

Development of the SMART™ Project Planning framework ☆

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Abstract

This paper presents work on development and testing of the SMART™ Project Planning framework. It is based on research into causes of both project failure and success. An empirical study of what industry practitioners think is important for effective project planning formed the basis of the study. Using this study, and other resources, a planning approach was developed that was designed to be holistic, integrated and risk sensitive. Field tests of the approach on live projects followed. The framework presents a unified approach to project planning, integrating both hard and soft aspects, enhancing current tools and techniques, and improving the project planning process by providing internal validation. Competence in project planning is reinforced as a cornerstone to effectively managing and leading projects.

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1. Introduction

It is widely recognized that poor project planning plays a major role as one of the significant causes of project failure. Numerous methods and techniques have been developed over the years on various aspects of managing projects from initiation to completion. Despite good coverage of project planning in project management books, conference proceedings and journals [1,2], a significant number of projects still fail in one way or another [3].

Projects do not often suffer from devastating failure. They do, however, have a propensity to run over budget, take longer to complete than was originally anticipated or fail to deliver on expectations in terms of quality, scope, safety or some other key stakeholder expectation.

Root cause analysis on numerous projects over an eight-year period suggests that these failures are com-

monly triggered by some form of communication breakdown. Causes of success and failure in projects have been studied and documented – with partially consistent findings – for many years and by many researchers, observers and authors.

This paper sets out the issues related to project success and failure as presented in the selected literature. These issues are then explored in the context of empirical data collected over eight years to assess industry practitioners' views of specific aspects of project planning and related activities, tools and processes. The issues are identified so that a rationale can be established to determine what we need to re-evaluate or re-emphasize in good project management practices.

We report on a new framework for project planning that resulted from this review. This planning framework represents the first step in a back-to-basics approach to project management. It uses established, modified and new tools, processes and competencies to help deliver a better project plan. Our paper is presented using the following approach to set the scene and present our findings:

- (a) Identify factors related to project success and failures through an on-going literature review (1995–2002) and empirical studies.

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- (b) Consider whether a “new” approach to project planning may be needed.
- (c) Expand the model to develop a more holistic approach.
- (d) Show how the resulting framework was validated and tested in the field on live projects (case based).
- (e) Conclude by comparing the results obtained using this new planning model against those obtained from more traditional approaches.

1.1. Factors related to success and failures

A significant number of projects exceed their original budgets, run late or fail to meet their objectives. Various studies suggest that the overall success rate is not more than 40%, whereas for Information Technology projects the rate of success is even lower [3]. Approximately 50% of construction projects and 63% of all information systems overrun their budget by between 40% and 200% [4].

Discovering which factors lead to project success has been a subject of interest to project management practitioners and researchers for a long time, and a number of studies have been carried out on the subject. The results have been widely published in project management literature (e.g. [5–13] and many others).

Following is a partial list of some of the main issues related to project success and failures, as identified from the selected literature review:

- Despite all the advances in project management theory and practice, project success rate is still below 40% for construction, engineering and other projects and even lower for IT projects [3].
- Only a small number of methods, tools and techniques are used and many respondents reported drawbacks to the methods, tools and techniques they had employed [3].
- The Project Management Institute’s (PMI) PMBOK [14] covers generic processes and practices. It fails to address some of the technical, and many of the commercial or environmental issues that are so often crucial in determining whether a project will be a success or not [15].
- Defining the scope, cost and time targets is probably less than half the battle; ensuring that the technical, commercial, business, environmental and other factors are effectively aligned with organizational and control issues is generally fundamental to ensuring an optimum output [15].
- Front end, business, technical and commercial issues are very important and receive little coverage compared to traditional (time, cost, scope and quality) subjects in the project management literature [15].
- Specifically, the triple constraint of time, cost and quality is becoming positively dangerous [16].
- There are differences in perception of project success factors and criteria among stakeholders [17,18].
- The single most important contributor to project success is to agree the success criteria with stakeholders at the start of the project, and things other than time, cost and quality may be important to the stakeholders [19–21,18].
- There is a need to develop metrics for project performance to have a clear link between project success and corporate success [22,23].
- Lack of proper communication is one of the major reasons for the failure of many projects to meet their expectations [13,21], [24,25].

In addition, the following needs have been highlighted by project management researchers and practitioners:

- There is a need to quantify and justify value for money – Return On Investment [26].
- A balanced score card approach helps target success criteria at the front end of a project [27].
- Alignment with corporate strategy is important [20,21].
- Meeting or exceeding stakeholders requirements and expectations is a pre-requisite for perceived project success [17].
- Success criteria should be clearly defined at the outset of the project [23].
- Simplification, standardization and integration of tools and processes is necessary [21].
- Alignment of the perception of success and expectations of stakeholders is needed throughout the project management process from inception to completion [18,28,29].

