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Managing Software Development

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The goal of any software development project is to produce a product that is delivered on time, within budget, and with capabilities expected by the customer. Unfortunately this goal is rarely achieved. If you understand the difficult challenge of the task, you will be less than surprised that one third of all major projects fail. They are usually stopped after big financial overruns, sometimes years after the original optimistic completion dates have been missed. However, a properly managed project, in a mature software engineering environment, managed by a competent manager, can repeatedly deliver a software system on time, within cost, and satisfactory to the user.



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Knowledge

Software Development is a knowledge-intensive activity involving the integration of diverse knowledge sources that undergo constant change. The knowledge required to successfully develop software system ranges from programming methods to the critical role of application domain knowledge and the diverse nature of software development processes and techniques. In addition the knowledge is under constant pressure from fluctuating requirements and technology advances, causing knowledge volatility and further pressures on the knowledge mastery burden.

Projects Gone Bad

Software Development projects can go bad any number of ways. This paper will mention some of the most common, but these don't even scratch the surface. See below for the most common problems which result in project failure.

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Management



The fundamental definition: “Management” is **accountability** for results, **authority** over resources, and making decisions based on **judgment**.

Managers are responsible for allocating resources, and they often look to the developers for resource requirements. If they assign inadequate resources the project will most likely slip or fail. Any number of problems can arise when management is not given information necessary to make good decisions, or when management fails to participate in the development process.

- **Mis-delegation** – assigns responsibility of the project to people who may not have sufficient authority and experience.
- **Management does not participate fully** – upper management does not want to be bothered with intermittent work, or, review of the project suggests a serious problem. If a project is important, upper management needs to make time to become involved.
- **Not tapping into the knowledge base** – Often times this is required of the highly skilled, knowledgeable individuals who are actually making the business run. These individuals are often legitimately too busy with real ongoing work to participate in the project, yet their participation is vital to the project’s success. Not budgeting time in their schedules for the project is a common problem.
- **Not looking at the whole project until it is too late** – Sometimes, design of some features are placed on hold until it is time to implement them. Often the project is already behind schedule causing a quick implementation that results in poor functionality and poorly written software.

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- **Failure to enforce discipline** – Documents need to be signed and reviewed. Often times those responsible for signing and reviewing the documents do not do so properly or delay the review time until it is too late to make changes to the current project, therefore forcing changes and delays to the project.
- **Not monitoring project progress**
 - The “99%” complete syndrome has burdened many projects, with a greater expenditure of time and money occurring after “99%” of the work was reported complete. Accurate report completions should be made to avoid this illusion of being almost done.
- **Failure to make appropriate decisions** – Often management attempts to paint a pretty picture to executives by delaying some fixes to known problems. Near the end of the project, a lot of these delayed problems must be corrected resulting in delayed schedule, and, in some cases, the software must be completely re-written depending on how many problems were ignored.
- **Failure to address known problems honestly** – Often management describes known problems as minor when in fact they should be considered major. This results in having lots of minor problems that need correcting near the end of the project, only to find out that most of them were major, causing project failure.

Must Know Assumptions for Management Development methods should recognize the following difficulties:

- 1. It is not easy to find high-quality developers.**
- 2. It is not easy to integrate developers into unfamiliar practices, particularly when it does not represent a long-term investment for the developer.**
- 3. It is not easy to measure other developers' progress on a project. And only experienced developers can give accurate estimates of time required on their own projects.**
- 4. It is not easy for a customer / requester to explain what he needs, and it is not easy for a developer to understand.**
- 5. It is not easy for many developers to work together on a single project.**

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Planning

Larger and longer projects require more planning than smaller and shorter projects. Some development methodologies are extremely valuable, while others are mere pipe dreams. Here are some clues to tell you where things might be headed.

- **Failure to plan training or implementation** – The main focus is to complete the project but user training and implementation is often overlooked until it is time to do so, resulting in inadequate planning or schedule delays.



- **Failure to plan on having staff responsible for system maintenance, especially if it's pieced together with 3rd party software** – Some features or 3rd party software require maintenance, whether it's a log file that needs to be deleted or a database table that needs purged. Often this is overlooked and suddenly there are no resources to maintain the system or funds have been exhausted.
- **Vapor test plans** – No plans on validation until the project is near completion thereby delaying the project and possibly missing many software anomalies that would have otherwise been caught.
- **Surprises by technology changes.** – Software no longer compatible with the latest technology causing your product to be obsolete and in order to compete you need to develop a new product all over again.

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Outsourced Developers

Unless you know the reputation of the outsourced developer you're using, you may be in for the ride of your life. Outsourced developers tend to do many things just to get a contract. Short-term per hour savings can be extremely expensive in the long run. Below is a list of the most common problems with outsourced developers.

- **Lying about experience** – They claim to have extensive experience with your solution when in fact you learn, too late, that they have none.
- **Failure to communicate** – Some may get outsourced developers from overseas and even third world countries. The language barrier can be a big problem and the lack of communication due to distance is not something to ignore. By the time you regret the decision to outsource overseas, it will be too late.
- **Failure caused by other development projects** – Some outsourced developers try to get as many contracts as possible from the same company only to share their in-house resources between projects. When one project is overdue, then another project will have to be put on hold. In the end all projects will be late or complete failures.

Recommended Reading:

**The Mythical Man Month,
Frederick P. Brooks Jr. –**

Very dated and points to the obvious, but is a widely read point of reference. This book should be in every managers' library and read once a year.

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Summary

The best way to manage your software development project starts by assigning a Project Manager, whether inside or outside the company, that has extensive experience managing both large and small software development projects.

This person should have complete control of the resources allocated. It is often the case where the Manager assigns a task to a developer and, for whatever reason, it is not a priority for the developer, resulting in a delayed schedule.

The biggest mistake managers make when there is a tight deadline is to throw many programmers into the task.

The best way to think about this is to consider a pregnancy - no matter how many women you throw at it, it still takes 9 months.

Adding programmers to the already delayed project is often counterproductive and causes further delays instead of bringing the project back on track. By having a complete plan, being honest and upfront, and not piling up things to do later in the project, you will be able to make the appropriate decisions when it becomes necessary. Furthermore, it will help you meet or be near the deadline and not give a false sense of completion.

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