

First Principles of Project Management

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This paper is an update of an earlier version that generated some vigorous exchanges. It sets out a philosophical discussion of the fundamentals of project management and tries to address some of the issues raised. It is not expected to be either definitive or final.

Introduction

There is a wealth of literature describing projects in all areas of project management application, what was achieved, how it was achieved and how successful were the results. Similarly, there is a wealth of literature providing advice on how to do project management – and presumably do it better. Based on this experiential material, various attempts have been made to assemble ‘bodies of knowledge’ and thereby articulate the role and content of project management^{1, 2, 3}. Such documents have been used in several countries for the development of individual certification and competence testing, and/or by enterprises for establishing corporate standards of practice.

While there is much material as noted above, there appears to be very little material available when it comes to identifying basic ‘principles’ and the theories that might support them. This absence means that the building of a project management profession or discipline is presently based only on project experiences and opinion and not on any reasonable theoretical foundation. Ideally, what is needed is a generally agreed and testable set of elemental ‘principles’ of project management which provide a universal reference baseline for a set of generally acceptable ‘practices’.

To emphasize that we wish to focus on the *founding* principles of project management, we will use the term ‘*First Principles*’.

It may be asked “Do we really need a set of ‘First Principles of Project Management’”? The problem is that within a corporate environment, understaffing is generally considered good business practice. However, projects require contingency allowances to accommodate risk events so that the practice of under-resourcing is a recipe for failure. Hence the need to promulgate a set of generally agreed fundamentals.

So what should be included as a ‘First Principle’? The key appears to be whether or not the principle is universally fundamental to project success. (See additional comments under Discussion: First Principles Generally.) However, the meaning of project success, like a number of other key terms, is debatable. So, in order to lay a foundation for this discussion, we commence with definitions for the leading terminology we use in this paper.

Definitions

We are well aware of the many and varying nuances arising from different definition wordings, but it is the intent, rather than the detail, that we are concerned with here. (For more on this topic, please see the Wideman Comparative Glossary of Common Project Management

Terms on line on the PMForum web site at <http://www.pmforum.org/warindex.htm> Click on 'Library' and then on 'Glossary PM Terms'.)

First 'Principles'

In general usage, there appears to be some ambiguity when it comes to the use of the words "principles and practices". Moreover, in the marketplace, the term 'principle' appears to be used indiscriminately to mean either.

Webster defines a 'Principle' as "a general truth, a law on which others are founded or from which others are derived..."⁴

Cleland and Kerzner go further in defining 'Principle' as follows⁵:

1. A fundamental rule or law of action based upon desirable ends or objectives. A principle is more basic than a policy or a procedure and generally governs both.
2. A fundamental truth, or what is believed to be truth at a given time, explaining relationships between two or more sets of variables, usually an independent variable and a dependent variable; may be descriptive, explaining what will happen, or prescriptive (or normative), indicating what a person should do. In the latter case, principles reflect some scale of values, such as efficiency, and therefore imply value judgments.

Webster defines 'Practice', on the other hand, as "customary use, method or art of doing anything...". Cleland and Kerzner do not include a definition for this term.

Thus, 'Practice' is a way of doing things and 'Principles' and 'Practices' may be distinguished by the difference between 'What' and 'How'. In Cleland and Kerzner's second definition there appears to be some overlap perhaps reflecting the confusion evident in the marketplace.

At first glance it would appear that the use of the qualifier 'First' with 'Principle' is redundant. However, in scientific circles, the idea of 'First Principles' is a common concept describing root or axiomatic ideas that provide the absolutely essential foundations for further thought and analysis. Since we are interested here in the very origin of project management, we use the term 'First Principle' advisedly.

Project

There are many and varying definitions of the term 'project'. For our purposes: "A project is a novel undertaking to create a new product or service the delivery of which signals completion. Projects are typically constrained by limited resources." Also for our purpose, such a project is viewed from the perspective of the 'owner' or 'sponsor' and begins when resources are dedicated to its specific goal, commencing with activities such as 'Concept Exploration' and 'Definition'.

Product Scope

Product Scope, typically but loosely just referred to as 'scope', is used in the narrower sense of "The definition that describes the project's product deliverables."⁶ This is not the same as the 'Scope of Work' which describes "The work involved in the design, fabrication and assembly of the components of a project's deliverable into a working product."⁷ The term 'product' includes the delivery of a 'service'.

Quality Grade

We use the term 'Quality Grade' to distinguish it from the term 'Quality' which is typically taken to mean "The totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs."⁸ Quality Grade on the other hand is "A particular attribute of an item, product or service, which meets all minimum project requirements but which may be delivered according to a class ranging from 'utility' (purely functional) to 'world class' (equal to the best of the best)."⁹ As such, Quality Grade is a separate variable. It is also the most enduring in terms of project success.

