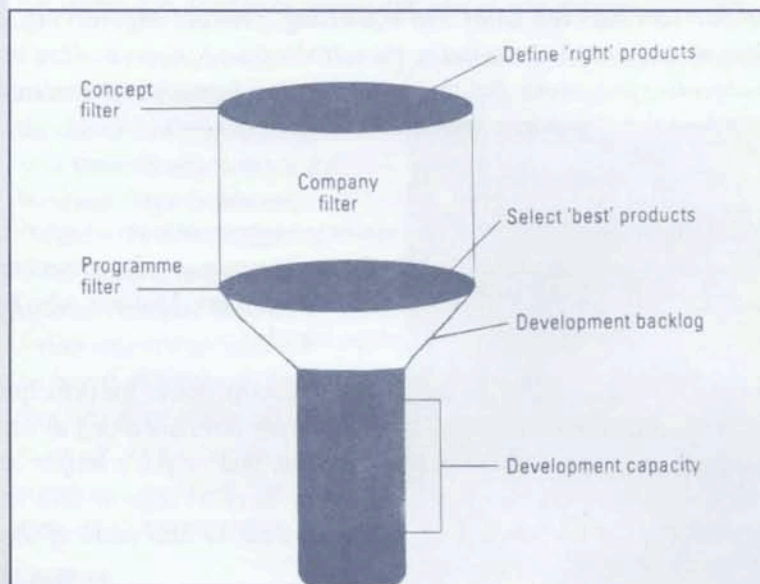
- Create and document a development process simple enough not to create a strangle hold.
- Move to multi-disciplinary team model, with team accountability for the entire product cycle through manufacturing release.
- Adopt simultaneous engineering, addressing manufacturing and development processes in parallel, moving to the factory very quickly for prototyping.
- Develop a disciplined way to gather and sift potential project information to put rigor into the selection process.

According to Goldense this first foundational step often takes longer than anyone likes. But it's a bad idea to rush the process: "*America is a do culture. The president says, 'We're going to do concurrent product development' and within two weeks half of America has a program called 'concurrent product development' complete with teams. No one's any smarter. Where's the knowledge? Because it's the president's initiative, it's anointed, gets resources, everyone pays lots of attention. So, of course, the first teams reduce their cycle time. But you can't repeat it. You didn't take the time to reengineer your process.*"

Texas Two Step: Product Filters

TN Technologies did take the time. They devised a two-step product idea filtering process as the master link of the new process chain. Step 1: Concept approval. You think you've got a good idea? Check it out against the company's business strategy to see if it fits. Step 2: Project approval. If your management team says it fits and gives the green light, form a cross-functional team and develop an A-Z development plan.

Says Makare, "*We called the first step 'filter 1.'* Before, new ideas typically came from sales and marketing. Now they could come from anywhere in the company. During this first phase, the idea champion does back-of-the-envelope estimates of a project and its



Source: Goldense Group, Inc.

potential worth to the company. If the management staff sees a strategic fit and the payback justifies going with it, we assign a team to it. They flesh out filter 2 with a thorough project plan – including a marketing plan, business plan, product development plan, and financial plan. Once they've done that, they come back to the management staff and we develop what I like to call a "contract with the staff."

This contract was a clear milestone-driven road map by which all parties can stay clear about their commitments and their process. The business case for the filtering process, says Goldense, is that it slashes major waste from the front-end of the process: *"You up your success rate on what you launch. It's common knowledge that only about 50% of all products launched succeed. So the biggest product development improvement a company can make is to get the bad ideas out up front."*

Marketing Takes the Lead With Pilot

To pilot the new CPD process, the company ran a hefty number of pending project ideas through the first filter which winnowed them down to three. They formed teams to take the finalists through the second filter phase. One team that best exemplifies the larger change TN Technologies was trying to introduce was to examine the need for a new transducer, a product that sought to leverage the core strengths of TN and those of one of the company's they acquired.

