



Identifying and Responding to *Complexity* in Major Projects and Programs



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PGCS PROJECT AND PROGRAM MANAGEMENT SYMPOSIUM
• Better Management • Better Projects



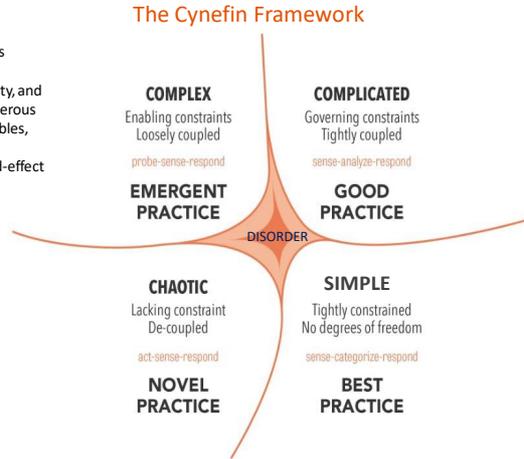
This session will explore **what makes a project, program or portfolio complex, and the implications for their delivery.**

After this session you will:

- Understand the difference between Simple, Complicated, Complex and Chaotic project contexts and the implications for project delivery.
- Appreciate the importance of the skills and competencies outlined in the Complex Project Leadership Standards.
- Understand that organisations need to operate systemically to deliver complex projects, programs and portfolios.

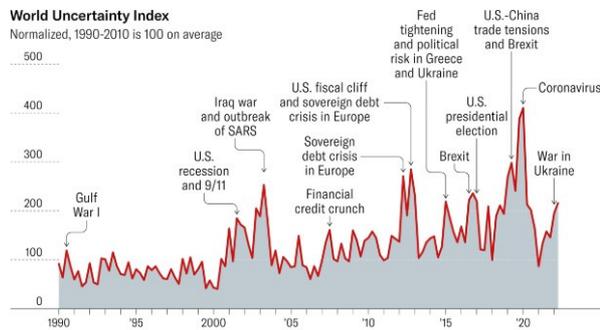
Understanding the difference between Simple, Complicated, Complex and Chaotic

A complex problem is characterised by **uncertainty**, ambiguity, and the presence of numerous interconnected variables, making it difficult to determine cause-and-effect relationships

