

PROJECT MANAGEMENT AS A PROFESSION: CHALLENGING THE PARADIGM

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Synopsis

After ten months reviewing the current status and direction of project management as a profession, the author has found many more questions than answers. An observer could be forgiven for thinking that there is a long way to go before project management as a discipline is well understood, and even for questioning whether the journey to being a recognised profession is necessary at all. Is the move to professionalise project management merely a manifestation of the political aspirations of project management associations - or something which will inherently add value to society?

This paper brings together a wide ranging collage of ideas, concerns, issues and concepts considered by the author to be relevant to the current project management paradigm. Although some time is spent discussing the role of the project management standards, the topics raised are much broader, ranging from fractal theory to work-to-role in organisations. The last part of the paper provides a status summary and addresses the question "*Where to from here?*"

Definitions

BOK. The project management body of knowledge (project management BOK) is the world-wide collection of documented project management experience and ideas as they exist today. Elements of the BOK include books, journals and articles, conference papers and academic course notes. They can be found in libraries, at conferences and on the web. The BOK is by nature broad, diverse and has obscure boundaries. It is constantly growing.

Project. For the purposes of this paper, a project is any organised activity with a unique objective, produced by people for stakeholders and operating within finite resources including time.

Complex Projects and Complex Project Environments. Throughout this paper it will generally be assumed that the projects referred to and their environments are complex. Complex projects are long term and involve the risk of failure for a variety of reasons. Project teams are larger rather than smaller, and involve people of different cultures, backgrounds and levels of knowledge and skills. The external environment is also generally complex, including the needs and views of many stakeholders and the impacts of organisational cultures, processes and policies.

1. QUESTIONING THE STATE OF PROJECT MANAGEMENT

Project management is a vibrant and increasingly well recognised discipline of management. In recent decades, its status has been promoted by various professional bodies such as the Project Management Institute (PMI) and the Association of Project

Managers (APM). Governments have recognised standards issued by those bodies, and individuals and organisations have flocked to join.

Such is the hype and hyperbole, but is it real or just a mirage we all see because we want to? It is easy to raise serious questions. Rather than applauding the number of project managers joining professional bodies, we could ask why most of them don't. Of those that do join, are most of them established experienced project managers or are they less experienced sub-professionals seeking to obtain value from membership? Why are there no entry level requirements for membership of professional project management organisations - unlike those for established professions? Instead of accepting the project management standards at face value, we could ask whether their value has been proven by independent research. Perhaps even more challenging, we could ask for evidence that projects fail less often now that the professional bodies and their standards are available.

1.1 Research Indicators

In 2001 Lynn Crawford published research results indicating that there is no discernable correlation between the assessed project management competence of practicing project managers, and their performance recognition in their organisations (Crawford, 2001). Her findings were that:

“There are no statistically significant relationships between total scores on the Knowledge Test, based on the PMBOK Guide, and Supervisor Rating of performance. There are no statistically significant relationships between scores in any of the nine knowledge domains and Supervisor Rating of performance.”

Since the sample was relatively large (385) and was taken over three continents, this result raises some serious questions. This is because it might have been assumed that successful project managers (those who are good at maximising project success) will be recognised as effective and successful by their organisations. Crawford's results indicate one of three things:

- the project management standards are very poor indicators of project management competence, or
- increased project management competence (of individuals) does not lead to similar increases in the probability of project success, or
- project managers who are in fact very good at project management are nonetheless not recognised as such by their organisations.

Since Crawford's work was based upon competence with the standards, the first of these would mean that the standards are inherently poor indicators of the competence of project managers, whilst the second would indicate that the individual competence of project managers is not a key determinant of project success. Both call into question the value of the standards in their current form - *if the purpose of the standards is to contribute to the success of projects.*

The last of these three is also possible but is considered unlikely. By their cooperation with Crawford's research, the organisations involved showed that they placed

value on the quality of project management and had faith in the competence of their project managers. Over such a large and diverse sample it would seem to be surprising to find no correlation between project success and the recognition of the individual project managers.

Before taking this further, it is necessary to consider the nature of other project management research to date. In her PhD thesis, Crawford summarised it as:

“Research into aspects of project management has largely been based upon the opinions of practitioners. No empirical research has to date been reported to validate the assumed positive relationship between performance to the standards and perceived effectiveness of project management performance in the workplace.”
(Crawford, 2001).

This problem continues even with researchers who acknowledge the problem. Work at the Center for Research into the Management of Project (CRMP) in the UK criticises current project management standards for being too narrow, and acknowledges that its own research suffers from the same problem (Morris, 2001).

On this basis it would seem that a majority of research into project management has been qualitative research, focused on the BOK. This being so, it could be argued that since the research itself becomes part of the BOK once it is published, the whole process tends to be circular rather than innovative (this is dealt with in more detail later). Regardless of this, Government and industry recognition of competence is universally based upon recognised standards such as the Guide to the PMBOK or the Australian National Competence Standards for Project Management.

It can be concluded that the relationship between the standards and the quality of project management performance has yet to be seriously tested from first principles.

1.2 The Voices of Experience

Crawford’s findings and the nature of the research effort to date would be of interest even if they were the only indicators that the standards are ineffective as indicators of project management performance. However this is far from the case - experienced project managers know that the knowledge and skills covered by the standards are “necessary but not sufficient” for project success, and that as a rule other factors play a much greater role in project success. This was demonstrated at the recent AIPM 2001 conference, where 17 papers discussed in depth how success can be achieved but of these only two relied heavily on the existing standards and three others did so to a lesser extent. The great majority either did not refer to the standards in depth when discussing how to be successful in projects, or made the point that the use of the standards was not a key determinant of success.

Despite these problems, project management standards are used by industry, by Government, by academia and by individuals as a baseline for project management training, competence and performance. The use of standards in this way is appealing - it offers a way to validate capability and performance and to gain professional recognition at various levels. Regardless of their acknowledged limitations, the standards are actually used as if they encompass all of the key requirements for project management success.

This is not surprising - after all the standards are in many cases endorsed by Government, industry and academia alike. What else is there to turn to when we seek to improve our project management performance? By their very existence and by their widespread use, the standards have established an unjustified and self-perpetuating paradigm that *“the application of project management standards is an appropriate and proven way to achieve an acceptable (or better) level of project management performance.”* This is despite the voices of experience that say otherwise.

1.3 Lessons from Failure

If research into project management from first principles is lacking and if experienced project managers are raising concerns about the use of the standards, what then do we learn from projects that have failed? The most closely analysed failed projects tend to be those which have failed in spectacular fashion and which were Government funded. These are often dissected in minute detail and the records, observations and conclusions become public property.

NASA and its space program was supposed to be the epitome of technical excellence and safety management, and the Challenger Space Shuttle explosion in 1986 shocked the world by its apparent suddenness. For those who watched as the inquiries brought out how and why the disaster happened, the realization was even worse. The explosion happened despite clear and explicit warnings of danger by engineers. It was only the final stage in a long process of avoidable errors leading to that point. The real culprit was a culture which insisted on meeting deadlines and managing costs, and which allowed serious immediate risks to be rationalized away (McConnell, 2001).

The West Gate Bridge disaster in Melbourne in 1970 was brought about by catastrophic failures in the metal structures of the bridge during construction. The inquiry identified that part of the problem was the use of an unproven design, but that there were other more immediate factors (Bignell, 1977). These included a reluctance to acknowledge the design risks, time and cost pressures, and union issues. However most of all there was a management culture which tolerated the build up of significant risks to safety.

The causes of the death of Katie Bender in the Canberra Hospital explosion were examined in minute detail by the ACT Coroner. The conclusions drawn included that the selection process for contractors was flawed, with too much reliance on the advice of contractors who (in retrospect) were not properly qualified. The Government decision to promote the event as a spectacle not only placed the public at increased risk, but also added undesirable pressures onto the contractor and the project director by making it much more difficult to alter the date on which the demolition was due to take place. Although the direct cause of the tragedy may have been technical errors with the explosives, the root cause lay in poor public service processes and in political pressures (Yates, 2000).

It would seem from these examples that failure tends to be driven by a wide range of social, political, economic and other factors. However what is equally apparent is that the “technical and techniques” competence of individuals are infrequently mentioned as a prime cause. Individuals and their behaviour are often central to failure - but their base knowledge and technical competencies are not.

This challenges the value of project management standards, which are all largely knowledge, skills or individual competence based. It would seem that no matter how well we train individuals to apply the current standards, we are not actually addressing the most common causes of failure. This is not to say that the standards do not have a role to play - rather that their current place in the project management performance paradigm is neither appropriate nor supportable.

2. A CLOSER LOOK AT THE PROJECT MANAGEMENT STANDARDS

2.1 Their Development and Purpose

Project management standards began to be developed in the 1980s. This was typified by the issue of the Guide to the Project Management Body of Knowledge (The PMBOK Guide) in 1987 by the Project Management Institute (PMI) (Morris, 2001). This was followed throughout the world during the late 1980s and the 1990s by a number of standards, many of which were based upon the Guide to the PMBOK. Most, like the Guide to the PMBOK, were knowledge and skills based and a few were based upon workplace competency (Crawford, 2001).

