Visions For the Project Management Software Industry
by Stacy A. Goff

A. Introduction

This chapter identifies visions of the future for the project management software industry. It hedges the difficulty of making these predictions by applying two groups of scenarios to establish possible futures for the portfolio, program, and project management software industry. Our audiences include PM practitioners, Managers, Executives, and key stakeholders in project-oriented or project-involved enterprises, and executives and product managers in project management product or services organizations. We apply the experience of a panel of industry veterans, executives of PM Software market leaders, and other key individuals who innovated and created changes in the industry's direction. We appreciate the contribution of ideas, predictions and visions of these individuals, giving credit to their specific citations with endnotes A-F, where we provide more information about them. Still, Microsoft visionary Ludo Hauduc[D] cautions that some of these predictions may be too naïve, or a bit too much like science fiction for some readers.

The Two Scenario Types. *Trajectory* scenarios trace key project management software achievements of the past and present to project a likely future. *Discontinuity* scenarios probe the game-changing disruptions from apparently unrelated or unseen impacts upon project management through 2025 and beyond. An example of an apparently unrelated impact is the rise of virtual worlds over the last several years, with a potential for far-reaching project impact. Both the trajectory and discontinuity sets of scenarios are relevant as PM practice continues to advance through 2025 and beyond. Indeed, an increasing number of project management software vendors have visions and plans for continuing that advancement. Yet, few enterprises (where enterprises include government agencies and corporations) take advantage of the power of all the portfolio, program, and project management Software tools they already have. Adding more features and capabilities will not be the driver for advancement. The challenge of the next several decades is to maximize our benefits from proper use of the tools that exist today, *and then* to add the PM competences needed to embrace the advancements to come. If you are prepared to suspend the *reality of now* for just a while, please read on.

B. Leaders and Laggards: The Gap Widens

Figure 1 shows a list of Ten PM Functions that benefit from automated support. It is part of a larger list assembled by the author in 1980 while designing a new project management methodology. That design included identifying the roles of the project manager and key stakeholders, documenting project processes and activities, and citing the extent to which then-current automated support (running mostly on mainframes and minicomputers) helped in managing projects. Since that time, the list has been the basis for evaluating the usefulness of a wide range of project management software.

Ten PM Functions the Automated Project Environment can help…	
1. Develop objectives and business need.	6. Optimize resource use across multiple projects.
2. Create or modify work breakdown structures.	7. Produce bar chart schedules for a tracking baseline.
3. Calculate estimates (overall project and activities).	8. Provide integrated, prioritized "to do" lists.
4. Record assumptions that affect the estimates.	9. Record and report actuals against the plan.
5. Perform precedence analysis--crash the model.	10. Store and re–use project history and metrics.

Figure 1: Ten project management functions in the automated project environment, by StacyGoff; used with permission[1].

The list is still useful today for evaluating a project management software suite, *and* for evaluating the extent to which any enterprise or project team is leveraging their software. For example, some project-oriented enterprises use a range of desktop tools, content management systems, and project or portfolio software, together with databases, to implement the entire list. Others use only desktop tools, barely covering items 1-3. Their schedules are "good enough to get executive approval" but are seldom used as a baseline for tracking purposes. The challenge for the project management software industry: *The majority of the* existing *market is still not effectively using 20-25 year-old technology!*

To help explain this perplexing situation, where for some the future arrives slowly, examine the innovation adoption curve shown in Figure 2. Originally popularized by Everett M. Rogers,[2] this standard bell-shaped curve with two standard deviations and a further breakdown on the left, identified five groups by their technology adoption patterns: innovators, early adopters, early majority, late majority, and laggards. Using this curve as a guide, it is the innovators and early adopters that we call leaders, who have made the most significant progress against our 1980 list of project management functions. Today's project management software vendors cannot be complacent with their current market share and influence.

They must either increase their audience or improve the market penetration of their tools, or both, to realize their maximum potential. Which will they do? The answer is one of several purposes of this chapter.

C: The Trajectory Scenarios: Past, Present, and Future

The Trajectory scenarios trace a small but relevant handful of key project management software achievements of the past and present, and then project a likely future from those achievements. Featured scenarios for the past, present and future in this section include project scheduling tools, the microcomputer revolution, automated project guides, virtual teams and social networks, portfolio management, emergence of real-time timesheets, capture, sharing and re-use of project knowledge, leveraging of information into project intelligence, and the absorption of project management software into enterprise systems. One challenge of making predictions based on trends is the surprises that occur, but that is the purpose of the discontinuity scenarios that follow.
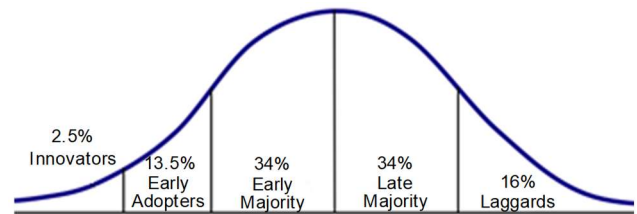
Figure 2: Innovation adoption curve.

Trajectory 1, Learning From The Past: 1960s and Project Scheduling Tools

In 1968, a young Fortran programmer integrated a new Calcomp 30" continuous-roll plotter with a 32KB IBM 360 Model 30 computer. After adapting road design software to work with the new operating system and plotter, he wrote a project schedule precedence diagram-plotting program. At first, his motivations did not involve project management, but rather intrigue with the challenge of producing an up-to-1000-activity precedence diagram with a minimum number of lines crossing. On a 32KB mainframe computer, the program input punched cards, and used Julian dates and 7/5 algorithms to approximate work weeks. When donated to the Calcomp User-Group Library, this program challenged the survival of two companies' similar commercial programs. Their programs required the user to manually locate the activities on a grid, and his program calculated and deduced the optimum location. Thus, from the earliest days of commercial project management software, innovation leapfrogged and challenged the then-leaders of the project management software industry.[3]

1a. 1980s: The Rise of Microcomputer-based Project Management Tools

Microcomputers began to arrive in the enterprise by the late 1970s but did not produce notable benefits at first. When the Apple Lisa computer came out in 1983, it included an innovative project management software package. For those who did not have access to mainframes or minicomputers with powerful workstations and high-end project management software, it was the first time they could "crash the model" (perform precedence analysis and see the cost and schedule impacts) *in real time*. This was an era of massive platform change, as mainframe and mini-computer applications jumped from their platforms to this emerging new microcomputer device. In a portent of things to come, visionary Joel Koppelman[E] saw the opportunities of the personal computer (PC), and co-founded a new company, Primavera, to develop for that platform. He emphasized combining processing power with ease of use. Existing industry-standard tools (at least in oil, aerospace and construction) such as Artemis also migrated to the new PC. New applications caught on, including Super-Project, Timeline, Harvard Project Manager, and many others at the midrange. At the low end, there emerged MacProject and others. The market was booming and broadening at the same time. This broadening aspect, with project management software reaching many more people, was a key outcome of the microcomputer revolution, benefiting from the ubiquity of the personal computer. You could manage your project on your desktop—or on the road. Such a concept!

1b. Intelligent Project Guides

Two project management methodologies, SDM/70 and Arthur Anderson's Method One, emerged in the late 1970s and early 1980s to significantly influence project management practices. Both were for information technology (IT) projects, in part because of that application area's need for improvement, and in part because that need was recognized with available funding. This is proof that the market often leads the tools. Each methodology had strengths and weaknesses. Their strengths included strong support for better PM practices. Their weaknesses included adding unneeded overhead to projects, and their lack of scalability to projects of different sizes (e.g.: smaller) than their design targets. They spawned a series of more scalable alternatives, and smart PM consultancies booked engagements to downsize the monolithic efforts to something more usable for smaller projects[4]. The net result of these efforts, when well-adapted, was more consistent PM processes, and higher levels of project success. Concurrently, the enterprise was moving from "big bang" multi-year projects to iterations that delivered business results within six months or less (where feasible). That scaling down was also key to extending the reach of project management software to people who were ***part-time project managers***. The ultimate scaling: one consultancy[5] published, marketed and trained tens of thousands of practitioners in small project management, with the Small Project Guide[TM] as a *universal project method* for any project from 8-360 hours of effort.

