

# Looking Beyond Contemporary Project Management

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## Abstract

In our current approach to project management, the aspects of time, cost and quality still remain as predominant considerations. However, the perception of project success has changed over the years and many other factors are also considered important today. It is difficult to incorporate most of these additional factors due to the complexity in accommodating a large number of variables, some of which are not common to all projects and to all client organisations. The authors propose a powerful tool to address this difficulty, innovation management, which has the capability of accommodating new considerations under one group. It has not been possible to focus on innovation management at the project level previously due to the non-availability of comprehensive studies on the subject area. However, the authors have come up with a theoretical framework to identify mechanisms that facilitate innovation at the project level of a construction project, most of which could be applied to projects in general. Based on this theoretical framework, the authors propose to integrate project management and innovation management and provide suggestions as to how the concept of innovation management could be incorporated into project management within the PMBOK (Project Management Body of Knowledge) project management framework (PMI, 2013).

**Keywords:** innovation, innovation management, project management, project outcomes, project success.

## Introduction

People have undertaken projects for more than 6,000 years, and projects are the key instrument for the development of society, starting from the pyramids and the Great Wall of China, and this is not going to change (Geraldi, Turner et al., 2008). As the projects are needed to uplift the lives of humankind, managing them is vital.

When the modern approach to project management started in 1950's, the necessity was to improve project performance and the main considerations were time, cost and quality (called the 'iron triangle'). Today, the considerations for project success include measuring the success in the implementation process, the perceived value of the project and client satisfaction. Project success is measured across dimensions such as meeting planning and design goals, customer benefits and benefit to the developing organisation. In addition, doing the process right, getting the system right and getting the benefits right are considered along with assessing project success according to short-term and long-term project objectives. Using the available literature, achieving project success is discussed in the paper.

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The complexity in accommodating a large number of variables, some of which are not common to all projects, is the main reason for not incorporating the additional considerations in the current project management approach. However, there is a powerful tool to use in this connection. It is innovation management. Innovation also has the capability in accommodating the large number of above mentioned additional considerations under one group. The benefits of innovation covers all the considerations for a successful project including those within the 'iron triangle'. Therefore, in innovation there is one entity to work with in dealing with the considerations mentioned.

It has not been possible to focus on innovation management at the project level previously due to the non-availability of comprehensive studies on the subject area. However, the authors have come up with a theoretical framework to identify mechanisms that facilitate innovation at the project level of a construction project, most of which could be applied to projects in general. This theoretical framework has been the result of an extensive literature review and consultations with several experienced practitioners. In the paper, the importance of innovation is discussed along with how it could provide solutions to the dilemma of not incorporating some success criteria in PMBOK (Project Management Body of Knowledge) (PMI, 2013) literature.

Firstly, the historical development of project management and its continued focus on the iron triangle are discussed.

### **Historical perspective of project management and project success**

There is rather widespread agreement that what could be validly called modern project management had its genesis in the 1950s (Stretton, 2007). According to Stretton, the USA Company Bechtel first used the term Project Manager in their international work beginning in the 1950's. The 1951-53 Transmountain Oil Pipeline in Canada was the first project in which Bechtel actually functioned as the project manager, although it was not called project management at that time (Stretton, 2007).

It is apparent that one of the main reasons contributed to the development of project management has been the need to prevent project failures. This view is supported by Atkinson (1999) who stated that based upon past mistakes and believed best practice, standards such as BS 60794 and the UK Body of Knowledge continue to be developed. Belassi and Tukel (1996) also supported this view. They stated that since the 1950s most of the work in project management has focused on project scheduling problems, assuming that the development of better scheduling techniques would result in better management and thus the successful completion of projects (Belassi and Tukel, 1996).

With this historical background and the focus on preventing failures, it is interesting to explore how project success has been viewed.

It is apparent that the project success is still looked from the perspective of 'iron triangle' considerations. For example, PMBOK focuses more on scope, time, cost, quality, resources, and risk management when defining project success. It states that since projects are temporary in nature, the success of the project should be measured in terms of completing the project within the constraints of scope, time, cost, quality, resources, and risk as approved between the project managers and senior management (PMI, 2013).