Note: The PMI claims ownership of the term “PMBOK” - and that when the term is used it refers to their specific version or interpretation of the project management body of knowledge. This is a curious manifestation of political imperatives. Is there any other profession where one national body claims global ownership of the body of knowledge?

The knowledge and skills based standards were developed from a wide range of books, articles, journals and other papers considered to “represent” thinking and practice in project management. They are a small sub-set of the accumulated knowledge on project management, being based upon those principles, ideas and practices which are deemed to be widely accepted (Crawford, 2001). In effect, the standards are a condensed and abbreviated insight into the current body of knowledge, and by definition they exclude any new or contested ideas, concepts or techniques.

The standards are based upon the performance of individuals, although they can also be used to validate project processes. For example the Guide to the PMBOK specifies that project managers should be capable of managing project schedules by applying suitable knowledge, skills, and tools (PMI Standards Committee, 1994). They can be used to test the project management competence of individuals, but they can also be used to test a project as an organisation by asking the related question “*does the project have an established and competent system to manage schedule?*”

Regardless of their origin, purpose and nature there exists an underlying assumption that the use of the standards should lead to improved project management - and hence to a greater likelihood of project success. Whether this is actually the case remains open to debate.

2.2 The Use of the Standards

It was noted earlier that standards are widely used by Government, industry and by individuals and that this is not surprising. However it can be argued that their use goes much further than this - that despite their acknowledged limitations the standards have become the predominant reference for project management performance. Not only that, but this situation is defacto supported and reinforced by the professional bodies because they certify and hence recognise project management individuals and organisations based upon the standards. Recognition of project excellence through annual awards is similarly focused on the content of the standards.

Thus we have a situation where standards which have never been claimed to represent the complete set of requirements for project success, are being used as if they do. This dynamic is represented in Figure 1 below.

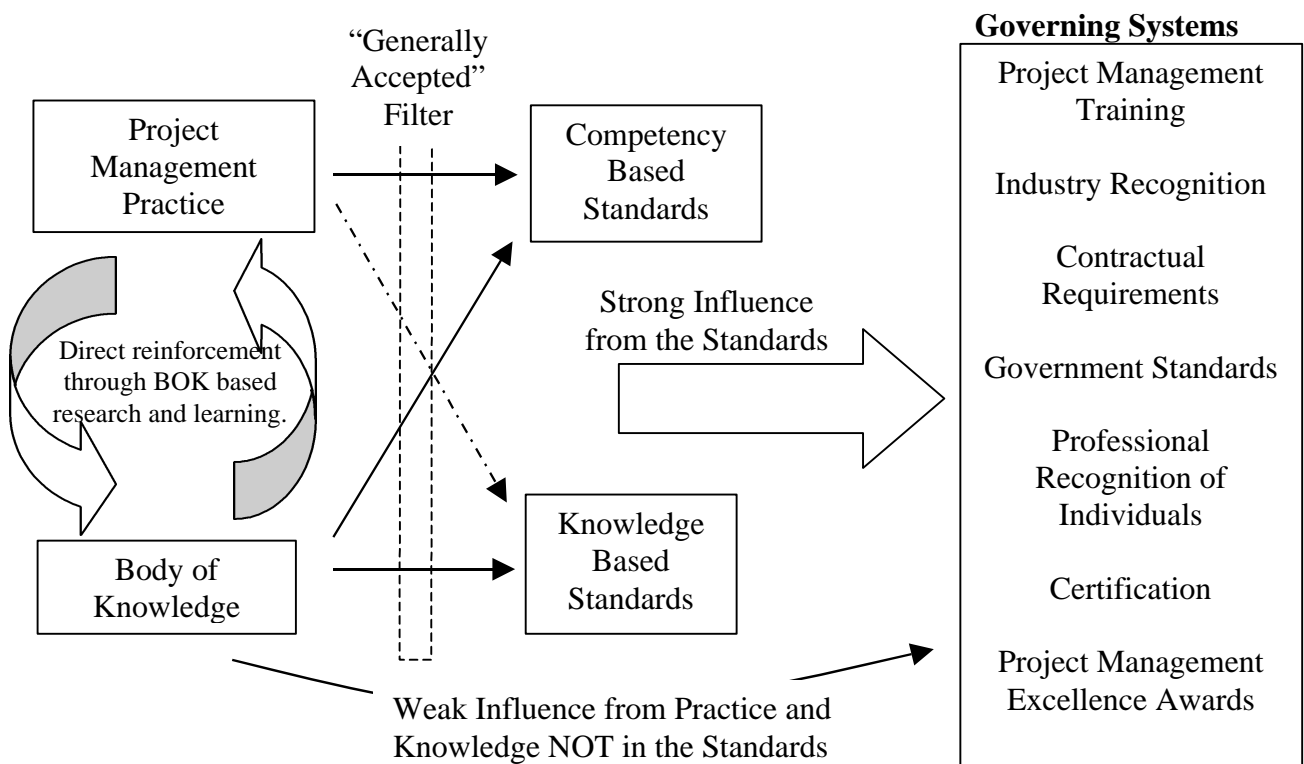


Figure 1 - The Impact of the Project Management Standards. The LHS shows the uncontrolled interaction between practice and the BOK. However a strong filter is applied to any knowledge transmitted to the standards and hence to the RHS of the diagram - to the governing systems. Thus these systems are strongly constrained.

Understanding this dynamic allows us to focus on the problems it creates. Part of the problem is the feedback which occurs. The Standards represent a part of the Body of Knowledge, which is then used as the basis for regulation, training and recognition. This will then lead to emphasis on those aspects in practice, distorting practice away from those aspects not covered in the Standards. In effect, it creates a tendency to shrink the scope of project management practice to cover only the range of activities identified in the Standards.

This is exacerbated by the time delays involved. To date, the Standards are being updated over periods of five years or more. New and innovative approaches to project management, even when broadly accepted, are thus not in the Standards for some considerable time. In turn this means that they are unlikely to be broadly accepted, and therefore might not get into the next issue of specific Standards when they do occur. This overall dynamic tends to stifle the broad acceptance of innovation and change, as illustrated in Figure 2 below.

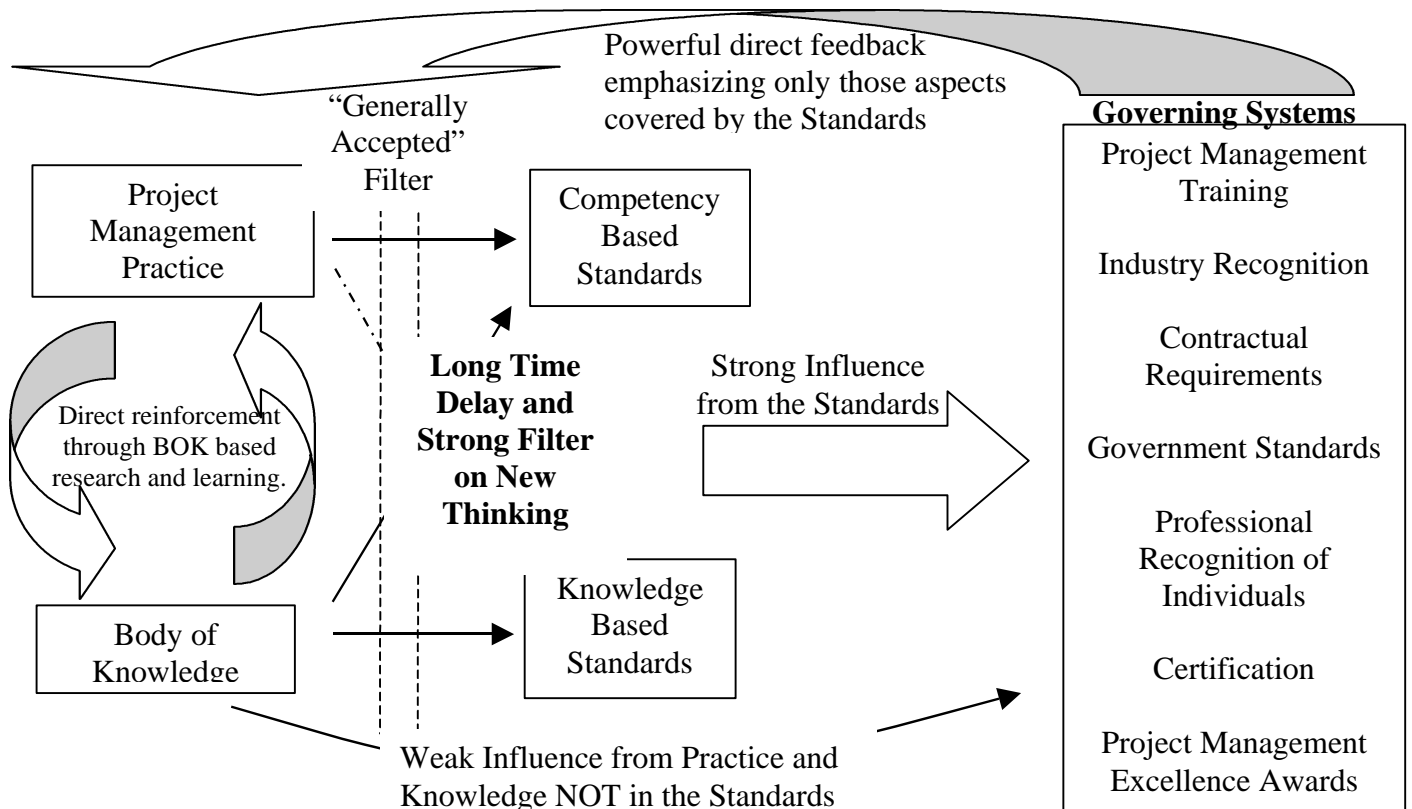


Figure 2 - The Impacts of Time-Delays and Feedback. Here Figure 1 has been modified to show the nature of the time delays and feedback. The inherent dynamics remain the same except to show the impact of a large time-delayed feedback that tends to perpetuate the “standards are all that really matters” paradigm. Given the strong filter applied between the BOK and the standards, this is a strongly limiting and conservative force that constrains innovation and change.