In 1987-1988, Ed Dante[C] developed Project Bridge,[6] a powerful "front-end" planning tool that supported ABT's Project Workbench and other popular scheduling software. Project Bridge was a key achievement in moving PM software beyond scheduling and tracking functions to supporting the development of reusable project plans. It used key project attributes to select an appropriate project path (method within the methodology), establish traceable estimates, help manage risk, and then scale a reusable project schedule template to serve as an 80% complete cost and schedule portion of a plan. The templates were pre-loaded with activity estimates and contained all key needed project roles, so all the Project Manager needed to do was to fill the roles and fine-tune the plan for the distinctive aspects of the project. The tool offered a way to model and measure the impact of insufficient support, and perform multiple viable project plan and schedule scenarios. While this method focused on IT, it could work across the enterprise with the addition of customized project kits.

Now, competent project managers had a credible tool to show executive managers the cause-and-effect relationship between adequate project support and success. Ed sold his product to ABT, marketer of Project Workbench, and the combination of Bridge and Workbench made a good PM scheduling tool into a much more powerful project management tool, "*the combination of which was lethal,*[C]" that dominated the midrange project management software market for years.

Trajectory 2. *The Present:* Assessing Where We Are

After 40 years, we in the project management software industry have made little progress—neither in increasing the size of the market nor in increasing the penetration of our Ten PM functions into enterprises. In fact, while it is clear that the innovators and early adopters have advanced significantly, the late majority and laggards have barely moved. We reflect this in a revised version of the innovation adoption curve, shown in Figure 3, overlaid by each group's estimated imple-

mentation of the Ten PM Functions. To explain the scale, innovators, at left, now apply all Ten Functions. Laggards, at the right, only apply three of them. This is unfortunately the case, despite huge investments in tools, methods or processes, and training. In addition, where in 1980 there was perhaps a 10-year gap in adoption rates between leaders and laggards, today that gap is approaching 25 years! Thus a prediction: unless something changes, the average enterprise in 2025, even with innovation, market pressures and significant effort, will still be struggling to adopt today's leading technologies!
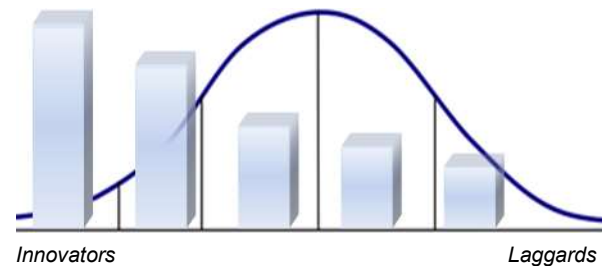

Innovators   *Laggards*
Figure 3: Innovation adoption curve and Ten PM Functions

What is holding back the successful adoption of needed functions? Here is one perspective: Many companies begin to improve their PM processes by finding and buying promising new technology. PM consultants frequently get a call for help *after* the decision to purchase and implement the new technology. By then, it is too late to maximize the investment's benefit. Technology can help, but only if it is the last step in a sequence that prepares the organization for beneficial change. Based on the work of the author,[7] successful PM methods improvement always considers the *right factors*, executed in the *right sequence:* 1. Enabling Policies; 2. Responsibilities; 3. Processes; and 4. Technology.

Thus the first step is *not* to explore the technology, but to identify the enabling policies, that set the stage for beneficial change. Here is an example of a policy: *All projects of a certain size and greater shall have a viable project plan, with a schedule that is staffed, has precedent relationships for each activity, and that the team will use as a baseline for tracking.* Next, identify the stakeholders, their roles, and responsibilities. The third step: identify the processes, supported by detailed procedures, where needed. Finally, and only last, specify the requirements and identify the technology needed to enable, support, and accelerate the improvements. Any gap in this proven sequence dooms the improvement effort if not to failure, at least failure to fulfill its potential.

Identifying Problems, and Seizing Opportunity

Besides the problem of inappropriate implementation sequence, today's enterprises and today's project management software vendors are well aware of the problems they are trying to solve. The most common project, program, and portfolio management problems encountered today are listed in Figure 4 (your list may vary, and it depends on the industry).

> **Common Project Problems**
> 1. Inconsistent prioritization of project efforts.
> 2. Changes in priority, that affect project momentum.
> 3. Conflicts between "real work" and project work for project participants.
> 4. Too many projects run in too short a time with too few team members.
> 5. Incomplete project plans and poor tracking against them.
> 6. Lack of clear, agreed-upon project success criteria.
> 7. Failure to capture project intelligence in lessons learned, issues, risks and assumptions.
> 8. Competition, not cooperation, in organizations that are driven by operational accomplishment rewards.
> 9. A pm knowledge re-invent, rather than reuse mentality, and no rewards for changing this pattern.
> 10. Failure to develop project stakeholder competences, especially in sponsors & resource managers.

Figure 4: Common project problems; used with permission of StacyGoff.

Innovators who manage project-oriented enterprises have overcome these problems, and apply project management software to extend their competitive edge over the rest. On the other hand, Ron Brown[B] points out that most of these problems are all symptoms of a greater set of problems. For example, many enterprises are trying to manage projects using an operations mentality, a sure sign of a company that has not made the leap to managing a project-oriented enterprise.

5% of Today's Recognized Market

Today's Project Management Software Status Summary

Even with our progress of the last 40 years, the project management software industry of today has barely penetrated its recognized market. That recognized market is still less than 5% of the world's population. This is the case even with the "mainstreaming" of project management in the 1980s mentioned earlier, as increasing numbers of knowledge workers became part-time project managers or team members. This is despite an increasing chorus of voices joining in since 1986, saying that the majority of society's work is project-oriented, and the majority of that work is not treated as projects, just more work to be done by the end of the month. Of course, this work is lower priority than the (perceived as) more-important process or support work efforts. The untapped market potential is huge. *Half the world's population* or more should be the project management software market. But perhaps we are getting ahead of ourselves.

Trajectory 3. *The Future:* Scenarios Bloom Through 2025

In addition to other changes, it will be the continuation of trends that solve the challenges that users of project management software face today. This section explores advancements that can be expected based on the trajectory extending from the present through 2025 and beyond. In fact, based on our insights, interviews and references, we actually projected out to 2050, then worked backwards to 2025, so we could verify the slope and path of the trajectory curve. Perhaps we will share some of those additional visions in a future edition of this chapter. Regardless of the target dates, these advances that we list in this section will both increase the market's size, and increase the industry's penetration of it. Undoubtedly many other interesting innovations will also occur; these are merely samples.

3a. Project Portfolio Management

Project portfolio management (PfM) has been around for years, and it will continue to increase its functions and audience for the foreseeable future. According to PMI's *The Standard for Portfolio Management*, PfM is *the centralized management of one or more [project] portfolios, and involves identifying, prioritizing, authorizing, managing, and controlling projects, programs, and other related work, to achieve specific strategic business objectives.*[9] Separating the PfM business functions from the technology is difficult but important. It is difficult because few organizations have identified a job classification and clear responsibilities for a portfolio manager. Instead, in many companies, portfolio management is administered by a part-time committee of managers and/or executives, with support from staff. It is important because of the need to implement technology *last*, only after planning enabling policies, responsibilities, and processes. The key to PfM is that although every organization does it, only a few do it well.