The SMART Project Management framework takes into consideration the importance of these factors and has been developed to help address them in an appropriate manner. This “appropriate manner” is to recognize the uncertainty inherent in planning and to clearly articulate it, thus helping to set and manage realistic expectations. Another key element is to plan based on how people manage rather than obliging project teams to try to manage the way people plan. The latter routinely leads to a practical disconnect between planning and doing.

1.2. Why do we need a “new” approach for project planning

We can see both from literature and from observations by practitioners engaged in real projects, that dissatisfaction with the current state of project planning processes and tools continues. Due to the continuously increasing complexity of projects, more traditional project management methods are becoming increasingly inadequate and paradoxically seem to be too complex.

New methods of analysis and management are needed [30–32].

The SMART Project Management framework addresses most of the concerns cited above in today's challenging projects, and has provided an integrated solution considering business, technology, processes, as well project drivers, team effectiveness, communication and stakeholders' concerns.

The SMART approach was developed in response to demand for better ways of delivering projects in tomorrow's world. It is built out of tools, processes and competencies. The *tools* provide the mechanisms for planning and implementing projects effectively. The *processes* offer ways of applying the tools, depending on the size, impact, complexity, uncertainty and attractiveness or appeal of the project and program in question. Finally, the *competencies* add and effectively harness the knowledge, experience and skill that make good project managers and their teams great. Finally, a balanced approach is advocated. In the SMART approach, this balance is between business issues (what are we trying to achieve?), technology (how are we going to do this?) and social issues (who is involved and whom do we affect by the changes created by this project?).

Fig. 1 illustrates some of the things that need to stay in balance for a project to be successful. The darker a section of one of the bars relating to elements of a project that need to be managed, the greater the focus of that element is on the issues and trust evolution continua. Equally, the shift from reliance on project management tools to process and then to competence follows. On the basis that this shift relates to maturity in

project management, we can note in particular that there appears to be a relationship between maturity of project management skills and the needed shift in focus from technical issues to business and then social ones. Equally, the reliance on measurable (competence based) trust to more ethereal (intuitive) trust also follows this pattern.

1.3. Empirical study

Based on the initial literature review, we developed an instrument to collect empirical information from practitioners in different industries in order to determine what is important for project success (Critical Success Factors), what is measured during the project (Performance Metrics) and what the project drivers were (Project Priorities) over the various phases of projects. This instrument was based on a structured interview and contained a mix of Likert scale based questions as well as open-ended ones. We also investigated the different perceptions of three major stakeholders, namely of Owner, Consultant and Contractor on these elements over the various phases of a project. For the purposes of our study we defined an Owner as one who pays for the project and receives benefits. A Consultant was a (trusted) professional advisor. A Contractor was a primary supplier of goods or services. We also captured information regarding the use and importance of various tools, techniques and processes. We collected data on over 100 projects from eight different industry sectors over a six-year period. Also, variation of critical success factors over project lifecycle has been studied earlier by

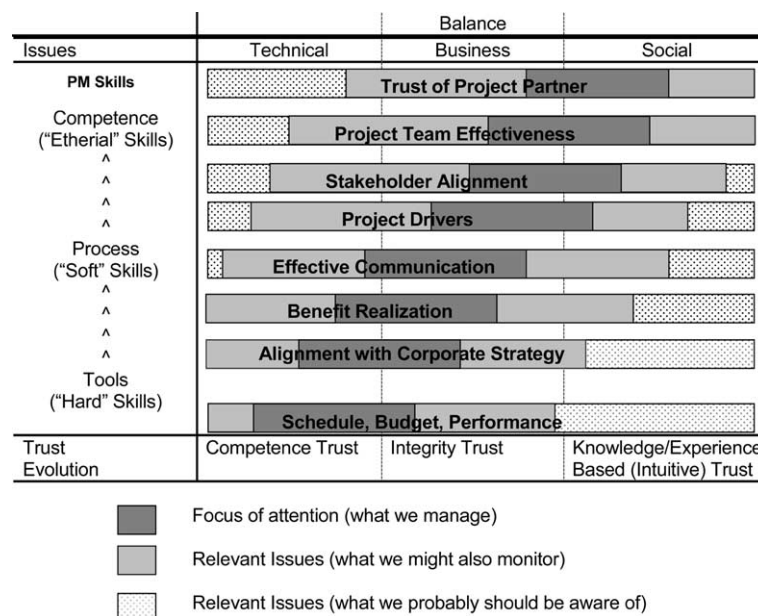


Fig. 1. Balance in project management (selected issues).