If this was the total picture, the efficacy of project management practice might be going backwards rather than forwards. Fortunately, there are other strong dynamics operating which do not rely so completely upon the Standards.

Figure 2 includes two of these influences. The first is the influence of the BOK (rather than the Standards) directly upon project management practice. This occurs when individual project managers (or researchers) use the BOK as a source of learning about best practice and new techniques. The effect on practice can be powerful but tends to be localized within a project or organisation.

The second other influence shown in Figure 2 is the weak link between practice and knowledge, and the governing systems. It arises from the transfer of knowledge directly from the BOK to these systems, by individual project managers and researchers. Although

weak overall it can have a powerful short-term or narrowly focused influence, if the individual concerned has the power to direct change within individual organisations. In rare cases this is sustained over time, replacing the focus on the Standards with a more direct link to best practice and the Body of Knowledge.

Figure 2 does not represent all of the dynamics of the project management environment surrounding the standards. In particular it does not directly address the question of project success. As noted earlier, there is an implicit assumption (among project managers and managers in general) that the ultimate purpose of project management practice is to ensure that projects succeed. This being the case, we should expect the application of the standards to contribute to that aim.

3. CONCEPTS AND IDEAS OUTSIDE THE STANDARDS PARADIGM

If the “standards” paradigm of project management seems too simplistic and incomplete and if we can question whether the Standards are being used appropriately, it is necessary to consider how we might construct an alternative paradigm. This part of the paper briefly explores each of a wide range of issues and ideas which contribute to a wider understanding of the reality of projects and of project management.

3.1 Project Success and Project Management Performance

Project success is a critical issue. We need to be able to assess the likelihood of success (and hence the risk of failure) before and during projects. To understand and improve our project management performance, it seems logical that we should know whether we deliver “successful” projects. However this is not a straightforward task.

Consider a project manager of a very complex, difficult project who sets the project up for success, but because of totally unforeseeable circumstances the final outcome is not acceptable to stakeholders. Judged in absolute terms, the project is a failure. However project management effectiveness may be judged very differently, depending upon the difficulty of the task and many other factors. Even if a project is totally successful in absolute terms, this may have been achieved through luck or by external intervention rather than by good project management.

This makes it clear that “project success” as measured by stakeholders cannot generally be used as an indicator of project management performance. If success in absolute terms is not a good measure of the quality of project management, then how do we judge our performance so that we can benchmark and improve? The problem is illustrated in Figure 3 below.

Figure 3 shows that project outcomes (success or otherwise as judged by stakeholders) depend upon a number of factors ranging from the quality of project management, to political interference. Even luck will play a part. This is the reality of life in a complex world and it provides a key lesson:

Excellent project management performance can only increase the likelihood of success in complex projects, it can never make it certain. The whole process is dynamic and ultimately unpredictable in nature.

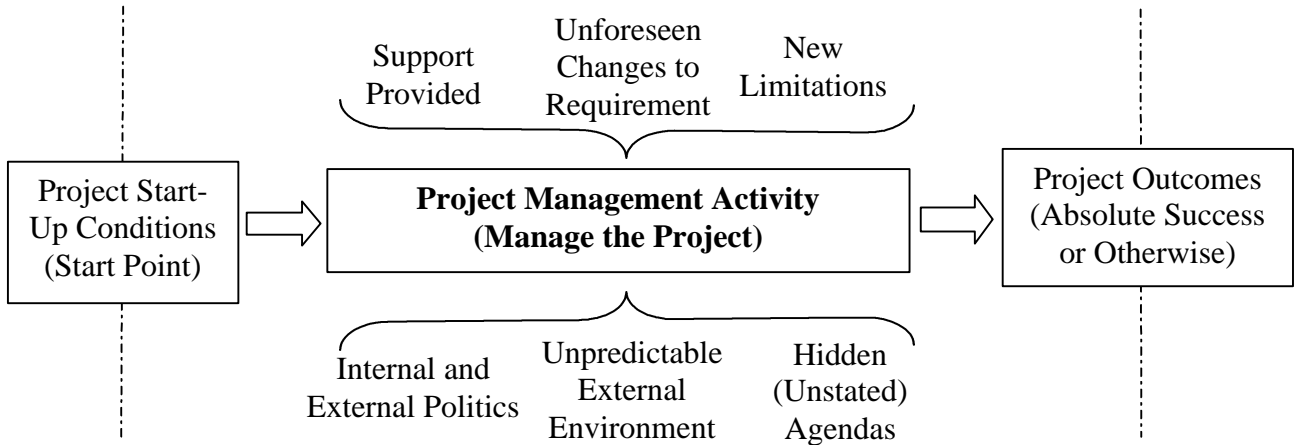


Figure 3 - The Context of Project Management Performance. Here the left to right flows shows the influences on “absolute” success. Project management performance cannot be judged only from outcomes. Project difficulty, external forces and project support are all strong factors in both success and performance.

On this basis we would expect the Standards to have a greater impact upon outcomes in relatively simple projects in a stable and predictable environment. In more complex and uncertainty driven projects we might expect the flexibility, experience and political skills of the project leader to have a greater influence. This fits with experience, and with the evidence available (Englund, 1997).

3.2 Inherent Task Complexity and Project Management Difficulty

Projects that are inherently larger (in cost, duration, technology and so on) and which are also more complex in nature also tend to be those that are more important to a wide range of stakeholders. Being more important means added induced (i.e. not inherent) complexity, brought about by increased external scrutiny and interference from those stakeholders. The result is that *project management* task becomes exponentially more difficult with increased inherent task complexity. This is shown in Figure 4:

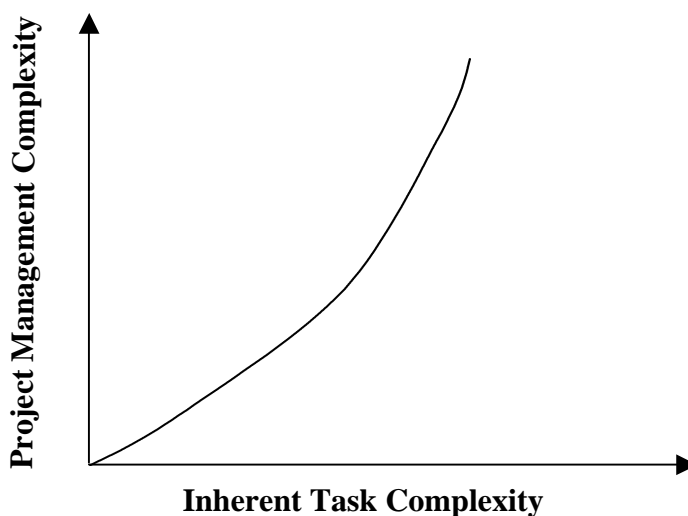


Figure 4 - Project Management Task Difficulty. This diagram illustrates the exponential nature of the increase to project management complexity as inherent task complexity increases. This arises because larger and more complex projects attract more interest and more interference from stakeholders. Otherwise there would be a one-to-one correlation between inherent complexity and task difficulty (the line would be straight, at 45).

3.3 Cultural Issues

Just as there are different forms of medicine in different parts of the world and just as this is as much cultural as otherwise, we might expect management attitudes and needs to vary with culture. Anyone living in a western country who seeks to do business in Asia or the Middle East quickly learns that this is so.

It is worth considering how this extends to project management. Is success seen from a different perspective in different cultures, or are the cultural expectations on individual managers very different? On the surface it would seem that the relationship between individuals and their organisations can vary greatly - take for example the traditional life-long links and mutual obligation found in Japan. There the traditional culture is that the needs of the many outweigh the needs of an individual, with significant implications on management and organisation.

This applies within and across industries - so we would not expect to manage (or lead) the people in a car production facility in the same way in Japan as we would in Australia. Whilst the technology used may be identical, the management style, approach and challenges we would expect to vary significantly.

Transferring this analogy to project management raises a similar series of questions. Is it true that in the United States, the roles of managers in generally more structured and compartmentalized? If this is true, how does it impact upon the role of a project manager and does it make project management Standards more effective and applicable in the USA than in Australia?

Cultural differences do not start or stop with national boundaries. Cultures vary between organisations and even within organisations. Although perhaps less predictable and less consistent over time than national cultures, they are arguably just as powerful in molding both individual and team behaviour. Cultural forces have a significant impact upon behaviour and hence upon capability (Smith, 2001).