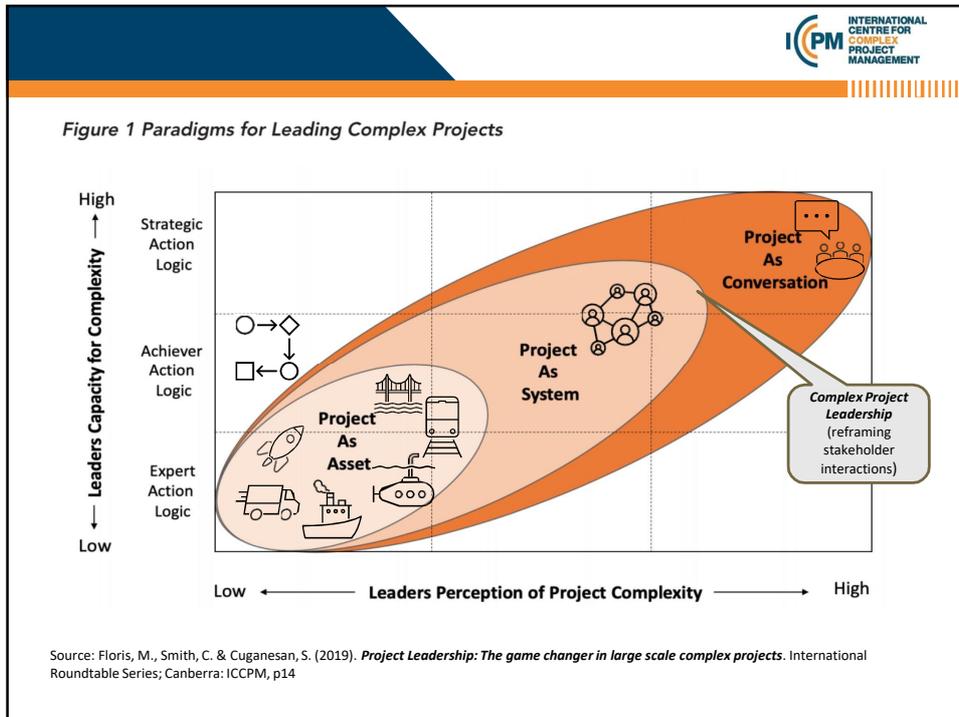
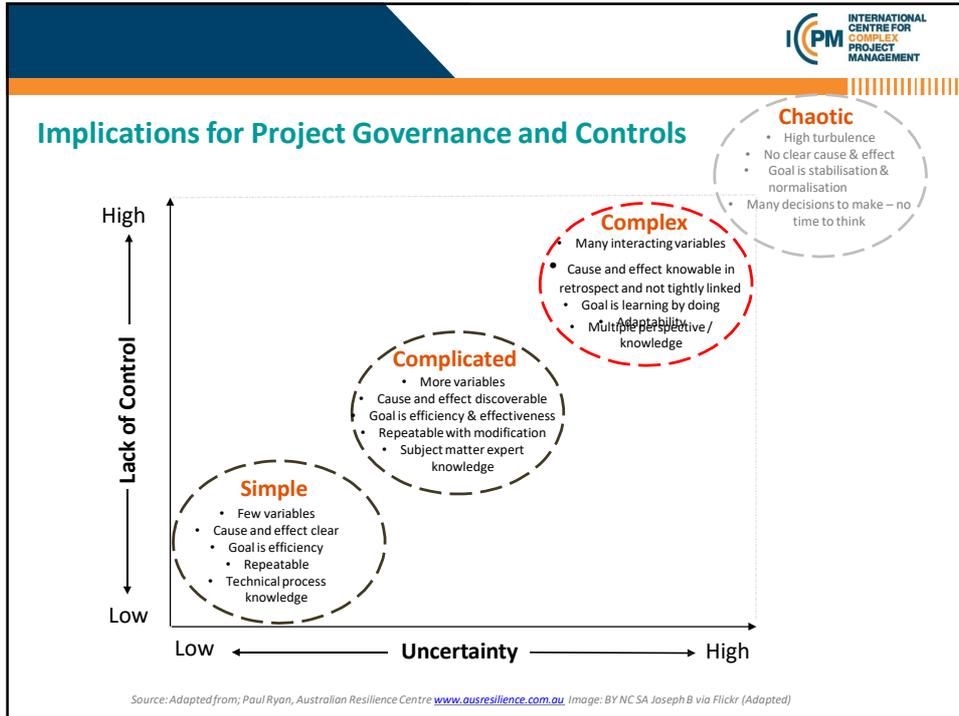


Source: The Cynefin Framework. Snowden, D.J Boone, M. 2007. "A Leader's Framework for Decision Making". Harvard Business Review, November 2007, pp. 69-76

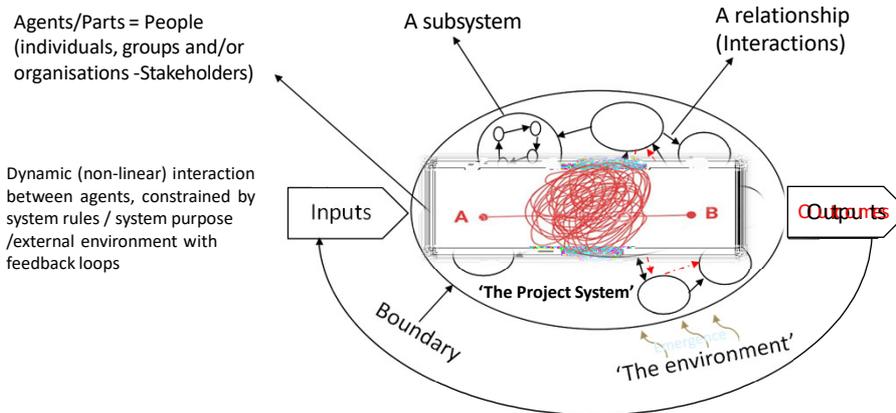
Uncertainty Is Rising



Source: Hites Ahir, Nicholas Bloom, and Davide Furceri, "World Uncertainty Index," Stanford mimeo, 2018 © HBR



Projects as Complex Adaptive Systems



Working with complexity

The concept of complex adaptive systems is a model for thinking about the world around us.

