CHAOS:

A Recipe for Success

"It doth often trouble me to thinke that in this business we are all to lerne and none to teach."

—Deacon Robert Cushman of Canterbury, 1620

Corporate America spends more than $275 billion each year on approximately 200,000 application software development projects. Many of these projects will fail, but not for lack of money or technology; most will fail for lack of skilled project management.

The opportunities for project failure are legion. Large-scale software development efforts are conducted today in complex, distributed IT environments. Development occurs in a fragile matrix of applications, users, customer demands, laws, internal politics, budgets and organizational dependencies that change constantly. Project managers who lack enterprise-wide multiproject planning, control and tracking tools often find it impossible to comprehend the system as a whole. Underestimating project complexity and ignoring changing requirements are basic reasons why projects fail. Under these conditions, "software project management" is an oxymoron.

Moreover, software today must not just automate processes; it must create business value by improving customer service or delivering competitive advantage. Return on Investment (ROI) raises the stakes of every large-scale development project: software must have a measurable impact on a company's bottom line.

Finally, urgent multi-project, multi-site undertakings like Y2K, Euro conversion, ERP, and the rush to the Internet add to the daunting development burden.

For all these reasons, the business case for adapting project management disciplines to large-scale software development is obvious. There is simply no other way, but implementation is dicey.

Project management is a process that spans the full lifecycle of a project, from inception to completion. Its cornerstones are planning, execution and control of all resources, tasks and activities necessary to complete a project. Project management is not an isolated activity, it is a team effort. In the end, project management is about people and process—how work is being performed. The four "P"s of project management are People Performing Perfect Process.

Project management is gaining traction in IT organizations and the results are encouraging. Failure rates are down, costs are down, and success rates are up. Large companies are taking a small approach to project management. Minimizing means scaling down features/functions along with minimizing scope. IT organizations are adopting standard project methodologies or building enterprise-level formal project management disciplines. This level of activity is quite a change.

For years project failure simply was not discussed, certainly not with the CEO. But 1996 was a watershed year, when IT project management finally acknowledged the cost, size and scope of the problem, and discovered that there was no silver technology bullet. Technology was neither the problem nor the solution.

The problem — and the solution — lay in people and processes. Valuable lessons were learned and were being applied to current projects. Project management developed better processes, organized teams more effectively and dealt with problems faster. Smaller, less complex projects were developed. Troubled projects were euthanized quickly, rather than lingering on to become late, over budget, reduced function skeletons of their original plans. The advent of professional project managers enabled mitigating project risk through scope minimization, standard infrastructures and improved communications.

History is replete with examples of ambitious projects that failed. Failure is a natural and necessary consequence of innovation; and innovation is key to progress. The Standish Group believes that failure is critical to success. Only by examining our mistakes and applying the lessons learned can one stem the tide of project failures and enhance an organization's probability of success.

PROJECT RESOLUTION: THE 5-YEAR VIEW

The body of the five years of The Standish Group's CHAOS research shows decided improvement in IT project management. Project success rates are up across the board, while cost and time overruns are uniformly down.

The best news is that project management is succeeding more often. In 1994, only 16% of application development projects met the criteria for success — completed on time, on budget and with all the features/functions originally specified. By 1998, 26% of projects were successful.

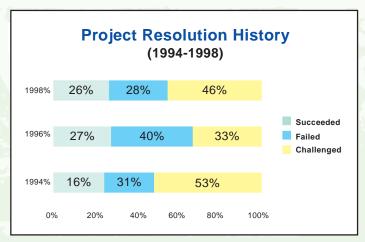The Standish Group classifies projects into three resolution types:
- Successful: The project is completed on time and on budget, with all features and functions as orignally specified.
- Challenged: The project is completed and operational, but over-budget, over the time estimate and with fewer features and functions than initially specified.
- Failed: The project is cancelled before completion.

Project Resolution History
(1994-1998)

Project success rates are rising. As shown in the resolution of the 23,000 applications projects in large, medium, and small cross-industry, U.S. companies tested by The Standish Group since 1994.

The Standish Group believes three factors explain these encouraging results. The first is a trend toward smaller application development initiatives. (Our research has shown smaller projects are consistently more successful because of reduced confusion, complexity and cost.) Certainly better project management and greater use of standard infrastructures are also instrumental.