Cultural issues are also often less well defined or managed than technical or techniques issues. This may be yet another manifestation of the impact of the knowledge/skills emphasis of the Standards, but it may also reflect weakness in our general management skills. The management of cultural differences and issues requires a different language and different (and perhaps more difficult) leadership behaviour. It might be expected that those project managers with broader experience will therefore cope better.

Whether harder to define and manage or not, cultural issues are pervasive and powerful. We do need to understand and deal with them in order to deliver project success (White, 2001). We need the correct language, skills and techniques, as well as the inclination to use them.

3.4 Project Energy and Leadership

The concept of entropy is based on the premise that closed systems cannot increase in energy (decrease in entropy). Although a specific scientific concept linked closely to heat, energy and the 2nd Law of Thermodynamics, similar concepts have been applied to information and to other more recent mathematical and management constructs.

In this case, let us consider management of organisations. In a stable and mature (but not closed) environment, enough energy (negative entropy) is provided from outside the system by the external requirement to report progress and performance - people are “energised” to continue to follow the process because they know that their manager is monitoring the process outputs. If the manager or the reporting requirement was not present, over time the process would fall into disuse.

The adding of (negative) entropy becomes much more important in systems which are less stable, less mature or under threat. This is illustrated by the management energy required to get people to adapt to a new process to correct faults in an existing process. The greater the rate of change, the greater the energy required to make the overall system operate. It has been suggested (Mant, 1999) that this is as much a function of leadership as anything else - that leadership is about an individual generating energy in others.

This concept is readily applied to the project environment, since projects are by nature change agents and one-off (unique). This is the arguably the most difficult form of change to manage, since it means attempting to achieve a defined result on the first attempt. Thus we might expect that of all human activities, projects (especially complex projects with many human factors and other issues) should require a high order of leadership skill, and a continuing injection of energy to succeed (Morris, 1994).

3.5 Lessons from the Nature of Other Professions

Another is to consider the nature of the work involved in project management, and to compare it with existing professions. The examples used here are that of the medical profession, engineering and general management.

The medical profession is well recognised and has been for a long time. The nature of its work rests almost entirely with the human body and mind, and seeks to ensure that these are “healthy”. This is true whether working as a GP, surgeon, or nurse. The aim is to maintain or improve health, and the activities of medical professionals can be measured accordingly. Their knowledge (of the human body and mind) can be tested, as can their knowledge of medical processes and procedures. There is a recognisable body of knowledge, existing as the accumulated accepted medical knowledge of mankind. Many standards, regulations and processes can and do exist to cover every aspect of medical work, from the use of surgical instruments to the allowable waiting time in casualty.

When we consider engineering as a profession, a similar pattern emerges. In this case, instead of working on the human body we specify an end-outcome or requirement. This could be a bridge, an electronic circuit or a chemical structure. The professional may be an engineer, a builder or a draughtsperson. Their knowledge can be tested, both of the final products and of the processes used. Plans can be specific, with a series of steps to follow that should not change. (*In this case, there is also a design process - which by nature is not the case for the medical profession.*) A wide range of standards exist.

Now consider general management. The core work here is much harder to define, and much less focused. A manager deals with human issues, administration, schedules, risks, organisational structures, process and system design, strategy, performance monitoring, sales, marketing, legal issues and the list goes on. These have to be coordinated and integrated to achieve both short and long term outcomes.

When a doctor or an engineer gets involved in management activity, in general at least they are considered to be acting outside their profession. The medical profession does not regard the hiring and firing of staff as a medical activity, even though many doctors do it. It is regarded as a management activity - an enabling activity necessary for the profession to work but not “medical” by nature.

This is an important point because it illustrates that management activities are “enabling” in nature - they exist in order to “organise” so that a medical, engineering or other objective can be met. Organisations (and hence management) do not exist for themselves alone - they enable organized activities to take place for some purpose. Management also always includes people. Finally, medicine and engineering almost always deal with repeatable situations where experience can be documented to become a part of the body of knowledge.

General management is quite different in nature. The behaviour of people cannot be predicted with certainty, and hence uncertainty exists in every activity. Plans (how something will be achieved) are only plans - the reality is always different. Managers constantly manage a dynamic and unpredictable environment - they do not know when the phone will ring next, when a person will be away sick or when a stakeholder will change their mind.

Measuring or assessing success in a management activity can be straightforward but often isn't, since it will usually depend upon circumstances which could not be fully known when the work started. More particularly, the management performance of individuals is very difficult to measure since every aspect of context and influence should (in theory) be taken into account. In this environment standards are limited in value and scope, and are often difficult to apply since there are many nuances in circumstance. One can also question whether a real body of knowledge exists - or if it does, how it can be defined and the role it can play.

However the most striking difference between management and most recognised professions is in their ability to measure performance and success in absolute terms. Either the human body is perfect, or it is not. The electronic circuit either works or otherwise. Even degrees of performance are measurable, to standards and specifications. They can also measure the level of professional “expertise” of an individual - are they able to diagnose or treat specific conditions, design an airfield, or build an electronic circuit?

What conclusions can we draw from this discussion? In the first place, it is clear that project management is much more like management than it is like medicine or engineering. It is an enabling activity, where it is not working “on” the final product but working “towards” it. People are always involved and must be managed, as are all of the other general management activities noted above. Although many projects deliver a physical product which can be specified and to which technical standards can be applied, this is equally often not the case. Even when a physical product can be specified, it is possible to separate general management activity from technical requirements. The former is the core of the project manager's role, with the latter the province of supporting engineers or other specialist staff.

Without taking these issues further at this point, it seems clear that we can and we should question the value of the concept of a BOK for project management, and the value

of the project management Standards. Both (since one is drawn from the other) suffer from the same limitation - that they are better suited to the established technical professions. When applied to project management they are at best only partially relevant.

3.6 Project Management and Political - Technical Duality

Within a project we can categorise the roles for team members and for project managers into four groups of activities:

- administration or general management.
- true technical (engineering or scientific in nature),
- project management technical (the techniques, skills, knowledge and processes of project management as described in the standards), and
- project political - the art of dealing with human political, personal and social issues both internal and external to the project.

The first of these is important but it is simply “assumed” by the standards and by most texts on project management. The second is also important and in some specific projects is critical. It is often assumed away, and there is some discussion in the literature as to whether to be effective a project manager needs to know the technology involved, or not. In Eastern Europe, for example, undergraduate courses in project management are common and graduates are expected to manage any project regardless of the industry or technology involved.

The third is the specific realm of the standards and covers the essential tools and techniques a project manager needs to understand before starting work. This is clearly important but as has been noted throughout this paper, it is arguably not the key determinant of project management performance or of project success. The final group of activities listed is often alluded to as being critical and determining of success, but is not often dealt with well - perhaps because it is an aspect that it is hard to measure or to apply design standards to.

It would therefore seem that a project manager may delegate the first two groups of activities virtually in toto. The third may also be managed day-to-day by others but the project manager must at least be conversant and aware of what is happening. However the last is not able to be delegated, since it is the essence and most difficult part of the project manager’s role. Thus the project manager must be part project techniques director and manager, and part leader, liaison officer, political manager. This duality is inherent in their role.

It is arguable (although I do not seek to prove it here) that an inexperienced or marginally effective project manager will spend most of their time dealing with the techniques of project management (risk, schedule, cost, performance). They will be less confident and less competent when dealing with the politics of the external environment, leadership issues and other human factors. They will also probably spend less time on these matters, due to a lack of understanding of their importance and because they are not comfortable.

On the other hand, it is also arguable that it is in the political and human issues where the rubber really hits the road, and that this becomes exponentially so as a project becomes more critical and more complex or risky. A truly competent project manager should be experienced, aware and highly skilled when negotiating with senior staff, leading the project team through periods of uncertainty and stress and in dealing with people in general (Englund, 1997). An illustration of this is the composition of the project team for the Sydney Olympics - nobody doubted that their key attributes included political acumen, public relations and liaison, and leadership.

If these arguments are accepted, the conclusion must be that although a project manager has a role which is largely in two parts (project techniques and human/political) the real core of skilled project management lies in just one role which cannot be delegated - that of leadership and political management. Since this role is only marginally dealt with in the Standards, this again casts doubt upon the real value of assessing performance to the Standards whenever we are dealing with complex and difficult of projects.

Some projects are almost “production” in nature. For example, building houses involves the repetition of a well known set of techniques and skills. Although each house can be a different design on a different block of land, such projects are not complex or difficult in the sense we mean here. Thus “production project management” (managing projects which follow a well established path) characteristically can be carried out “to the standards” alone. This may be part of the reason for the growth in the use of the standards, since such work represents a large part of the volume of project management effort in society (although arguably it does not include many really important projects).

3.7 Lesson from Organisational Hierarchy

Lessons about the role of a project manager can also be drawn from an organisational analogy. Most human organisations are hierarchies of some form (Jaques, 1998). Typically this is drawn as in Figure 5 below, where the bottom row of the diagram is where workers actually produce outputs. As we move up the hierarchy, the role becomes more management oriented. In a well-designed organisation each manager will carry out a work of role that adds new value (a different type of value) than the levels below (Barber, 2001).

Now let us consider the use of standards, rules and processes in the organisation. At the bottom level, we expect the products to be “to specification” and the processes leading to those products to be applied carefully and consistently. Consistent quality arises out of adhering to standards, regulations, processes and rules. Whilst in some industries and organisations this is less so than in others, it is true to say that in all organisations it is more so at the bottom level than at higher levels.