As Ron Brown[B] points out, PfM is not a project function, but an enterprise function. So the first step in maximizing a portfolio is to decide how each project relates to enterprise strategies, operations, and a multi-year funding process. On the technology side, tools for project-related PfM (financial portfolio management has existed for years) first emerged in the 1980s, with a focus on aggregating cross-project plans for their common resource use. Many of the high-end project management software tools supported that aggregation, either with additional modules, or within the tools themselves. Soon PfM vendors began adding prioritization, risk management, dashboard indicators, and portfolio tracking functions.

Today there are many PfM vendors, most of them having only marginal penetration in their market. However, given continued investment, plus feedback from the innovators and early adopters, some of the vendors will see a massive increase both in their market breadth and in their penetration midway between this writing and 2025. But what are the features that will cause these increases? Looking at a few examples can help answer that question. In researching this chapter, we interviewed, in our convened panel of experts, a handful of key executives from leading PfM vendors, including some with whom you are familiar, and some you should be.

Our representatives of leading vendors includes those involved with Microsoft's Enterprise Project Management Solution, Primavera's P6, Spider Project software from Russia, and Delta Group's Proconsul. Each product has their strengths, and many of the features *they currently offer* will be the in-demand functions of the 2025 project-oriented enterprise.

For example:

- A more-complete enterprise portfolio that integrates the management of projects with operations, capital, and business functions—with the knowledgebase and information from all areas—for improved executive decision-making;
- Cash flow and human resources management occur across the enterprise, including the prioritization, modeling and provisioning of project, process, and on-demand support staff (often the bottleneck in today's enterprise);
- Multi-year workplace talent projections, and the budgeting to support them, including capital investments needed;
- Modeling and simulation to show the beta: The risk threat and opportunity reward blend, to evaluate trade-offs between combinations of proposed efforts—and their benefits;
- Calculation of net present value of planned initiatives, plus follow-up to assure that benefit realization occurs;
- Inclusion and key consideration of otherwise-separate project management activities and tools needed for the portfolio, including parametric estimating, and combined project *and* business risk management; and
- Knowledge, process, and template reuse and metrics capture, for improved estimating, bidding, risk management, and project performance.

This partial list of PfM features shows a vivid future for project management. For some, it is also the present. In a déjà vu way, Ed Dante, mentioned in the section C1 Past Trajectories with his innovative Project Bridge, reappears here with his newest effort, Proconsul. And outside the United States, Spider is seeing increasing uptake from construction to petroleum, and other serious project-oriented industries. Microsoft's suite solution does a stellar job of targeting the roles and information demands of unique stakeholders. And the progeny of the original PC-based Primavera solution is still a preferred leader for many enterprises, significant in that none of their first-decade competitors remain today.

3b. Collaboration: Virtual Teams and Social Networks

A range of innovations (some of which have been on the scene for some time) promise to improve the adoption rate and increase the size of the project management software market—if one is flexible in identifying what that market is. One such innovation is the combination of virtual teams (project teams that are not co-located) with social networks. Leaders are bringing together the tools that support this collaboration and communication, reaping great results for those who apply them. Starting with voice over Internet protocol (VOIP)-based Skype conference calls and web-conferencing, and supported by wikis or SharePoint sites for content management, some of the tools are known for their flexibility and power, others for their accessibility and ease of use. Increasingly, teams combine those tools with free or fee-based collaboration networks[8] that help virtual teams to work together, research together, network together, relax together (where that is within the boundaries of the culture), and achieve together. This movement is viral rather than planned, and that in itself is a boost: This is not just another change that is mandated from above. The net result is a *massive increase* in the size of the market audience that uses PM software. And, imagine what this can do for market penetration in the Ten PM Functions!

3c. Mastery of Real-time Time Tracking

Time tracking has long been a frustrating factor for project teams; too many team members view time sheets as one of their greatest scourges. This is exacerbated for any person who works on multiple projects, and who has ongoing work responsibilities, plus frequent interruptions for customer support or other causes. And then *some* managers wonder why the project cost numbers are so unreliable! To repeat our policies, responsibilities, processes, and technology sequence; *enabling policies* are essential to save time wasted in tracking ineffective assignments. For example, in large[10] projects, the core team members shall be full-time-assigned and their other responsibilities covered by others. In medium projects, core team members shall be at least half-time assigned (with that time of day or week established in advance); and their interruptions from ongoing responsibilities shall be handled by others.

Here is the breakthrough: The next release of your calendaring system does more than accept and notify you about project assignments, due dates, ongoing work responsibilities and other scheduled events. *Under your control* (an *essential* privacy requirement), it also records all your activities against those and all other events during your day. Your workstation, unified phone system, calendar, and car collaborate to link with your PCD (personal communication device, a cell phone-sized supercomputer) to collect and maintain your activity information. They also track your interruptions, recording them with their charge number and the context of the interruption, so later you can reduce the unnecessary ones. At the end of your day, summary information "pops up" for your review, complete with all needed charge numbers. After your approval, all information brokers, including those interested in your project costs, effort, status, and earned value, activity completions, and payroll, receive postings in the right locations, with the right codes. Working late? Your PCD also records that information. On holiday? Your PCD reports in, and logs your time, at your option.

The outcome? Significant advances result from this real-time tracking: it drives the need to develop honest schedules that the team actually tracks against, abandoning the too-frequent trick (in some enterprises) of developing a schedule that is only good enough to get an executive approval—but is seldom followed. From this advancement, the penetration of project management software increases significantly. Earned value management becomes much more useful, as the window of currency moves from one month after your action to one day; plus, the information is now much more accurate and reliable. Managers make much smarter prioritization decisions much faster, and project success rates soar. Of course, all this is mostly for the back half of our innovation curve: The innovators and early adopters solved this problem years ago.

3d. Capture and Reuse of Project Knowledge

In the 1970s, most companies realized that literally thousands of homegrown payroll or general ledger systems had been developed, and started *buying* their commodity software, rather than writing the code for yet another costly system. That same realization continued in the 1980s for the advanced project players cited in the *Past trajectories* section: You only really need to develop the same project schedule, and to a great extent, the same project plan, once. All successive similar projects should merely reuse the materials as templates. After all, most of your organization units repeat the same six-to-nine projects over and over, 80% of the time; the only difference is their scale, plus several key and distinctive attributes. That reuse potential also applies to the product documentation: requirements, test plans, even training templates all contain reusable project knowledge. As content management systems increase in both power and ease of use (both increases are essential), the information reuse goes beyond the clever few to the mainstream many.

There exist challenges to reuse: first is a lack of incentive to reuse project knowledge. The incentives set up by some enterprises (note the needed enabling policies) include rewarding not only those who reuse materials, but also those who *produce* reused materials. This incents those who produce the materials to internally market them to others. Other challenges include the selfish departments that discourage sharing outside their group, because others may instead receive the scarce performance bonuses from the enterprise pool. Add the idea of tagging the content with the right searchable attributes so template-shoppers can easily screen for the most relevant works by project size, disciplines, and strategy or approach. The last idea is the greatest one: Even with tagging and attributing there may still be over a dozen template candidates; which one is best? Ludo Hauduc[D] asserts that a user ratings method, as is used at Amazon, Newegg or eBay, will nicely fill that knowledge gap.

Innovators and early adopters are already doing much of this: They prosper with this approach. But as the early and late majorities also adopt the approach, an open market emerges for the exchange of these *project catalysts*, first within professional societies, then in industry groups, and then worldwide. A role of *project knowledge broker* emerges, as enterprising salespersons bring together the knowledge buyer and seller—and profit from it. Schools and government agencies are the first to plunge into this new *information-is-knowledge-is-profit* economy, because they are less-often competitors. Some enterprises initially block the sharing of knowledge that could add to their competitive advantage, but after just a few years, most see that the benefits of mutually-shared knowledge far outweigh the risks. As this market matures, it results in another massive increase in market size and in penetration of the PM software market.