Smaller projects have another benefit. Because they are easier to manage and contain, smaller projects experience fewer time overruns. CHAOS '98 data shows that from 1994 to 1998, the percent of applications completed 200% over the estimated completion time fell from 12.3% to 2.5%. Even more impressive, the percent of applications that took under 20% longer than estimated for completion tripled, from 13.9% to 41.1%.

The cost of failed projects decreased from $81 billion in 1995 to an estimated $75 billion in 1998. Even more dramatic was a major shift in cost overruns from $59 billion spent in 1995 to an estimated $22 billion in 1998.

Despite this progress, The Standish Group cautions that challenged and failed projects — and their staggering costs — remain the norm. CHAOS reigns.

Project Success Rates Rise, Costs Fall (1994 vs. 1998)

Company Size	Success Rate '94	Success Rate '98	Project Cost '94	Project Cost '98	True Delta
Large	9%	24%	$2.3M	$1.2M	-65%
Medium	16%	28%	$1.3M	$1.1M	-41%
Small	28%	32%	$0.4M	$0.6M	-4%

Average project costs have fallen in large and medium companies. Only in small companies did project costs rise, by 50%.

More projects are having successful results in all companies, but improvement has been most dramatic in large companies (over $500 million). For example, in 1994 the chance of a project developed by a Fortune 500 company coming in on time and within budget was 9%. The average cost of a Fortune 500 project then was $2.3 million. In 1998, the chance of that same Fortune 500 project succeeding rose to 24%, and the average project cost fell to $1.2 million. During the same period, 1994 to 1998, medium companies also posted higher project success rates and lower average project costs. In small companies success rates rose, but so did average project costs — by 50%.

THE 3 PILLARS OF PROJECT SUCCESS

The Standish Group believes three key metrics can pinpoint a project's success potential: project size, project duration and team size.

Size matters. CHAOS research confirms that small projects are more likely to succeed than large projects.

As project costs rise, typically through the addition of features and functions that are rarely or never used, the likelihood of success falls.

Although one school of thought would argue that larger projects with more funding and resources should be more successful, and should produce more function, the reverse appears to be true. Smaller projects tend to be more manageable, and it's usually easier to ensure they meet the CHAOS Ten success criteria. Simply throwing more money at a project is no solution.

We have long been convinced that shorter time frames, with delivery of software components early and often, increase the success rate. Shorter time frames foster an iterative process of designing, prototyping, developing, testing and deploying small elements. "Growing" (instead of "developing") software engages the user earlier and confers ownership. Because each software component has a precise statement and set of objectives, realistic user expectations are set.
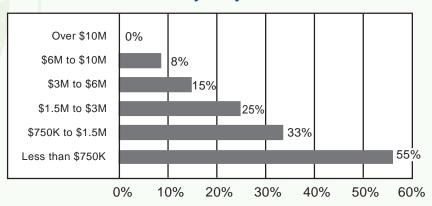
Certain industries breed success. The Standish Group's CHAOS research shows that in 1998 the retail industry had the highest project success rate (59%)—almost twice the success rate of the financial sector (32%), more than twice that of the manufacturing sector (27%), and three times that of government projects (18%). Of all industries, retail also had the fewest challenged (28%) and failed projects (12%).

Success by Project Size

Project Size	Success Rate
Over $10M	0%
$6M to $10M	8%
$3M to $6M	15%
$1.5M to $3M	25%
$750K to $1.5M	33%
Less than $750K	55%

Small is beautiful. Projects costing less than $750,000 are more successful than any others. Project managers should realize at the outset that the more expensive a project becomes, the less likely its chance of success.

We believe the retail project success rate is a function of that industry's tight cost controls. The low-margin retail industry cannot tolerate waste. The government, on the other hand, faces no such challenge.

Company size does not guarantee success. The Standish Group has found no correlation between a company's size and its project success rate. As with project size, bigger is not necessarily better. While large companies (over $500M) do experience more failures and fewer successes than medium companies ($200M-$500M), project failure rates are generally distributed quite uniformly across companies of all sizes. Project failure is everyone's problem.

Another way to look at project resolution is to compare the value of successful projects with the waste of challenged and failed ones. Along with improvements in time and cost overruns, companies' waste to value ratios have improved substantially. In 1996, CHAOS research found 50% waste in IT projects. By 1998 the data identified only 37% waste.