As we move up the management hierarchy to the second or third level, the use of specific rules, standards and specifications becomes less relevant and less frequent. The work of role is more focused on planning, monitoring, and dealing with unforeseen events. There starts to be some requirement to manage people, politics and other human issues. This level of management can be seen as comparable to the “techniques” role for a project manager. Standards which deal with such techniques are useful at this level, but not totally sufficient.

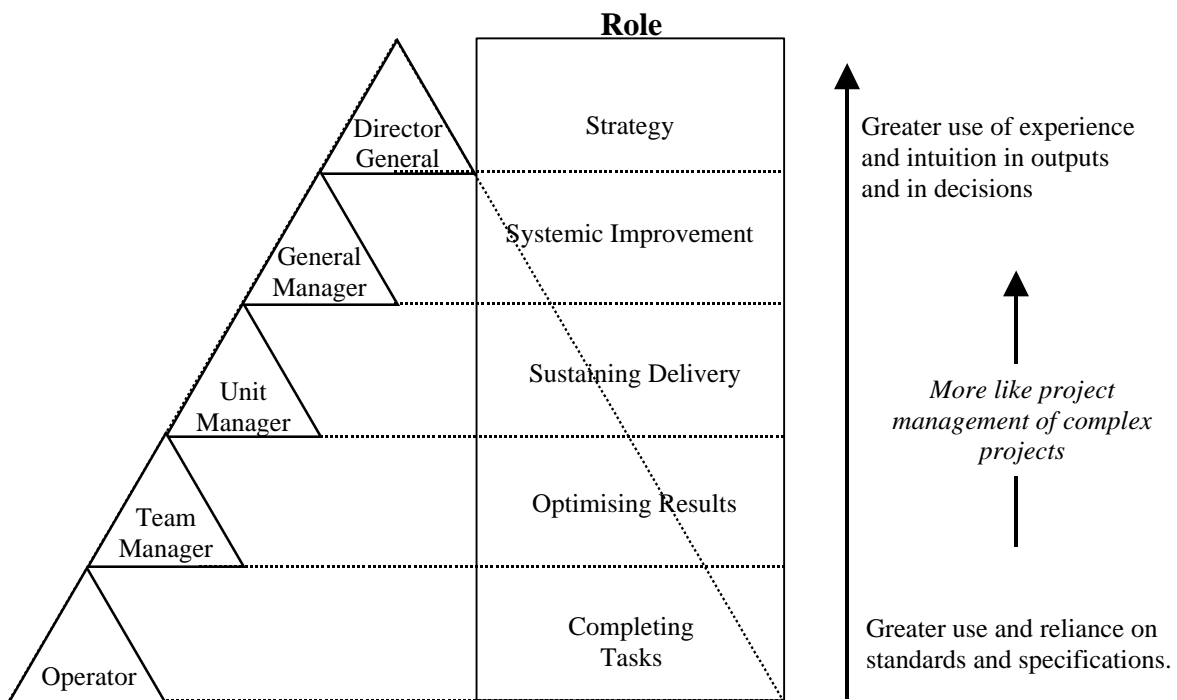


Figure 5: Hierarchical Roles and Project Management. The project management role in complex is more like senior roles in general management, including less reliance on standards and specifications and greater use of experience and intuition.

As we approach the executive level in a hierarchy, the role becomes much more one of politics, strategic planning, systems design and negotiation. At this level, few formal standards are applied, and the level of performance of an executive is assessed almost entirely by the CEO and by peers using their own experience and intuition. It should be noted that even a CEO needs to understand key management techniques for managing cost, schedule risk and so on, but these are assumed skills at this level and are not seen as critical indicators of performance.

This level is analogous to the political/leadership role of a project manager in a complex and politically sensitive project. In effect, the project manager is the “CEO” of their own organisation and must lead it through the complex political/social/human external world of the larger host organisation. This general management analogy infers that we should not expect to be able to apply standards to direct or to assess the performance of the project manager of a complex project. It is like trying to apply written formal standards to the work of a senior executive or CEO.

3.8 Measuring Project Management Performance Using Risk Analysis

Earlier it was argued that project success in absolute terms is a poor indicator of the quality of project management - whether the project is successful or not. We have also seen that based on research and on the intuition of experienced project managers, the Standards are not good indicators of likely project success or of effective project management. However the quality of project management is central to the development of the project management profession. We need to be able to assess it in order to be able to benchmark and improve, and to support the development of more effective standards.

One approach is to ask the question “*how effective was the project management effort in the circumstances?*” Another is to focus the question differently “*did the project management effort give the project the maximum possible chance of success (as judged by stakeholders) in the circumstances?*”. The latter question can be turned around to ask it a different way “*did the project management effort minimise the risk of failure in the circumstances?*”

The last question provides an opportunity to analytically assess the quality of project management, because the risk of failure brings together all project management activities into a single focus on the requirement to make the project successful. In short, unless the project management effort is complete, effective, integrated and responsive to the project environment the risk (of failure) will not be minimised.

Conversely, if we can assess whether the total risk of failure has been minimised in the circumstances, we are able to consider how effective the project management effort has been. This may provide a much more complete and analytically sound approach than does either simply measuring absolute project success, or simply considering whether the individuals have been applying the project management standards. The use of risk analysis to assess the quality of project management, is therefore worthy of further consideration.

3.9 The Fractal Nature of Projects

If the definition of a project is kept as broad as possible then it might be something like:

“A project is the planned application of limited (non-infinite) resources, over a limited period of time, to achieve a specified outcome.”

Based upon that definition, all complex projects can be broken down into smaller tasks, each of which is also by nature a project. This process continued for a number of steps “ n ”. n would at first glance appear to be finite and integer, but it can be argued that even the smallest projects can be further broken into shorter, smaller but still discrete tasks.

Even as n approaches infinity, each such project retains some characteristics which reflect the larger project(s) of which it forms part. These shared characteristics are the key elements of the definition above:

- finite resources
- finite period of time
- specified outcome

The continuing similarity between the larger and the smaller elements of the same whole is “fractal” by nature. It can also extend in the opposite direction - even large complex projects are part of even larger ideas, concepts or objectives. In a logical sense, this extends to the infinity of the universe. Projects do not have to be elements of one another in order to share the key characteristics of projects, but for projects to be part of the

same fractal set, all projects in that set must also be related as elements of one of the projects within that set - usually the largest and most complex project in the set.

Does the “fractal nature of related projects” have any value when we consider project management? Do our project management methods also repeat themselves in a fractal way - that is, does each project management activity have sub-elements which share characteristics of the whole? These unanswered questions indicate an area for further study.

3.10 Understanding the Complexity of Project Dynamics

Complexity has been alluded to a number of times throughout this paper, as a characteristic of large and difficult projects in the real world. This has a number of important implications when we consider a project as a system. Perhaps the most important of these is that in truly complex projects, outputs and outcomes cannot be predicted with certainty. No matter how organised a project manager or project team are, there will always be two factors which cause uncertainty.

The first of these is inherent chaos in project systems, brought about by factors which are never precise or fully definable - such as human relationships, culture, unknown (undiscovered) issues, risks (uncertainties) and so on. The second is uncertainty caused by external events and forces, beyond the control or even influence of the project manager. The possibility of some of these events may be anticipated as possibilities or risks, others are totally unforeseeable.

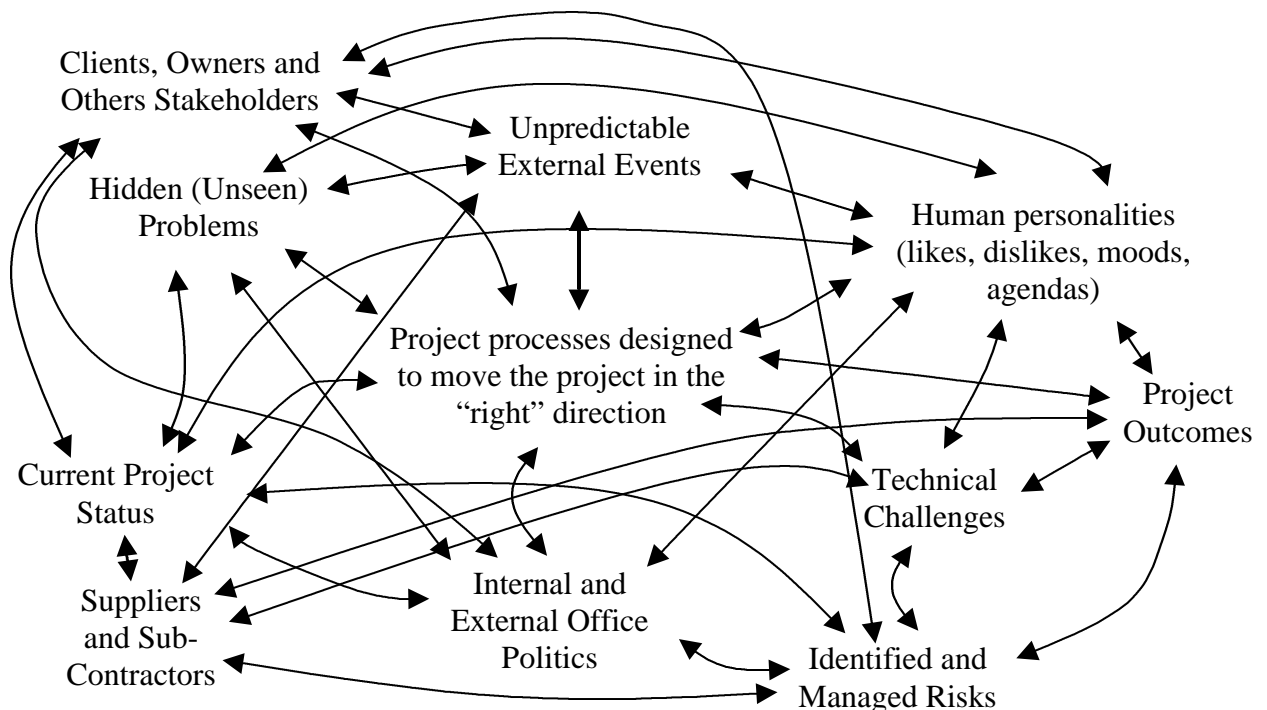


Figure 6. The Inherent Complexity and Uncertainty of Project Systems. This diagram is not intended to show all project issues or relationships. All relationships are shown as two-way, although this is an oversimplification. Time delays should also be implied, but are not shown on the diagram. Note the current status on the left, and the project outcomes on the right. In between is messy and uncertain.

