Executive Summary

Many IT projects continue to suffer from poor estimation. Indeed, the accuracy of estimation has hardly changed from that reported in a seminal study carried in 1992 by Lederer and Prasad. The full article is based in the results of two survey-based studies, which replicated and then extended the original study. The findings from Study 1, which looked at overall organizational estimation practices, are remarkably consistent with Lederer and Prasad's study, with "classic" estimation mistakes still being made—over-reliance on personal memory, use of intuition and guessing. Moreover, the common causes of poor estimation practices have changed little over the past 20 years—change requests from users, users' lack of understanding of requirements, poor problem definition and insufficient analysis prior to an estimate being made.

Importance and Accuracy of IT Project Estimation

<table>
<thead>
<tr>
<th>Importance and Accuracy of IT Project Estimation</th>
<th>Lederer &amp; Prasad</th>
<th>Study 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>The accurate estimation of IT projects is moderately/very important</td>
<td>84%</td>
<td>88%</td>
</tr>
<tr>
<td>What percentage of all IT projects significantly overrun their estimates?</td>
<td>63%</td>
<td>56%</td>
</tr>
<tr>
<td>What percentage of all IT projects significantly underrun their estimates?</td>
<td>14%</td>
<td>13%</td>
</tr>
<tr>
<td>What percentage of all IT projects are completed at cost close to estimate.</td>
<td>23%</td>
<td>31%</td>
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The findings from Study 2, which looked at project-level data, are slightly more encouraging. They indicate that contemporary practices, including Agile development methods, seem to be making some headway toward improving project success. Interestingly, most projects met their stated requirements, produced usable products and services, and improved organizational value, leading to a high overall stakeholder satisfaction rating. However, somewhat paradoxically, most of the projects were late and many (40%) were over budget, reiterating the need for better time and cost estimation. Thus, today's "typical" project can be characterized as a "successful failure."

Why Estimates Matter

Accurate estimation is very important to IT project managers for the following reasons:

- **Avoiding the vicious cycle:** poor estimation results in more schedule pressure, which in turn creates more stress, producing more mistakes, and ultimately more schedule slips, creating even more schedule pressure, and so on.
- **Avoiding the ripple effect:** slippage in one project’s completion date can have a ripple effect on other projects and stakeholders throughout the organization. Effective organizations require a portfolio projects, and better estimation leads to better coordination with other tasks and projects throughout the portfolio.
- **Avoiding late-in-the-project discovery** that the project has been underestimated, which is difficult, if not impossible to correct.

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1 The full article is published in the March 2014 issue of MIS Quarterly Executive, available online at www.misqe.org.
Facilitating better budgeting: accurate budgets depend on accurate estimates of size, effort and time.
Evaluating project personnel: compensation is often tied to project performance.
Generating more credibility for the project team: being part of a team that brings a project in on budget and schedule can do wonders for an individual's career, not to mention job satisfaction.

Ten Guidelines for Improving IT Project Estimation

Based on the findings of our studies, the full article provides detailed guidelines for improving IT project estimation, taking account of the greater use today of Agile, rather than traditional Waterfall, development methods. In summary, the ten guidelines are:

1. **Admit You Have a Problem.** While there have been tremendous advancements since 1992 in the project management discipline, technology, IT development processes and the education level of IT professionals, it is clear that developing accurate estimates continues to be a huge problem.

2. **Revisit The Prescriptions Offered by Lederer and Prasad.** Many of Lederer and Prasad's prescriptions can be adapted for today's IT development environment, even though the increased use of Agile methods is now more prevalent. Specifically:
   - Assign the initial estimating task to the final developers
   - Delay finalizing the estimate until the end of a thorough study of requirements
   - Monitor project progress closely—including actuals versus estimates
   - Rely on documented facts, standards and simple arithmetic formulas rather than guessing, intuition, personal memory or complex formulas to generate the estimate.

3. **Conduct Project Retrospectives.** Project teams should be encouraged to perform status reviews throughout the life of a project.

4. **Employ Estimation Tools.** The use of estimation tools (e.g., software packages) was relatively low in both of our studies. Estimation tools can help to:
   - Evaluate and sanity-check project plan alternatives against industry data or an organization's historical data
   - Negotiate a reasonable schedule and budget, using a tool's reporting capability
   - Coordinate estimated and actual project data within and across project teams.

5. **Adapt Estimation Techniques for Agile Approaches.** It is critically important that project managers understand Agile development methods and how traditional estimation techniques can be adapted to fit them.

6. **Avoid Cognitive Biases Toward Estimation.** People are subject to an almost limitless set of biases when making subjective judgments or decisions, and the process of estimation is no exception. The most common ones, which are explained in detail in the full article, are the underestimation bias, the planning fallacy, wishful thinking, the self-serving bias and the focalism bias.

7. **Understand the Estimate-Convergence Graph.** Also known as the “cone of uncertainty,” the estimate-convergence graph is predicated on the idea that project estimates fall within predictable ranges at various stages of a project. Project managers should be asked include a “cushion” in their estimates, with the cushion decreasing as a project progresses.

8. **Understand the Difference Between a Target and an Estimate.** Estimates are arrived at based on careful analysis; targets represent a desired schedule or cost and are set without any analysis. Project managers should be encouraged to set targets within a reasonable range of an estimate and delay making a firm commitment for as long as possible.

9. **Manage Stakeholders.** Stakeholders play a critical role in defining project requirements, setting targets, changing requirements and exerting pressure on the project team throughout a project. Project teams therefore need to find ways to effectively involve stakeholders throughout a project.

10. **Develop Estimation Competencies of Project Managers and Team Members.** Project managers should look for opportunities to develop and hone their estimation competencies and those of project team members. Ample opportunities for such training exist and project managers who continue to ignore them do so at their own peril.

Many of the deficiencies in current projects can be traced back to poor estimation, so there is clearly room for improvement in estimation practices. The guidelines we have provided will help IT project managers reverse the trend so that the estimation problems identified by our studies do not continue for another 20 years.