3e. Dashboards and Project Intelligence

Project dashboards have been around since the 1980s, but aside from the leaders, too many enterprises were basing them on poor tracking against even poorer project plans. Even worse, many focused on easy-to-measure trailing indicators (time and cost), rather than more actionable leading ones. The resolution of that long-standing time-tracking problem mentioned earlier opened the door for much smarter project information management. Project information that is rear-view mirror shows where we were last week—or last month. You would never drive a car based on reports that you drove off the road last Thursday. But for too many projects, that has to suffice. A car's dashboard is in front of you so you can glance at your indicators without taking your attention from the road ahead. This helps explain the need for leading indicators, rather than just trailing ones. As shown by the author in an article, *Project Levers and Gauges*[11], cost and time are trailing indicators. By the time you see them "go red," it is too late to fix them. Scope and *the right Talent* are leading indicators. Action taken on leading indicators shows up (much later) on the trailing ones. But what do most PM software tools track? Mostly trailing data on time and cost. This insight opens the door to project intelligence to those who act on it.

If data is important, and information is *very important*, how do you use them intelligently? Effective managers make decisions based primarily on information. Data is useful in identifying the amplitude of the impact, but one cannot make a decision based just on data.

As presented at the IPMA 2005 World Congress,[12] the best source of actionable project information is constantly in front of us: Assumptions, risks, issues, failures (and successes), and lessons learned are *all the same information, at different points in time*. And they are recurring from phase to phase in any one project, and from project to project. Do you capture and apply Lessons at the end of each phase? If not, these are more-often lessons recorded than lessons learned. In addition to improving actionable project information, our other scenarios also contribute: they improve real-time tracking and Enterprise-wide portfolios of projects, programs, *and* operations. Enterprise dashboards are now relevant, accurate, timely, and essential. Intelligent project practices proliferate, project communications improve, decision-makers are smarter, and adopting enterprises thrive. The project management software market increases its audience and penetration once again.

3f. Project Management Absorbed into Enterprise Systems

These trajectory scenarios seem to be soaring; how could it get any better than this? Depending upon your point of view, this may be as good as it gets. As inspired by Vladimir Liberzon,[F] most of today's project management software functions will be absorbed into one of the enterprise software management domains. The fight is between the TLAs, the Three Letter Acronyms: ERP, CRM, SCM, and PLM. Here is the rationale: this is all enterprise data. And, as we move towards virtual enterprises, with a CEO, a procurement/contracts staff, and a program management office—with everything else a project contract—the requirements change. The challenges of flowing project data and information, first in one direction, then the next, and keeping it all current while reducing duplication and accelerating access to it, just breaks too many processes.

The latest challenge begins when project-oriented enterprises focus on their program/project systems, and flow all data from there to payroll, to payables, general ledger, and others. The only back-postings are for depreciation, additional overheads that are not customer-billable, and vacation accrual. Between new transparency and regulatory requirements, and increasing back-and-forth flow of data between systems, by the early 2010s we will see a monster data management problem. Just as industries run in cycles, the cycle of centralized management systems will come back into vogue.

Enterprise resource planning (ERP) has the longest ties to project management software, having served it well for years as a separate Enterprise service. In addition, with its absorption of all the human resources functions, it already has all the information about people, their competences, and qualifications. Customer relationship management (CRM) points out that ERP just covers overhead functions, while CRM is all about the customer, *whom projects serve*. Supply chain management (SCM) opines that without the supply chain, no one is going to get anything done, and besides, once every enterprise is a virtual corporation, SCM is the last service remaining. Then the Engineers in Product Lifecycle Management (PLM) point out that adding the other enterprise project competences to their portfolio would be the easiest integration of all. PLM eventually wins with the argument that the project life cycle was really just a small part of the inspiration-to-retirement product life cycle they manage. However, shed no tears for the PM software industry: Entrepreneurial as they are, the vendors—and their project and program manager customers—soon become the spokespersons and visionaries for the engineers and product managers with whom they are partnered. With this move (which takes some time), the market size and penetration of the PM Software industry increases again.

Impact of the Trajectory Scenarios

This sampling of trajectories—and many others like them—grow the project management software market, and increase vendor penetration of it. For the PM software vendors of 2025, there is a combination of the same patterns of the past: We see some new players that establish innovations, some larger, well-known players that continue to serve, and too many familiar players that cannot survive. Nevertheless, PM software of 2025 (based just on trends), while seeing noteworthy progress, still has far to go to fulfill its potential (see figure at right). Of course, there are many other candidate scenarios that will have impact, beyond our slim sample. For example, we have not even discussed the existing simulation software that will soon simulate your entire project execution, proving or disproving your assumptions, risks, plans, and strategies.

40% of Potential Market by 2025

Still, it will take more than useful trends, tools and technology for project, program, and portfolio managers, teams, and executives, to realize the promise of competent and performing project management. Fortunately, one does not predict the future only based on past trends. For example, many of us figured in January 2000 that we might be able retire comfortably by 2002, given the trends at that time in retirement accounts in global stock markets. We must also explore the **discontinuity** scenarios to understand more about the possible state of the project management software industry in 2025.

D. Discontinuity Scenarios Transform the Industry

Kurzweil's *Age of Spiritual Machines*[13] inspired some of the content in this section. This section has two parts: *Near-term scenarios* that reflect the first half of the period between this writing and 2025, and the *longer-term scenarios* that reflect through 2025 and beyond. And where Rogers' innovation curve was an important visual for understanding the project management software market for the trajectory scenarios, something a bit different is essential for the discontinuity scenarios. We refer you to *Crossing the Chasm*,[14] where Geoffrey A. Moore adapted Rogers' innovation curve to illustrate the unique difficulties of organizations in adapting to discontinuities. The challenges of discontinuities are multiple. They come out of nowhere. When they work, their impact can be game-changing, both for those who adopt them, and those who avoid them. And the majority of discontinuities fail; we all remember those attempted by others, and conveniently forget those we tried that failed. In this section we introduce the ***Disrupt-O-Meter*** to summarize the impact of these discontinuity scenarios, based on feasibility, cost-effectiveness, and disruptiveness.

1. Near-term Discontinuity Scenarios

Scenarios in this *near-term* group may be only partly outrageous. Most discontinuities *are* outrageous, you know. These may occur in the period between our publication date and 2017; they have their roots in accomplishments *outside* the project management software industry over the last 20+ years. Although coming from outside, they will have impact by helping to resolve two problems facing project management software vendors. To grow their market, they must:

1. Increase the functions to increase penetration in their market, while also increasing ease-of-use.
2. Increase the market size, by broadening the audience from project specialist tools to general population tools.

The gains for PM vendors from the project management software trajectory scenarios, as described in the previous section, are often only incremental. At the same time, the benefits for the innovators and early adopters are significant. The discontinuity scenarios offer both greater risk and greater reward for both groups—if they succeed. Those that do will have profound impact on the market, and upon the success of organizations managing projects. But here is a warning: even these near-term discontinuities may be disconcerting for those who have difficulty letting their imagination soar.

1a. Near-Term Scenario: Gloria Gery's Electronic Performance Support Systems

In 1991, Gloria Gery published her book, *Electronic Performance Support Systems*,[15] based in part on her experiences in helping a major insurance company improve the efficiency and effectiveness of staff performance. Moving far beyond classroom training, her approaches dealt with the fact that most true learning and skill-building occurs on the job, not in the classroom. Her concept, which forms the foundation for today's performance management, was to provide just-in-time coaching, examples, or tutorials for knowledge workers. Perhaps her work inspired Microsoft's Clippy, that paperclip that kept pestering you until you figured out how to turn it off. But that is all background information. Let's extrapolate Ms. Gery's concepts forward to a possible future. Do you have your imagination circuits triggered and ready?