As shown in Figure 6, this can be illustrated using a cognitive map. This further illustrates the intensity and complexity of the interdependence of stakeholders, and hints at the uncertainty which must follow whenever human cultures, ideals, personalities and desires are involved. From a project perspective, the internal and external systems and processes are linked dynamically over time. Even a high level model which only shows the larger forces at work can be seen to possess an increasing degree of uncertainty as we look into the future.

Whilst this may seem to imply a chaotic and ungovernable project environment, it is in fact very familiar to senior general managers. Management of people and resources to achieve results over time is always inherently complex, uncertain and chaotic. It is for this reason that we find that in senior managers we look for adaptability, intelligence, leadership and people skills. These are the attributes necessary to deal with such environments in general.

Effective managers do not seek to achieve total control, since they know it is futile and would be wasteful of energy and effort. Instead they seek to design systems that inherently move us towards the desired results (outcomes), by using appropriate system dynamics (Jaques, 1998). For example, if project workload can vary quickly they design systems to allow hiring and firing of staff with minimum fuss or delay.

Effective managers in chaotic environments also seek to understand the boundaries and interactions within their systems, so that decisions can be made in proper context. This is where balance must be achieved between competing demands - quality of work verses time taken, cost verses performance, one stakeholder's needs verses another. The need for such balance is a continuing theme of project management and this is why success is often determined by the liaison, interpersonal and negotiation skills of the project manager.

A notable omission from this discussion so far is the role played by the techniques and skills covered in the project management Standards. Some of these (e.g. schedule, cost and scope) seem to be control oriented and unless directed very carefully may tend to limit flexibility.

Others, such as risk management, have a more positive and dynamic role to play. The identification and management of risks, if undertaken as a continuing and adaptive process over time, can powerfully shape events towards desired outcomes even in a largely unpredictable environment.

3.11 The Concept of Congruency and the Role of the Project Manager

Figure 6 showed the complexity of the project management environment, even at the broadest level. It is clear that for success it is necessary to bring together or to align the diverse interests of the many stakeholders. In some cases this is mandatory to success, such as when the rules of a regulatory body must be obeyed for the key project outcome to be achieved (e.g. a new aircraft design must have its airworthiness certified before it is allowed to carry passengers).

In other cases the alignment of interests may not be mandatory, but has a very large impact upon the likelihood of project success and the efficiency of the project effort. This

can be as direct as ensuring that different project owners do not have differing ideas of the required outcome, or as indirect as ensuring that the finance manager does not design internal financial processes independently of larger project needs.

Lack of alignment not only has an immediate affect, but also sets up longer term and more complex stresses with impacts upon personal relationships, morale and teamwork. The degree of alignment (congruence) required within a project also takes other less obvious forms which may be equally important. For example, is the experience of the project manager aligned with the nature of the project's technology, complexity and context? Are organisational objectives in conflict with project objectives? The former impacts upon every aspect of project management, the latter determines whether the project has the resources and external support it needs.

Cultural congruency also has strong significance and is overlooked at a project manager's peril. As noted earlier in discussions on culture, national and ethnic cultures are powerful forces. This is not to say that a single project cannot have many nationalities in its project team or its stakeholders - clearly it can. Where this occurs, however, there is a requirement to ensure that such variations are at least tolerable and amicable, and at best that they are completely overtaken by stronger team and business links. It is important to note that it is neither appropriate nor generally possible to "remove" such cultural differences - to try to do so is fraught with the danger of alienation. Instead there must be an alignment of goals and values across those different national or ethnic cultures.

Cultural congruence also requires a more local form, to deal with internal project and business cultures. This is very much the business of the project leader and the business executive. In this case such cultures can be changed over time, and congruence needs to be achieved for the long term. Project leadership is a major issue here, and in longer duration projects the behaviour, attitudes and attributes of the leader have a very powerful impact on team behaviour and culture. Rules, regulations and processes are embodiments of organisational culture, and also will have a powerful impact.

Congruency may be considered a project characteristic and as an indicator of the chances of project success. The argument is that if all stakeholders are clearly aligned in their views and their requirements, if the project culture is appropriate for the nature of the task and the project manager has the best possible attributes for this project, then success is not assured but is more likely than it would be if the overall project congruence were less.

The concept of congruency in projects therefore allows us to bring together aspects of the culture, behaviour, and needs of all stakeholders into a single measure which is an indicator of likely success. It can also be linked to project processes and to the external environment, to establish a significant measure of project performance and maturity, in context.

4. THE ROLE OF CAPABILITY MATURITY

4.1 Introduction

The use of Capability Maturity Models (CMM) is becoming widely accepted as a means of assessing and improving the performance of organisations (Sheard, 1998). This

idea has also recently transferred to project and program management. At the recent AIPM 2001 conference, six papers raised this topic and four dealt with it extensively. This compares with the AIPM conference two years earlier where the topic was mentioned in four papers but was not the main topic of any paper. A review of the PMI, APM and AIPM websites reveals that the PMI is about to issue a maturity model for project management and that the AIPM has a similar aim for the future.

Before moving on to a detailed discussion on capability maturity in projects, it is of value to consider the scope the discussion and to define some terms. In the project context, the concept of capability maturity can be applied in a variety of ways:

- **Individual Capability Maturity.** This is the extent of the experience, knowledge, skills and attributes of an individual, as they apply to the ability to operate in a complex project environment. The concept applies to all team members, including the project manager. The project manager would be expected to have a much higher level of maturity in general, plus additional attributes such as leadership.
- **Project Team Organisation Capability Maturity.** This is a combination of team cohesion (the ability to think and act together) and team organisation and processes, in a complex project environment.
- **Project Program Capability Maturity.** This is a characteristic of all organisations which host projects, and indicates how well complex projects can be initiated, managed, resourced and closed as part of the larger organisation. It is a measure of the ability of the host organisation to host successful projects.
- **Host Organisation Capability Maturity.** This is the maturity of the host organisation as a whole, as dealt with in the Capability Maturity Models (CMM) in general use.
- **Sponsor/Owner Capability Maturity.** How well does the sponsor fulfill their role? Do they understand and are they capable of delivering consistent direction and advice on their requirements? Can they provide the necessary political and other support required for the project to be successful?
- **Supplier/Subcontractor Maturity.** Sub-contractors and suppliers will have their own level of organisational maturity. Their capability maturity will impact upon project performance both in the products and services provided, and in how well they become part of the larger project team.

It is only necessary to look at the list above to begin to understand some of the implications of maturity for projects. For example, how will a project fare if the project manager is very mature (experienced and capable), but the host organisation is not? Alternatively, what dynamics will be set up if the project organisation is very capable, but the project owner/sponsor is incapable of their role? In the former case, a great deal of frustration and occurs with cost and time blowouts (Dobie, 2001).

These interactions all impact directly upon project management performance and ultimately upon the likelihood of success. This can be quite dramatic - for example where

the owner sponsor really has little idea what they require from the project and change their minds late in the process. Capability maturity relationships are shown in Figure 7 below.

