

The Innovation of Things

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Abstract

Innovation in project management, including adaptable (Agile) practices that can respond quickly to opportunities and explore alternative solutions with the freedom to experiment, requires a new approach that is not constrained by conventional ideologies and the fear of failure. The parallel processes of innovation management and project management need to interact, new ways of working need to be applied where time is of the essence, and the benefits of design thinking within a diverse team environment must be realised. Innovation requires a cross-disciplinary approach using creative and entrepreneurial skills and blending financial, social, political and environmental criteria to realise value for project stakeholders. It is a new way of thinking, and a desire to measure success not just in the delivery of projects but also taking account of good design and end-user delight. Projects must be progressive and generate collective utility. The authors of this paper discuss a novel approach for embedding innovation management within project management to plan, act, learn and continuously improve our delivery performance.

Keywords: *innovate, success, design thinking, project management.*

Introduction

The word ‘innovation’ is frequently used these days, and has become synonymous with ‘success’ and ‘competitive advantage’. In the context of project management, it is seen as an important attribute and something to be valued because of the perceived benefits it brings to project stakeholders. But innovation can also lead to failure. The management of innovation, therefore, is critical if positive outcomes are to prevail.

An online search of the *PMBOK® Guide* (Sixth Edition), including the companion *Agile Practice Guide*, shows that the text ‘innovat’ appears just 22 times throughout its 977 pages. Nevertheless, this is a significant improvement over earlier versions, which contain just 2 matches (in both Editions 4 and 5). In contrast, the text ‘success’ (excluding ‘successor’ and ‘successively’) appears 198 times (Edition 6), 120 times (Edition 5) and 78 times (Edition 4). It could be concluded, therefore, that innovation is a minor issue for the profession at this time.

But this would be a mistake. The definition of ‘project’ is broader than what many might think, and can include product development, business start-up and new services to consumers. Project managers are increasingly operating in what is generally referred to as the ‘gig economy’, and the scope of their projects span a wide range of industry sectors. Innovation is becoming a requirement for success, rather than a novelty or merely marketing spin. Despite the choice of methodology, whether it be ‘Waterfall’ or ‘Agile’ or somewhere in between, embedding innovative solutions into project delivery is now key.

It is also important to consider the phases of projects. Traditionally, a largely sequential approach is assumed that focuses on project delivery (or implementation) activities. But in reality, the success of a project is a function of *design* (project initiate), *delivery* (project implement) and *delight* (project influence). Benefit realisation is fundamental, although difficult to measure. Innovation pervades all phases and may include considerations such as customer needs and wants, market appeal, productivity improvement, new materials and technologies, sustainability, and collective utility. Projects, whatever their type, should be progressive, not regressive. Innovation is aligned to concepts such as continuous improvement and the plan-act-learn notion that underpins it.

The aim in this paper is to explore the interface between the disciplines of project management and innovation management and how project success and project innovation are inextricably linked. A new conceptual framework is presented as a solution for embedded innovative thinking into project delivery, in particular. A case study is included to demonstrate how the project management profession can up-skill to expand the scope of their services and to learn how to embrace innovation and design thinking, and to increasingly deliver projects that are demonstrably successful. The paper concludes with some advice about how the project management profession can integrate innovation management into its existing skillset to improve the success of project delivery.

Literature Review

Innovation Management

Innovation is defined as the introduction of something new; a new idea, method or device¹. Innovation is linked to creativity, experimentation, testing and validation, change management and organisational success (see Figure 1).