Project Duration, Team Size Affect Project Success

Project Size	People	Time (mos.)	Success Rate
Less than $750K	6	6	55%
$750K to $1.5M	12	9	33%
$1.5M to $3M	25	12	25%
$3M to $6M	40	18	15%
$6M to $10M	+250	+24	8%
Over $10M	+500	+36	0%

The smaller the team and shorter the duration of the project, the greater the likelihood of success. Obviously, this does not suggest that compressing the schedule and reducing the resources of a large project will make it successful. Nor should it be construed that large projects with large teams cannot be successful. The Standish Group believes any project can be successful if all the key criteria are met.

CHAOS Ten

User Involvement	20 Points
Executive Support	15 Points
Clear Business Objectives	15 Points
Experienced Project Manager	15 Points
Small Milestones	10 Points
Firm Basic Requirements	5 Points
Competent Staff	5 Points
Proper Planning	5 Points
Ownership	5 Points
Other	5 Points

RECIPE FOR PROJECT SUCCESS: CHAOS Ten

The three biggest contributors to project success are user involvement, executive support and a clear statement of business objectives. Together they account for 50% of a project's chances for success. Bring on board an experienced project manager, and the chance for a successful resolution rises to 65%. The number one contributor to project success is user involvement. Not surprisingly, the absence of user involvement is a major cause of project failure. Even when delivered on time and on budget, a project can fail if it does not meet users' needs.

Participants in The Standish Group's focus groups conducted in 1998 were virtually unanimous in citing increased user involvement in the project planning stage as the most notable change in application development over the past two years. Participants recognized the benefits of early and continuous user involvement. When users are actively involved in planning, IT cannot second-guess them. Users who are fully engaged in design, implementation and testing feel a deeper sense of ownership.

Validated in The Standish Group's research results and focus groups, the CHAOS Ten success factors continue to be a valuable tool to assess project success potential. While there is no magic formula that can guarantee project success, ensuring the presence of the CHAOS Ten can increase the odds in one's favor.

Better Project Management Through Communication. The Standish Group has compared project success with a three-legged stool. One leg is communication. The other two legs are scope minimization and standard infrastructure.

Standard Infrastructure. Requirements are in a state of constant flux, but the infrastructure needs stability. The Standish Group's research shows that seventy percent of application code is infrastructure. Some of this code is unique to the application; nonetheless, much of it is code that could be purchased from an infrastructure vendor. By using standard infrastructure, the application development team can concentrate on business rules rather than technology.

Many application development projects fail not in the development of the stand-alone application, but in the integration of existing applications. Here standard infrastructures can shortcut application integration.

The Standish Group estimates that by the year 2000 the people of this earth will generate 100 million transactions every second. World businesses currently have over one million business-critical applications in place. Every five years the number of mission-critical applications doubles: more transactions, more applications, and more interfaces. This, of course, does not include the number of applications the enterprise may need to integrate with other companies and partners.

The Triad of Project Management

What has become clear since 1996 is that people and process have a greater effect on project outcome than technology. Through a series of multi-city focus groups and workshops at CHAOS University ® '98, The Standish Group set out to explore the proper roles, responsibilities and relationships of project stakeholders.

These stakeholders include the Function Representative, Executive Sponsor and Project Manager. We wanted to know what qualities and characteristics each stakeholder should possess, as well as what kinds of executive behavior might detract from a project's success.

The relationship between the project manager and the business and technology stakeholders is shown in the chart below. In the ideal triad, the project manager is the lone interface between the business and technology sides of the company.

Function Representative: The Business Person

The function representative knows the business of the corporation better than any other member of the team does. This person is in an executive position, but has the knowledge to drill down into all key user departments for the essential details about how the organization works. The function representative also knows the expectations, doubts, fears and previous negative experiences of the user community.
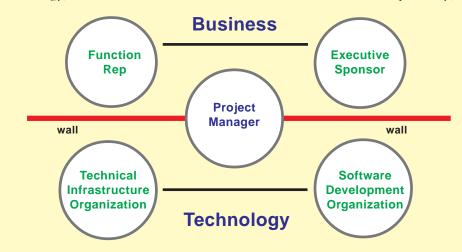
The most important task for the function representative is goal definition, which is twofold. First, the function representative must take a detailed snapshot of the organization at the moment before project planning commences; then he or she must have thorough understanding of what the user organizations want tomorrow. These will help build the project goals. And the

business person must also be in charge of milestone recognition, an ongoing task to chart ongoing progress.