Thamhain and Wiloman [33], Pinto and Slevin [34,35] and others. Some of the results of the study have been published in [17,36,37,29,28,38].

A brief summary of key findings from this extended study follows:

- Different sets of project success factors, metrics, and priorities are important for different industries. Contrary to the findings of previous studies, a single set of project success factors may not be suitable for all industries.
- There was lack of alignment among stakeholders on success factors, metrics used and project priorities, and this phenomenon was consistent!
- The way project success was measured changed over the life of the project, with time and cost typically being the most important priorities during the project definition to execution phases. However, client satisfaction became the most important priority and suc-

cess criterion at the termination phase. This was consistent across industries and over time.

- Career development and training was the lowest of the project priorities for most industries. This helps explain low learning and high repetition of old mistakes in most industries and enterprises. Knowledge management is almost non-existent.
- There were differences in importance among major stakeholders regarding what is critical to project success (critical success factors), what is measured during project phases (metrics) and what the project drivers (priorities) were. This emphasizes the need to define project success factors and criteria (metrics) as well as priorities at the outset of the project, and aligning stakeholders on these critical elements.
- The importance of critical success factors, metrics and project drivers changes over the phases of the project. We need to understand what is important

Table 1
Sample cases

Case	Case outline (industry sectors)	Key issues at project outset (pre SMART planning)	Benefits observed
A	Completion of a runaway IS project: Implementing a new accounting system. Value: \$18 million (US). Overall schedule 2.5 years (IS in Oil and Gas company)	Project was late, over budget and not delivering results after 2 years of work. Team was dysfunctional. Project failure was creating new problems based on need for regulatory compliance.	Project re-planned. New budget (small adjustment) and new schedule agreed with Board of Directors. Project was successfully delivered on (new) time and budget. Board, executive, system users, contractors and team were very happy with results.
B	Re-planning of multi-billion dollar capital project (Oil and Gas Company)	Un-qualified risks and misalignment of stakeholders caused anxiety. There was no agreed definition of completion or success. Completion was variously defined as “mechanically complete” and delivered nameplate production for 12 months. The same date was used for both, though these are about 18 months apart.	Risks identified, assessed and managed. Alignment of stakeholders achieved. Potential of substantial cost and schedule overruns identified and explicitly mitigated. Key stakeholders were consulted and brought on board with the charter and metrics for success (production, operating cost, downtime)
C	Program of 20 Storm Water Management Projects worth \$40 million in total (Municipal Government)	Sequence and priorities of projects defined based on standard procedures. Standard engineering solutions adopted. Budget could not cover all proposed projects.	Sequence modified to suit real priorities and to create synergies between projects. Selected projects solutions were challenged and savings of over 50% on some projects were achieved through innovation and teamwork.
D	Delivery of new technology in record time and using a geographically distributed team spread over three countries and five locations (Telecommunications)	Technology release required in 1/3 of previous record time. Severe financial penalties for delays. Untried technology, new client and lack of faith by team in senior management who made commitments and project manager who promised success.	Project performance criteria split into “must have”, “should have” and “nice” parts. Focus of team-based planning on “must have” components. Creative solutions developed jointly with client. Success redefined to be achievable in specified timeframe. Second project spawned to provide “should have” and “nice” components later. Project manager was promoted to Vice President as a direct result of his success on this project.
E	Film festival with a very tight budget. Annual event (Entertainment)	New team; no history or learning from past years; lead sponsor dropped its funding; program already published and secured funding was falling short.	Project redefined to include finding new source of funding. Success metrics helped identify need for refocusing effort. Festival got new sponsor. Project was a success. Improvements for delivery the following year were identified.

at various phases of the project, e.g. management style (what type of management style is suitable at a particular phase), stakeholders' involvement (who should be involved, when, and to what extent), communication (when, how, and with whom).

- We noticed discrepancies in what is regarded as important (critical success factors), and what is measured during the project (metrics), that shows we often measure the wrong things.
- An understanding of how changing project priorities during the various phases of the project affect how we plan and manage is needed in order to manage projects effectively.
- Risk *management* is a relatively rare phenomenon, though risk *identification* is increasingly common.

1.4. SMART Project Planning framework

The SMART framework was developed by looking at both the tools and practices used by good or exceptional project managers, enterprises or industries and the primary causes of failure observed through root cause analysis as well as existing literature. This framework is detailed in the PMI (Project Management Institute) book "Don't Park Your Brain Outside – a Practical Guide to Improving Shareholder Value with SMART Management" written by Francis Hartman. The supporting planning tools were developed by testing of modified and new tools on live and real projects. As with a good dentist and her selection of which instruments to use, we did neither expect nor encourage use of every tool on every project. The overall approach is based on

Tools (Awareness), Processes (Performance) and Competencies (Mastery). The words in brackets imply levels of maturity in project planning and management.