Monday morning when you get to work (your home office, time-shared cubical at headquarters, or your favorite wireless coffee shop) your PCD (personal communications device, introduced earlier) presents you with a prioritized list of your actions for today, the week, and the next month. You review, modify, and approve the list, then start your first activity. Your PCD has multiple ways for you to interact: digital paper that displays and records your updates (for interactive work), a personal viewer that attaches to your glasses or earphone and displays the equivalent of a 30-inch monitor. Or a small projector pops out of your PCD and can project an up-to 8-foot display on the wall (it only runs 4 hours on a charge without the solar panel). Based on a combination of Ms. Gery's efforts and your enterprise knowledgebase, an "Intelligence Agent" (IntellAgent) layer between your hardware and your operating system assures that your every action is monitored, coached, critiqued, improved, and researched on the web for citations or disagreements with your theme. When you encounter an obstacle, your IntellAgent records what information or inspirations you need, and goes out in search of them. When you are awaiting information or approvals from others, your IntellAgent interacts with theirs to deliver what you need to complete your efforts. And because project work relies so much on research and innovation, your IntellAgent doubles your results in half the time. Feasible? *Absolutely!* Cost-Effective? *Definitely!* Disruptive? *Definitely!*

Disrupt-O-Meter

100 100 100

Feasibil.   Cost-Effect.   Disrupt.

### 1b. Near-Term Scenario: Bonnie O'Neil's Rule-Based Databases

In the early 1990s Bonnie O'Neil, a database consultant, was inspired to establish the first real innovation in databases since Codd's relational revolution: Rule-based databases. Ms. O'Neil worked with a group of database luminaries, together with database vendors, to establish a new standard for the use of databases with business rules.

This idea, with the resulting standard, eased the implementation of data warehouses and the potential for data conversions, as well as solving the information management challenge of the preceding 30 years: *"Separate the business rules from the logic, and make them accessible to the customer."* And what does this have to do with the PM software industry? It established the foundation for a transformation in the way Enterprises collect, manage, use, reuse, and store project information—after all, the most valuable project information, in most cases, is a series of if—then statements: *business rules*.

This particular discontinuity scenario began with Hedge Funds using business rules with neural networks (self-learning networks of computers working concurrently to solve wicked problems) to game the U.S. stock market, often by selling short in derivatives. This discontinuity next proceeded to the project world. As mentioned in the trajectory scenarios, most project decision-making is based primarily on information, with supporting data. Much of that information is recurring risks/issues/failures (and successes) and lessons learned. The final link: Those can all be expressed as business rules in your business rules enterprise engine, a massively parallel neural net workstation.

A simple example: *If* there is a freeze in Florida in March, *then* the cost of orange juice will go up by 25% in June. Add a consequences engine, and you no longer need a Monte Carlo simulation module to model 1,000 instances of a risk/threat, you can merely search your active project histories. Need to bid a project? Add your project attributes to your selected competitive strategy (Win on price, win on prior performance, or win on business development relationships). Your workstation will prepare your bid as specified in the request for proposal, then coach you through the project delivery when you win the contract. Feasible? *Probably!* Cost-effective? *Probably!* Disruptive? *Definitely!* **Thanks Bonnie!**

Disrupt-O-Meter

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Feasibil.	Cost-Effect.	Disrupt.
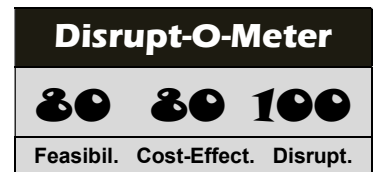
1c. Near-Term Scenario: Collaboration Impacts From Virtual Project Worlds

This discontinuity scenario also has its roots in the past. You may recall the adventure games from the early 1980s. The idea was to navigate a virtual environment (using up/down/left/right arrow keys), overcome challenges or puzzles, and find the gold. Primitive, but engaging, they were. Today's manifestation consists of virtual communities where you immerse in three-dimensions and engage in interaction and discovery. Second Life is our favorite as of this writing, although it is only one example, and others will arise. How does this scenario affect PM software? We'll tell you in a bit, after we complete our transaction for a new wardrobe for our avatar: we did not like the corporate-issued version. OK, follow closely: Every project is virtual, because the product does not yet exist. It is a vision, ideally held by an enterprise executive who will serve as project sponsor or champion. The project manager works with that sponsor to flesh out the vision in a simple project charter, then create a likely team. That team further fleshes out the vision with business objectives, preliminary scope, approach, effort, needed talent, cost and duration estimates, and a next phase or next stage plan. Your executive group funds and approves the effort—and it is still all in your imagination!

This entire set of transactions could take place between avatars in any of the virtual world tools. The advantages include eliminated travel time to distant locations. Technology limitations, such as sharing a document at a face-to-face meeting, are already being solved through GoogleDocs, Microsoft's Sharepoint Server, or other online community tools. And while research at Purdue University and other places has shown how your avatar can respond to all your body movements using sensors in your clothing, other research determines participant mood and satisfaction with meeting proceedings by "watching" facial expressions and eye movements. The finishing touch: those personal viewers mentioned earlier are superseded by a multi-sensory (even smell is transmitted, because *you can smell fear*) three-dimensional holographic environment in which you and your project team plan, execute and close out even your most complex projects—at least those that produce soft products. You will still have to be "onsite" for the hard-product periods to pave a road, build a skyscraper, or run clinical trials. At least for the last half; and at least for now. Feasible? *Definitely!* Cost-effective? *Definitely!* Disruptive? *Absolutely!*

Disrupt-O-Meter

100	100	100
Feasibil.	Cost-Effect.	Disrupt.

1d. Near-Term Scenarios: Changing Requirements from Governments

The scenarios presented so far benefitted the innovators and early adopters. But looming is *Son of SarbOx*, the next round of government regulation. Expensive, stringent and ineffective regulations enacted by the United States and other nations to deter corrupt enterprises are relaxed to increase productivity and revive struggling world economies after the 2008 crash. Then, a new wave of re-regulation strikes. Its basis is the need for greater enterprise transparency, coupled with legislative and voter anger over perceived excess pay and profits in some industries, plus the necessity for struggling governments to replace taxes lost by economies in chaos. This new legislation enacts regulations and taxes that cause a new era of centralization in all enterprises. Even not-for-profit organizations having revenues above a certain level are affected.

Draconian information monitoring and reporting requirements stifle any enterprise activity that contains unmanaged risk, or poor transparency, or both. Projects in many enterprises are curtailed or eliminated, causing those enterprises to degrade services or fail. Of course, enterprises that intelligently and consistently apply our Ten PM functions continue unscathed. Moreover, the PM consultancies that specialize in developing organizational PM performance competence cannot fulfill all the demands for their services, as interest in their specialties soars.

The affected enterprises' trauma only lasts four years, but in that time entire industries are gutted. First-world countries become third-world. Resource-rich and agricultural economies thrive (nations in Africa send food and economic aid to the US), but most of the services, knowledge and financial industries take years to recover—and the gap between savvy project oriented enterprises and those that are not continues to grow. Governments on all continents gently nurse their struggling economies back to health, eliminating corporate and capital gains taxes, and establishing worldwide flat taxes. Out of the chaos, Phoenix-like, a new world economy gradually emerges, even stronger than former ones at their peak: This is the 2017 new project intelligence economy—in more ways than one. Feasible? *Absolutely!* Cost-effective? *No way!* Disruptive? *Absolutely!*

Disrupt-O-Meter

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Feasibil.   **Cost-Effect.**   **Disrupt.**
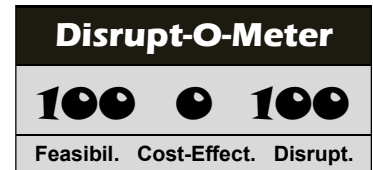
2. Longer-Term Discontinuity Scenarios

Now we move from the short-term scenarios to longer-term ones; our samples are few, compared to the potential for many more discontinuities. Again, two threads are consistent: increasing support for project management functions in existing markets, and growing the market. As we move closer to a project-oriented culture, the latter will have the greatest impact.