The Function Representative should be the "Operations Person". Operational knowledge is important to the function representative, who must be able to answer operational questions. His/her role must be defined with clear responsibility and clear ownership, but also with a limited scope of responsibility (the user representative is NOT the executive sponsor). The function representative does not own the technology, does not control or schedule

project resources, and does not determine the project approach. But he or she does speak with a loud voice for all user departments.

The Function Representative should be the "Minuteman". The function representative can be most effective when using physical separation of regular work assignments from those on the project management team. Physical separation, such as a different workspace, encourages mental compartmentalization and focus on the project dynamics.

The function representative is the team's subject matter expert and as such best qualified to become the project's evangelist — selling the benefits of the project internally to the user community.

Like Paul Revere, the function representative can rally the troops.

The Function Representative can be lead astray. There is a constant potential for overlap or conflict with the project manager. The tendency of the function representative is to exceed his or her authority and to devise potential solutions or suggest deployment of certain technologies. Neither of these is within the responsibilities of the function representative, whose contribution is to explain and reinforce the user's requirements, and to keep the project focused on them. Most importantly, the function representative must emphasize the business value of the project, not technology implementation.

The Function Representative should be "Sherlock Holmes". Elementary as it may seem, the function representative must be prepared to explain the business process in detail to the IT organization. He/she must be trained to follow the project management process and might need a business analyst assigned to work with him/her.

The Function Representative should be the "Cheap Date". The function representative should be encouraged to set realistic expectations, be involved from the start and recommend prototyping.

The Executive Sponsor: Project Champion

The executive sponsor provides the vision for the project. Often the executive sponsor provides the funding and some of the major resources, as well. When choosing a sponsor, it is crucial that the executive have a vested interest in a successful outcome.

To ensure this interest, answer the following questions:
- *Is there clear understanding of what will motivate the executive?*
- *Have the political issues affecting the executive been identified?*
- *Can the executive afford to have the project fail?*
- *Will the executive gain stature from a successful project?*

Once a project has the backing of the right executive sponsor, it's vital to encourage positive and discourage negative traits. Our CHAOS University® participants identified the following ways to accentuate the positive:

The Executive Sponsor should be "The Visionary".
An executive sponsor should have a global view of the project, how it supports corporate goals and benefits the organization. The executive sponsor should set the agenda, arrange the funding and articulate the project's overall objectives.

The Executive Sponsor should be the Project's Champion.
The project should live and die by the executive sponsor. IT can encourage the executive sponsor to champion the project by supplying full disclosure and minimizing blindsides, having well defined goals and milestones, and focusing on business rather than technology issues.

The Executive Sponsor should be a "Minesweeper".
An effective executive sponsor should positively reinforce the winners and neutralize the losers on the project team. The executive sponsor must pave the way for success and guarantee that the project does not get sidetracked.

The Executive Sponsor should be a "Gen. Schwarzkopf".
The executive sponsor will muster the resources necessary to complete the project. If IT identifies those resources quickly, the executive sponsor will have adequate time to marshal them.

The Executive Sponsor should be the "Fall Guy".
It is imperative that the executive sponsor claim total ownership of the project, including blame if the project fails. The buck stops here. Sometimes knowing what not to do is as important as knowing what to do. CHAOS University® and focus group participants delineated the negative traits for an executive sponsor.

The Executive Sponsor should not be the Project Manager.
Too much executive involvement can be as disastrous as too little. IT must clarify roles and responsibilities early on by defining the rules of engagement. IT also should provide weekly filtered reports that offer the executive sponsor easy and digestible information in language devoid of techno-speak.

The Executive Sponsor should not be the Function Rep.
The executive sponsor is probably unaware of the true operation of the business. Enlisting committed, trusted users in the project will help keep the executive sponsor out of the project details.

The Executive Sponsor should not be "Santa Claus".
Time is the absolute enemy of all projects. All too often, features and functions are added to the project with no understanding of the consequences for the health of the project. IT must discourage scope creep by alerting the executive sponsor of those consequences, by having a formal change management procedure, and by pushing to deliver quickly.

