

# As more companies use more R&D metrics, the “top five” metrics remain the same, according to research study

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New types of metrics are introduced into Product Development every week or month. Yet, according to this recent study by Goldense Group, Inc. (GGI), the “top five” metrics remain the same as those used by most companies seven years ago. The authors provide details of this study in the following article.

**A**lthough more companies are using more research and development (R&D) metrics these days, the same top five metrics continue to rise to the top, according to a 2004 metrics study recently released by the Needham, Mass.-based Goldense Group, Inc. (GGI). This was the fourth metrics study done by the firm since 1998.

The top metrics, as shown in Exhibit 1 on this page, were “R&D spending as a percent of sales”; “Total patents filed/pending/awarded”; “Total R&D head count”; “Number of products/projects in active development,” and “First year sales of new products.” It is not surprising that these five have remained on top over the past six years since it takes many years to sort out the “chosen few” and for practices to be adopted across industry lines.

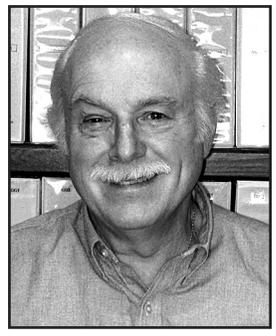
At the same time, the 2004 study reveals that companies are using many more R&D metrics than six years earlier (1998). In



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Exhibit 1: Top Five R&D Metrics in Use Today

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  1. R&D spending as a percent of sales.
  2. Total patents filed/pending/awarded.
  3. Total R&D head count.
  4. Number of products/projects in active development.
  5. First year sales of new products.

SOURCE: Goldense Group Inc., 2004 Survey

fact, over twice as many metrics—75 to be exact—are in general use, compared to only 33 in 1998. This is undoubtedly the result of the improvement in internal R&D

and NPD processes over time. As the R&D culture continues to mature, we would expect to see even more metrics in use.

**Purpose behind metrics**

Perhaps, not surprisingly, the study shows smaller changes between the use of metrics in 2002 and today (2004). The purpose of the study was to assess usage of R&D metrics in industry. Measurements of the R&D function serve many purposes from justifying R&D investment to being an overall indicator of the maturity of the function. Process maturity capability models are built on this basic principle. Competitive pressures of the 1990s and the continued globalization of product design and manufacturing by companies have increased the inherent variability of the Product Development environment. Metrics to improve business and technical monitoring are on the rise at all levels of R&D and Product Development. It appears that lots of measures are being tried out in order to find the most useful metrics. These emergent measures will then probably become adopted by a large percentage of companies.

**Structure of the study**

GGI's 2004 Product Development Metrics Survey, the study, was conducted by sending questionnaires to a wide distribution of Product Development professionals in industry in North America, Europe, and Asia. Replies were received from 202 companies, ranging from industrial and medical products to aerospace, defense, electronics, and chemicals industries. Respondents were asked to report which met-

Exhibit 2. Overall Usage of R&D Metrics in Industry (2004)

Metric	Percent of respondents reported usage
1. R&D spending as a percent of sales	78%
2. Total patents filed/pending/awarded	63%
3. Total R&D headcount	60%
4. Number of products/projects in active development	54%
5. First year sales of new products	51%
6. Percent of resources/investment dedicated to new product development	48%
7. Current-year % sales due to new products released in the past N yrs.	44%
8. First year profits of new products	38%
9. % resources/investment dedicated to sustaining existing products	38%
10. Number of products released	36%

SOURCE: Goldense Group, Inc., 2004 Survey

rics were in use in their company by choosing from a list of 75 commonly used R&D metrics. The 2004 survey was completed by respondents from April through early August 2004 and published in October 2004.

### R&D metrics usage

In 2004, five metrics are being used by more than 50 percent of respondent companies, the same number found in GGI's 1998 survey. "R&D spending as a percent of sales" is used by 78 percent of companies, followed by "Total patents filed/pending/awarded" used by 63 percent of respondents. Exhibit 3 on page 9 shows the top ten most commonly used R&D metrics in 2004 for the companies surveyed. As in prior years, the first metric listed is required for financial reporting, and the second metric is mandated by legal and regulatory requirements. The fourth metric listed is the first measure originating in the R&D department as opposed to being "owned" or strongly shared by another business function. When we compare top metrics use with prior surveys, as shown in Exhibit 3 on this page, we see more or less the same usage in 2004 compared with the results reported in 1998.