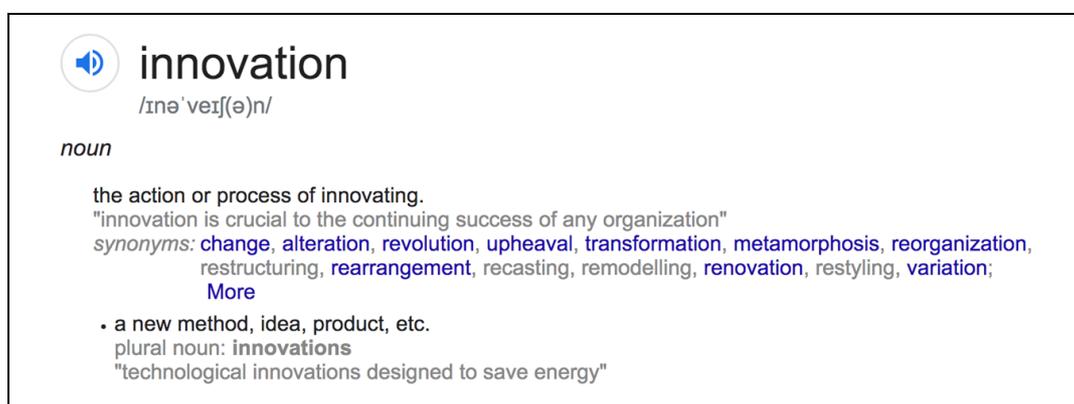


Figure 1: Google search ‘define innovation’

A key question for innovators is: *I have a great idea – now what?* A great idea not acted upon is a wasted idea. So the implementation of ideas, including creativity, experimentation, testing and validation, and change management processes, is what is often called *innovation management*.

Innovation management and project management share common ground. Both are concerned with goals of successful implementation and benefit realization. Lenbrzowski (2013) summarises the key differences (see Table 1).

¹ <https://www.merriam-webster.com/dictionary/innovation>

Table 1: Five key factors of successful execution

Traditional PM Theory	Innovation Management Thinking
Project End Result – The ‘what of the project, why it’s important to the organisation and what are the deliverables.	Searching – In this phase, ideas that meet needs, respond to opportunities, or advance the organisation’s strategic goals are deliberately hunted and gathered. At the end of the phase, there will be many ideas needing to be evaluated.
Critical Success Factors – The make-or-break issues that need to be resolved for the project to succeed. This includes management of risks that could be damaging to the project.	Exploring – Ideas and opportunities are organised and analysed in order to understand them in depth. Ideas may need to be tested to demonstrate that they are practical and viable (as far as possible).
Project Scope – The interdependency of resources, time, and features of the project. This is the tool most project leaders use to understand the impact of changes on the project.	Committing – Here’s where we move from ‘what could we do?’ to ‘what should we do?’. The focus is on what to do, not how.
Key Relationships – Managing the politics, gaining the support and resources from internal and external team members to get the deliverables of the project accomplished.	Realising – The emphasis moves to execution, from the ‘what’ to the ‘how’. What are the things that lead us toward our defined goals?
Schedule – The planning and articulation of the deliverables and milestones of the project. This is where inexperienced project leaders leap before understanding the above items!	Optimising – Maximising benefits: increasing the degree to which the idea has been exploited. Like PDCA (plan-do-check-act), this continuous prototype (pilot-assess-learn-redo) cycle is central to the concept of innovation.

Innovation management can apply to new products, projects, services, organisational structures, policy initiatives, and other endeavours. The context within which it occurs is typically a team-based projectised environment under the direction of a project leader (project manager, product manager, business analyst) or ‘champion’ (Gemünden, 2016). The process of managing innovation is potentially generic, much like the process of managing projects, and there is opportunity to integrate these two activities moving forward.

Agile Project Management

Project management can adopt a number of methodological approaches to delivering successful projects. Two of the prominent approaches comprise Waterfall and Agile. The former traditionally involves a sequence of process groups defined as Initiating, Planning, Executing, Monitoring and Controlling, and Closing (PMI, 2017a). The Agile approach, which has evolved from the software development industry, is more exploratory, and may comprise a series of ‘scrums’ and ‘sprints’ designed to deliver products capable of testing and customer validation.

So Agile has a natural affinity with innovation management since it supports making progress toward overall project goals without fully understanding and planning the end result (Nakano & Higuchi, 2017). Researchers, which often look for new ideas through experimentation and analysis of field data, typically follow an Agile approach even though it may be informal or accidental. They do not know the outcome of their work at the start, although they do define the problem and set a clear aim that guides the ongoing research effort.