The Executive Sponsor should not be the Technical Officer.
The best way to discourage an executive sponsor from being a technical officer is to have good technologists in the company.

The Executive Sponsor should not be a "Wimp".
All too often the executive sponsor will not make decisions because he does not understand the project or the technology. IT must encourage the executive sponsor to make business decisions and to reduce political conflicts. Using the 10 positive and negative characteristics outlined here, a development team can get a head start toward finding the appropriate executive sponsor to lead their project.

The Project Manager: The Linch-Pin

The IT community is just beginning to understand the true role of the project manager, the skill required to be a good project manager, and the benefits a project manager can bring to any project.

The Standish Group's research clearly shows that projects are likely to be less challenged and more successful with a competent and experienced project manager on board.

The package of skills most CIOs cite as desirable in a project manager includes technology and business knowledge, judgment, negotiation, good communication and organization. Emphasis is on business skills rather than technical credentials. Moreover, project managers must know not only the business needs of their own company, but also those of suppliers and partners.

The Project Manager should be "Multilingual". He/she must have the skills necessary to converse with all the stakeholders and technical teams. The project manager needs to have a view of the project resources and how those resources come together. Giving the project manager exposure throughout the organization will encourage him or her to be "multilingual."

More exposure to both the business organization and the technical teams will increase the project manager's skills. One way to do this is to establish a mentoring and buddy system. Another way is to have monthly "Project Managers Only" brainstorming sessions to exchange ideas and problem resolutions. Project management should be considered a profession, not a discrete task.

The Project Manager should be a "Gatekeeper". He/she must have the authority to decide at the detail level which features and functions will be part of the project, whether for the first phase or for later release. There must be a change policy procedure in place, with associated risk factors and cost increases. Change increases the scope of the project, the time involved and the chance of failure. The project manager should advise the stakeholders about the risks of scope creep and its potentially disastrous effects.

The Project Manager should be a "Maestro". The project manager must orchestrate all the resources so that they play together like a fine symphony. In this regard, the project manager needs to know the depth and skills of all the players to prevent wrong notes. The project manager must be empowered to acquire and keep the right talent and get rid of non-contributors.

The Project Manager should be a "Cattle Driver". The project manager must be a hard driver, able to focus on the goal and to minimize diversions.

The Project Manager should be a "Clark Kent". Good communication is one of the cornerstones of successful projects. The project manager must communicate well, both verbally and in writing. In order to encourage these skills, IT management should consider two training venues: Dale Carnegie classes on how to win friends and influence people, and Toastmaster's classes on how to present. The project manager should be encouraged to use the organization's business dialect to keep communication simple.

The Project Manager should not be the Executive Sponsor. The Standish Group believes the surest road to project failure is through the IT organization. Projects are done on behalf of the business organization and should have firm executive commitment. IT must set down the rules of engagement and clearly define the stakeholders' roles. The project manager needs to move with the team, while getting the project done. The best way to discourage the project manager from becoming the executive sponsor is to have an effective sponsor already.

The Project Manager should not be the Function Representative. The Standish Group has seen many cases where the project manager thought he/she knew more about the organization than the function representative did. However, in most cases this is not so. The best way to discourage a project manager from being a function representative is to have strong user representation.

The Project Manager should not be a "Santa Claus". Learning to say "no" is the hardest lesson for many project managers. Each feature and function must be measured against business value, project quality, resources, risk and schedule. With eighty percent of delivered features and functions ultimately unused, enlarging the project's scope should not be taken lightly.

The Project Manager should not be a "Control Freak". While the project manager must control the resources and know all the project details, he/she cannot look over the shoulders of the other stakeholders. Establishing peer review processes, focusing on goals and having status communications meetings can discourage a control freak.

The Project Manager cannot be "Superman". Projects are risky, and even a remarkable project manager cannot save a failing project. It takes the active participation of all the stakeholders to create a successful project. Setting correct expectations early in the project can have a positive effect. Minimizing project scope will result in better estimates, and over-promising should be discouraged.

A Project Manager is much like a President of a Small Company. The executive sponsor is the venture capitalist, the function representatives are the customers, and the developers are the workers. Keeping the project on track is like keeping a small company on track — no easy feat.

MENTORING FOR THE PROJECT MANAGER

Since the time of the ancient Greeks, the concept of mentoring has defined a constructive personal relationship between individuals who provide support, guidance and assistance in the achievement of their full potential.

