

Driving software development through measurement

Results from PwC's Software Measurement Study

Technology Institute

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At a glance

Software has evolved to be central to most high tech products. Leading companies recognize that measurement of the R&D engine that produces that software is more critical than ever.

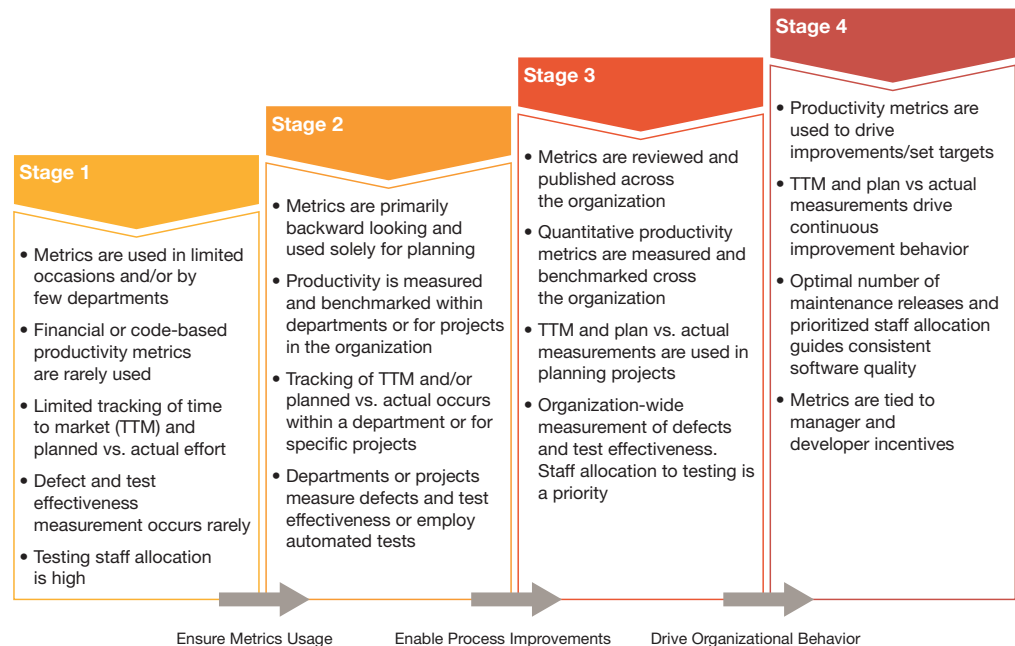


Introduction

The performance of software development teams is an area of high interest for Technology executives—especially with the increasing impact of software on the usability and functionality of high-tech products. Unlike hardware development, software is less amenable to the hard, quantitative metrics that enable side-by-side performance comparisons. The “soft” nature of software development makes concepts like content, time to market (TTM), and quality more ambiguous and, as a result, harder to measure.

PwC’s *Software Measurement Study (SMS)* was designed to analyze the current state of measurement and practices in software development environments. Thirty-one companies participated in the study, representing a range of industries, software development methodologies, and software domains. The study compared measurement practices to industry leading practices to provide an assessment of software measurement. PwC’s Software Measurement Practices Maturity Model, shown in Figure 1, served as the framework for software measurement leading practices.

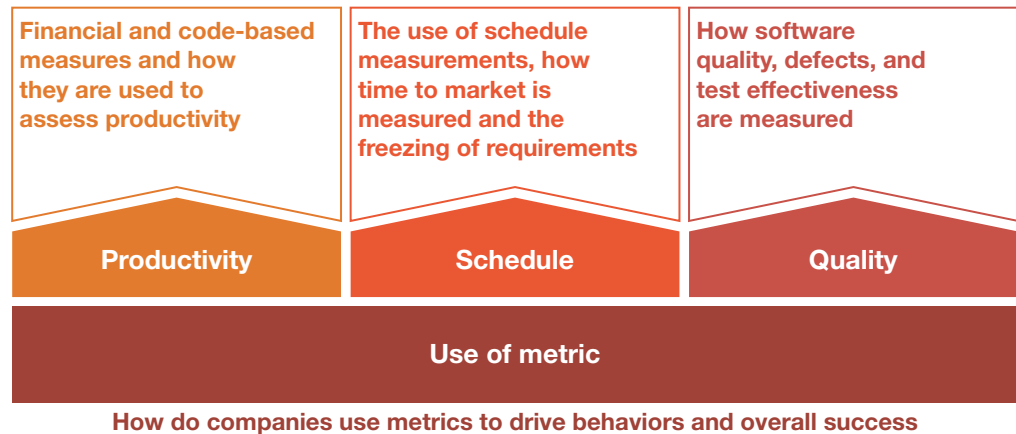
Figure 1: PwC’s Software measurement practices maturity model