The *Agile Practice Guide* (PMI, 2017b) recognises the importance of Agile in delivering innovative and successful outcomes to project stakeholders. Its Introduction states (p.3):

Disruptive technologies are rapidly changing the playing field by decreasing the barriers to entry. More mature organizations are increasingly prone to being highly complex and potentially slow to innovate, and lag behind in delivering new solutions to their customers. These organizations find themselves competing with smaller organizations and startups that are able to rapidly produce products that fit customer needs. This speed of change will continue to drive large organizations to adopt an agile mindset in order to stay competitive and keep their existing market share.

Agile is now used beyond the computer software development industry (Conforto et al., 2014) into manufacturing, education, healthcare and other industries that need to be more responsive, disruptive, nimble and customer-focused. Scrum and Kanban are subsets of Agile. Lean is a companion adaptive approach, defined as maximising value and minimising waste² (i.e. unnecessary effort), and may be referred to informally as ‘working smarter not harder’.

Design Thinking

The concept of design thinking was popularised in 1991 with the foundation of IDEO by David Kelley (Geissdoerfer, Bocken & Hultink, 2016). Kelley went on to found the Stanford d.school in 2006. With its human-centred approach, design thinking is an integrative and holistic style of solving complex problems (Stanford, 2018). It involves collaboration in multidisciplinary teams, experimenting with artefacts and solving complex problems by using the following generic five-step process (IDEO, 2018):

1. *Empathising*: Understanding the human needs involved.
2. *Defining*: Re-framing and defining the problem in human-centric ways.
3. *Ideating*: Creating many ideas in ideation sessions.
4. *Prototyping*: Adopting a hands-on approach in prototyping.
5. *Testing*: Developing a prototype/solution to the problem.

In the first stage, designers communicate with clients regarding issues in delivering an innovative project/product/service solution. To truly engage with the client, design thinkers are required to develop empathy by observing the environment where the solution will reside, talk with other stakeholders, experience some of the daily activities or processes required to complete existing tasks as well as listen to current concerns, needs and wants. The empathy-gaining activities lead to the definition of the problem, which helps the designers develop creative ideas. Liedtka (2014) states that these ideas contribute to solving the problem initially identified. Idea development later creates the prototype for idea implementation and problem-solving. The prototype is considered as working principles, which also determine whether the designers will use deductive or inductive reasoning. After selecting the working principles, the test of applicability of the idea for solving the particular problem is observed.

As commented by Kleinsmann, Valkenburg & Sluij (2017), this approach benefits the organisations by resolving the problem through focusing on systematic and rational processes. This model also prioritises human interaction as the designers empathise with the problem. The client has to provide well-defined insight into the problem for getting the desired results. Creativity should focus on problem identification and even solving the problem through the introduction of innovative ideas. There are other variants of this approach, but they all share the non-linearity of the process through feedback loops and lessons learned.

² <https://www.lean.org/WhatsLean/>

Benefit Realisation

The purpose of innovation, ultimately, is to add value. This is essential given that innovation carries risks and costs that inherently consume value. Put simply, the outputs must outweigh the inputs. Sometimes this notion can be expressed as a benefit:cost ratio, but it may also include intangible benefits that cannot be easily monetarised. For this reason, benefits should be judged as the contribution they make to stakeholders (including society more generally), and as not all stakeholders will be equally rewarded, ‘winners’ should at least outnumber ‘losers’. This is known as collective utility. Losers might need to be compensated.

Benefit realisation is a key aspect of project success and a key objective of innovation (PMI, 2019). It is related to the passage of time. The benefits from innovation in projects may take many years to materialise. A discounting philosophy, therefore, is relevant here: benefits realised sooner are more attractive than benefits that appear well into the future.

PMI (2019, p.2) provides the following rationale for their advocacy of benefit realisation:

Facing rapid change and increasing complexity, organizations struggle to implement the strategies they need to generate and sustain a competitive advantage. There is greater need now than ever before to ensure that the investments in portfolios, programs, and projects lead to clear, sustainable benefits.

Projects must be progressive, not regressive. Therefore, collective utility must be positive. Utility can be measured as a combination of economic, social, political and environmental criteria (Little, 2002).

Conceptual Framework

Innovation applies to a wide variety of endeavours and which, for the sake of simplicity, are referred to hereinafter as ‘projects’. The phrase (and title of this paper) – *The Innovation of Things* – is useful because it reinforces the generic and pervasive role that innovation plays in our society and our living standards.