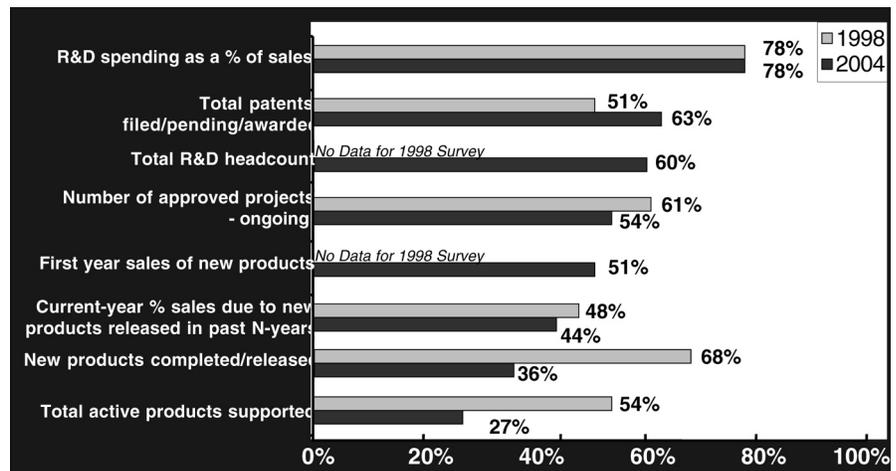
Many more metrics have emerged over the past six years. Seventy-five are now generally "in use" compared to GGI's first survey in 1998 when only 33 were generally "in use." This clearly shows that companies are experimenting with different metrics to find the best ones to measure and improve their R&D processes. As the R&D function matures and companies continue to improve their internal processes, we would expect to see more metrics in use.

### Corporate metrics versus project metrics

Project metrics are used by project or functional managers to measure project performance and/or resultant business performance of these project investments. While these metrics are numerous, they are usually not consistently rolled up to create an overall R&D performance metric. Corporate metrics, which are the focus of this research, are used to measure R&D as a whole; e.g., the overall measure at a V.P. of R&D business level. This research covered only project-level measures that were rolled up to a top-level number that is the "average of all projects." Rolled-up project measures contributed to an increase in the number of measures being used.

More corporate measures are also being tested. Increases in the use of R&D metrics as a whole are evident in the less-used metrics. In 2004, the 25<sup>th</sup> ranked metric was used by 23 percent of companies. This is a nearly threefold increase over the 8

Exhibit 3: Corporate Usage of R&D Metrics: 1998 versus 2004



SOURCE: Goldense Group, Inc., Needham, MA

percent level of usage of the 25<sup>th</sup> ranked metric in 1998. This evidence of greater usage of metrics shows how metrics have penetrated many companies; simply put, more companies are using more metrics. In 2004, each of the 75 metrics listed was used by at least one company. Usage of any of these metrics, however, still has a long way to go to becoming "standard." In the long run, a few metrics will rise to become commonplace across industry.

The lack of development of a standard set of R&D metrics does suggest some reluctance of the R&D function to measure

80 percent of R&D organizations in industry. This has been clearly seen in other business functions. Leading edge companies will embrace these new measurements early, but it will take two to five years for them to become accepted, embedded, and fully utilized. The fast following companies then adopt the new metrics over the next one to three years. This first quartile of industry generally takes up to eight years to adopt the new measurements. Two to five more years are expected for the second quartile of industry, at which point the new metrics reach the 50 percent level, a stage when benchmarking can be practically achieved. Once this occurs, software tools emerge to automate the measurement process, which drives adoption by the rest of industry. This process of R&D measurement maturation is projected to take place over the next two decades. GGI believes the rise of companies using 25 metrics from 8 percent in 1998 to 23 percent in 2004, the past six years, has largely concluded the adoption process by the first quartile of industry.

The lack of an agreed-upon, commonly-used set of R&D metrics suggests that we are still in the early stages of R&D process and measurement maturity. Legally required metrics and basic business control metrics will likely always remain at the top of the list of common metrics, but look for true R&D-driven performance metrics to surface over the next eight to ten years. The real challenge is to determine the set of metrics that correlate with business results. These will be the ones that become adopted by R&D. R&D will then move through a step function increase in business performance as has been witnessed in other business functions, and the competitive playing field will elevate once again. ▲

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itself. The high growth economy of the 1990s greatly increased R&D competitiveness, but it did not lead to the development of any "new" corporate R&D metrics, except for one in the specific area of "Return on Innovation." A number of companies are trying various calculations generally expressed as new product profits divided by R&D investment for the cumulative period of time they consider products to be new. It is encouraging to see that two measures of sales and one measure of profit have now entered the top ten metrics.

The evolution of R&D performance measurement is likely to parallel the manufacturing measurement evolution of the 1980s and the distribution evolution of the 1970s. Approximately 25-30 metrics will emerge as an accepted set that will be used by 60 to