Having looked at the development of project management over the years, it is interesting to find out how the meaning of project management and project success changed over the years. Referring views from the 1950's, Atkinson (1999) stated that after 50 years it appears that the definitions for project management continue to include a limited set of success criteria, namely the Iron Triangle of cost, time and quality. He argued that this emphasis and the rhetoric which has followed over the last 50 years supporting those ideas may have resulted in a biased measurement of project management success and could be the problem

to realising more successful projects (Atkinson, 1999). Supporting this view, Shenhar, Dvir et al. (2001) stated that “one of the most common approaches to project success has been to consider a project successful when it has met its time and budget goals. Although this may seem true in some cases—and appropriate in the short run when time to market is critical—there are many examples where this approach is simply not enough. Quite often, what seemed to be a troubled project, with extensive delays and overruns, turned out later to be a great business success” (Shenhar, Dvir et al., 2001). Mir and Pinnington (2014) added further “projects differ in size, uniqueness and complexity, thus the criteria for measuring success vary from project to project making it unlikely that a universal set of project success criteria will be agreed. Traditional project management systems which exclusively pursue the success criteria of cost, time, quality and meeting technical requirements have become considered ineffective” (Mir and Pinnington, 2014). Egemen & Mohamed also supported this argument by stating that the traditional assumption that clients only need projects which are completed within budget, on schedule and with a reasonable quality should start to change (Egemen and Mohamed, 2006).

In the light of this argument, it is interesting to know what scholars describe as contemporary project success.

### **Project success assessment**

Project success (or failure) is a comparative term, which can be interpreted by different parties in different ways. However, there is a widespread agreement about the ways of measuring the success of a project.

Citing other researchers, Mir and Pinnington (2014) have identified the following different ways of measuring project success:

- Measuring the success in the implementation process, the perceived value of the project and client satisfaction with the result.
- Measuring project success across the four dimensions of meeting planning and design goals, customer benefits, benefit to the developing organisation.
- Dividing project success into three categories: doing the process right, getting the system right and getting the benefits right.
- Assessing project success according to short-term and long-term project objectives including efficiency (meeting schedule and budget goals), impact on customers (customer benefits in performance of end products and meeting customer needs), business success (project benefits in commercial value and market share) and preparing for the future (creating new technological and operational infrastructure and market opportunities). (Mir and Pinnington, 2014).

Many researchers such as Shenhar (2001), Baccarini (1999), Dulaimi, Ling et al. (2003), Dulaimi, Nepal et al. (2005), Lu and Sexton (2006), Ozorhon (2012), Gambatese and Hallowell (2011), Eaton, Akbiyikli et al. (2006) and Panuwatwanich (2008) have identified general factors that contribute to project success. The authors have listed the following as the factors contributing to the success of a project, which include the findings of the above researchers:

1. User and stakeholder considerations: solving a customer’s problem, fitness for use, satisfying stakeholders and user needs, creating user happiness and loyalty, providing positive economic impact to surrounding community.

2. Firm level considerations: increased revenues, profits and market share, competitive advantage and market impact, enhanced reputation, higher diversification, increased capabilities, creation of new opportunities for new products and markets.
3. Project execution level considerations: meeting owner's needs, decreased time and cost, higher quality, higher project efficiency and productivity, meeting functional performance, meeting technical specifications, reduced waste and sustainable outcomes.
4. Organisational level considerations: content project team, job satisfaction and personal development of team members, positive organisational and professional learning, increased organisational effectiveness and commitment, higher organisational motivation.

This clearly shows that the factors that are currently being considered as project success are not confined only to those related to scope, time, cost, quality, resources and risk. Supporting this view, Shenhar (2001) added "the project management success criteria of time, cost and performance are subordinate to the higher product success of goal and purpose".

The authors agree that the project success should go beyond the consideration of those in the 'iron triangle' and that the current project management approaches do not accommodate many factors considered important for project success today. In our opinion, it is difficult for contemporary project management approaches to cater for the additional project success factors due to the following reasons.

1. There are too many factors to deal with and they differ from project to project and organisation to organisation.
2. Accommodating them make the project management approaches more complicated, limiting its ease of use.
3. Currently, there is no single entity accommodating all project success factors under one group.