The role of today's business mentor is as friendly advisor, coach and teacher. Like their predecessors, today's mentors share experience in pursuit of higher levels of organizational performance. With mentors, skills and expert knowledge are transferred and institutionalized within the organization.

From a management perspective, mentoring offers a safety net to the organization as it undertakes new projects, pursues new strategies or applies new techniques. Thus, the best mentors are alert to situations where methods, tools and strategies are inconsistent or incompatible with those currently in use, so that management goals and objectives are not compromised, and process improvement opportunities are not missed.

Engaging a mentor requires care. Selecting the wrong mentor can have devastating consequences that could potentially take years to undo.

10 FUNDAMENTAL QUESTIONS FOR EVALUATING A MENTOR:

1. *What direct experience does the contractor/mentor have?*
2. *Has the contractor/mentor proposed constructive suggestions and/or strategies?*
3. *What methodologies has the contractor/mentor offered?*
4. *What training has the contractor/mentor received?*
5. *What are the characteristics of the contractor/mentor?*
6. *What are the greatest strengths of the contractor/mentor, and why?*
7. *In which areas are the contractor/mentor weak and why?*
8. *Has the contractor/mentor made viable observations or suggestions for immediate change?*
9. *Why does the contractor/mentor want to work on this assignment?*
10. *Has the contractor/mentor answered any questions that should have been asked but were not?*

Does Formal Project Management Have Value?

In 1986 Alfred Spector, former president of Transarc Corporation, co-authored a paper comparing bridge building to software development. The premise was that bridges are normally built on time, on budget, and do not fall down. Software, on the other hand, never comes in on time or on budget, and it always breaks down.

One of the reasons bridges are built on time, on budget, and structurally sound is the extreme detail of design. The design is frozen, and the contractor has little flexibility in changing the specs. However, in today's dynamic business environment, a frozen design does not accommodate rapid changes in business practices. A more flexible model is required.

Another difference is that when a bridge collapses, the event is thoroughly investigated, and a report is written on the cause of the failure. In software development, until recently, failures were covered up, ignored or rationalized.

Project management, used successfully for decades in the construction industry, is still an evolving discipline in information technology.

Eighty CIOs in workshop sessions at both CHAOS University ® '98 and European CHAOS '98 discussed the value of formal project management disciplines and the merits of adopting formal project management processes to large scale software development. In other words, why bother?

CHAOS participants said that a formal project management process is the only way large-scale software development can be structured for success. All-encompassing methodologies address the typical array of development problems such as inadequate planning, inadequate user input, unstable requirements, evolving technology, loose specifications and unrealistic cost estimates.

Like scaffolding, project management supports defined roles and responsibilities to achieve project objectives. The project framework is procedural, rigorous, standardized and documented. Standards are repeatable. Monitoring, reporting and change order procedures are in place. Resources can be allocated for maximum effect.

Formal project management provides a realistic picture of the project and the resources committed to it. Certain steps and procedures are reproducible and reusable; thus minimizing the tendency to reinvent the wheel, and maximizing project-wide consistency. Lessons learned can be incorporated into active projects. The process encourages go/no go decision check points, so a project team can proceed with a higher confidence level, or steps can be halted or altered to fit changing requirements. This ability to adjust in real time reduces project risk and enhances skills.

Predictability is a big benefit, CIOs said. Predictability reduces uncertainty, making use of resources more efficient. A project manager has the ability to predict and manage human and capital resource issues; and can also direct user expectations.

Formal project management adds value by mitigating risk in almost any development effort. But project management is valuable in other circumstances, too, such as in complex situations, when certainty is needed, or when projects require an extended time to complete. Formal project management processes diminish the level of complexity and reduce the corresponding program risk when structured and controlled implementations are planned. That reduced risk includes this project, future projects and overall business.

Project management is most valuable when planning new projects or enlarging existing ones. However, not all projects warrant formal project management techniques. Project management adds no value to small, simple projects. Emergency, time-critical projects that require quick delivery bog down under the weight of formal project management techniques. In very mature situations, where sound processes already exist, formal project management adds nothing, and project management probably should not be used when innovation is required, or when the overhead is greater than the project value.

