

Advances in Project Management Series¹

Complexity, projects and systems: Just going around in circles?

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Last month's article in this series emphasised the need for project resilience and the ability to bounce forward. This month's contribution looks at the idea of systems thinking as a potential lens that can be used to build resilience and overcome the challenges of complex systems.

Project management and systems engineering share common roots dating back almost seventy years. Proponents of both disciplines trace management and systems features all the way back to the Manhattan Project, the US programme to develop the atom bomb. Following the end of the Second World War and throughout the Cold War, the race to develop new weapons technologies and improved space exploration capability resulted in the conception, elaboration and enactment of distinct management and systems practices.

Indeed, 'modern' project management and systems engineering were formulated as approaches to address the emergent complexity of defence weapons acquisition and aerospace projects. Major undertakings such as the Atlas program, Polaris, Sage, Project Mercury and the Apollo program required integration of complex components, sub-systems, systems, projects, programmes and specialisms. The view that large engineering, defence and aerospace systems will inevitably necessitate large organisational systems was articulated by Sayles and Chandler (1971), noting that the socio-technical complications require a new type of resolution approach.

The effort to manage and address the exponential increase in complexity demanded by the increasingly ambitious undertakings attempted after WWII, spawned a number of fledgling disciplines, including systems analysis, systems engineering, systems management, systems integration, project management and programme management. With each of these disciplines emphasising certain features, aspects and procedures for overcoming complexity, they independently evolved into specialised approaches and domains. Each community further developed a

¹The *Advances in Project Management series* includes articles by authors of program and project management books published by Gower in the UK. Each month an introduction to the current monthly article is provided by series editor **Prof Darren Dalcher**, who is also the editor of the Gower *Advances in Project Management series* of books on new and emerging concepts in PM. For more on Gower project management, visit <http://www.gowerpublishing.com/default.aspx?page=2063>. See Darren's background summary at the end of this article.

vocabulary, body of knowledge and a set of normative (and at times prescriptive) approaches for solving problems, reducing complexity and delivering solutions.

Thinking (and learning) through systems

Systems proponents continued to develop a body of methods, approaches and tools that was increasingly applied to society as whole. Over the last seventy years many of the approaches have been consolidated around the notion of system thinking.

Systems thinking offers holistic approaches that focus on the way constituent parts of a system integrate, influence one another, and shape the overall behaviour of the system. Behaviour can be explained as a result of the processes and feedbacks that occur within the parts and influence the entire system and other connected systems. Systems thinking offers a general approach to problem solving that avoids reductionism or local emphasis, favouring a more inclusive and comprehensive view that considers relationships and influences.

Systems thinking has been applied in many contexts using slightly different interpretations and approaches. Systems thinking received significant exposure through the publication of Peter Senge's book *The Fifth Discipline: The art and Practice of the Learning Organization* in 1990. The book has sold over a million copies making it the best selling systems thinking, and organisational learning book. In 1997, Harvard Business Review identified it as one of the seminal books of the previous 75 years, and the Journal of Business Strategy named the author, Peter Senge 'the Strategist of the Century'.

Senge believes that systems thinking is the cornerstone of learning organizations; those adaptive organizations where people continually expand their capacity to create the results they truly desire. Learning organizations require the combination of a number of disciplines: personal mastery, mental models, shared vision, team learning, and the fifth discipline of systems thinking that integrates all the other disciplines. The combination allows the disciplines to become "concerned with a shift of mind from seeing parts to seeing wholes, from seeing people as helpless reactors to seeing them as active participants in shaping their reality, from reacting to the present to creating the future" (Senge, 1990: p. 69).

Senge's book utilises systems thinking to make sense of organisational questions and issues, using it to fuse and create a coherent body of practice and theory (p. 12). Feedback thus plays a critical role in how we understand and construct responses, in the impact of our solutions on the system, and on our ability to learn and improve as a result of our experiences.

Re-connecting disparate disciplines?

Ironically, the complexity that necessitated the development of new sub-disciplines that would endeavour to harness it, contributed to the creation of different sub-cultures and approaches in each of the new disciplines. Isolated and focused on a particular idea or perspective, each would develop its own context, culture and ideas.

Borrowing from Senge, over time each would search for its personal mastery, mental models, shared vision and team learning. Yet, faced with a challenge of even greater complexity, the need for an integrating perspective and discipline becomes dominant.

Project management has developed some of the above features. The discipline has a growing understanding of personal mastery and the view of adapting professionalism; we are increasingly encouraged to look at different mental models and metaphors and adopt new perspectives; shared vision is often addressed through stakeholder engagement and engagement with sponsors; and team learning, dialogue and communication are supported by knowledge management and developed through agile ideas, best practice repositories and other means of drawing insights from experiences. However, the need for integrating disciplines and perspectives is not properly addressed within project management.