The authors are of the opinion that innovation management is capable of accommodating project success factors considered relevant today and should be the entity that we look for to incorporate project success factors in contemporary project management approaches.

To prove above arguments, it is necessary to first look at how innovation could pave the way for project success.

### **Importance of innovation for project success**

In order to assess the importance of innovation for project success, it is necessary to understand what innovation means in the context of projects. A comprehensive literature review has identified that scant research focus has been given to project innovation. In fact, authors found no proper definition for project level innovation after undertaking a comprehensive literature review on the topic. The closest definition the authors found to specifically describe project level innovation was given in the context of construction industry by Ling (2003). Ling defined innovation as "a new idea that is implemented in a construction project with the intention of deriving additional benefits although there might have been associated risks and uncertainties". Ling's definition refers to new design, technology, material component or construction method. However, the term 'additional benefits' does not provide a meaning without first identifying 'default' benefits (if such benefits do exist).

After lengthy interviews and consultation with ten highly experienced practitioners in the construction industry, the authors developed the following definition, which they believe can be applied to any project. Our definition is with respect to projects, innovation can be regarded as the application of ideas for new or improved products (including materials, plant and equipment) and software, technologies, methods, practices and systems designed to benefit the project.

The unique nature of projects provides a suitable environment to use innovation. Commenting on project based firms, Keegan and Turner (2002) stated that “Project based firms are engaged in unique, novel and transient work, delivering bespoke outputs to clients and working to customised specifications in both capital and new product development projects. All project based firms use teams, usually multi-disciplinary, to achieve their goals. Because no two projects are the same, project based firms deal with change as a matter of their daily commercial reality. Further, because they produce once-off offerings rather than commodities, customer orientation is always a strategic concern. What better context in which to examine innovation?”

Many scholars who conducted research on the construction industry, have emphasised the importance of innovation in projects. They include Dulaimi, Ling et al. (2003), Dulaimi, Nepal et al. (2005), Lu and Sexton (2006), Eaton, Akbiyikli et al. (2006), Gambatese and Hallowell (2011) and Ozorhon (2012). According to Newton (1999), innovation has been advanced as the fourth dimension of competition in construction, along with cost, quality and time. Russell et al. (2006) pointed out that innovation can occur at the project delivery level at one or more of the project stages/phases—design, construction, and operation and maintenance. Innovations appear to be ubiquitous in design and construction (Russell et al., 2006). The authors agree with these views and believe that they could be extended to projects in general. In addition, all these arguments point out to the fact that projects provide fertile grounds for innovation.

Innovation benefits all types of projects. However, some types of projects receive more benefits than others from innovation management. Shenhar (2001) has categorised projects into the following:

1. Low-technology projects, which rely on existing and well-established technologies, such as construction, road building and “build to print” projects, where a contractor rebuilds an existing product;
2. Medium-technology projects, which rest mainly on existing, base technologies but incorporate some new technology or feature. Examples include industrial projects of incremental innovation, as well as improvements and modifications of existing products;
3. High-technology projects, which are defined as projects in which most of the technologies employed are new, but existent, having been developed prior to project initiation, such as developments of new computer facilities, or many defence developments;
4. Super-technology projects, which are based primarily on new, not yet existent technologies, which must be developed during project execution. This type of project is relatively rare, and is usually carried out by only a few (and probably large) organisations or government agencies.

Most construction projects belong to the lowest level in the hierarchy, i.e. low technology projects. Yet, many researchers have found significant benefits from innovation for construction projects. They include decreased cost, competitive advantage, higher quality (Gambatese and Hallowell, 2011), productivity improvement, improvement of client

satisfaction (Ozorhon, 2012), improvement of working conditions, quicker construction times and better value for clients (Eaton, Akbiyikli et al., 2006), increased organisational effectiveness and commitment and higher organisational motivation (Dulaimi, Ling et al., 2003; Dulaimi, Nepal et al., 2005; and Lu and Sexton 2006). If low-technology projects such as construction projects benefit from innovation, the benefits to higher order projects can be even higher.