Bridging the gap between innovation management and project management processes requires the adoption of a more flexible (Agile) mindset (Mahmoud-Jouini, Midler & Silberzahn, 2016), which could still exist within a more traditional Waterfall approach if appropriate, creating a hybrid methodology. Even more critical, however, is the integration of design thinking as the launching point for innovation management. This creates a ‘sub-routine’ within a larger projectised environment so that innovation and project management can co-exist.

Figure 2 illustrates a proposed conceptual framework for this integration. It highlights the key objectives of *understand*, *explore* and *materialise* in delivering successful outcomes. All three are critical. It also demonstrates an alignment between *understand* and *plan* (appreciate what is the rationale for change – empathise/define), *explore* and *act* (generate new solutions that can improve value to stakeholders – ideate/prototype/test) and *materialise* and *learn* (implement solutions that realise expected benefits – evaluate/reflect). This forms the basis of continuous improvement. The shaded area (depicted in Figure 2) is where innovation takes place. It represents a purposeful synergy between the three domains and is a reminder that the skills needed by the project team are multidisciplinary and iterative. In fact, creativity is extremely important – not just in the context of idea generation but also the wider demands of solving novel (and sometimes ‘wicked’) problems in a dynamic project environment.

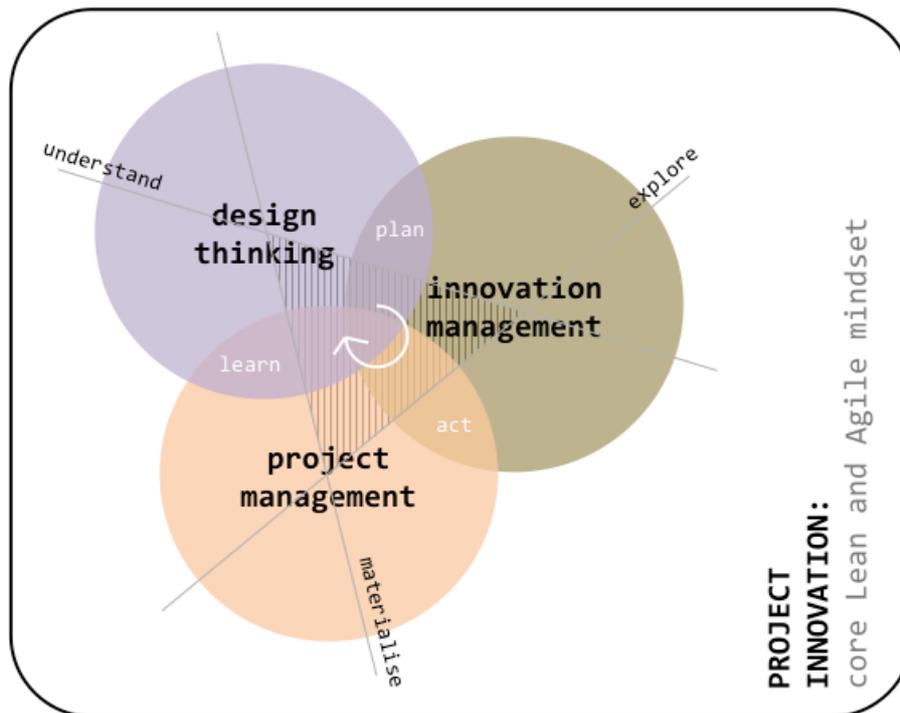


Figure 2: Project innovation conceptualisation (source: Authors)

For example, in a large complex building development, a need is determined that requires an innovative solution to the problem of energy demand by building occupants. The design thinking process leads to an understanding that the solution lies in a precinct-wide energy management system that takes account of tri-generation opportunities and uses a nearby lake as a thermal source for heating and cooling. This requires new ideas to be prototyped and tested before full implementation can occur, including feedback on expected performance and energy footprint. So this ‘sub-project’, including the adaptive nature of the process that needs to deal with the uncertainty typically present in innovation, can be undertaken concurrently with the other works, and implemented at the appropriate time once all of the design and performance issues are fully resolved.