The core team included one person each from marketing, design engineering, and manufacturing engineering. The team picked the marketing person as leader, a breakthrough for the engineering-driven company. Says Makare, *"We'd had a general rule that engineers were always the leaders. But when you're trying to work with multi-functional teams, how can you get buy-in from the other functions if it's pre-determined that an engineer will be the leader? With this new model, management's job was to be to be sure the right resources were available with the right folks in the room."*

From the outset, they worked with a two-tier team model: lean core teams, supplemented as needed by a larger support team. This was dictated in part by the limited resources of a small company. But Goldense says it's also good team practice and cites research that shows that optimal core team size is no more than six; much beyond nine members it becomes counterproductive. Which functions should be on the core team depend on the situation: you want representation from those functions that are task-critical.

Collocation Can Be a Problem in Small Companies

Well-executed CPD calls for collocation of the teams. In a nutshell, team members should be housed next to each other for the duration of the project. Goldense is convinced it's critical to success: *"Studies show that you have to be within 30 feet of someone in order to have the kind of effective communication that helps your teams really drive down your cycle time. Think about it. One person is on the phone. The other one hears what's being said and can jump in real-time. No memo, no time lag."*

Yes, but...The idea quit being feasible at TN Technologies as the company went into a downsizing mode. On the one hand, Makare says the general trend in the company is toward greater collocation of everyone: even senior managers are now located with the rest of their business units. But when TN first began with CPD, they had five manufacturing engineers. Now they're down to two.

Says Makare, *"It's just not realistic to insist on complete collocation in a small company with limited human resources. When we had five manufacturing engineers, it was easier to deploy them almost full-time to product development. Even then there weren't enough to go around. We're down to two. It can't work."*

Goldense acknowledges the small-company challenge, *"If you have two product managers and 16 engineers, it's illogical to think you could collocate the two product managers on*

all the different design teams the 16 engineers might be on. Also, if you have one product manager working on three teams, ideally you would have a designated office space for that product manager in all three areas, and he or she would rotate through. The smaller the company, the more collocation begins to break down around things like people and space limitations."

Hard to Stay the Course Amidst Massive Changes

What finally happened at TN Technologies is that — measured against an ideal state — the CPD process did not sustain itself. The company was sold to a parent that challenged TN to improve their near-term profitability. The original senior CPD champion, a scientist-president with a product orientation, left; his successor came from finance. A second senior champion, a seasoned head of R&D, retired. The company was re-organized twice. There were massive lay-offs with a tendency toward outsourcing. As a consequence, in Makare's view, manufacturing lost key people — especially the manufacturing engineers — whose experience and expertise were critical to the CPD process.

In such a turbulent environment, Makare questions the viability of the reengineering effort called for by a complete CPD implementation. *"It's too much to chew on for a small company like ours, in a downsizing environment. I think for it to have a chance you need to have the resources to select some people with the right talent mix and deploy them in a skunkworks environment."*

Okay: in the rough and tumble of small company experience, the ideal CPD state might be out of sight. Where does that leave things? Says Makare, *"We got a clearer process, with more discipline. And we're adding to it, and revising as we go."*

Moreover, they now have a culture in which a senior manager's role has shifted from micro-managing day-to-day project details so that they can focus on things coming down the horizon. Says Makare, *"For projects in process, the tone has changed. Management shouldn't be about threatening people. It's really about two things: making sure teams have the resources they need to be successful, and clearing away obstacles."*

Finally, by introducing the filtering process, they have opened up the game: product development at TN Technologies, once the domain of engineering, is now theoretically everybody's business. Says Goldense, *"What's the best practice at 3-M? Anyone in the company with an idea can have a forum where their idea will be heard. What we do before that first filter is take all the rules off. Anyone in the company can bring a product concept to management."*^P_D

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Key Learnings:

- If you want to implement radical process discipline, include the key implementer as a full member in senior management strategy sessions.
- It takes longer than you'd think to get clear about how and why you want to change your process, and how you plan to do it: don't rush the process.
- The biggest product development improvement you can make is to find a way to weed out bad ideas up front.
- Collocation may be critical to concurrent product development success, but small companies with limited resources may find that they can't do it.
- By introducing a disciplined idea filtering process, a company can make product development everyone's business.