SMART Project Management has developed as a generic approach to managing projects, with ideas taken from a broad range of industries and project managers. It has now been tested on over 800 projects in the period from 1994 to 2002 (see Table 2). All of the projects on which SMART was tested came ahead of schedule and budget as well as producing or exceeding the expected results with two known exceptions at the time of writing: one where the team reverted to traditional project management and the other where the project was rightfully cancelled as a result of SMART planning. The sponsors base success of these projects on internal comparisons to other similar projects.

Good planning is the foundation on which project success is built. So, it made sense to focus on the planning phase of a project to enhance success. The key considerations on which the SMART planning framework was developed included the following issues:

- The business, technical and social outcomes for a project need to be clearly articulated at the outset and need to support the sponsor.
- A planning and management strategy needs to be consistently built and applied through development and implementation of the plan, based on both project priorities and how the project will be managed.
- Planning needs to be completed at an appropriate and credible level of detail to accommodate the realities of uncertainty and increasing complexity.

Table 2
Distribution of projects

Industry	Rating ^a			Project types	Approx. # of cases	Time period ^b			
	<100	101–1000	>1000			A	B	C	D
Government	◆	◆	◆	Infrastructure, Social Development, Taxation, Reorganization	235	◆		◆	◆
Oil and Gas		◆	◆	Pipelines, Exploration, Refineries, Infrastructure, IT	45		◆	◆	◆
ICT ^c	◆	◆	◆	IS/IT, Telecommun., New Product Development	185	◆	◆	◆	◆
Entertainment		◆		Film, Theatre, Staged Events, Museum Shows	5	◆		◆	
Construction	◆	◆	◆	Heavy Civil, ICI ^c , Subcontracting, Hospitals, PPP ^c	55		◆	◆	
Defence/Aerospace		◆		IT, New Product Development, Training	2	◆	◆		
Management Consulting	◆	◆	◆	IS/IT, Reorganizations, M&As, Change Management	235			◆	◆
R&D	◆	◆		University, Startup Commercialization, Product Development	30			◆	
Other	◆	◆		–	45	◆	◆	◆	◆

^a Rating is based on a score from 1 to 3125 (5⁵) calculated by multiplying the assessment on a Likert scale of 1–5 of the projects under the headings of Impact, Complexity, Uncertainty, Constraints and Ugliness.

^b The time periods reflect four stages of development of the SMART framework. A = 1994–1997: testing of components; B = 1995–1999: integration of components; C = 1997–2002: validation of integrated framework; D = 2000–now: full commercial application of framework.

^c ICT, Information and Communications Technologies; ICI, Industrial, Commercial and Institutional; PPP, Public/Private Partnerships.

- Stakeholders' expectations need to be met or managed from the outset and throughout the life of a project. Alignment of stakeholders is key and should be confirmed and tested.
- The plan should be formulated based on what is normally the basis on which we prefer to manage, measure and monitor: deliverables.
- Risk and uncertainty need to be reflected in the plan. Risk needs to be managed or mitigated. Uncertainty needs to be acknowledged in budgets, schedules and other elements of the plan, including performance outcomes or key results. Stakeholder expectations need to be managed to accommodate the real uncertainties of today's projects.
- The process of building a plan should nurture an effective team, trust, open communication, creativity and a shared vision of success.
- Flexibility needs to be built into the plan to accommodate inevitable changes with a minimum of disruption and as few surprises for stakeholders as possible.
- The plan should be easy to track performance against, and to adapt to actual conditions without compromising the intent and success criteria of the project.
- The project charter is the team's license to spend sponsor money. To be implemented effectively, the charter and the project plan need to be synonymous.

These primary considerations led to the evolution of the planning framework and development or adaptation of the tools needed to support it.

1.5. Elements of SMART

SMART is an acronym. There are four aspects to this framework for managing projects. Projects need to be Strategically Managed, stakeholders, management processes and other factors need to be Aligned, we should work with Regenerative teams and we work in a Transitional world. Let us look at these elements in a bit more detail.

1.5.1. Strategically managed

The project needs to be of value to the sponsor organization for it to be successful. This means that there is a clear line of sight from the mission of the project to the objectives and strategy of the enterprise. Tools in this area include those that help identify and select the projects that should proceed and be funded. CheckPoints and OffRamps are special milestones that serve as stage gates where the projects are revalidated and the next round of funding is provided or the project is modified or cancelled. These are integral to the SMART framework.