Lucky or Lousy

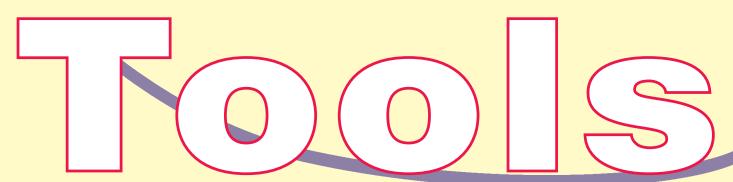Yogi Berra once quipped, "Predictions are hard, especially about the future". Countless times during focus groups, project group therapy sessions and failure post mortems, IT executives echoed, "We did our best estimate, we doubled it, added some more, and we still missed the mark".

Project and program estimating is nothing more than predicting the future outcome of a project or program. It is difficult.

In this regard, there are only two kinds of estimates: "Lucky" or "Lousy". Frequently, different people make these estimates at different times using different methods. Clearly a more standard estimating process could generate significant improvements.

One must be realistic; there is no such thing as a reliable estimate. Learning to work better with poor estimates rather than developing better estimating techniques is crucial. Nevertheless, project managers who recognize their limitations can use some formal estimating tools and these tools can greatly improve their luck.

Many tools offer a combination of statistical and judgment forecasts. These tools combined with an iterative process development style enable a project manager to react correctly to the changing program environment. Thus, the estimating process itself is iterative through the life of the project. This will give little comfort to the financial officer trying to decide on funding the project in the first place. It is imperative to know if there is a kill switch and how it gets pulled.

Project Management Tools

The growth of the project management field has been accompanied by the emergence of planning, estimating, scheduling and tracking tools designed to support the process. The need to utilize project management tools in complex environments is inescapable. Today's projects are huge, often spanning the enterprise and global boundaries. It is virtually impossible to create a comprehensive project plan for a large or enterprise-wide project without using a tool.

The purpose of project management tools is to support the project management process by providing a vehicle for planning, executing and controlling the project. The tool does not manage the project, the project manager manages the project by utilizing the tool.

Users are assured that all tools will perform the basic uses but they still need selection criteria to assess the many available tools on the market. To this end, The Standish Group has defined 10 fundamental requirements that we use to compare and evaluate project management tools. These fundamentals are the "must have" attributes that influence which tool meets an organization/enterprise's needs.

Ease of Use: Project management tools must provide ease of use features to avoid the undesirable fate of becoming shelfware. Market availability, a reasonable learning curve, good support and documentation, and easy implementation are some of the critical ease of use features.

Adaptability: Project management tools must be flexible and customizable. While projects share many common attributes, they can be widely diverse with unique plan attributes that must be accommodated by the tool. Multiple projects can be embedded in a larger one, with each individual project having its own team. Today's enterprise-wide projects mandate flexibility in project management tools.

Scalability: Project management tools must support projects ranging from department size to enterprise-wide, multi-project, multi-site, and distributed environments. Projects such as migrating an entire enterprise to a standard platform or addressing the year 2000 problem in a global corporation demonstrate the need for scalabilty.

Affordability: Project management tools must be affordable or risk being deemed unjustifiable in today's environment of cost constraints and limited funding. The Standish Group 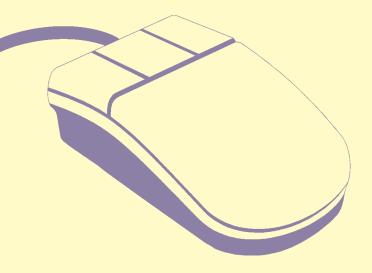believes that the use of a project management tool can save substantial amounts of time and money through productivity gains and more effective planning.

Interoperability: Project management tools must work with other tools. This can be accomplished through general interoperability via standard APIs and common interfaces or through integration.

Security: Project management tools become repositories of highly sensitive data such as dates, costs, resource rates and other confidential or restricted information. Security, therefore, becomes a critical issue. Features such as version control, access control, password protection and field level control are desirable.

Project management tools are used for:

- Defining and assigning resources
- Reporting/communicating progress
- Identifying and managing dependencies, contingencies and risks
- Tracking
- Planning
- Scheduling
- Analyzing
- Organizing
- Estimating

Portability: Any project manager can attest to late Sunday evenings or "off hours" at home spent updating a project plan. The tool must be able to run independent of the environment.