Project Success

Project success is a multi-dimensional construct¹⁰ that inevitably means different things to different people. It is best expressed at the beginning of a project in terms of key and measurable criteria upon which the relative success or failure of the project may be judged. For example, those that¹¹:

- Meet key objectives of the project such as the business objectives of the sponsoring organization, owner or user, and
- Elicit satisfaction with the project management process, i.e. that the deliverable is complete, up to standard, is on time and within budget, and
- Reflect general acceptance and satisfaction with the project's deliverable on the part of the project's customer and the majority of the project's community at some time in the future.

Project success is closely linked to opportunity and risk. Projects by their nature are risky endeavors and some project hazards cannot be entirely avoided or mitigated even when identified. Since project success may be impacted by risk events, it follows that both opportunity and risk are necessarily shared amongst the participants.

It is also important to note that success criteria can change with time. That certain objectives were not achieved does not necessarily mean that the project was a failure.

Project Customer and Project Community

Rather than project stakeholders and constituents, we prefer the more focused terms 'customer' and 'community'. Project Customer is the immediate recipient of the product of the project, who will use it and is in the best position to evaluate its acceptability after a suitable period of learning. The 'customer' may be more than one person. Project Community includes anyone who is impacted by project activities or its product, either directly or indirectly and for better or worse.

Criteria for Establishing a First Principle

To identify a set of 'First Principles of Project Management' we must set criteria for their acceptance or exclusion. The following criteria are proposed.

A First Principle of Project Management must:

1. Express a basic concept or idea.
2. Make for a high probability of project success as defined above. The corollary is that the absence of the condition will render project success on a majority of the key criteria as being highly improbable.
3. Provide the basis for supporting practices that can be proven through research, analysis and testing.

In addition and ideally, a First Principle should:

1. Be universal to all areas of project management application.
2. Be capable of straight forward expression in one or two sentences.
3. Be self-evident to experienced project management personnel, and
4. Carry a concise label reflecting its content.

First Principles of Project Management

Based on the foregoing criteria, the following 'First principles' are proposed. These principles build extensively on the work of John Bing¹². All the principles make certain assumptions about the team players involved. For example¹³:

1. Everyone is working towards the same or similar goals, whatever those might be.
2. Everyone is being honest with one another.
3. An appropriate level of skill or experience is available as needed.
4. Everyone wants the project to succeed.
5. Everyone is clear and agrees on who the customer is.

1. *The Commitment Principle*

An equitable commitment between the provider of resources and the project delivery team must exist before a viable project exists.

The provider of resources (money, and/or goods and services, and general direction) is typically called the project's 'owner' or 'sponsor'. The project delivery team is responsible for developing appropriate strategies, plans and controls for applying the necessary skills and work to convert those resources into the required deliverables or product. An 'equitable commitment' means that both parties are sufficiently knowledgeable of the undertaking, the processes involved and their associated risks, and both willingly undertake the challenge.

The owner of the project must understand that even with appropriate management controls in place, there must be a sharing of the risks involved. The attributes of both parties should encompass relevant skills, including those of the technology involved, experience, dedication,

commitment, tenacity and authority to ensure the project's success. (See also Discussion: Commitment Principle below.)

2. The Success Principle

The measure of project success, in terms of both process and product, must be defined at the beginning of the project as a basis for project management decision making and post-project evaluation.

It is axiomatic that the goal of project management is to be successful, otherwise the incurring of this management overhead is a valueless exercise. First and foremost, project success needs to be defined in terms of the acceptability of the project's deliverables, e.g. scope, quality, relevance, effectiveness, etc; secondly in terms of its internal processes, e.g. time, cost, efficiency, etc. The timing of the measurement of success itself may also need specifying. Without agreement on the project's success criteria, it will not be possible to measure its ultimate success. (See also Discussion: Success Principle, below.)

3. The Tetrad Trade-off Principle

The core variables of the project management process, namely: product scope, quality grade, time-to-produce and total cost-at-completion must all be mutually consistent and attainable.

This principle is an extension of both the Commitment Principle and the Success Principle. The core variables of product scope, quality grade, time-to-produce and total cost-at-completion collectively, often loosely referred to as scope, quality, time and cost, respectively, are measures of internal project management efficiency. If these variables prove not to be mutually consistent and attainable, the commitment is neither equitable nor are key success criteria likely to be met. The interrelationship of these four separate variables are somewhat similar to a four-sided frame with flexible joints. One side can be secured and another moved, but only by affecting the other two.

4. The Strategy Principle

A strategy encompassing first planning then doing, in a focused set of sequential and progressive phases, must be in place.