1.5.2. Aligned

Alignment of three things is needed: Stakeholders with the objectives of the project, team members with the project plan and the priorities for the project with

the metrics to be used for management. In the absence of this alignment the project will suffer from rework and other energy draining activities and determination of success at the end will be arbitrary.

1.5.3. Regenerative

A regenerative team is one that has the following seven ingredients: open communication, ownership of job, a propensity to take risk, a high level of trust, fun in the work place, creativity and tribalism. These are discussed in detail in [21].

1.5.4. Transitional

This element of SMART shines the spotlight on the need to manage complexity, uncertainty, change and risk. A number of tools can be used to help do this, but the management of stakeholders' expectations is of paramount importance in this area. As the project and its environment change (which they will inevitably do) the best project managers spend a significant amount of time in keeping stakeholders informed of the changes and their impact on the project. We make course corrections on all projects to reflect the shifts in wind and current. If the helmsman or other crewmember does not know of our intent we will not make the changes effectively or even at all. If our plan is too constrained, we will experience unnecessary difficulty and pain in making necessary changes.

1.6. Key differences in approach

Central to the SMART Project Management planning framework is the Project Charter. This Charter is both the project plan and the project team's license to spend the client's money. As such it must answer the pertinent questions that buyers are entitled to have answered. To provide a framework for development of these answers, the Charter uses a number of devices at each of the Tools, Process and Competence levels. Four of the core devices used are briefly described below. Note that we refer to the "differences" in this description. These differences are not universal in that they reflect observed good practice but do not necessarily reflect common practice.

2. SMART breakdown structure (SBS)

This is similar to a work breakdown structure with a few notable differences. The term "differences" was discussed in the previous paragraph.

2.1. Differences in the tool

- The top of the SBS is the mission of the project. It defines the problem we are trying to solve and provides

a vital link to the buyer's objectives or corporate strategy.

- The second level identifies key stakeholder groups, their expectations and the results that will lead (by definition) to achieving the mission. This helps identify conflicting agendas and resolve issues between these stakeholders at the outset rather than at, or near the end of, a project. It contains the result of an effective stakeholder analysis.
- The third and subsequent levels identify, in the form of tangible deliverables, what will be produced by the project team in order to meet or support these expectations as identified in the second level.
- Two other parts are included in a SBS: Exclusions – what will NOT be delivered and parked items—those deliverables we do not know what to do with. The parking lot should be empty as we near completion of the project.

2.2. Differences in the process

- If there is no supportable link between the mission for the project and the objectives of the buyer or sponsor, the project should be cancelled. Equally, it should be cancelled or modified if the resulting value proposition does not support the values and strategy of the sponsor organization.
- The SBS is developed by the team, not just the project manager or by project controls specialists or a planner. For the purposes of SMART Project Management, the “team” includes the client, key subcontractors and suppliers (if available) and the other important or influential stakeholders. If such stakeholders are not available, every effort is made to accommodate their interests and address their likely concerns.
- Stakeholders (level 2 of the SBS) are not just identified. We rank them in order of importance and influence on the project. Later the stakeholders themselves will agree to this order. It will help us in management of expectations and priorities.

2.3. Differences in competence

The SBS makes some key connections. The most important of these, from a project delivery perspective, is the link between key results, the stakeholders who have a particular interest in them and the deliverables that define their achievement. This facilitates management of stakeholder expectations as deliverables inevitably are modified over time. Another important connection lies in the link between the project and corporate strategy. Yet another is the connection between stakeholders and conflicting expectations. Part of the resolution of such conflicts lies in the pre-agreed priorities of stakeholders' needs in the context of this project (see differences in process).

3. Priority triangle

This is a refreshed “iron triangle”. The intent in refreshing and using this tool is primarily to help identify latent disputes associated with priorities and how this project should be managed. The differences lie in a number of areas.

3.1. Differences in the tool

We draw the tool as an inverted triangle with a dividing line along each of its three axes. Fig. 2 shows this priority triangle. The “X” shows priorities to be set as P (= performance, a combination of scope and quality) as most important, T (time) as second and C (cost) as a third priority. A total of six permutations are possible for project priorities. Each of these six alternatives implies a quite different approach to how we plan and manage the project.

3.2. Differences in process

Again, the team is involved in developing the priorities for the project. Experience has shown that individuals within the team will select most, if not all of the possible permutations of priorities for the project. The process is to determine which option is the right one and then work with the other stakeholders to understand what it would take to align their interests with those of the project and the rest of the team. Most often, setting one set of priorities will help bring out differences of opinion, *and* help us as a team, to identify what is required to improve alignment of stakeholders with project objectives.

