

First Principles of Project Management

By R. Max Wideman
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Principles that are established should be viewed as flexible, capable of adaptation to every need. It is the manager's job to know how to make use of them, which is a difficult art requiring intelligence, experience, decisiveness and, most important, a sense of proportion.
Henri Fayol, General & Industrial Management

Earlier versions of this paper have generated some vigorous discussion. The paper sets out a philosophical discussion of the fundamentals of project management and this revision responds to some of the latest issues raised.

Introduction

Project management is a composite activity with multiple dimensions. Depending on the type and class of project this management activity can be very complex, not least because the typical project environment echoes the 'fractal' form of the common garden snail's shell. That is to say, the same approach can be applied at every level of the management hierarchy and only the size and branch of the activity changes. For example: on a very large project, it may well be subdivided into 'sub-projects' each of which is managed as a project in its own right.

Strictly speaking, such a "large project" should be referred to as a program, but the analogy is not limited to large projects. The pieces of any sized project that are parceled out to otherwise independent operators can be considered, from their point of view, as a project which they own and manage. Similarly, the principles of project management can be applied to any level or branch of a project that falls under a different area of responsibility in the overall project organization. Under these circumstances, it is not too difficult to see that the problem of different agendas can arise and the overall goals of the project can become obscured as a result.

We should also be clear on what we mean by project management, not in terms of the traditional definitions but in terms of the scope of this management activity. For purposes of this paper, we see a distinction between technical management and project management. Technical management is the business of managing the technology of the project whereas project management is the business of managing the entire endeavor through its project life cycle process. While we draw this distinction, in the real world the two must be fully integrated but the combination varies between different project management application areas.

In the literature, there is a wealth of information describing projects in all areas of 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.

In contrast, there appears to be very little content establishing basic 'principles' and theories to support them. This absence suggests that the building of a project management discipline is presently based only on experiential records and opinion and not on any reasonably logical or theoretical foundation. Ideally,

what is needed is a generally agreed and testable set of elemental ‘principles’ of project management which provide a universal reference basis 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 the inevitable uncertainty involved 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](#).)

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; provides a guide to conduct or procedure...”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', 'Initiation' or 'Inception', etc.

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 general or fundamental truth, a basic concept.
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 establishing logical processes and supporting practices that can be proven through research, analysis and practical 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 presume certain assumptions about the cultural ambience in which the project takes place. An ambience that encourages and sustains teamwork and honesty (See The Cultural Environment Principle below) and demonstrates that¹³:

1. Everyone is working towards the same or similar project goals, whatever those might be
2. Everyone is clear and agrees on who the customer is
3. Appropriate levels of skill or experience are available as needed, and
4. Everyone wants the project to succeed.

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 measures 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 to client needs, effectiveness, etc; and 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.

It goes without saying that these measures of project success should be verified and reinforced throughout the project life cycle. As a corollary, if the success measures are no longer in alignment at any point, it should be perfectly acceptable to abort the project or at least halt it pending re-evaluation. (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 remaining 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.

The genesis of the project life cycle process, in its most basic form, is to be found in the very term “project management” itself. A project has, by definition, a start and a finish. The essence of management is to ‘plan’ before ‘doing’. Hence the most fundamental project life cycle process consists of four sequential periods of ‘Start’, ‘Plan’, ‘Do’ and ‘Finish’. Of course these four periods can be expanded into separate phases each with their own interim deliverables and Executive Control Points (or Emergency Exit Ramps.) These can be designed to suit the control requirements of every type of project in every area of project management application. Indeed, this sequence is, in effect, equally applicable at every level and branch of the project organization. It is also just as relevant where a ‘fast-track’ strategy or an iterative approach is adopted.

The importance of this life cycle process and its influence on the management of the project cannot be over emphasized. This relatively short-term life-to-death environment, and the consequences that flow, is probably the only thing that uniquely distinguishes projects from non-projects¹⁴

5. The Management Principle

Policies and procedures that are effective and efficient must be in place for the proper 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 Management Principle establishes how it is going to be done and by whom. The attributes of this management 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 maintaining quality, time and cost, etc. as well as 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 management principle and 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. However, this only applies to the decisions affecting the product scope and hence the project’s overall cost and schedule. In all other respects, free and transparent communication is indispensable for the coordination of a complex set of project activities. Therefore, this principle must not in any way inhibit the proper exchange of information through the network of project communication channels that is required to integrate all aspects of the project.

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 product. 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”.

Cultural Environment Principle

Issue #8: 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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R.M.W.

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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.