Distribution of Data: Project management tools are a major source of communication throughout the lifecycle

of a project to a variety of audiences. The tool must contain features/functions to support their differing communication requirements, from the high level executive view to the more detailed level required by a project manager. This can be accomplished through report facilities, online queries, Web access, e-mail notification, and/or integration and interoperability with other tools providing these functions.

Integrity: Project management tools must maintain the integrity of the data/plan input into the tool. In essence, a project management tool is just a productivity aid. It does not "manage" a project or ensure its success; it simply assists the project manager in planning and executing a project. The project plan, as the primary output of a project management tool, is the bible of the project. A project manager must be confident that the tool will not alter the content of a project plan.

Rapid Response Time: Project management tools must accommodate resource movements, task/activity additions, expansions or deletions, constant schedule changes occurring throughout the lifecycle of a project and rapidly reflect those changes to all participants, whether they are local or geographically dispersed.

The Standish Group anticipates that tool vendors will place more emphasis on enterprise-wide project management via Internet enablement, multiple nested projects support, and enterprise-wide collaboration features. Interoperability will be a primary objective.

Role of the Internet and the Cybernetic Worker

Internet technology changes everything. As a ubiquitous communications infrastructure, the Internet enables enterprise-wide project management and the building of virtual project teams within a global, collaborative project management environment.

Because the Internet is the only widely available platform for accessing process and project information, it is a cost effective backbone for extending project planning and execution to every corporate location using the TCP/IP common denominator. A number of project managers are tapping the power of the Internet, corporate Intranets and corporate Extranets to provide all stakeholders with instant access to project plans and status reports.

However, project management on a global scale will not be easy. Most project management techniques were designed for co-located project teams. Those techniques may prove ineffective in global, multi-site organizations.

Globally distributed software development projects must contend with different languages, cultures, time zones, work ethics, legal systems, and hardware and software requirements. The development of large software systems will require larger teams of people with different knowledge and educational backgrounds to work together at multiple locations. This fact of life must somehow be weighed against CHAOS findings that project size and scope creep threaten project success.

Coordinating and managing the work of geographically distributed high performance virtual project teams, providing global access to project plans and dynamic project data, and internalizing the experience of past projects to make it usable for future projects are challenges to be addressed.

Despite the hurdles, The Standish Group's research found that project management is one process cited by CIOs as most adaptable to virtual environments. CIOs understand that managing a virtual project workforce is not technology dependent. From e-mail to cell phones and pagers, communications abound. Again, people and processes are at the heart of project management, not toolsand technology.

CHAOS University® participants engaged in building or supporting virtual enterprises reported that the top three cyberworker issues are measuring productivity, managing communications and motivating isolated workers. Project size magnifies these human challenges. Building virtual teams with a minimum of face time, clearly defining work, measuring cybernetic worker productivity and managing employee communications across time zones are major management priorities.

Recipe
for
Project Success

The Standish Group's recipe for success combines reducing requirements to the stark minimum, providing constant communication systems and coupling those with a standard infrastructure. Mix these ingredients with a good project manager, an iterative development process, project management tools and adherence to key roles, and success is practically in the oven. This recipe for success works and we have seen it work again and again for the last two years. It's a simple recipe that produces incredible success rates.

RECIPE FOR SUCCESS

Ingredients: Minimization - Communications - Standard Infrastructures

Mix With: Good Project Manager - Interactive Process - Project Management Tools - Adherence to the Key Roles

Bake: No longer than six months - No more than six people - At no more than $750,000

However, too many cooks will definitely spoil this stew; so use no more than six people for six months and at a cost of no more than $750,000. This recipe may sound like magic, but it is just common sense. When it comes to project success, the fewer features and functions put in, the greater the yield. While many have tried to break up large projects into small fragments to increase the success rate, this strategy is fatally flawed. Only when you break the dependencies of one fragment to the next do you truly accomplish minimization. Features and functions add time, and time is the absolute enemy of all project success.

Although project management makes steady progress in reducing project failure rates and project waste, there is a long way to go. Even our optimistic projection of 30% waste by 2000 is too high. Certainly, project management is only beginning to understand the different roles and responsibilities of the stakeholders. Major research must be conducted to better understand the motivations of each of these constituencies.

Through CHAOS research and CHAOS University ®, The Standish Group will continue to investigate better ways to improve project success. It will be a long journey, but we have come a long way already.