3.3. Differences in competence

The SMART priority triangle validates priorities tested or disclosed using other tools (such as the three

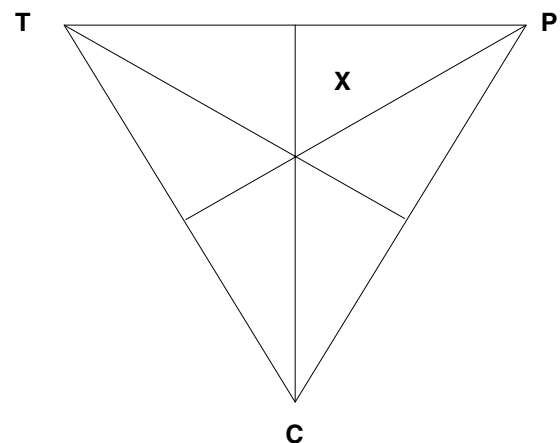


Fig. 2. Priority triangle.

Key Questions). It also recognizes the ambiguity (overlap) between quality and scope: deletion of some feature may be a reduction in quality to the customer but is a reduction in scope to the project deliverers.

The “inverted” triangle is drawn this way as a reminder. Balance in juggling priorities is of constant importance throughout the life of a project. Sometimes we can even predict changes in priorities by phase and even by deliverable. Accordingly, a project may have a number of different priorities for different parts. If time is of a critical nature overall, but one element of the project needs to be driven on performance first and cost second, then we know that this element must never be on the critical path if we are to manage these priorities differently. Also, in addition to float time, this part of the project will carry an appropriate and specific cost and labour contingency.

4. Three key questions

These three questions address fundamental issues relevant to understanding the project objectives and necessary to validate what we learned in development of the SBS.

4.1. The tools difference

- The following three questions are asked together.
 - (a) What is the final deliverable for this project? Check: delivering this defines the successful completion of the project.
 - (b) What is everyone praising this project for? Check: the success of this project is directly proportional to the measures of success of this/these result(s).
 - (c) Who will decide (vote on) the answers and the outcomes of questions (a) and (b)? Check: did we identify the right stakeholders and their key results in the SBS.
- Experience has shown that answers to these simple and apparently obvious questions have routinely been neither simple, nor obvious. For example, some common issues include:
 - (a) Everyone knows when the project should be finished (date), but most people disagree on what triggers this:
 - Work is done by the contractor.
 - Operations have accepted the facility/project.
 - Management are satisfied that they will achieve the expected return of investment.
 - Down time, measured over a specified period is within acceptable limits.
 - The product of this project performs (in some proven way, over a specified period) as expected or better.
 - The warranty period is over.

- The contractor has been paid... and many other non-congruent outcomes that are clearly delivered at different times.
- (b) What is identified as important to stakeholders is not measurable at the time of completion of the project or, in some cases, ever. This makes success of the project a matter of OPINION and therefore a constantly moving target.
- (c) A key stakeholder was missed in the development of the SBS, and this may result in rethinking of the scope, priorities and other factors affecting the project plan.

4.2. Process differences

- The team develops, negotiates and agrees upon the priorities of the project as set out through use of the priority triangle.
- Each phase of a project may have different priority drivers.
- Plans are aligned with priorities for that phase or deliverable, thus reducing stress, conflict, ambiguity and often rework.

4.3. Competence differences

These usually are the result of understanding that priorities, once set, will fundamentally change the way we plan and deliver a project or a part of it. Aligning the priorities for a project element driving the planning, scheduling, estimating, risk management and other steps produces a more robust plan with less conflict and usually, with greater ownership of the plan by the project team.

5. RACI+ charts

RACI in this context stands for Responsibility, Action, Coordination and Information. The “+” represents additional information that, when added to this chart, makes it more useful. A sample RACI+ Chart is shown in Fig. 3.

5.1. Tools differences

Three additional elements are typically added to a SMART RACI+ chart, the first is a short term schedule, usually in the form of a Gantt chart spanning about six weeks. The second is the work hour budget for each deliverable in the Gantt chart. Note that we schedule production of deliverables, not “activities”. Thus a product is delivered at the end of each bar in the Gantt chart. The third addition is the budget associated with the deliverables.