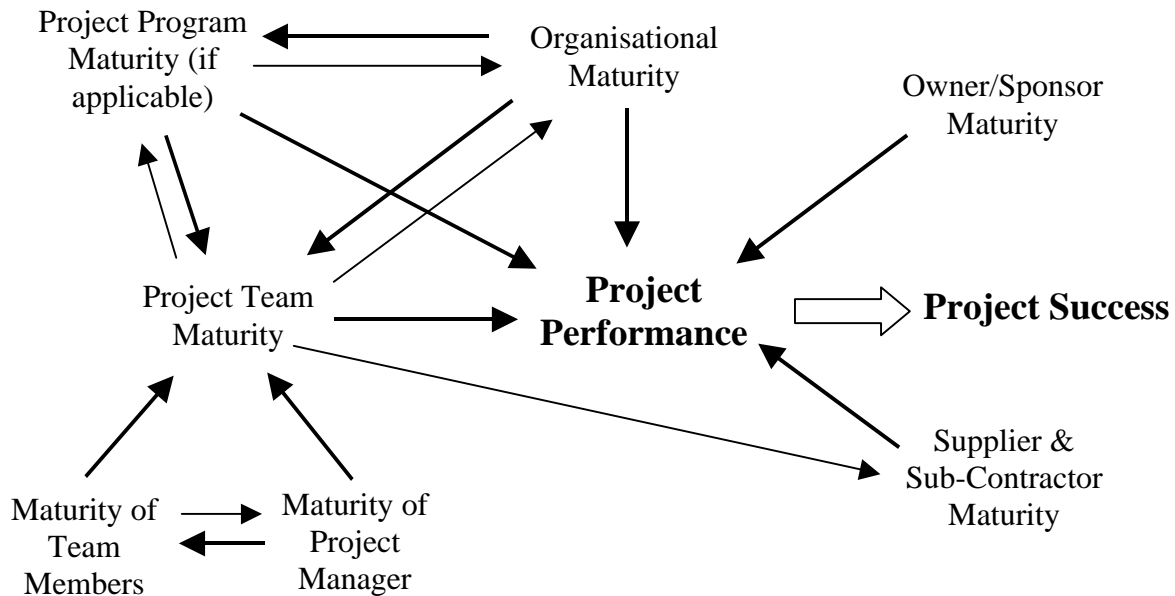


Figure 7: Capability Maturity Interactions in Projects. The thicker lines indicate a stronger influence. Note the central role of project team maturity, but also note that it is heavily “controlled” by Program and Organisational Maturity as well as by the maturity of its team members and manager.

Figure 7 brings to mind questions of relative importance. Just how important is it to have a mature project manager, and is this more important to performance than having a mature host organisation? The following sections will deal with some of the more important capability interrelationships.

4.2 Assessing Capability Maturity of Host Organisations

When the CMM construct is used for project management, it is still most common to retain the focus on the Standards as a basis for assessment. This is illustrated by the four relevant papers at the 2001 AIPM Conference, all of which relied heavily upon one or other of the project management standards when measuring organisational maturity. However there are instances where existing Project Management Maturity Models (PMMM) recognise that project management maturity is much broader than this, for example the CPM Group model (Dobie, 2001). This applies the nine elements of the Guide to the PMBOK, plus another seven criteria focused on the project’s relationship with the organisation and its stakeholders, plus knowledge and data management.

As discussed earlier, the standards seem to be too limited in their scope and do not deal well with a number of key drivers of project management performance. Thus if we wish to assess the maturity of project management (host) organisations, we need to step well outside the standards in order to do so. We need to ask questions like:

- How well integrated are the organisation’s line management and project management structures?

- Are the project start-up and close-down processes seamless with the organisation’s line management processes?
- Does the organisation’s culture value line managers and project managers equally?
- Does the organisation have systems for monitoring and improving project management performance in the context of the operating environment?
- Does the organisation provide sufficient external support to projects e.g. does it provide accountable project champions?

Questions like these are necessary if we are to assess how effective a program management organisation is, but they do not arise from the Standards. This is because the Standards are designed for individuals and for individual projects - not for use at the “whole organisation” level.

Figure 5 illustrates a relatively simple view of the capability maturity relationship between the project and its host organisation. Many of the key processes and cultures that are necessary for overall success are “general management” rather than “project management”. Not only that, but many of a project’s internal capabilities are heavily influenced by external processes. Weaknesses in external systems therefore manifest

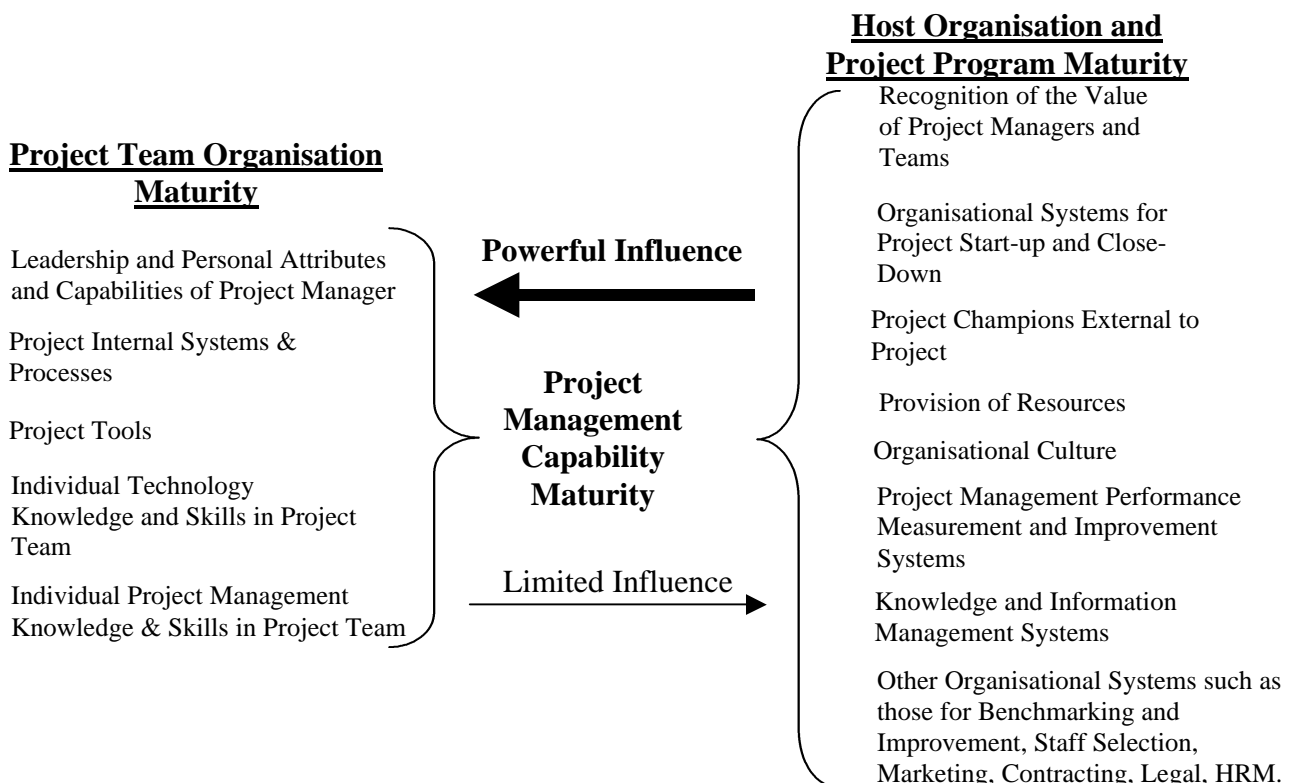


Figure 8: Project Management Capability Maturity Relationships. This shows the strong pressure exerted by the host organisation upon the maturity of the project (from right to left on the diagram). This implies the near impossibility of having a mature project organisation, unless the host organisation is also mature.

themselves as similar weaknesses in project systems.

At the organisational level this is not surprising - since such external cultures and processes determine how well each project is designed, resourced, and supported. The conclusion from this is clear. *The maturity of the whole organisation in general management terms is a key determinant of the likelihood of project management success.*

It might also be supposed that organisational maturity in general and project management organisational maturity in particular will share many features, but that there will be some special features for the latter. The RHS of Figure 5 illustrates this. Project management capability maturity of organisations is therefore an important area for continuing research and improvement, even though it is not even mentioned (for example) in the index to the Guide to the PMBOK.

4.3 Project Team Organisation Capability Maturity

The previous section dealt with overall organisational maturity, where it is assumed that projects, or programs of projects, occur within or are sponsored by an organisation. However projects are also themselves organisations which require internal structure and processes in order to operate successfully. Each project operates in a specific (often very dynamic) external context and are often driven by external forces far more than the project manager would like.

It is therefore possible to consider project organisational capability within its context, as shown in Figure 9.

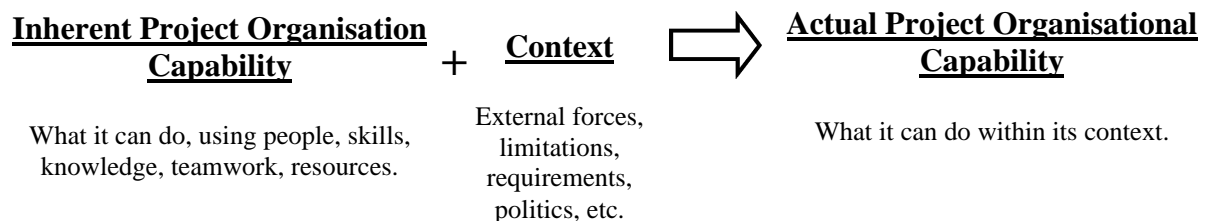


Figure 9: Project Team Organisation Capability Maturity. Inherent capability maturity (LHS) is a combination of individual capabilities plus the team work, processes and organisation of the project as a whole. This is then considered in context, to understand the actual real-world project team capability.

Here we should note that even though it is considered within the context of its environment (the larger organisation), project capability and project performance are not synonymous. Assuming that inherent capability includes such “soft” factors as morale and leadership, we must also deal with the question of time, and project status. The same project organisation with the same inherent capability and in the same larger context and environment, will perform differently depending upon the stage of the project since the requirements at different stages are likely to be very different.

