PLM Strategies in High Tech

by Michael Burkett and Heather Keltz

High-tech manufacturers grapple with the challenge of managing fast-paced innovation in an industry where nearly 70% of revenue is generated from products less than two years old and the market window lasts just 20 months. Opportunities abound for companies willing to extend their PLM roadmap to encompass non-traditional facets such as customer needs and design complexity, and to understand how these facets impact new product introduction.

This fall AMR Research surveyed 142 U.S.-based high-tech and electronics equipment manufacturers to see how they manage new product introduction and data sharing processes. Our sample consists of OEM and suppliers that operate multi-nationally. Specifically, the survey covered the following areas:

- Consumer electronics/computers (38%)
- Industrial electronics / communications equipment (35%)
- Semiconductor design and fabrication (27%)

All respondents were screened for involvement in new product development and launch (NPD&L) initiatives, and most are decision-makers at the corporate level.

Segment analysis looks at differences between:

- Product, project, and program planning (25%)
- Product development and design (27%)
- Supply chain (13%)
- IT (36%)

The target group of manufacturers report at least $750M in annual revenue, with one-half of the sample less than $5B and the other $5B or more.

Reasons for product launch failure

High-tech companies operate in a fast-paced arena where customers demand the latest products, often through new and quicker market channels. Opportunity is greatest for companies that are able to promptly integrate downstream demand data with product design to bring products to market that are aligned to customer needs.

Our study reveals, however, that the average success rate in 2008 was merely 51% for new product launches and 59% for modified or improved products. Cost issues, missed market demand, and customer needs are most often cited as reasons for failure. A drilled-down view into industry sub-segments highlights fluctuated pain points by industry type.

New product development and launch is a cross-functional process, and our survey highlights the differing levels of satisfaction across these roles. Product planners are the least happy group, especially in terms of customer needs. The top reasons for failure cited by organizational role are as follows:

- **Product planners**—Product costing/pricing (49%), customer needs (43%), late to market / missed demand (43%)

- **Product development and design**—Product costing/pricing (47%), customer needs (34%), inventory shortage or product availability (34%)
**Supply chain**—Poor commercialization (44%), poor promotion (39%)

**IT**—Product costing/pricing (41%), late to market/missed demand (35%), product quality (35%)

**Figure 1:** Why product launches fail—by industry segment

Q. What are the top three reasons why new product launches fail at your company?

*N = 142 high-tech manufacturing companies*

Source: AMR Research, 2009
Gaps in NPD&L

When examining the processes in place for new product development and launch, the top areas for improvement continue to be customer needs management and collaborative product and process development.

Comparative analysis between the importance of NPD&L processes and a company’s performance results in “performance gaps”—in other words, areas where execution falls short of expectations.

The performance gaps found in our survey show disconnect between product development and customer-, manufacturing-, and supplier-facing processes. While PLM is capable of supporting these cross-functional processes, it appears most high-tech organizations are not satisfied. In many cases PLM is seen primarily as a product development application, or deployment has not reached beyond this organization. There is also a need for PLM to extend NPD&L process support deeper into these functions.

Figure 2: NPD&L performance gaps

Q. How important are these processes to ensure successful new product design and launch? (1=Not at all / 10=Extremely important) How well would you say your company performs these today? (1=Poorly /10=Extremely well)

N = 142 high-tech manufacturing companies

Source: AMR Research, 2009
Gaps across our segment pool show that semiconductor design and fabrication companies have the greatest performance issues and report significant gaps across nearly all NPD&L processes—the highest being 28% in design execution. Industrial electronics manufacturers struggle largely with collaborative product and process development (22% gap), while consumer electronics manufacturers tend to perform better than their high-tech counterparts, with no gaps exceeding 10%. By role, the planning group again hypes dissatisfaction in the ability of their companies to meet customer and market needs (29% gap). The gap in collaborative product and process development appropriately stems from those with product development and design titles, because they are striving for streamlined product costing and synchronized product manufacturing processes through development and launch.

**Broadening the scope of PLM**

The survey indicates a narrow definition of PLM that excludes the capability to address customer needs management, including customer and market needs assessment, idea management, sample management, and support for marketing/promotion and sales planning. There appears to be an organizational disconnect as well between product development and customer demand. Our survey found only one-third of companies consider customer and market segmentation during their product development process. Yet designing product platforms that will support various markets is a strategy we see leading companies pursue. Building in such strategies provides an opportunity for companies to further expand the footprint of their current PLM processes. In fact, even though gaps exist, 90% of respondents describe their organization’s PLM processes in the top two levels of maturity:

- **Level 1 (2% of sample)**—We lack clear goals and our performance lags competitors on time-to-market and driving innovation.
- **Level 2 (9% of sample)**—Our progress is inconsistent. We are not recognized as an industry leader.
- **Level 3 (48% of sample)**—While we drive some breakthrough innovation, and products are often on time and on budget, our programs are variable and we have areas to improve.
- **Level 4 (41% of sample)**—Our products are on time to market and we lead our sector in driving breakthrough innovation.

While many companies define their PLM process as mature, large gaps remain in performance across industry and role segments. This inconsistency indicates a narrow definition of PLM within companies compared to the performance required to achieve NPD&L success. Product strategy and development execution cannot be treated separately.

Likely because of the current economic climate, our survey finds that the primary goal of PLM strategy is to improve cost management. PLM is needed now to deliver designs that offer the most important product differentiators while optimizing manufacturing and supply chain efficiencies.

Breakthrough innovation will be the primary PLM strategy two years from now when companies once again will seek premium prices for the most superior designs. Speed of iterative design cycles and commercialization will also be a primary requirement of PLM.
Q. In your organization, how important is product lifecycle management? (1=Not at all important / 10=Extremely important)
How would you rate your company’s performance in Product Lifecycle Management? (1=Novice / 10=Best in class)

N = 142 high-tech manufacturing companies

Source: AMR Research, 2009
**Measuring innovation success**

Our study also reveals a disconnect between the metrics for determining innovation success and the top reasons for product launch failure.