Study focus

The study focused on the four main areas of software measurement shown in Figure 2: productivity, schedule, quality, and use of metrics. Key findings are included in the following section.

Figure 2: Software measurement study focus areas



Productivity

Companies use both financial and code-based metrics to gauge software team productivity. In the area of financial metrics, most survey participants, as shown in Figure 3, favored R&D as a percentage of revenue. However, there are other financial metrics—such as percentage of revenue from new product/services—that should provide a better indication of software team productivity.

In the area of code-based metrics, most participants favored easy, but vague metrics such as features and requirements delivered over more quantitative metrics like Function or Story Points (as shown in Figure 4). Furthermore, participants performed very little benchmarking—internal or external—for their code-based metrics. As a result, the value of tracking these metrics is low (a considerable percentage of companies (14%) said they do not use code-based metrics at all).

Figure 3: Financial productivity metrics

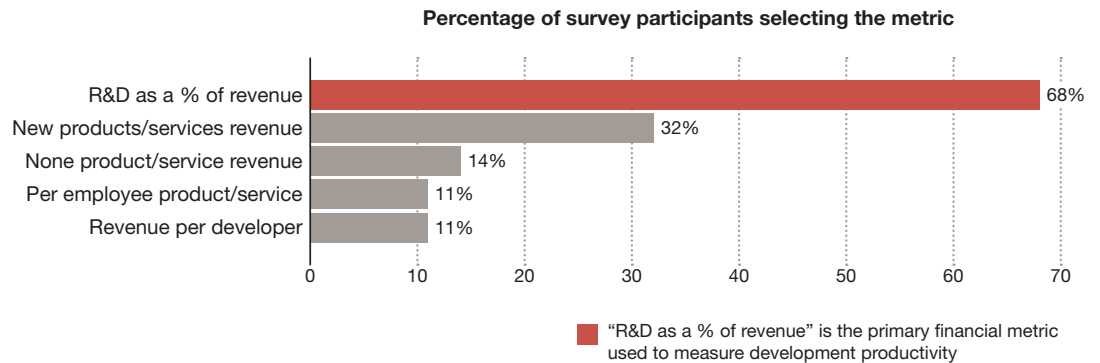
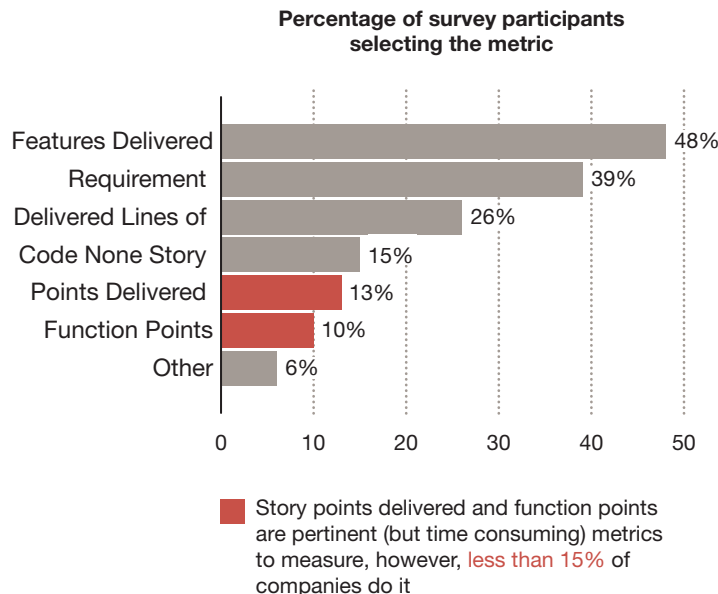