While early project management textbooks were happy to draw on the concepts of systems thinking, their glaring omission from the existing bodies of knowledge serves to reinforce the disciplinary separation that occurred when the disciplines disconnected.

Increasingly, the management of projects is challenged by the potential benefits of systems science, systems thinking, business analysis and enterprise systems that benefit from a more holistic perspective and can offer more comprehensive and integrated solutions. Indeed, adaptive approaches such as agile often allow guided engagement to parts of the system, providing an opportunity to observe feedback loops, respond, adapt and gauge the connections and relationships.

Even more ironically, it is only when faced with even higher levels of complexity, especially within the weapons acquisition systems and aerospace programmes that project practitioners are starting to re-engage with 'complex project management thinking', encompassing some of the long forgotten facets of systems thinking.

Making new connections

However, relating project management theory to ideas in other disciplines, and in particular to systems thinking requires holistic and connected 'integrative' thinking. This month's article 'Systemic thinking as a mechanism for managing risk arising from behavioural complexity in major projects' by Tony Llewellyn asserts that such thinking is essential to addressing the emerging challenges associated with complex projects. The article lays the ground work by proposing a framework encompassing different viewpoints and perspectives, another hallmark of systems thinking, as a basis for reasoning about projects, issues and risks.

The article utilises the spheres of influence as a systemic lens that identifies concerns and perspectives, and the potential inter-relationships and influences across them. The approach offers new avenues to identifying pressures, dynamics and influences which can be used as a basis for obtaining richer insights,

considering issues from multiple perspectives and identifying additional risks and concerns.

The article draws on Tony's book *Performance Coaching for Complex Projects: Influencing Behaviour and Enabling Change*, published by Gower as part of the Advances in Project Management series. The book makes an important contribution by advocating the novel concept that project managers and leaders should coach the team as part of their role. Influence can be a powerful driver in the drive for change and can be used to power the project. The book thus offers a shift from a transactional directive mindset towards a transformational coaching philosophy, one that appears to chime with the idea of the learning organisation. The main part of the book is therefore dedicated to introducing a model of project team coaching which looks to build team resilience capability and utilise feedforward mechanisms in an effort to foster success for the long term.

Addressing complexity in projects and systems

Developing adaptive and resilient teams remains a key to succeeding in complex project environments. In the *Fifth Discipline* Peter Senge notes that most change efforts run into interpersonal and cultural issues embedded into the existing system that combine to resist change. Rather than provide a prescriptive formula, he advocates for the development of reflection and inquiry skills so that real issues can be identified and addressed. One of the key challenges according to Senge is that there must be some help during the change process. Applying a coaching model in a developmental fashion satisfies that criteria and provides an inspired beginning to the discovery and development journey.

Anton Chekhov observed that "all of life and human relations have become so incomprehensively complex that, when you think about it, it becomes terrifying and your heart stands still."

Project management requires a more intelligent and fundamental ways of addressing the challenge of dealing with such complexity. Peter Senge notes that business and human endeavours are systems; yet, we tend to focus on snapshots of isolated parts of the system and wonder why the deepest problems never get solved. To sustain and enable meaningful change we will need to learn to harness collaboration, learning and development of individuals and teams. Tapping into excellent leadership may well entail creating a space for and getting others to join the journey whilst guiding their travels through coaching, support and encouragement.

Peter Senge quipped that 'reality is made up of circles but we see straight lines'. Systems and projects have both emerged from the need to wrestle with complexity. Each has strengths and benefits to offer, but addressing projects without the benefit of systems insights may be short sighted and ill advised. The disparate disciplines appear destined to be re-united and re-invigorated by thoughtful integration of thinking approaches and perspectives. However, people will remain an essential and irreducible part of the systems we see and develop as projects; to cope with an ever faster changing reality, we will need to both accelerate and improve our ability to

learn and develop. The ultimate trick is not to find the experts who can solve our problems, but to develop those inside to appreciate systems, respond to challenges, inquire and reflect continuously, and become more systemic and reflexive in our everyday practice.

References:

Sayles, L. R. and Chandler, M. K., *Managing Large Systems: Organizations for the Future*, New York: Harper & Row, 1971.

Senge, P., *The Fifth Discipline: The Art and Practice of the Learning Organisation*, London: Random House, 1990.

Editor's note: Darren Dalcher is the editor of the series of books on Advances in Project Management published by Gower in the UK. Information about the Gower series can be found at <http://www.gowerpublishing.com/advancesinprojectmanagement>. The above article is an introduction to the invited paper this month by another Gower author. You can find previously published articles by Prof Dalcher and Gower authors at www.pmworldlibrary.net.

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