It is also interesting to explore how innovation brings in benefits to projects. For this, it is necessary to look at the fundamentals of innovation. Innovation is closely related to creativity. Creativity, in general, means the ability to combine ideas in a unique way to make unusual associations between ideas. Innovation is the process of taking a creative idea and turning it into a useful product, service, or method of operations (Robbins, 1994). In other words, facilitation of innovation means providing opportunities to generate beneficial ideas and implementing them. As there is no limit to the scope of ideas, they could include the ideas contributing to achieve the 'iron triangle' considerations of time, cost and quality and all the other success considerations discussed above. This means that focussing on innovation enables dealing with all project success considerations under a single entity.

With this background, the authors conclude the following:

1. The time has come to expand project management approaches to accommodate multiple success criteria, considered necessary today, in projects.
2. We have a tool to do this through facilitating innovation as it is a single entity which could be used to achieve multiple project success criteria.

Understanding the importance of innovation in project management is one thing but accommodating it in project management methodology is another.

### **Proposed framework for applying innovation in project management**

To apply innovation management during the execution of projects it is necessary to have a good understanding of mechanisms that facilitate innovation. A comprehensive literature review conducted by the authors has revealed that no research has been done so far to comprehensively study the mechanisms that facilitate innovation at the project execution level. In order to fill this knowledge gap, the authors are undertaking a research in the area of construction. The objectives of the research are the following:

1. To identify mechanisms that can be implemented by the client in construction projects, which enhance innovation performance through a comprehensive literature review and discussions with experienced practitioners.
2. To develop an empirically-tested model that encapsulates the above mechanisms as constructs and their relationship to each other and on the performance of innovation.
3. To test and validate the model using appropriate methods.

The first two objectives have been achieved thus far. The identified mechanisms are idea harnessing, relationship enhancement, incentivisation and project team fitness. They are briefly explained below.

#### **Idea harnessing**

This is the use of new and beneficial ideas to identify and implement innovative actions. There are techniques and strategies available that could be used in projects to harness ideas. They include suggestion box, general brainstorming, brainstorming with De Bono 6 hats, scenario planning, risk assessment planning, life cycle costing and value management. Some of the strategies that can be used to generate new ideas are: following new research in the

field of work; using inputs from experienced personnel, key stakeholders, contractors and suppliers and fellow staff and workers; using best practices and using captured project learnings from completed projects.

### **Relationship enhancement**

No innovation could be achieved in an adversarial environment (Ling, 2003). Relationship enhancement is employing actions to improve relationship within the project team and between parties to the project such as contractors, consultants and suppliers. Different formal or informal relationships are formed during the execution of a project with the contractor, some of which enhance relationships. They belong to the category of relationship contracting which includes 'partnering' and 'alliancing'. Partnering is a formal process to facilitate greater team participation and communication outside the contractual process. Alliancing goes further than this by making the process contractual. In relationship enhancement mechanism, the type of relationship between parties to the project and the level of relationships are considered that enhance relationship between parties.

### **Incentivisation**

Research shows that innovative activities in a project could be enhanced by encouraging and providing incentives or rewards to augment synergistic motivation of those engaged in the project. These could be internal (such as presenting awards within the organisation) or external (such as industry professional organisational awards). They could also be monetary (payments to contractors and to other key suppliers if they undertake innovative activities) or non-monetary (giving future contracts to innovative contractors). Incentives could be given to individuals and to teams and they could be from the client's team as well as from parties contributing to the project.

### **Project team fitness**

All the mechanisms mentioned above may not work unless the client's team is capable and focused on enhancing innovation. Therefore, the client's team should be highly motivated, experienced and knowledgeable on promoting innovation within the project. In addition, the client's team should be encouraged and well supported to engage in innovative activities. This aspect is covered under project team fitness.

Project team fitness consists of deliberate actions taken at the project level to strengthen the project team and improving its capability to focus on innovative activities. The client actions for project team fitness can be broadly grouped into the following components:

1. Create a capable project team by appointing suitable team members and develop the team to undertake activities to enhance innovation performance.
2. Establish a strong supportive environment for the project team to undertake innovative activities.