Case Study

In order to improve current project delivery practices through innovation management skills, education and training of industry participants is key. Desktop research was undertaken to identify existing cases where project management is taught in this wider context. There was evidence found at the subject level at several universities in Australia (e.g. *PMGT5875: Project Innovation Management* at The University of Sydney³). At the level of a program, such as an undergraduate or postgraduate degree, no attempt was discovered. This led to the realisation that a mix of programs may be necessary, such as an undergraduate degree in business entrepreneurship followed by a postgraduate degree in project management.

Innovation management is typically taught in Business schools, which is not necessarily where project management resides. A career in project innovation places an expectation on the aspiring graduate to build their own pathway that delivers the necessary competencies to be useful in practice. It could take the form of a collection of *micro-credentials*, perhaps even from different providers, to establish a basis for employment in this emerging domain.

³ <https://sydney.edu.au/courses/units-of-study/2019/pmgt/pmgt5875.html>

This notion was the subject of discussions over several years between colleagues across two faculties at Bond University. The Bond Business School had been teaching entrepreneurship and innovation for many years within their Master of Business Administration (MBA) program. The Faculty of Society and Design had an accredited Master of Project Management (MPM) that also had been delivered for a long time. In 2016, discussions between these two faculties led to the creation of a new combined program that merged both degrees into a coherent pathway and provided dual qualifications (MBA+MPM). While not unique, it did lead to closer working relationships and further initiatives.

In 2019, a new Master of Project Innovation (MPI) was approved that comprised six core subjects: three delivered by business entrepreneurs and three delivered by project managers. The genesis of this program was to enable graduates of Bond’s MPM degree (or equivalent) to up-skill and enhance their existing knowledge via a series of micro-credentials that target emerging career specialisations. For new students, a combined degree was simultaneously launched (MPI+MPM), delivered over six trimesters in two calendar years⁴. Figure 3 summarises the combined degree’s design.

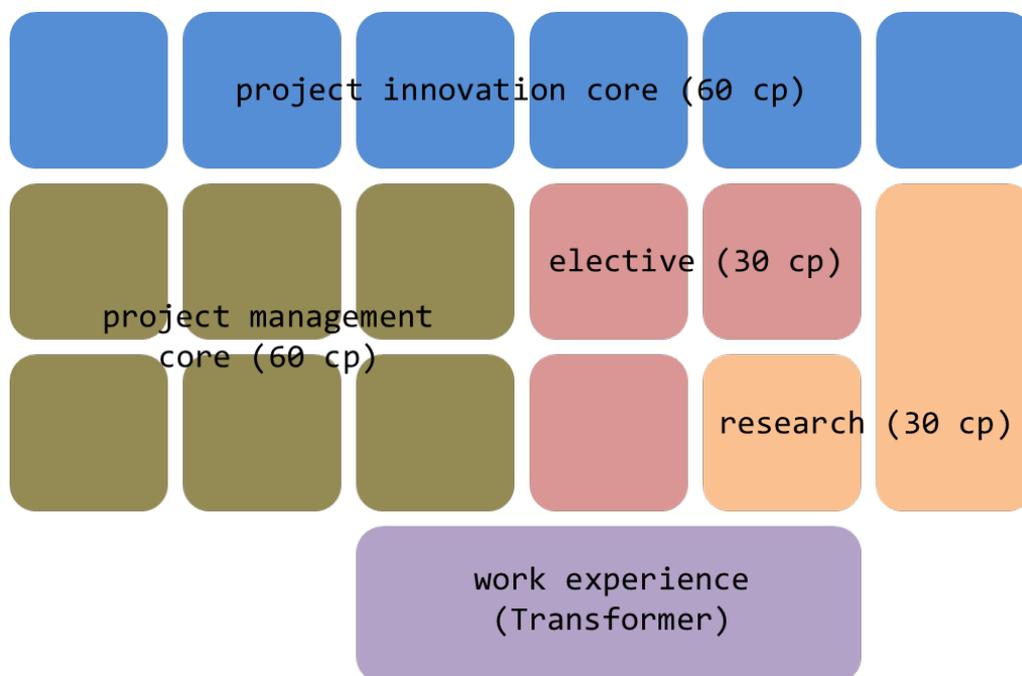


Figure 3: MPI+MPM course design (source: Authors)