All project work should be planned first and then done. This 'plan-do' sequential process forms the basis of every project life cycle and can be expanded to suit the control requirements of every type of project in every area of project management application. The project life cycle, characterized by a series of phased 'milestones' determines when the project starts, the 'investment' or 'control' gates through which it must pass following completion of a major milestone, and when the project is finished. The nature of the project life cycle (as distinct from a corporate business life cycle or even a product life cycle) is the only thing that uniquely distinguishes projects from non-projects¹⁴

It should be noted that this plan-do sequence is not limited to the project level but is equally applicable at any level of the project breakdown hierarchy. Thus, its application is just as relevant where a 'fast-track' strategy or an iterative approach is adopted.

5. The Control Principle

Policies and procedures that are effective and efficient must be in place for the conduct and control of the project commitment.

This principle is an extension of the strategy principle. The Strategy Principle determines what is going to be done and when. The Control Principle establishes how it is going to be done and by whom. The attributes of control encompass the project's assumptions, its justification and a reference baseline in each of the core variables as a basis for progress measurement, comparison and course adjustment. The attributes of good policies and procedures encompass clear roles and responsibilities, delegation of authority, and processes for managing changes in the product scope and/or scope of work.

6. The Single-Point Responsibility Principle

A single channel of communication must exist between the project sponsor and the project team leader for all decisions affecting the product scope.

This principle is an extension of the control principle. While free and transparent communication is indispensable for coordination of a complex set of project activities, this principle is necessary for effective and efficient administration of the project commitment. For example, the owner of the eventual product, if represented by more than one person, must nevertheless speak with one voice through a primary representative with access to the sponsor's resources. Similarly, the project's delivery team must always have a primary representative.

7. The Cultural Environment Principle

Management must provide an informed and supportive cultural environment to ensure that the project delivery team are able to work to the limits of their capacity.

The ability of a project delivery team to produce results both effectively and efficiently is highly dependent upon the cultural environment. This 'cultural environment'¹⁵ encompasses both internal and external project relations and values. Internally, the management style of the team leader must be suited to the type of project and its phase in the project life cycle. Externally, the management of the organization in which the project takes place must be supportive and the environment free of obstacles.

Discussion

First Principles Generally

Issue #1: Do we really need "First Principles of Project Management"? Most people seem to have managed very well without them, that is, until the trouble starts. Most projects take place in a corporate environment but the approach to corporate management and to project management are very different.

Marie Scotto has provided a compelling list of differences¹⁶. Perhaps the most significant is that “The business community believes in understaffing which it can prove is generally good business most of the time.” In contrast, projects are especially risky by their nature and need a margin of surplus if for no other reason than to take care of contingencies. For a project to be under-resourced is a recipe for failure. Consequently, a set of credible ‘fundamentals’ is sorely needed for making an adequate case to corporate management for providing the required support.

Issue #2: What should be included as a First Principle and what excluded? The key criterion is thought to be whether or not the principle is universally fundamental to project success as defined. For example, without some form of commitment there can be no project and hence no possibility of success. On the other hand, there are many major tools and techniques the application of which might be considered as essential to success.

For example, a formal work breakdown structure, schedule network, earned value analysis, change control process and so on. However, projects in many application areas are run successfully without applying these tools. So, while they may be considered good practice, they are not necessarily essential. Each such tool undoubtedly relies on its own set of principles which may be considered as secondary to the First Principles.

Commitment Principle:

Issue #3: It has been suggested that there should be a ‘Business Principle’ which states that the project must be in alignment with the sponsoring organization’s goals. This is a valid comment, but on balance this should be corporate management’s responsibility to determine that before embarking on the project. Nevertheless, a prudent project manager will satisfy him/herself that the project is indeed so aligned, and justified.

Issue #4: Similar to Issue #3, it has been suggested that there should be a separate ‘Technical Principle’ which states that the project leader and team members must be knowledgeable in the technology of the project. This is certainly true, but is deemed to be covered by the Commitment Principle in that an ‘Equitable Commitment’ is not possible without an understanding of the risks involved including those associated with the technology.

Issue #5: It must be recognized that every project ‘evolves’ through its life cycle and the commitment and tradeoffs will similarly evolve. On most projects the players will also change, as it moves through its life cycle, simply to meet the changing level of effort and skills required in each phase. Nevertheless, an ‘equitable commitment’ can and should exist for every phase of the project if the project is to remain viable.

Once again, in the real world, many projects are not set up this way. Resources are short changed or reprioritized and unattainable deadlines are set, often for the reasons described by Marie Scotto (see Issue #1 above.) Thus, the absence of this and the following principle simply means that the probability of success is greatly diminished – if not impossible.

