

Resource & Capacity Management In Product Development

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* Welcome *

Welcome to this issue of 2PLM, an e-zine distributed every two weeks on a free subscription basis. This week's article, *Resource & Capacity Management in Product Development*, is from Bradford L. Goldense and Anne R. Schwartz of the Goldense Group, Inc. (Needham, MA).

This article summarizes results from a survey recently completed by Goldense Group, Inc. (GGI), a respected consultancy and research firm whose work we here at 2PLM have been aware of for many years now. Many 2PLM subscribers and friends participated in the survey, introduced by Brad in an article in the <<http://www.johnstark.com/2plm113.html>>August 12, 2002 issue of 2PLM.

* Resource & Capacity Management in Product Development *

Every other year, on even numbered years, GGI conducts a survey of hot topics in engineering and product development. The 2002 GGI Product Development Survey focused on "Resource & Capacity Management." A free copy of the survey can be downloaded from GGI's web site at <http://www.goldensgroupinc.com/biannual.shtml>. The 2002 Survey explored five Resource & Capacity Management issues:

1. **Loading the RD&E Capacity Pipeline** : The methods companies use to select projects and establish backlogs and priorities.
2. **Providing Capacity for RD&E Activities** : The approaches companies take to determine outsourcing requirements and the allocation of resources to sustaining activities.
3. **Balancing Cross-Functional Resources** : The resource ratios companies use between functional disciplines within RD&E, and between RD&E and cross-functional disciplines.
4. **Using Systems, Tools, & Metrics to Manage Capacity** : The infrastructure companies have put in place to enable resource and capacity planning and management.
5. **RD&E Metrics Used In Industry** : The metrics and measures companies use to plan, track, and manage resource and capacity allocation activities.



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RESOURCE & CAPACITY MANAGEMENT IN PRODUCT DEVELOPMENT

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GGI's 2002 Metrics Survey questionnaire was quantitative and targeted at advanced R&D practitioners. Many companies did not participate, as their processes were not mature enough to generate the information sought in the questionnaire. As a result the 83 respondents constituted a "self-selected sample" of advanced R&D practitioners representing the aerospace, automotive, chemical, consumer products, durable goods, electronics, industrial products, medical products and semiconductor industries. Sixty-one percent of the respondents were from public companies; the rest were from private companies.

Respondent companies were fairly evenly distributed with regard to sales revenues, with the exception of the nearly one-third of respondents reporting revenues in the \$25 million to \$100 million range. Nearly one-half (48%) of respondents were smaller firms having between 1 and 500 employees. Eleven percent of the respondents represented companies of over 5000 employees. While three-quarters sell globally, almost all develop only in North America and less than half manufacture offshore.

The key findings from analysis of the survey data are summarized below.

1. Loading the RD&E Capacity Pipeline.

Wheelwright and Clark have postulated that R&D capacity is loaded between 150% and 300% of its capacity, resulting in inefficiencies in output. More careful review should result in better product selection and improved loading. A significant majority of companies now reporting are following a rigorous project/product selection process. 80% of the firms use a 2-Step or 2.5-Step methodology, which results in only 29% of products initially reviewed at Step 1 approved at Step 2 for launch to full development.

This sharply contrasts with companies using a One-Step selection process, where 78% of the ideas are approved for development. Clearly this leads to capacity overload of the development function. One can easily conclude that a 2-Step or 2.5-Step process is far better for managing R&D capacity. For advanced development projects, a significant number of firms (49%) are even using the same 2-Step or 2.5-Step decision process.

2. Providing Capacity for RD&E Activities.

Almost everyone is contracting out some of its engineering work. 90% of the respondents report that practice, but of that total 82% outsource less than 16% of the workload. Noteworthy is the fact that only 5% of outsourced resources perform sustaining engineering.

A significant minority of firms (39%) reported that their sustaining support operations (engineering, spare parts, service) is a profitable business and that they organize selected resources to focus on those activities.

3. Balancing Cross-Functional Resources.

On average, development professionals in technical disciplines spend two-thirds of their time on new product development and one-third on sustaining engineering. Cross-functional development professionals spend one-third of their time on new product development and two-thirds on sustaining engineering. This is the result we expected, because technical development professionals are primarily responsible for new product development, while the cross-functional disciplines typically are more focused on existing products.

Based on a comparable study, in which GGI participated in 1991, cross-functional participation in the new product development process is clearly on the increase. It is no longer the domain of design engineering exclusively. Depending on the discipline the data show a 30-40% increase in time spent in new product development by non-engineering people. This holds true for Quality, Manufacturing Engineering, Purchasing, and Process Engineering. Only the Marketing function did not significantly increase its participation in new product development.

4. Using Systems, Tools, and Metrics to Manage Capacity.

With regard to systems and tools, there are few robust solutions available today for capacity management. Some 12% of the respondents took the bold step of developing a custom software application to manage capacity, while 5% attempt to realize capacity management by using a multi-project management system. Stand-alone tools such as MS Project are still the most



common. Single-user MS Project-type systems with resource data exported in a variety of ways, most popularly to a spreadsheet with no underlying project management system, are the approach reported by 62% of the respondents. Surprisingly, nearly one quarter of the respondents reported no project management system or software, resulting in no opportunity for capacity management.

With regard to metrics, just over 1/3 of the respondents have a defined set of R&D metrics (36%) while a comparable number could derive the metrics set from experience and observation of meetings, etc. Almost 1/3 (29%) cannot state what is measured. The average number of metrics in use in companies that can only derive the set is approximately 1/3 more (8.3) than where the set is clearly stated (6.4).

5. R&D Metrics Used in Industry.

Over the past four years GGI has conducted three surveys aimed at determining the commonality of metrics across companies. Only 5 measures are used by more than 40% of those reporting, reaffirming what has been observed in past years. The most common metrics (and the percentage of companies using them) are:

R&D Spending as a % of Sales (68%),
New Products Completed/Released (46%),
Current-year % of Sales due to new products released in past "N" years (47%),
Total Patents Filed/Pending/Awarded (50%), and
Number of Approved Projects-Ongoing (42%).

None of the metrics noted is unique to the R&D managers. All of the above metrics, with the possible exception of Current-year % of Sales due to new products released in past "N" years, originate from non-development functional areas such as Finance, Legal, Sales and Marketing. A great opportunity exists for the Product Development function to measure itself.

Three research reports, Highlights, Summary and Detailed Results, are available through the GGI Electronic iStore.

A complete reference is: Goldense, B. L., Power, J. R. and Schwartz, A. R., Pipeline Loading, Resource Allocation, Cross-Functional Balancing, & The Tools Involved, Goldense Group, Inc., Needham, MA, 2002.

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