Creating a capable project team includes the following:

- Appointing a capable project manager by looking for innovative leadership characteristics and by looking for past innovation history.
- Appointing a capable project team by recruiting technically knowledgeable and experienced project team members from diverse backgrounds.
- Developing the project team by inculcating a team innovative culture and developing it as a high-performing team.

For the client’s team to be highly active in facilitating innovation, it needs to get encouragement and required resources from the parent organisation. This task would be easy if the client organisation, itself is innovative.

After identifying these mechanisms through a comprehensive literature review, they were tested through lengthy interviews with ten highly experienced Australian construction industry practitioners.

**Further work**

Based on the above framework, a conceptual model encapsulating the mechanisms and how they interact to influence project innovation performance has been proposed, which is shown below.

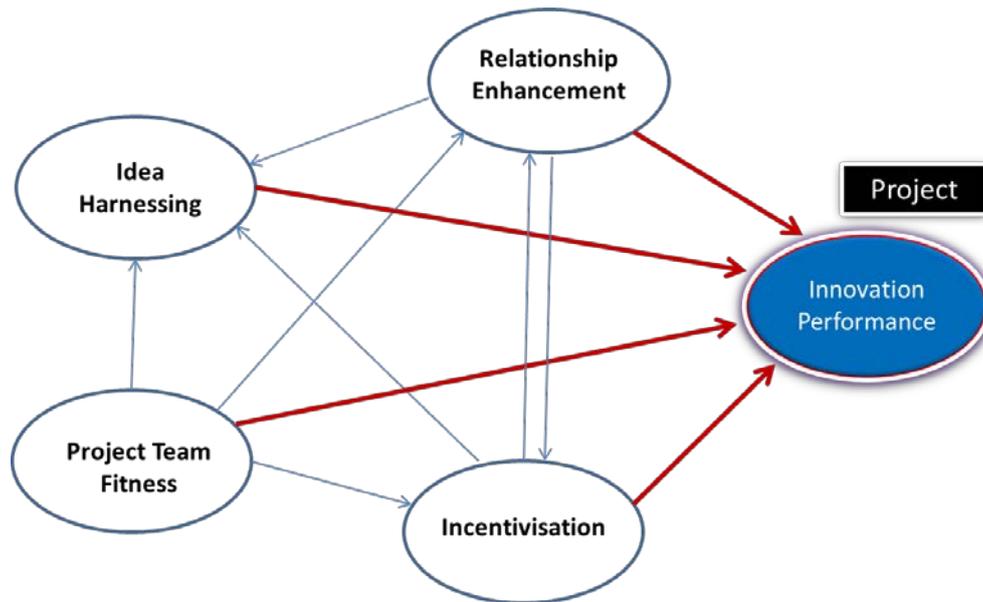


Figure 1: Proposed model

Data collected from a survey of practitioners will be used to refine the model using a semi-quantitative questionnaire. The participants of the survey would be Australian practitioners who have considerable experience in major infrastructure construction projects, working in key positions for the client.

The data will be analysed using statistical methods including descriptive data analysis to describe the data set and to get a feel for the data, measurement scale analysis to assess reliability and validity and model assessment and refinement. The relationships between the model constructs will be analysed using multivariate regression analysis. The validation of the model will be through an expert panel employing the ‘Delphi’ technique.

Although the framework mentioned above has been developed in the context of construction projects, the authors believe that it can be equally applicable to any other project. In addition, the authors believe that the mechanisms identified could be incorporated into contemporary project management approaches. Suggestions for incorporating these mechanisms into PMBOK methodology are given below.

## **Integrating project management and innovation management**

The authors suggest that the above research findings be included in the PMBOK methodology (PMI, 2013) through the following ways:

1. Add innovation facilitation skills under “Interpersonal Skills of a Project Manager” (see section 1.7.2 in PMBOK). The following abilities may be categorised under innovation facilitation skills:
  - Encourage people to try new ways of doing their jobs
  - Encourage bringing out ideas even some look silly
  - Coordinate and combine the creativeness of project team members and facilitate their idea generation efforts
  - Adopt and implement new ideas on projects
  - Show appreciation to creativity and innovation by giving public and meaningful recognition
  - Have enough time to pursue innovative ideas
  - Provide adequate funding for new technologies
  - Provide enough manpower to support innovation
  - Provide adequate training for new technologies
  - Constantly look for opportunities to improve
  - Seek out and promote new technologies, processes, techniques, ideas to solve problems
  - Recruit team members from different backgrounds to generate divergent thinking (male, female, people from different ethnic backgrounds)
  - Convince and sell innovative ideas to potential allies and get their support and approval.
2. Improve the wording of “Project Success” (see section 2.2.3 in PMBOK). Suggested wordings are “Since projects are temporary in nature, the success of the project should be measured in terms of completing the project within the constraints of scope, time, cost, quality, resources, risk and other success criteria as approved between the project managers and the senior management” (added words shown are underlined).
3. Improve the section on the Role of the Knowledge Areas (see section 3.9) by adding a new knowledge area called “Innovation Management”. Under this area, the mechanisms mentioned above, i.e. idea harnessing, relationship enhancement, incentivisation and project team fitness should be discussed in detail identifying actions under each mechanism. It is noted that some actions are mentioned elsewhere (example, brainstorming). They may be removed from current sections and placed under the new knowledge area.

## **Conclusions**

The authors believe that the contemporary project management has not been able to deliver optimum outcomes, which it is capable of. Project management approaches currently available tend to focus mainly on the ‘iron triangle’ outcomes, namely the time, cost and quality, leaving most other potential project outcomes untouched. The main reason for this is the difficulty in catering to many desired project outcomes, which differ from organisation to organisation and from project to project. In addition, a single way of dealing with these multiple outcomes has not been found up to now. The authors believe that they have found the answer to this problem in innovation.

Innovation has benefited humankind in all walks of life. However, it has not been properly utilised in project management up to now. Although many clients recognise the importance of fostering innovation in projects, they face an apparent paradox: how to influence the disorderly and unpredictable process of innovation using orderly and predictable business processes. This task has increasingly become difficult due to the lack of sufficient knowledge on factors that client can influence to promote innovation at the project level. The author's research in the area of construction projects have unearthed a set of mechanisms to apply innovation in projects. We believe the four mechanisms discovered, namely idea harnessing, relationship enhancement, incentivisation and project team fitness, could be applied to projects in general to facilitate innovation during project execution.

Therefore, the authors propose to integrate project management and innovation management, arming project managers with more tools to achieve enhanced project outcomes. Specific details of how this can be done in relation to the PMBOK project management approach have been provided.

As there is no adequate definition currently available, a new definition was developed to describe innovation related to projects, which will benefit future researchers. This paper is based on the research findings to date in the context of construction projects. Future research may include testing these research findings in other project areas.

## References

- Atkinson, R., 1999. Project management: cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria. *International Journal of Project Management*, 17(6): 337-342.
- Baccarini, D., 1999. The logical framework method for defining project success, *Project management Journal*, vol. 30, no. 4, pp. 25-32.
- Belassi, W. and O. I. Tukel, 1996. A new framework for determining critical success/failure factors in projects. *International Journal of Project Management*, 14(3): 141-151.
- Geraldi, J. G. et al., 2008. Innovation in project management: Voices of researchers. *International Journal of Project Management*, 26(5): 586-589.
- Keegan, A. and J. R. Turner, 2002. The management of innovation in project-based firms. *Long range planning*, 35(4): 367-388.
- Ling, F.Y.Y., 2003. Managing the implementation of construction innovations, *Construction Management and Economics*, 21(6): 635-649.
- Mir, F. A. and A. H. Pinnington, 2014. Exploring the value of project management: linking project management performance and project success. *International Journal of Project Management*, 32(2): 202-217.
- PMI, 2013. A guide to the Project management body of knowledge (PMBOK Guide), fifth edition, *Project Management Institute*, Chapters 4-8.
- Shenhar, A. J. et al., 2001. Project success: a multidimensional strategic concept. *Long range planning*, 34(6): 699-725.
- Stretton, A., 2007. A short history of modern project management. *PM World Today*, 9(10): 1-18.
- Robbins, S.P., 1994. *Management*. Fourth Edition: Prentice Hall International Editions. USA, 399.