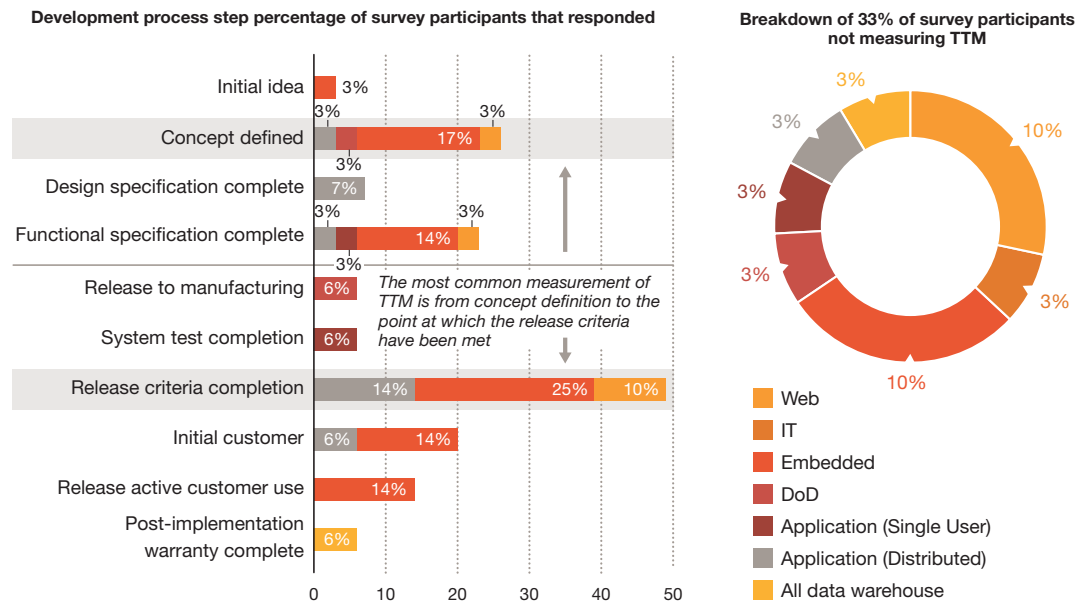
Figure 4: Code-based productivity metrics



Schedule

Measuring development schedules and TTM ensures more predictable releases and provides insight into development challenges. Despite these benefits, one-third of the companies surveyed, as shown in Figure 5, do not measure TTM. The remaining two-thirds measure the “start” of TTM as the point where the concept is defined and the “end” as the point where the release criteria have been met. While most participants measure TTM, half do not measure the predictability of their schedule forecasts. Similarly, half do not measure the predictability of the effort required to achieve those schedules. The lack of focus on tracking schedules and effort commitments is likely the cause of much of the unpredictability surrounding software development.

Figure 5: Software TTM measurement practices



Quality

Software quality is an area where the opportunity for using metrics is large, but companies often focus on too few or too many metrics. Striking a balance on the right number and mix of metrics is essential.

Two quality-related metrics in the study that were of particular interest focused on the allocation of staff. Figure 6 shows the percent of staff allocated to fixing defects. Most participants were in the range of 0–20%, but a significant number (~25%) reported that more than 40% of staff members were allocated to fixing defects. These staff members were not only working on non-revenue producing tasks, but were also fixing defects at the most costly point possible—once it was in the field.

The second metric related to staff allocation was the ratio of feature releases to defect fixing releases. Figure 7 shows the range of ratios provided by the survey participants.

Companies with a ratio above five likely have quality problems both in their code bases and in their release criteria—and are fixing those quality issues in the least cost-effective manner possible.