RACI+ Rolling 4 week project schedule: (Project Name)

For the period: July 15 to August 15

Project Manager: Name

Project Team: Names

Milestones: **M1-M2: Requirements**

Key:

R = Responsible for deliverable

A = Action (does the work)

C = Coordination - consulted on the work, has input

I = Information - informed about the work, reviews output

S = Sanction - who has to sign on to accept the completed work i.e. agree on format and quality standards

*Planned and Actual hours are only for action items for this activity

1=Planned Work Hours for each assigned Action

2=Actual Work Hours for each assigned Action

RESOURCES

ACTION	Planned Start	Planned Due	Started	Completed	Name	1	2	Name	1	2	Name	1	2	Name	1	2	Total Planned Hours	Total Actual Hours	Delta Hrs	Planned Cost	Actual Cost	Delta Cost
Major Deliverable	19-Jul	5-Aug	17-Jul																			
First activity	19-Jul	21-Jul	19-Jul	23-Jul	R			A	10	7	I			C			10	7	3	\$4	\$2	\$2
Second activity	21-Jul	23-Jul						R			A	15	20				15	20	(5)	\$5	\$3	\$2
Third activity	26-Jul	28-Jul			A	10	10				R			A	10	15	20	25	(5)	\$6	\$4	\$2
Fourth activity					C			R			A	10	9	A	5	9	15	18	(3)	\$7	\$5	\$2
Fifth activity					I			A	15	15	C			R			15	15	0	\$7	\$6	\$1
Total Effort						10	10		25	22		25	29		15	24	75	85	(10)	\$29	\$20	\$9
Major Deliverable	19-Jul	5-Aug	17-Jul																			
First activity	19-Jul	21-Jul			R			A	10	7	C			I			10	7	3	\$4	\$2	\$2
Second activity	21-Jul	23-Jul			A	15	20	S			I			R			15	20	(5)	\$5	\$3	\$2
Third activity	26-Jul	28-Jul			S			C			A	20	25	I			20	25	(5)	\$6	\$4	\$2
Fourth activity					I			R						A	10	10	10	10	0	\$7	\$5	\$2
Fifth activity								S			A	20	20	R			20	20	0	\$7	\$6	\$1
Total Effort						15	20		10	7		40	45		10	10	75	82	(7)	\$29	\$20	\$9
Major Deliverable	19-Jul	5-Aug	17-Jul																			
First activity	19-Jul	21-Jul			A	5	3	R			C			S			5	3	2	\$4	\$2	\$2
Second activity	21-Jul	23-Jul			A	5	10	C			A	10	10	R			15	20	(5)	\$5	\$3	\$2
Third activity	26-Jul	28-Jul			S			I			C			A	20	25	20	25	(5)	\$6	\$4	\$2
Fourth activity					A	15	18	S			I			R			15	18	(3)	\$7	\$5	\$2
Fifth activity					R			I			S			A	20	25	20	25	(5)	\$7	\$6	\$1
Total Effort						25	31				10	10		40	50		75	91	(16)	\$29	\$20	\$9

Deltas: Negative is bad,
Positive is good

Fig. 3. One interpretation of a RACI+ chart.

5.2. Process differences

- A rolling-wave approach is used to develop the RACI+ chart. The time horizon for this is often six weeks but is typically discussed and set by the team to reflect the complexity of the project.
- Ownership of every deliverable is important. The 'R' defines the person who is responsible for delivery of that deliverable.
- RACI+ charts map out who needs to communicate with whom, when and at what level of detail.

5.3. Competence differences

One of the primary causes of project failure is a breakdown in communication. Communication plans are often developed for larger projects. Understanding the use of the RACI+ chart to fill this role within the team, and how to keep awareness of communication alive has significantly reduced issues associated with either miscommunication, inadequate coordination or a failure to inform a key participant.

Other tools that were used in this study for development of the Charter included:

- A 3-D (Drop Dead Dates) Schedule was used to establish key dates for completion of deliverables, decisions, reviews and realignment of stakeholders.
- A Risk Matrix and Schedule [21] were used to develop an understanding and awareness of risks and

how they would be managed as well as how they might impact the interim and final project outcomes.

- Monte Carlo Risk analysis was used to obtain an assessment of likely outcomes for all major success metrics.
- Rolling-wave planning was used in conjunction with modified CPM Scheduling and Gantt charts. RACI+ charts and checklists were used to add detail as needed, in conjunction with the SBS, to implement the plan.
- The SMART Global Positioning System – a reporting, forecasting and re-planning tool was used for tracking, reporting and archive purposes as well as for proactive earned value assessments of the probability for success in future weeks.
- SMART checklists and other tools were used for capturing learnings and supporting process improvement.

A full explanation of how these tools are integrated with the elements of SMART is provided in [21].

Typically, project-level reporting was handled through a one-page graphical summary of status addressing performance and expected outcomes against schedule, budget, priorities, risks and key results.

Not all of the tools listed above were used every time. It seems that good project managers, like good dentists, use as few tools as possible to get the job done – and use these tools as efficiently and painlessly as possible.