Complex situations are characterised by:

- A degree of disorder, instability, emergence, non-linearity, recursiveness, uncertainty and randomness
- They are dynamic, the parts in the system can react and interact with each other in different ways
- They are connected and the stakeholders often have multiple and divergent views
- Complex adaptive systems change over time and adapt to their environment

Implications for Project delivery

Since the nature of complex projects is determined by the interaction between its stakeholders and its external environment, relationships are fundamental



- "fit-for-purpose" -----> • "fit-for-context"
- "just in time" -----> • "just in case"
- "efficiency" -----> • "resilience"
- "Inputs-transformation -outputs" -----> • "Inputs- collaborative interaction -outcomes"



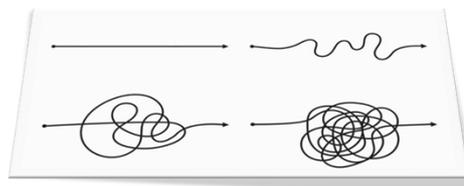
- We need to embrace 'provisionality' and be open to adapting our plans and designs as new paths emerge.

Remaining **open to emergence**, and holding plans lightly, remains one of the biggest challenges to overcome in organisations used to command and control.

Source: Based on 7 Implications of seeing organisations as complex systems by Sonja Blignaut published in Agile & Change <https://medium.com/agile-change/aug-28-2019>

What can escalate a Project, Program or Portfolio from a simple state to a complex state?

- **Scale** (size, range, scope, magnitude, constituent parts etc.)
- **Uncertainty** (unknowns, variables, assumptions)
- **Environmental Dynamics** (emergent, compounding, adaptive, momentous)
- **Interdependencies** (integration, sequencing, stakeholders, networks)
- **Stakeholder Behaviour** (erratic, deviant, diverse, illogical, chaotic)



Why project organisations need to operate systemically to deliver complex projects, programs and portfolios

- Understanding Interdependencies
- Navigating Complexity
- Anticipating Unintended Consequences
- Enhancing Adaptability and Resilience



- Collaboration and Integration
- Optimising Resources
- Continuous Learning and Improvement
- Emphasising the Whole System

Project delivery is not simply a mechanistic process of executing identified project activities.

Examples of organisations that operate systemically to deliver complex projects, programs and portfolios

NASA (National Aeronautics and Space Administration):

NASA operates systemically to manage complex space exploration projects. Their projects, such as the Mars Rover missions or the International Space Station, involve numerous interdependent systems, technologies, and stakeholders. NASA uses a systemic approach to analyse risks, coordinate multi-disciplinary teams, ensure safety, and optimise resource allocation throughout the project lifecycle.

World Health Organization (WHO):

The WHO operates systemically to address complex global health challenges. Their projects and programs involve multiple stakeholders, countries, and healthcare systems. WHO uses a systemic approach to analyse the social determinants of health, understand the complex interactions between various diseases and risk factors, and develop comprehensive strategies to improve global health outcomes.

Large Construction and Infrastructure Companies:

Companies involved in large-scale construction and infrastructure projects, such as Bechtel or Skanska, operate systemically to manage complex projects. They consider various interrelated factors, including engineering, environmental impact, stakeholder engagement, regulatory compliance, and resource management. By taking a systemic approach, these companies can effectively coordinate and integrate the diverse elements involved in delivering complex projects.