Success Principle:

Issue #6: It has been suggested that the issue of success is so obvious as to be unworthy of a first principle. However, 'success' for a project and how it will be measured after completion does need to be defined at the beginning of the project. The most important reason is to provide an on-going basis for management decision making during the course of the project. Contrary to conventional wisdom, there have been many projects that have been "On time and within budget" but the product has not been successful, and similarly many that have not been "On time and within budget" yet by other measures the product has been very successful. Motorola's Iridium is a good example of the former while the movie 'Titanic' is a good example of the latter.

We believe that project success is much more than just "Doing what you set out to do". It is also about whether what you are doing is in fact the right thing to do. We believe that the ultimate goal of a project, and therefore its measure of 'success', should be satisfaction with the product on the part of the customer. As noted earlier, the assumption is that the 'customer' is clearly identified.

However obvious and sensible the setting of project success criteria at the beginning of a project may seem, regrettably, it is not currently a common practice. Without defining these success criteria, how can agreement be reached on a particular project's priorities, trade-offs, the significance of changes, and the overall effectiveness and efficiency of project management post-project? For this reason, a lot of conclusions drawn from experiential material could also be very questionable.

As Gerald Neal points out, the reality of life on many projects is that everyone on or associated with it does not have the same aspirations and goals. As a result "the project gets pulled in many different directions ... [by] ...status, pride, power, greed..." In most cases, this may be a little exaggerated, but even at the most elementary level, the project owner will be interested in benefiting from the product while the workers on the project will be interested in benefiting from the process. This makes the definition of a project's success even more important - to provide a reference baseline for the correction of divergent progress.

Tetrad Trade-off Principle:

Issue #7: Although the term 'Tetrad Trade-off' has been in the literature for some years¹⁷, objection has been raised because the term is unfamiliar. Perhaps this is the very value of the term – to emphasize that there are four separate but interactive variables (scope, quality, time and cost) rather than just three as in the old view of 'Triple Constraint' (time, cost and performance.) Thus, quality, the most enduring variable of the four when it comes to project success, is given new prominence. It should be stressed here again that quality means 'Quality Grade', i.e. the measure of level or class (utility to world-class) as distinct from 'Quality Conformance', i.e. "conformance to specified requirements".

Single-Point Responsibility Principle

Issue #8: John Bing likens this principle to an hourglass where the ends represent the project's owner and the project team respectively and the narrow part in the middle is the interface

between the two. While the hourglass is 'transparent' the 'sands' of decisions and approvals must all pass through the 'neck' in an orderly sequence¹⁸. Nothing in this analogy precludes proper exchange of information to coordinate all aspects of the project through a network of communication channels.

Cultural Environment Principle

Issue #9: Once again, the reality is that many managements place obstacles in the way of project progress, perhaps unwittingly because of management's functional heritage. Yet another reason for a solid set of Project Management First Principles.

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Footnotes

- ¹ A Guide to the Project management Body of Knowledge, Project Management Institute, USA, 1996
- ² IPMA Competence Baseline, International Project Management Association, Germany, 1998.
- ³ CRMP Guide to the Project Management Body of Knowledge, Centre for Research in the Management of Projects, University of Manchester, 1999.
- ⁴ The New Webster Encyclopedic Dictionary of the English Language.
- ⁵ Cleland, David, & H. Kerzner, A Project Management Dictionary of Terms, Van Nostrand, New York, 1985, p187.
- ⁶ Centre for Research in the Management of Projects (CRMP), University of Manchester, UK, 1999.
- ⁷ Turner, R. Interpreted from the Gower Handbook of Project Management, 3rd. Edn, Ch 1.
- ⁸ ISO 8402, International Organization for Standardization, Geneva 20, Switzerland.
- ⁹ Project Management Guidelines (Private BC Corporation), 1995.
- ¹⁰ Shenhar, Aaron J., Dov Dvir and Ofer Levy, Project Success: A multidimensional Strategic Concept, Research paper, University of Minnesota, MN, June 1995.
- ¹¹ This is a composite of ideas reflected in various success factors and indicators quoted in the Wideman Comparative Glossary of Common Project Management Terms at the following web site <http://www.pmforum.org/>
- ¹² Bing, John, A. Principles of Project Management, PMNETwork, PMI, January 1994, p40
- ¹³ Contributed by Gerald Neal by Email dated 9/23/99
- ¹⁴ Section 60 Life Cycle Design and Management, CRMP Guide to the Project Management Body of Knowledge, Centre for Research in the Management of Projects, University of Manchester, 1999.
- ¹⁵ For definitions of 'culture' and 'environment' in the project context, refer to the Wideman Comparative Glossary of Common Project Management Terms, see Note 11 above.
- ¹⁶ Scotto, Marie, Project Resource Planning, in Project Management Handbook, Jossey-Bass, 1998, Chapter 13.
- ¹⁷ A Framework for Project and Program Management, Editor R. Max Wideman, Project Management Institute, PA, 1991, pV-4.
- ¹⁸ Bing, John, by Email 7/15/99.