2a. Longer-Term Scenarios: IntellAgent-Facilitated Meetings Improve Effectiveness

Do you spend a significant amount of time in meetings? Is that your most productive time? Whether it is a cross-functional managers' meeting, a staff meeting, a project team meeting, or a facilitated project kick-off meeting, too many meetings today waste your time. Worse, they are not the type of event that generates stakeholder passion for more such meetings. Despite John Cleese's identification of the problem *and* the solution over 30 years ago in his popular video, *Meetings, Bloody Meetings*,[16] today's meetings are worse, not better. Many enterprises could save massive amounts of money and make huge productivity improvements just by making their meetings more effective.

Imagine a time when your personal communication device's IntellAgent could prepare you for all your meetings, coach you through your key talking points, and help you complete the needed follow-up. Voice recognition captures and categorizes all comments. Using recorded knowledge and processes, your IntellAgent learns how to improve your processes, interactions, and the results of each session. It adds new topic processes as meetings evolve them. Need a SWOT (strengths, weaknesses, opportunities, threats) analysis? Your IntellAgent does a better job than you can to guide the process. This capability exists today, but does not reach critical mass until longer-term because of participant concerns about their power being eroded. Feasible? *Eventually!* Cost-effective? *Definitely!* Disruptive? *Yes!*

Disrupt-O-Meter

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Feasibil.   **Cost-Effect.**   **Disrupt.**

2b. Longer-Term Scenarios: Plug and Play Project Plans

The concept of reuse took longer than expected to achieve adoption, due to its nemesis, the *Not Invented Here* syndrome. PM software leaders, reinforced by project intelligence brokers, institutionalize the profitable exchange of vital project information, processes, and metrics. One obvious business driver is the interest of brokers who profit from bringing buyers and sellers together. Another unexpected (for some) driver is the emergence of PM competence (or capability) as the new taxonomy for project management, rather than focusing only upon knowledge. The roots of this scenario go back many years: PMI published the *Project Manager Competence Development Framework*—Second Edition, in 2007. Before that, the IPMA Individual Competence Baseline for Project Management (1996, 2003, 2014) introduced, then popularized the demand for performance-competence in project management practices, building upon PM knowledge documents.

The consequence: No more reinventing the wheel. If it has been done before, you can license, from a shared library, a reusable, tailorable PM Plan, you can adapt it for your current project's attributes, link it to enterprise strategies, and see the majority of the risks you will encounter (threats *and* opportunities). All of this is tuned for your project by (once again) your IntellAgent. The new competence taxonomy establishes the needed framework for concurrent interaction of multiple elements, allowing modeling and simulation of project scenarios as a dynamic way to plan, monitor and control projects.

Leveraging other scenarios in this chapter, alerts "pop up" with possible paths, and consequences of actions taken. Project managers, project management office consultants, and executives spend more time evaluating consequences of action (or inaction) and less time trying to sort out data. Feasible? *Yes!* Cost-effective? *Definitely!* Disruptive? *Yes!*

Disrupt-O-Meter

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Feasibil. Cost-Effect. Disrupt.
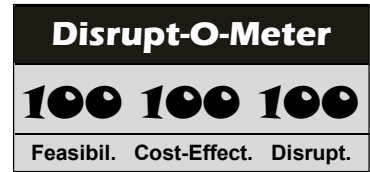
2c. Longer-Term Scenarios: Socket To Me and the Wisdom Tooth

Our last disruptive scenario (we have many more) is longer term, but is just a small step beyond the preceding ones. By 2020 or so, Kurzweil[13] predicts that computers will catch and exceed humans in processing power. Coupled with massive storage and the ability to tap larger networks when needed, this new technology leverages our earlier scenarios to reach new markets. The first innovation is the *Socket to Me* chip. Capable of storing the knowledge, business rules and project intelligence of more than 1,000 project experts, the chip is powerful, yet very small. Now the differentiator between enterprises and between PM practitioners is not their years of training and knowledge, but their ability to harness, reuse and apply the encapsulated intelligence of others. Of course, the prior steps of learning to capture and use project intelligence, plus the PM competence taxonomies and the use of tagging for easy reference, were prerequisites to this advancement.

The chip is located in a socket surgically implanted near the base of your spine (a freeway to the brain), and runs off body electricity; chips can be swapped into the socket, based on the nature of the work you perform. There is only one known disadvantage: it depends on your willingness and ability to be a life-long learner. Two successive releases appear, and further miniaturization and need for speed prompts a new location for the chip: The distance from the base of the spine is now the greatest barrier to performance. The third generation, a much faster, much smaller chip, called the *Wisdom Tooth*, is implanted in the open spots in your upper jaw—and has direct access to the brain. But the disruption is not as far-reaching as imagined. As observed by guest expert Ludo Hauduc,[D] knowledge alone does not accomplish all the needed results: *"Everyone knows the notes, but there is only one Mozart."* Religious experts are concerned about the societal impact, amid fears that we are trying to become god-like. Those concerns are quelled when people who were active in the movements of the 1970s observe that we have finally figured out how to *tap our cosmic consciousness*. Feasible? *Perhaps!* Cost-effective? *Maybe!* Disruptive? *Yes!*

Disrupt-O-Meter

50 50 100

Feasibil. Cost-Effect. Disrupt.
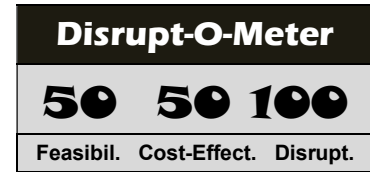
3. Summary of the Discontinuity Scenarios

It is difficult enough to predict the impact on market penetration and market size of any one of these discontinuity scenarios. To predict the compounded impact of any two or three (or more) would be impossible. Yet they all range from quite feasible to just perhaps so. Clearly, they will not only vastly grow the market for project management software, they will also demand higher levels of use of the functions the software delivers. They will require other changes, for those companies that survive. And because the market leaders *"are great people filled with great ideas"* (a quote from Joel Koppelman[E]), new business functions, and increased software support for them, will continue to increase the gap between the leaders and the laggards.

80% of Potential Market by 2025

E. Implications of the Project Management Software Industry Scenarios

Based on assertions made in this chapter, the reader might assume that the majority of today's enterprises are troglodytes—ancient, backward, slow-moving entities. On the contrary, those Enterprises that are not among the project management software early adopters have carefully chosen their market position. While they may have not yet made project management their differentiator, they are often the leaders in their marketplace (or government-space) *based on excellence in their ongoing business processes.* This excellence may come from combinations of procedure efficiency, customer focus, product or service selection, financial management brilliance, ability to attract and keep talent, or other factors.

Moreover, while project-oriented enterprise leadership and process-oriented excellence are not mutually exclusive, enterprise managers and leaders must manage each work type completely differently. For example, *"Starve the process"* is a typical approach in a process-oriented enterprise. They use statistical control to track the process quality and only intervene—adding needed resources or funding—when the defect rate exceeds bounds. In a project-oriented enterprise, you must *"Feed the project."* If you instead starve the project of needed funding or resources, you delay delivery, hamper needed scope and quality, and significantly delay or eliminate benefit realization. *This is a completely different mentality,* and a different method of managing and operating. The integration of a project portfolio with financials, operations, and all other enterprise aspects, is a huge first step in bringing together both sets of strengths, while balancing them all.