Figure 6: Percentage of SW staff allocated to bug fixing

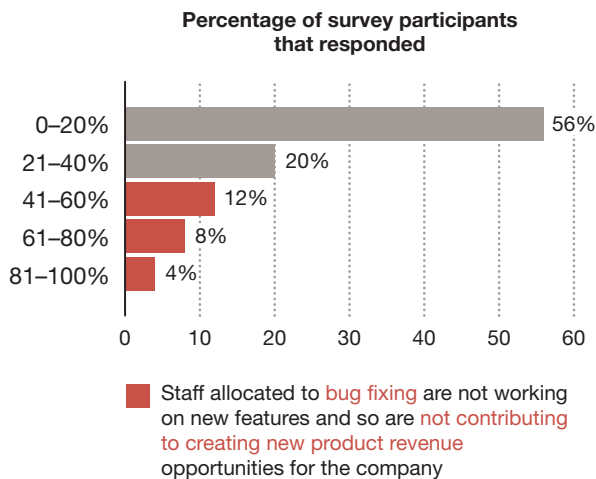
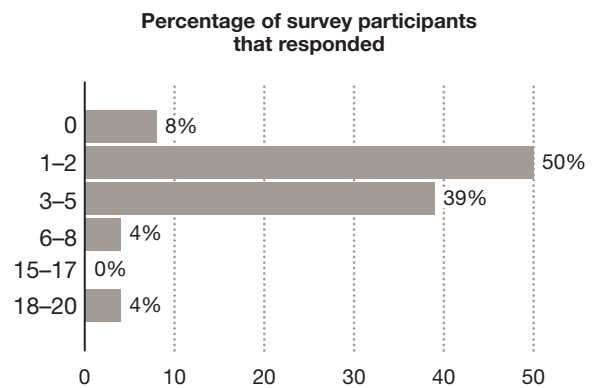


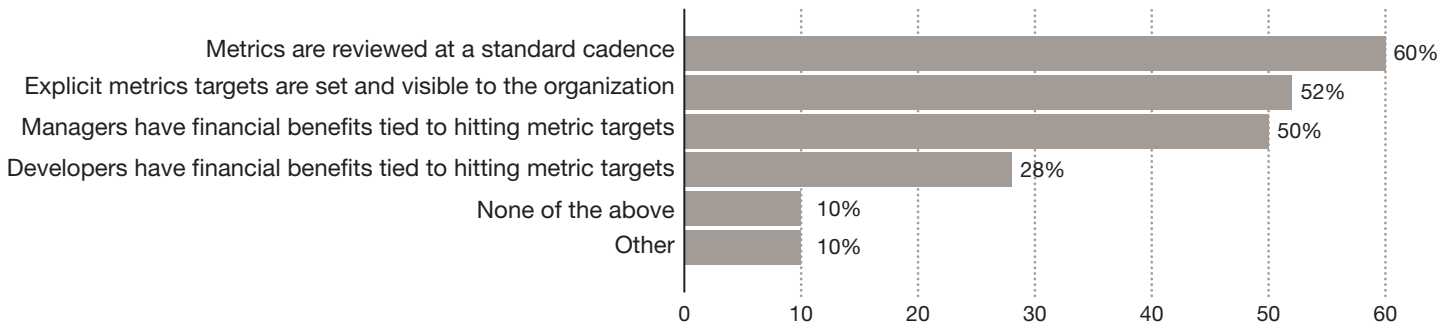
Figure 7: Number of maintenance releases per year per feature release



Summary

The results of the *Software Measurement Study* show that software development is still a practice where a “culture of metrics” has not been implemented at most companies. Many participants are not using metrics to effectively drive the performance of their software teams. Figure 8 shows that only about half of those surveyed link manager compensation to measurable performance targets, and roughly a quarter link developer compensation to similar targets. A structured approach to designing and implementing a balanced set of software performance metrics may provide software development organizations with significant benefits.

Figure 8: Use of metrics



PwC can help

A balanced set of software performance metrics provide software development organizations with significant benefits. Is your company prepared? For a deeper software measurement discussion, please contact one of our practice leaders:

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Let's talk

Please reach out to any of our technology leaders to discuss this or other challenges. We're here to help.

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