To avoid this problem, it is necessary to modify Figure 9 to incorporate a “time and status” context and to explicitly include human factors and attributes within inherent capability, as in Figure 10 below:

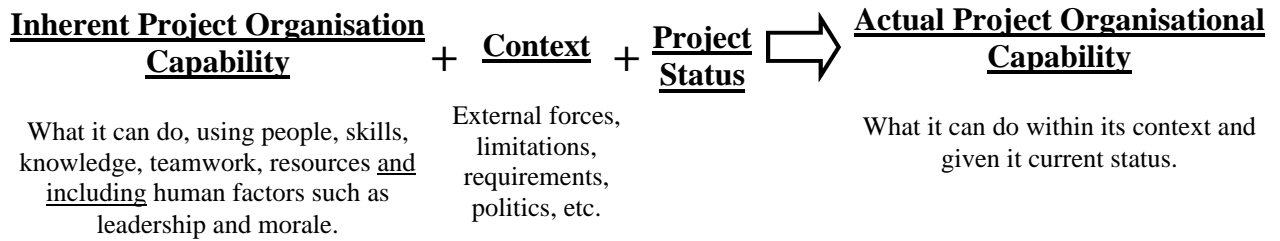


Figure 10: Modified Team Organisation Capability Maturity. Inherent capability (LHS) has been modified to make human factors explicit. Project Status has also been added to provide a current time context. Actual Team Capability now includes the context of time and environment, plus the total team capability.

The relationship between organisational capability and project capability was shown to some extent in Figure 8. Clearly, there must be more to this relationship now that we can see from Figure 10 that project capability is time and context dependant. As well, the development of a project team’s inherent capability depends upon the organisation’s capability, and the actual project capability at any specific time depends also upon its context (and therefore upon the organisation’s maturity, which is a large part of the project context).

These relationships are dynamic, in that they vary with time. As was shown earlier in Figure 8, it might be expected that the organisation will influence the project much more than visa versa. Figure 11 shows this, and incorporates the ideas proposed in Figure 8 and Figure 10.

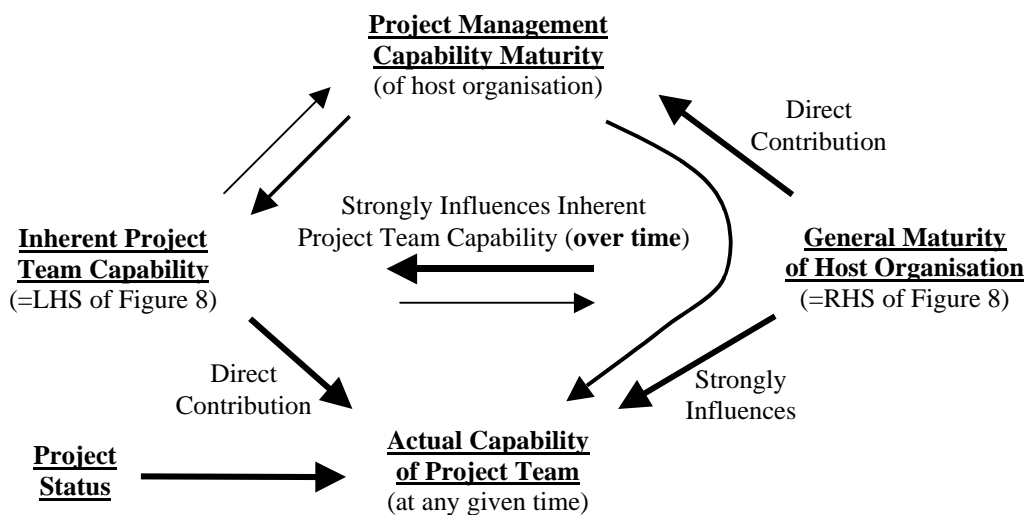


Figure 11: Contributions to Actual (Real-World) Project Team Capability. There are a series of strong influences, from the inherent capability of the team (LHS) to the capability of the host organisation in general (RHS) and as a project management organisation (top). This is placed in time context by adding the influence of the current status of the project.

5. WHERE TO FROM HERE?

5.1 Paper Overview

This paper challenges the standards-based paradigm within project management. It does so by identifying from research, experience and project failures that the topics covered by the Standards are not the key drivers of project success or failure in the real world. It also reviews the dynamics involved between the Standards and project management practice.

The paper goes on to consider concepts and ideas outside the Standards based paradigm. It reviews the nature of project success and its relationship with project management performance. It reviews task complexity and difficulty, before tackling some of the forces which drive project management but which are poorly covered within the Standards.

The role of leadership energy and entropy in projects is discussed. Project management as a profession is examined by comparing its nature with that of existing professions, and lessons are drawn from our knowledge of how work is done in organisational hierarchies. There is a slightly tongue-in-cheek look at whether the concept of fractals can be applied to projects and to project management.

However during the whole paper there are some ideas which are more powerful in their impact than the others:

- The existing project management Standards are limited and constraining, and research to date has not proven their value or effectiveness.
- Project management as a profession is significantly different from the established science-based professions.
- Project management performance and success is very much about the personal attributes, leadership, political skills and interpersonal relationships of the project manager.
- Cultural issues are powerful, long term forces that must always be considered.
- The idea of maturity at the individual, project and organisational level tends to bring together (integrate) the key factors for success.
- The need to achieve congruency of cultures, stakeholders requirements, levels of maturity and so on. This is a core role of the project manager.
- Complex projects are complex dynamic systems, the outcomes of which cannot be predicted with certainty. They should be managed as such.
- Measuring project performance is difficult. Risk analysis may offer a technique which is much more effective than simply monitoring adherence to the standards.

- To understand their profession, project managers need to understand the language, tools and techniques of the political and social sciences. They cannot simply rely on the tools and techniques of industrial engineering.

5.2 Conclusions

The subjects and content of this paper should not be surprising in the light of Crawford's research results, nor given recent work by authors such as Morris and Englund. There are many indicators that whilst on the one hand we have allowed ourselves as a group to become focused on the Standards for the purpose of promoting the profession, as individuals we have at the same time been exploring a more fundamental understanding of the nature of project management than is offered by the Standards.

This dichotomy remains. Our professional organisations continue to update, improve and re-issue Standards as though they are the elixir of life and will somehow become more meaningful and powerful if worked on. The truth is that the Standards represent a small and necessary set of skills and techniques which can be taught and learned at the lower levels of project management work. They are necessary but far from sufficient. They do not and never can provide a mechanism for real professional development.

In order to truly progress as a profession, it is necessary to consider the stronger and more pertinent forces such as leadership, culture, management maturity and congruence as they apply to project management and to project success. We need to start to measure project management performance in its own right, as distinct from project success and we need to benchmark using sophisticated concepts such as capability maturity.

We need to step away from technology and techniques issues, and begin to understand how to design projects to be successful in a complex, risky and very dynamic environment. We need to recognise that projects are themselves complex systems with a focus on change management. It is necessary to use the similarities and lessons that can be drawn from general management, but also to deal with the special characteristics of project management.

Project managers live in a world of change and of challenge. Very little is constant and they are constantly working to achieve congruence between stakeholders, in maturity levels and of cultures. They must design their projects for success, without compromising the links to the outside world. It could be argued that project managers are super-managers, and that they exist and operate in the most volatile and difficult area of management of all.

The current standards based paradigms are limiting and constraining, with little link to reality. They must be challenged, and a new paradigm created.

Questions like those raised in this paper need to be asked and answered before project management can claim an appropriate level of maturity, self-understanding and completeness, for recognition as a professional discipline. This recognition cannot simply be "willed" into existence - it must be earned.

5.2 Possible Areas for PhD Research

Crawford recommends further research to validate her work and to extend it. However it would appear that any research which remains focused upon the knowledge Standards or upon individual competency, is missing the point. We need to move away from that area of research if we are to add anything of significant value.

Areas of greater interest include:

- Use of analytical methods to define those factors which contribute most to excellence in project management performance.
- Development of a culture based view of project management - identifying the key issues of culture and how they might be managed effectively. It would require the identification and further development of appropriate language and research tools.
- Development of a holistic maturity model for project performance, including all elements of maturity from individual to stakeholder maturity.
- The use of risk analysis as a tool for analytical measurement of project management performance.
- The development of a complexity and uncertainty based view of projects - an alternative construct to the current reductionist approach (which breaks each project down into smaller tasks).
- Congruency, its role in project performance and its relationship to maturity.
- Project design - making the design of effective project management systems an integral part of project management..

5.3 Current Plans

As noted at the beginning of this paper, the work to date has raised more questions that it has answered. Project management as a discipline is clearly not mature in its self-understanding, and this leaves many opportunities for further work. However there is a key theme based upon the desire and need to be able to understand project management performance.

It would seem that we should be considering the complex and interrelated issues of maturity and congruence. Between them (or perhaps when they are combined with general management ideas such as Balanced Scorecard) we might hope to be able to provide a more complete and intelligent approach to understanding project management performance. These concepts inherently bring together other complex factors such as leadership, culture and organisational structure.

On this basis, further PhD research should seek to develop a model of “congruency and maturity” for projects, including within the model those capabilities and factors which are most critical in determining likely project success.

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