For example, only half of the companies surveyed measure the cost of new product commercialization, yet this was the No. 1 reason for product launch failure and is an important strategy driver. Visibility into cost information at various stages of the NPD&L process is critical and should align to performance measures.

Best-in-class PLM performers (those that rate their PLM performance in the top tier) are more likely to gauge cost metrics than average companies (56% vs. 41%, respectively).

**Figure 4:** Metrics tracked to determine innovation success

Q. What performance metrics do you track in order to determine success in innovation? Rank the top three most important metrics used to gauge your company’s success today.

*Source: AMR Research, 2009*
Managing design impact on manufacturing complexity

Our study also highlights a lack of understanding of how design impacts manufacturing. The largest manufacturing planning gap was the inability to evaluate the impact of design change decisions on the cost and complexity of manufacturing. For example, a design change could require manufacturing processes unavailable in current manufacturing locations, such as a tighter machining tolerance or a curing process for a unique composite material.

An opportunity exists for digital design and open design networks to improve manufacturing planning. Nearly 70% of best-in-class PLM organizations emphasize the need to eliminate physical prototypes and validate designs digitally. This becomes more important when evaluating design tradeoff decisions across remote design and manufacturing locations. Reducing the use of physical prototypes speeds product time to market and leads to lower NPD&L costs.

As product supply becomes more distributed across manufacturing networks, it is more critical than ever to understand a design’s impact on manufacturing capacity and capability. Advanced manufacturing planning can evaluate important techniques, such as using design for postponement to deliver more product variants to the market while maintaining manufacturing flexibility.

**Figure 5:** Benefits anticipated by reducing physical prototypes

- **Reduce time to market:** 63%
- **Reduced cost of final product:** 55%
- **Reduced cost of prototypes and early stage production:** 54%
- **Improvements in manufacturing quality:** 53%
- **Designs that better meet customer needs:** 51%
- **More time before design freeze and commitment to factory tooling:** 38%

Q. What benefits would you hope to achieve by reducing use or cycle-time of physical prototypes? Which would be most important for your company?

**N = 142 High-Tech manufacturing companies**

**Source:** AMR Research, 2009
Although current adoption of innovation networks is relatively low, our results clearly show that greater use of open design networks can improve time to market and product launch success, and reduce process gaps.

**Table 1:** Impact of open design networks

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage of designs developed using open design networks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-25%</td>
</tr>
<tr>
<td>Overall new product process (removing overlap)</td>
<td>14 mo.</td>
</tr>
<tr>
<td>Time in each stage: (avg number of months)</td>
<td></td>
</tr>
<tr>
<td>Concept</td>
<td>6.2</td>
</tr>
<tr>
<td>Design</td>
<td>8.9</td>
</tr>
<tr>
<td>Introduction/launch</td>
<td>9.9</td>
</tr>
<tr>
<td>Manufacturing ramp to full volume</td>
<td>11.8</td>
</tr>
<tr>
<td><strong>Overall process</strong></td>
<td></td>
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<tr>
<td><strong>Better success rate</strong></td>
<td></td>
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<tr>
<td><strong>Small performance gaps</strong></td>
<td></td>
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<tr>
<td>New products</td>
<td>46%</td>
</tr>
<tr>
<td>Modified/improved products</td>
<td>53%</td>
</tr>
<tr>
<td>NPD&amp;L process gaps</td>
<td></td>
</tr>
<tr>
<td>Collab. Product and Process Development</td>
<td>18%</td>
</tr>
<tr>
<td>Design Execution</td>
<td>16%</td>
</tr>
<tr>
<td>Customer Needs Management</td>
<td>19%</td>
</tr>
<tr>
<td>Direct Materials Sourcing</td>
<td>14%</td>
</tr>
<tr>
<td>Product and Process Portfolio Management</td>
<td>16%</td>
</tr>
<tr>
<td>Product and Process Data Management</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Product management gaps</strong></td>
<td></td>
</tr>
<tr>
<td>Identifying/validating business value of new product opportunities</td>
<td>11%</td>
</tr>
<tr>
<td>Developing extensions of core product platforms</td>
<td>7%</td>
</tr>
<tr>
<td>Enhancing capabilities of products installed in the market</td>
<td>16%</td>
</tr>
<tr>
<td>Introducing new-to-the-world disruptive innovations</td>
<td>14%</td>
</tr>
<tr>
<td>End-of-life planning and execution of unprofitable product variants</td>
<td>11%</td>
</tr>
<tr>
<td>Developing product platforms to share across brands</td>
<td>11%</td>
</tr>
<tr>
<td>N=</td>
<td>85</td>
</tr>
</tbody>
</table>

Q. What percent of your designs are developed using open design networks? (Open design networks is the process of using external concepts and knowledge to accelerate the innovation process) **Source: AMR Research, 2009**
Conclusion

New product launch success remains low across the high-tech industry, indicating plenty of opportunity for improvement. Interestingly, while many companies feel they are mature in their PLM implementations, they admit that PLM is still not meeting all their NPD&L requirements.

A gap exists between the scope of PLM definitions and the cross-functional user requirements of the NPD&L process. Roles outside of product development, including product management, don’t recognize PLM as an application that supports their requirements for defining and satisfying customer needs.

There is also a demand to better evaluate product design’s impact on manufacturing. There is an opportunity to educate these roles on PLM’s capability to support customer needs management and manufacturing planning. It also highlights the need for PLM providers to better understand the needs of these users and to define additional functionality that can help close existing NPD&L performance gaps.

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