Global Consulting Firms:

Large consulting firms like McKinsey & Company or Boston Consulting Group often handle complex projects and portfolios for their clients. These firms use systemic thinking to understand the broader organisational context, identify dependencies and impacts, and develop comprehensive strategies. They consider multiple dimensions, such as organisational structure, processes, culture, and market dynamics, to deliver integrated solutions that address complex challenges.

Defence Primes: Lockheed Martin is a global aerospace and defence company known for its complex projects, such as the F-35 Lightning II fighter jet program. Operated systemically managing a multi-party collaboration (Lockheed Martin, BAE Systems, Northrop Grumman) with multinational stakeholder countries (NATO, United Kingdom, Australia, Canada, Italy, Norway, Denmark, the Netherlands, and formerly Turkey) producing three different variants across three services by integrating multiple subsystems, such as avionics, propulsion, and weapon systems, into a cohesive platform.

Navigating Project Complexity is Fundamentally a Leadership Skill

Project Management Methodology (PMM)

Is mostly concerned with:

Administrative Management

Primacy is given to scope, cost and time.

- Process and task focused
- Control- through project controls and process compliance

Reductionist Approach

Stemming from a rational, universal and deterministic paradigm;

- Rigid work breakdown structures
- Specified stakeholders
- Linear, sequential approach
- Resists environmental change

The project plan is the map of the terrain



Complex Project Leadership (CPL)

Is mostly concerned with:

Adaptive & Enabling Leadership

Primacy is given to realising project outcomes

- Aligned with business strategy
- Navigating project complexity
- Negotiating project success

Holistic Approach

Stemming from a Complex Adaptive Systems paradigm;

- System of systems interconnectedness
- Numerous and varied influential stakeholders
- Multidimensional, unpredictable and iterative
- Environment affects and is affected

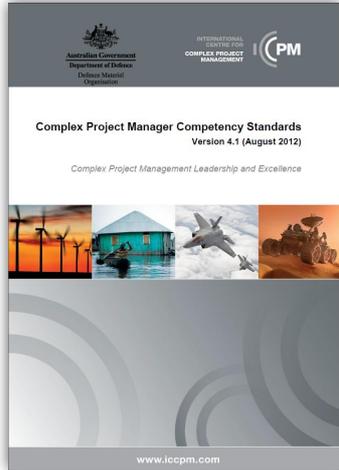
Leaders use multiple maps relevant to the terrain

PMM is mostly about managing the 'things' and tasks that the project is about. CPL is about leading the 'people' involved in delivering the project as part of a complex adaptive human activity system. Both are necessary to achieve successful complex project delivery outcomes.

Challenges faced by leaders of complex projects

- Achieving strategic alignment between project partners
- Establishing and maintaining an effective multidisciplinary team with shared purpose
- Monitoring the changing project environment and adapting (mitigating risk and realising opportunity)
- Aligning project governance. Connecting Adaptive & Enabling Leadership Functions with Administrative Management Functions.
- Delivering broader project objectives (organisational development, sovereign capability, sustainability, diversity, jobs & GDP)
- Engaging multiple and diverse stakeholders with a vested interest in the project

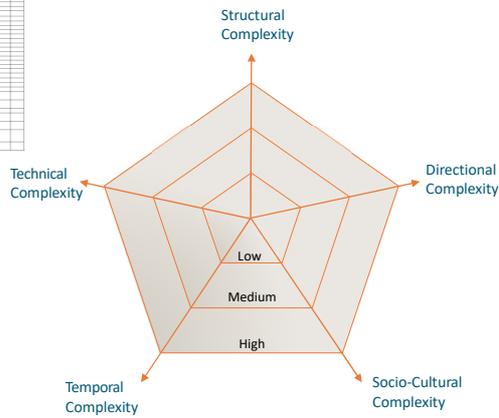
Update on Competency Standards



Project Categorisation Framework- PCAT

Under construction

Complexity Category	Technical Complexity	Structural Complexity	Directional Complexity	Socio-Cultural Complexity	Temporal Complexity
Low					
Medium					
High					