Implications For Project Management Software Vendors*.* Many project management software vendors have burst onto the scene with novel ideas. Next, they either established their niche, got absorbed by larger enterprises, or died out. As the project management software market broadens and deepens, we see a coming flood of great new ideas and players, just as we saw in the roaring 1980s. At the same time, consultancies also thrive, in part just because of the talent needed for the massive growth in market size. Of course, both vendors and consultancies must show their differentiating competences.

Implications For The Practice of Project Management*.* Project management practice has changed from the 1970s, when the majority of projects had full-time, experienced project managers. By the mid-1980s, PM was often an added "spare-time" assignment for roles ranging from business analysts, to developers, to engineers. It was expected to take no time (if it did, it was treated as overhead), and no training or experience. Except, of course, in the leading enterprises, where project management was often a step up the ladder, on the way to higher management positions. With the emphasis on PM competence beginning in the 1990s, championed by nations (Australia, New Zealand, and South Africa) and professional organizations (International Project Management Association), managers in smarter enterprises realized that trained, experienced, competent and high-performing practitioners were the key to their project and program success.

And, the training and experience was not limited to the easy-to-test technical areas of project management. Instead, savvy leaders focused on the harder-to-learn parts of the discipline that contributed most to project and program success: Interpersonal and Leadership skills, and Organizational Context and Strategic Linkage. They built the foundation for the transformation of the practice of project management in the 2000s, resulting, for a few, in huge increases in project success over the next 20 years. Still, as identified by guest expert Ludo Hauduc,[D] both practitioners and their enterprises will need to change old habits (specifically around reuse and improving collaboration effectiveness) to maximize those increases.

Implications For Executive Transformation*.* The greatest project management challenge for many executives is to get timely, actionable project information. Over the last 20 years, enterprise executives have been increasingly frustrated by the lack of visibility into an increasing proportion of their enterprise portfolio, that of projects. Many have responded by inserting more layers of middle managers between them and "the problem." As described in *Lets Cure the Dumbing-Down of Project Management,*[17] changes occurring today will improve visibility, especially into leading (rather than lagging) indicators of project success. Couple that with the integration of projects and programs, operations, and financial capital management in one true enterprise portfolio (with better plans and honest status tracking). Add the prediction by guest expert Dr. Kraft Bell[A] that the software will present the needed information tailored in the style, format, and level of detail needed by each individual executive: They can thus achieve piercingly clear vision into all of their domain, enabling better decisions, faster. But with others, the damage has been done; as predicted by our expert, Ron Brown,[B] many frustrated executives will retire before the needed and actionable information—and delivery systems—are available.

Implications For Organizational Change Management*.* It is not just project practitioners and executive managers who will see change. Entire organizations will change their structures, their strategies, their prioritization processes, and their reward systems. As the practice of project management becomes the universal core management discipline, the enterprise learns to manage change as well as it manages the status quo today. You know, competent project managers have always been *Change Agents*, and Organizational Change is the most demanding. De-Taylorizing[18] the enterprise reverses the deskilling of "assembly-line" process workers, in the factory, the field, and the office. We will broaden the skill, experience, discretion and rewards for talent, and accelerate the flow of actionable information. The enterprise collaborative network blows away the rigid inflexible, information-thwarting power-seeking old hierarchy. The nearly-trite call of the 1970s, "Information Is Power" is reborn and partnered with "Competence Leads Success." Those who demonstrate competence have the power to apply it. Those who do not, have the option of gaining it—or to retire. It costs the enterprise less to pay them to leave, than to keep them on. Energized talent soars in an environment wealthy with collaborative project success.

Implications For Societal Impact*.* As mastery of project management and its related practices begins by age seven (or when students begin working in teams), project management becomes, not a separate profession, but a core competence for all disciplines. Its value-add is clearly perceived by all who desire beneficial change. Clear understanding of the need for scalability allows adaptation or tailoring and combination of different methods or emphasis for projects of varying size or complexity. Highly complex projects or programs, such as major disaster recovery, use appropriate project management approaches, thus accelerating rescue of those affected, and recovery from negative economic impact. As basic knowledge, experience, and wisdom become commodities, *innovation, interpersonal skills and communication effectiveness* become the differentiator between nations, industries, and individuals. And what is the role of the project management software industry in all this change? Merely the catalyst, available for the ready reagents of the willing enterprises.

F. To Summarize the Project Management Software Industry Visions of 2025

We have identified a wide range of scenarios for a possible future of project management. Clearly, the software industry will evolve and innovate. **Will you?** To do so, thus gaining your needed career transforming take-aways from the predictions in this chapter, we suggest the following actions:

- Move beyond the easy-to-master technical aspects of project management, and focus more on the factors that are 90% responsible for project and program success: The Behavioral/Leadership skills, and Business Context savvy. After all, if all the knowledge you need to succeed can be leased on a chip, your personal style and savvy is your only advantage.
- Focus upon *information* in planning and managing a project; share the right information in a timely way that accelerates managers' decision-making; communicate also the data that shows the amplitude of importance for each decision.
- Share and re-use forward-looking project information, rather than merely focusing on easy to track, but hindsight-oriented data. Seek opportunities to truly learn from your own and others' lessons, rather than merely recording them.
- Focus too, on your communication skills: Improve your frequency and effectiveness with executives, managers, other key stakeholders, internal and external clients and customers, suppliers, and of course, project team members.
- Remember to pursue change in the right sequence: Policies, Roles & Responsibilities, Processes, and then Tools.

Your challenge is to adopt the practices, adapt the interpersonal skills, and continue to develop the PM Performance Competences you—your peers—and your enterprises—need, to thrive through 2025, and beyond.

G. Reference Information

Chapter Contributors: Guest Talent Interviewees

This chapter benefitted from the insights of our expert panel, listed in alphabetic sequence below, whom we convened and who participated to contribute their vision, insights and time. We cite their insights and "sound bites" with end note referenced as A-F in the text. We also blended into this chapter many of their opinions, predictions, concerns, and respect for the practice and practitioners of project management. We very much appreciate their comments and their perspective.

[A] **Dr. Kraft Bell** is a visionary, yet practical consultant on business strategy, IT alignment, project management, and cultural change. Dr. Bell was vice president and distinguished analyst for Gartner, as the resident expert on corporate strategy, the business value of IT, and a keynote speaker on enterprise change management at Gartner's portfolio, program, and project management conferences. Dr. Bell is valued by top IT, corporate, and government executives for actionable advice that insures viable business strategies, enterprise change, and issue resolution. Dr. Bell has spent 25 years working with executives and teams in medium and large-sized firms in the United States, Europe, and Japan on enterprise, project, process, and change management. He is now CEO and executive consultant for RKB Strategic Change Consulting, as well as vice chairman and chief change officer for a transformational start-up with an industry-changing, integrative solution that delivers the highest quality at lowest total usage cost.

[B] **Ron Brown** speaks for visionary executives of enterprises that are customers of project management software vendors. Mr. Brown is a senior executive and consultant with extensive business and program management experience. He has served in the following industries: applications software; information technology; technical and systems software, internet software and services; and medical laboratories and research. He has worked for or completed engagements with Fortune 5000 companies, including HP, AT&T, Procter & Gamble; and Exxon. Mr. Brown's significant experience at the Executive and Enterprise level brings a unique mix of business perspective and program management experience to challenging technology-change initiatives. He is a certified Project Management Professional (PMP®) and is a member of PMI®, IPMA-USA, and CTEK. Ron has a MBA in information and operations management.