The project innovation core subjects were designed to reflect an adaptive Agile mindset as shown in Figure 4 (Agile-nergised curriculum). Unique subject bundles lead to the achievement of up to six emerging career specialisations for project management graduates. These comprise Design Thinker, Change-agent, Product Manager, Agile Coach, Business Analyst, and Entrepreneur. Digital badges are awarded where performance in specific pairs of subjects is meritorious, defined as credit level (65%) or higher. Students also get up to one year of work experience guiding fellow students in their entrepreneurial journey as part of Bond University’s *Transformer* initiative. Digital badging supports personalised competency achievement and knowledge up-skilling for industry practitioners.

⁴ bond.edu.au/mpi-mpm

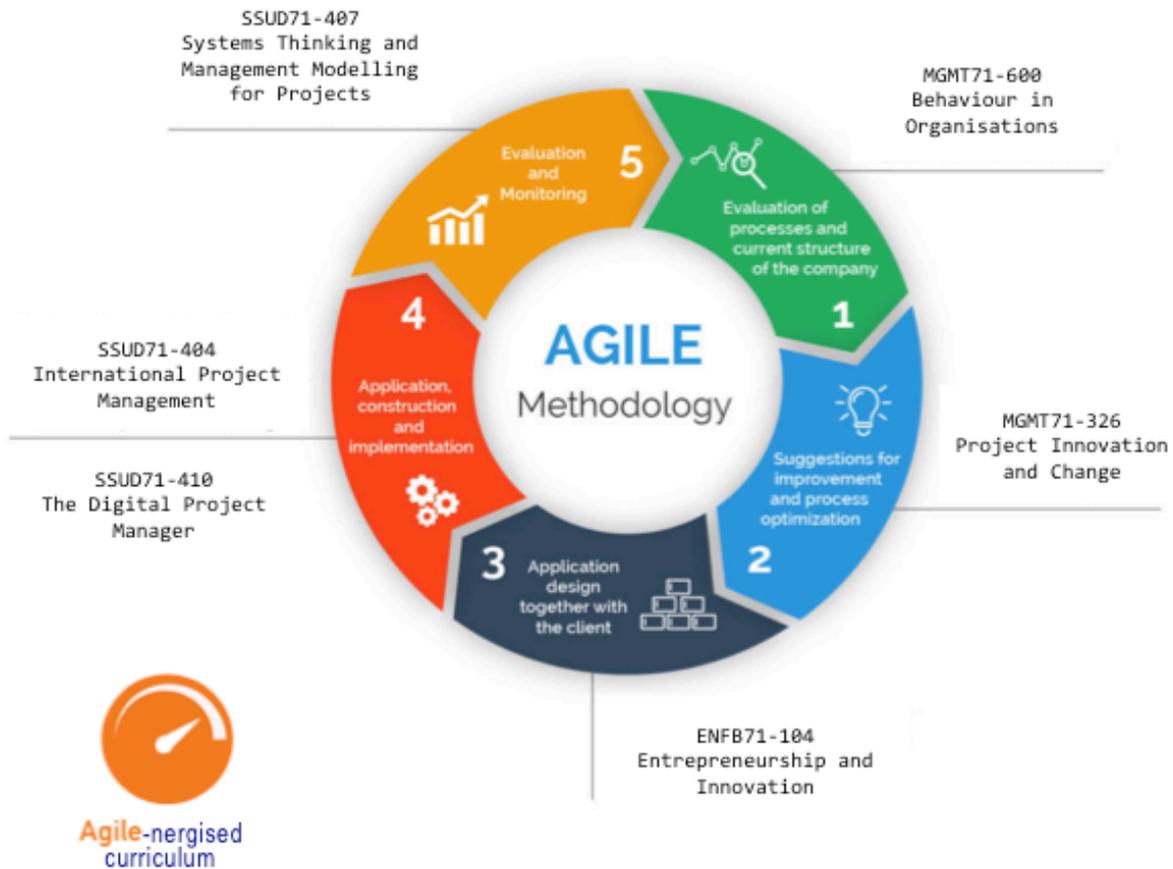


Figure 4: Project innovation core subjects (source: Authors)

It is envisaged that other institutions will need to develop pathways that similarly combine traditional project management education with emerging techniques related to project innovation. This might take many forms. Lifelong learning opportunities, ideally as a partnership of industry and academia, can help our profession to develop unique services.