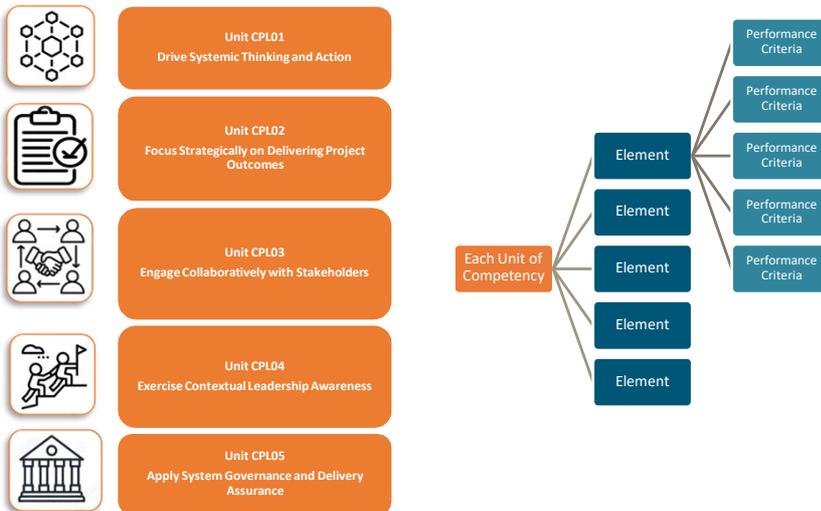


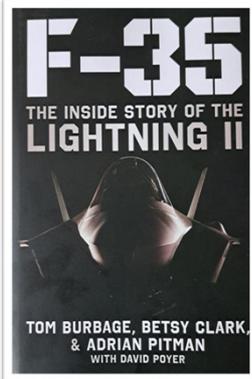
Based on Remington, K., Pollack, J. (2007) Tools for Complex Projects. Gower

A High-Level Preview of the New ICCPM Complex Project Leadership Competency Standards© 2023

	<p>Unit CPL01 Drive Systemic Thinking and Action</p>	<p>•This unit defines the core elements required for leaders to address the complexity, ambiguity, and emergence that characterise projects as complex adaptive systems.</p>
	<p>Unit CPL02 Focus Strategically on Delivering Project Outcomes</p>	<p>•This unit defines the elements required to lead the planning and execution of complex projects: setting a clear purpose for the project; maintaining a clear focus on outcomes delivery; whilst adapting plans and execution to changing circumstances; and being mindful of sustaining a viable supply chain for the whole of life of the system delivered.</p>
	<p>Unit CPL03 Engage Collaboratively with Stakeholders</p>	<p>•This unit defines the elements required to successfully understand and engage with stakeholders, communicate effectively, and foster a constructive culture and trust within the project team and stakeholders. The leadership of complex projects requires the ability to conceive of projects as strategic conversations, and this unit captures key leadership capabilities essential to success.</p>
	<p>Unit CPL04 Exercise Contextual Leadership Awareness</p>	<p>•This unit defines the elements required for effective leadership in complexity. Successfully leading through complexity requires leaders to be self-aware and understand how to adapt their style to context, culture, and values, striving to develop their own capabilities and those of their teams.</p>
	<p>Unit CPL05 Apply System Governance and Delivery Assurance</p>	<p>•This unit defines the elements required to establish and evolve as appropriate the governance and delivery assurance of the complex project as a system</p>

A High-Level Preview of the New ICCPM Complex Project Leadership Competency Standards© 2023





A Brief Case Study for Complex Project Leadership

Defence Primes: Lockheed Martin is a global aerospace and defence company known for its complex projects, such as the F-35 Lightning II fighter jet program. Systemically managing a multi-party collaboration (Lockheed Martin, BAE Systems, Northrop Grumman) with multinational stakeholder countries (NATO, United Kingdom, Australia, Canada, Italy, Norway, Denmark, the Netherlands, and formerly Turkey) producing three different variants across three services by integrating multiple subsystems, such as avionics, propulsion, and weapon systems, into a cohesive platform.