[C] **Edmund Dante** is president and CEO of Delta Group International (DGI), providers of the enterprise portfolio management tool Proconsul. Dante brings a history of project management software tools innovation to our chapter. Prior to establishing DGI, Mr. Dante founded Princeton Management Sciences, which developed and marketed Project Bridge in North America as well as in Europe with The Hoskyns Group, a major consulting group in London. Project Bridge was acquired in 1990 by Applied Business Technology, where Ed continued to evolve and promote the capabilities of the product, renamed Project Bridge Modeler. After Project Bridge, he developed The Enterprise Process Continuum (EPC). EPC became the Platinum Process Continuum (PPC), which was acquired by Computer Associates in 1999. Mr. Dante's latest work-in-progress, Proconsul, extends his vision of the complete project and process portfolio management tool to include projects *and* operations in the portfolio.

[D] **Ludovic Hauduc,** general manager at Microsoft, is responsible for product development and strategic direction of the Microsoft Project Business Unit. Ludovic has been involved with the Microsoft Project team since 1994. Prior to this role, he led the development team for Project Professional/Standard, Project Server, and Project Portfolio Server. Mr. Hauduc holds a BS in computer science from ESIGELEC, an electrical engineering school based in France. His insights for this chapter that we especially appreciated focused on the sociological and enterprise changes needed to benefit from today's and tomorrow's project management software. He cited the need to change old habits, and recognize and reward those who do so. See Microsoft's enterprise project management solution website by starting at: office.microsoft.com/project.

[E] **Joel Koppelman** co-founded Primavera Systems in 1983 with the vision of creating project management software for the IBM PC and revolutionizing the way people plan and control projects. Now, after 25 years of consecutive growth and profitability, Primavera is now a Global Business Unit of Oracle, having been acquired in October 2008. The company is a leading provider of project, program, and portfolio management software in the world and its nearly 600 employees offer industry-specific solutions to customers in 85 countries. Mr. Koppelman co-authored the PMI best-selling book *Earned Value Project Management* with Quentin Fleming. Among his other activities is the funding, through the PMI Educational Foundation, of an unique project management approach for complex projects, such as disaster recovery. For current information, see Primavera.com. As this chapter went to press, Primavera was acquired by Oracle.

[F] **Vladimir Liberzon** is the architect of Spider Project. He has been involved in project management since 1975. He first developed project management software for mainframe computers in the USSR in 1978. Mr. Liberzon is a mathematician and developed many of Spider Project's algorithms. Today he is a well-known project management consultant and trainer and serves as vice president of the PMI Moscow, Russia Chapter. Spider Project was originally presented in 1993 at exhibitions in Russia and Germany. Even in 1993, it had many advanced features including skill scheduling, parametric estimation of activity durations, resource-constrained scheduling optimization, etc. Since then its development has been continuous and today it is powerful project portfolio management software with many unique functions. As of 2008 Spider Project is in use in 22 countries. See Spider Project at (English website version): www.spiderproject.ru/aboutus_e.php.

H. About the Author

STACY A. GOFF, *the PM Performance Coach*, has coached and inspired tens of thousands of project and program managers, and hundreds of organizations, on five continents, for over forty years. A Project Management practitioner since 1970 and consultant since 1982, he has also been a strong contributor to professional organizations such as IPMA® and PMI® since 1983.

He is a co-founder and past-president of IPMA-USA, and 2011-2014 Vice President of Marketing & Events for IPMA, the International Project Management Association. In September, 2015, he was named an IPMA Honorary Fellow.

Goff's interest in project competence and performance began with establishing a PM Competency Center for a nuclear power plant in the early 1980s. It continued with international engagements during the 1980s and 90s as he helped organizations assess and improve their project and program performance. Today, he coaches, speaks and performs keynote speeches at major project-related events. And, he continues to pursue his interest in individual, project team, organization, and national and international PM performance.

Mr. Goff brings a results-oriented approach to Project Management coaching, consulting, and training. His insight for the needed PM Competences, and his delivery of effective training translate to improved project performance. In his working life, he combines his Project experience with sensitivity for the interpersonal skills areas—the human aspects of projects.

In his papers, presentations, workshops or in consulting, he combines his project experience with strategic linkage for all projects and programs. His insights and experience have provided competitive advantage for his clients for over 40 years. His business result: measurably increased **PM Performance**.

Contact Stacy at +1.719.488.3850, email: Stacy.Goff@gmail.com. His website is https://StacyGoff.com

I. About The Book

This is one chapter of a book published by Project Management Institute in October 2009. The book, Project Management, Circa 2025, was edited by Dr. David Cleland and Dr. Bopaya Bidanda, with chapters from PM practitioners from all over the World. With PMI's support and encouragement, chapter authors speak at Congresses, Symposiums, and meetings, to help promote the book's ideas. Chapter authors receive no proceeds from our efforts (aside from a copy of the book); we contributed our insights for the benefit of professionals and practitioners in Program and Project Management. As noted in the footer, we have permission from Project Management Institute to re-use and post our chapter.

End Notes

[1] The author, Stacy Goff (stacy@StacyGoff.com), has used this list of Ten PM functions to evaluate PM Methods Improvement needs and to perform project management effectiveness analysis since 1980.

[2] Rogers, Everett M. *Diffusion of Innovations*. Free Press of Glencoe, 1962.

[3] The source of this saga about the scheduling software? That young Fortran developer is the author of this chapter.

[4] Many buyers of these powerful tools contracted with consultancies that helped scale them down to the much-smaller-projects those buyers more often managed. This demonstrated early understanding that "one size doesn't fit all."

[5] That consultancy is Stacy Goff's, the chapter author. Learn more about the Small Project Guide™ at the StacyGoff.com website.

[6] The author collaborated with Ed Dante during 1987; both were working on similar concepts, and benefited from each other's insights. This chapter focuses on Ed's achievements, rather than ours, to avoid self-promotion. Our IT methodology product, The Project Guide, with its *IntellAgent* Plan By Example™ tool, has served from 1985 through today.

[7] *PM Methods Improvement Plan* is a methodology for improving project management processes. It helps increase success with all new project management methods. A copy is available at: StacyGoff.com.

[8] There are many popular social or business networking sites as of this writing; LinkedIn is more business-friendly than others, while still having enough of the same features as other sites, so most generations embrace it.

[9] *The Standard for Portfolio Management.* Project Management Institute, 2006.

[10] In 1983, the author classified projects by size, established minimum staffing requirements for each size range, set the ideal duration, and identified the primary roles of the project manager. A white paper that explains the size ranges and key success factors for each, *The Successful Project Profile*, is available at the StacyGoff.com website in the *Articles* section. Note that other organizations have their own preferred size ranges and rationales.

[11] *Project Levers and Gauges* is available in the *Articles* section at the StacyGoff.com website.

[12] *Risk Management: Key to Project Intelligence,* presented at the IPMA 2005 World Congress in India, is available in the *Articles* section at the StacyGoff.com website.

[13] Kurzweil, Ray: *The Age of Spiritual Machines*. Penguin Books, 1999. This book predicts key changes in computer and societal development decade-by-decade, predicting how computers will have caught up, then surpassed human processing speed and capacity by the year 2020 or so.

[14] Moore, Geoffrey A,: *Crossing the Chasm*. Collins Business, Revised edition 2002.

[15] Gery, Gloria: *Electronic Performance Support Systems*. Gery Performance Press, 1991.

[16] *Meetings, Bloody Meetings* is available for personal use through most libraries, or for commercial use through johncleesetraining.com. Although it was originally produced in 1976, it is still totally relevant and useful today.

[17] *Lets Cure the Dumbing-Down of Project Management* is in the *Articles* section at the StacyGoff.com website.

[18] The term *de-Taylorizing* refers to reversing the de-skilling of processes instituted by Fredrick W. Taylor, the father of Scientific Management. His scientific approach to optimizing manufacturing and other repeatable processes revolutionized mass production in the early 1900s. However, some feel the process went too far. The Quality movements of the 1980s began the re-enrichment of knowledge workers' (including project managers) jobs.