Discussion

Given that innovation management is a new area of technical knowledge for many project managers, up-skilling is necessary. Interdisciplinary collaboration is also key to attaining successful project outcomes. To be effective for existing practitioners, access needs to be enabled so that additional studies can be undertaken while remaining engaged in practice working full-time. Webinars and professional development seminars, hosted by industry associations charged with nurturing the project management discipline, are also vehicles for dissemination of new knowledge. Over time, industry and academia working together can shift current practice to a broader and more influential position that benefits all involved.

Innovation underpins project success and manifests at various stages in the project life cycle. A successful project is one that provides positive collective utility across the three macro phases of design (project initiate), delivery (project implement) and delight (project influence). These phases and the methods listed for measuring success can be found in Langston, Ghanbaripour & Abu Arqoub (2018), and form the *i3d3* model as summarised in Figure 5.

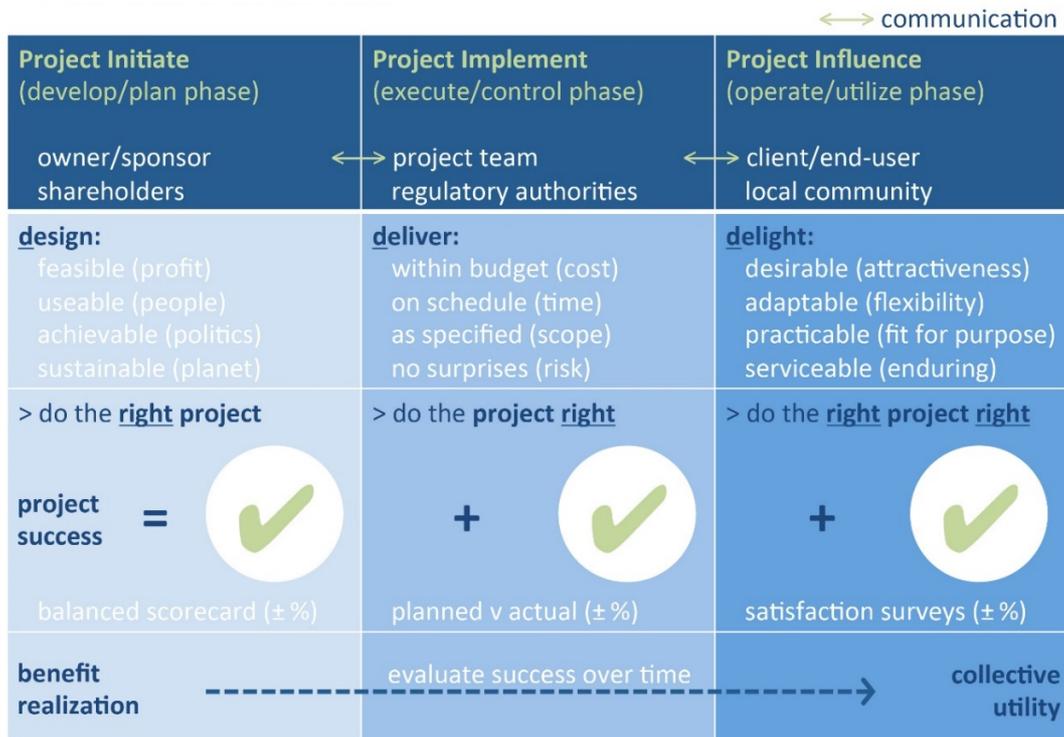


Figure 5: *i3d3* model for measuring project success

There is horizontal connectivity between success factors (e.g. feasible > within budget > desirable). This connectivity ties back to wider system characteristics of financial, social, political and environmental consequences. Factors within phases have equal weight and, when combined together, negative scores for any phase indicate an unsuccessful project outcome. Overall success is the mean (unweighted) score of design, deliver and delight, each judged by a different stakeholder group. High scores are preferred.