6. Case studies

The SMART framework has been tested on numerous live projects both large and small, and in due course was improved and enhanced based on the lessons learned during planning and implementation. A summary of sample cases is offered in Table 1. These cases were selected out of many to illustrate some key points. While much was learned on each implementation, space limitations dictate being selective. The projects were selected to reflect some of the diversity (size, industry, time span, key issues and benefits) in these projects and to show how each contributed to the continued development of the SMART framework. The framework remains a “work in progress”. We hope it will continue to do so for many years as more practitioners adopt and contribute to it.

7. What SMART planning has added

First, traditional project management is not an absolute set of tools and practices. We define it, for this comparison, as being the material embodied in or implied by the Project Management Institute PMBOK™ [14]. The purpose of this partial comparison – in the form of “what was added or is new” – is to highlight a few of the key observed differences in project performance and project management practices.

1. The clear and explicit link between the project and the sponsor's and other key stakeholders' corporate strategies was added. This has helped the project team understand and integrate project business drivers, technical constraints and requirements and social issues into the project plan. A plan that is more sensitive to corporate needs resulted from this process and as a consequence project performance appeared higher.
2. Alignment of stakeholders with project objectives was made a central part of planning, leading to greater ownership and commitment from team members and sponsor (or client) alike. Alignment of project metrics with expected key results kept the focus at both planning and implementation stages on what the project was really about, not just schedule, cost, quality and scope. This typically resulted in greater flexibility to respond to changes.
3. In the end, it is the project team that delivers the needed results. Development of the team, how it will function and its buy-in to the charter were key elements addressed in the planning phase. Communication maps for project implementation were developed using RACI+ charts. On-boarding processes, timing of on-boarding sessions and revalidation of the project (OffRamps and CheckPoints) were integrated into the planning process. A regenerative work envi-

ronment and a sense of commitment was not only identified but also actively measured and maintained throughout the life of the project.

4. The volatile nature of the business climate in which many projects were tested helped prove out the need to manage stakeholder expectations regarding the resulting uncertainties and risks. Risk mitigation included alternative plans and pre-made decisions at CheckPoints and OffRamps based on the ranges of likely outcomes at key points in the plan.
5. The repeated criticisms of traditional project management observed in the literature were validated in as much as addressing these criticisms – at least in part – has led to significant and measurable improvement in project performance. The IPMA (International Project Management Institute) body of knowledge (BOK) and the Association for Project Management (APM) of the United Kingdom on which the IPMA BOK is based offers a broader and more complete inventory of project management knowledge and skill than the PMBOK™ [14] of the Project Management Institute of North America, further reinforcing the findings in the work reported in this paper.

Here is a final comment on the empirical study and the results of field-testing the SMART Planning (and implementation) approach. As implementers, we were astounded by the apparent dramatic – and consistent – improvement in performance using this approach. The differences we observed or recorded were based on comparing actual costs, schedules and performance assessments (the latter, only where available) from similar past projects by the sponsor organizations. These sponsor organizations included a broad range of companies from some of the largest multinational corporations to relatively small local companies. The projects too, were quite diverse, so not all of them had historical data for benchmarking purposes. In these cases, we worked with the estimates prepared by the sponsor organization adjusted to reflect the outcomes of a risk assessment that we had completed for the project.

8. Conclusions

Over the course of testing the SMART framework, the following primary observations were made:

1. The project Charter and the Plan drift apart and become disconnected unless they are treated as the *same set of documents*.
2. A simple one-page summary showing planned, actual and expected end states for budget, schedule, scope, key results, priorities and risks helps keep key elements integrated and aligned.
3. The simple one-page summary can only be successfully implemented through a fully integrated approach to project planning and delivery and by

addressing real issues that affect the success of the project, such as expectations of stakeholders and how the project should be managed.

4. Process, including negotiation and facilitated creativity are key components to effective planning. All key stakeholders need to be involved, or at least fairly represented, in the planning process.
5. The plan needs to be assembled on the same basis that we manage day-to-day activities: plan the way we do activities, not vice versa.
6. The plan serves two critical roles: done right, it keeps participants informed and engaged and it helps in managing stakeholder expectations. It is a critical communication tool.

Good planning enabled creativity and supported both team formulation and effectiveness. It brought out innovative ideas that led to cost or time savings. More traditional approaches to planning have conventionally stifled innovation. In some cases it led to significant changes to the project as new opportunities were identified, or assumptions were challenged. And in other cases it led to cancellation of a project because the cold light of reality showed it to be unachievable as proposed.

The final conclusion is that observations by researchers and practitioners in recent literature are correct: we do need better ways to manage projects. Performance improvements resulting from SMART project planning implementation suggest that these changes at least are headed in the right direction. There is still a long way to go.

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