There is a disconnect, however, between the three phases as a result of changes in stakeholder power and interest (Griffith et al., 1999). This can be mitigated by effective communication and the use of technologies to share knowledge and ensure that objectives are consistently pursued over time. Project success planning ought to involve strategic thinking and management (Shenhar et al., 2001). Phases should not be compartmentalised but rather provide opportunities for feedback and learning. Torbica & Stroh (2001) assert that if end-users are satisfied, the project can be considered successfully completed in the long run. However, a communication bridge from project initiate through to project influence is essential to ensure that benefits are indeed realised. In other words, what is important is that right projects are done right. This is the essence of project success.

Conclusion

The future of project management is likely to involve increased attention to the delivery of innovative ideas that lead to successful projects, including new products and services. This won't happen by accident. Now is the time to build knowledge and capability through an effective partnership between academia and industry, and to elevate the influence of our profession to create amazing outcomes that maximise value and minimise waste.

Expertise in *project innovation* is considered to be 'the next big thing' for our profession.

References

- Conforto, E.C., Salum, F., Amaral, D.C., da Silva, S.L., & Magnanini de Almeida, L.F. (2014). Can agile project management be adopted by industries other than software development? *Project Management Journal*, 45(3), 21–34.
- Geissdoerfer, M., Bocken, N., & Hultink, E. (2016). Design thinking to enhance the sustainable business modelling process: a workshop based on a value mapping process. *Journal of Cleaner Production*, 135, 1218–1232.
- Gemünden, G.H. (2016). Project and innovation management: bridging contemporary trends in theory and practice. *Project Management Journal*, 47(2), 3–7.
- Griffith, A., Gibson, G., Hamilton, M., Tortora, A., & Wilson, C. (1999). Project success index for capital facility construction projects. *Journal of Performance of Constructed Facilities*, 13(1), 39–45.
- IDEO (2018). *5 stages in the design thinking process*. Available at <https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking-process> (accessed 18/01/2019).
- Kleinsmann, M., Valkenburg, R., & Sluijs, J. (2017). Capturing the value of design thinking in different innovation practices. *International Journal of Design*, 11(2), 25–40.
- Langston, C., Ghanbaripour, A.N., & Abu Arqoub, M. (2018). Measuring project success: conceptualizing a new approach applicable to all project types. AUBEA 2018 Conference, Singapore, September, 1, 107–120.
- Lenbrzozowski (2013). *Innovation management vs. project management*. Available at <https://lenbrzozowski.wordpress.com/2013/01/30/innovation-management-vs-project-management/> (accessed 18/01/2019).
- Liedtka, J. (2014). Innovative ways companies are using design thinking. *Strategy and Leadership*, 42(2), 40–45.
- Little, I.M.D. (2002). *Ethics, economics, and politics: principles of public policy*. Oxford University Press.
- Mahmoud-Jouini, B.S., Midler, C., & Silberzahn, P. (2016). Contributions of design thinking to project management in an innovation context. *Project Management Journal*, 7(1), 144–156.
- Nakano, N.D., & Higuchi, M.M. (2017). Agile design: a combined model based on design thinking and Agile methodologies for digital games projects. *Revista de Gestão e Projetos – GeP*, 8(2), 109–126.
- PMI (2017a). *A guide to the project management body of knowledge: PMBOK® Guide* (Sixth Edition). Project Management Institute, Pennsylvania.
- PMI (2017b). *Agile practice guide*. Project Management Institute, Pennsylvania.
- PMI (2019). *Benefit realization management: a practical guide*. Project Management Institute, Pennsylvania.
- Shenhar, A., Dvir, D., Levy, O., & Maltz, A. (2001). Project success: a multidimensional strategic concept. *Long Range Planning*, 34(6), 699–725.
- Stanford (2018). *Bootcamp bootleg*. Available at <https://dschool.stanford.edu/resources/the-bootcamp-bootleg> (accessed 18/01/2019).
- Torbica, Z.M., & Stroh, R.C. (2001). Customer satisfaction in home building. *Journal of Construction Engineering Management*, 127(1), 82–86.