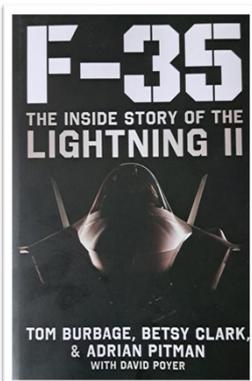
ICCPM Fellow



Tom Burbage

(USA)

Tom Burbage was Lockheed's General Manager of the F-35 program from 2000 until 2013. Prior to leading the F-35 program, Tom was the General Manager for the F-22 and President of Lockheed Martin Aeronautical Systems Company. He is the co-author with Betsy Clark, Adrian Pitman, and David Poyer of the new book *F-35: The Inside Story of the Lightning II*.



A Brief Case Study for Complex Project Leadership

"I was part of a living laboratory on complexity management called the F-35 program, and the program manager was convinced that **traditional program management tools and techniques were inadequate to ensure success**. . . . He was right!" *Jude Olson*

"There was an important purpose behind the teambuilding," Olson added. "**Tom Burbage's view of organisations was that they were more like living organisms**. His thesis was that real knowledge was largely exchanged through social relationships, so we knew we had to connect people socially and get the trust going so that technical knowledge would be shared." *Jude Olson*

ICCPM Fellow

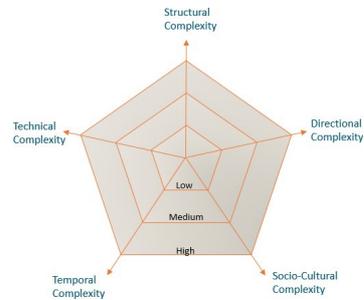
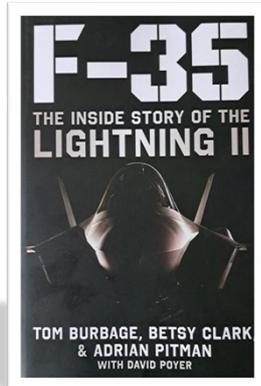


Dr Jude Olson

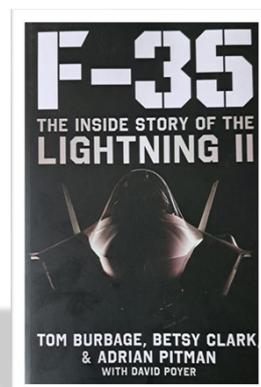
Jude Olson was Head Coach for Lockheed Martin Aeronautics Company, in Fort Worth, TX, on the F-35 Program.

Among her many accolades, she published in the Elsevier book on Complex Collaboration (2004) and "Inventing the Joint Strike Fighter—Applying Appreciative Inquiry to Collaborative Startups" in the OD Network Journal and as an E-Book (2013).

A Brief Case Study for Complex Project Leadership



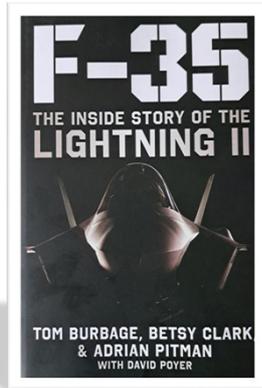
A Brief Case Study for Complex Project Leadership



Summary of JSF Challenges:

- project complexity—integrating multiple perspectives and multiple resources, special technical challenges;
- uniting teams that didn't already have a shared interest;
- creating common ground, shared interest and/or principles; and
- aligning a large, distributed, global integrated product team.

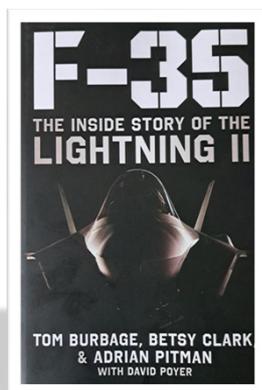
A Brief Case Study for Complex Project Leadership



Summary of JSF Challenges:

“Our first leadership challenge was the critical need to establish a unique “F-35 culture” capable of truly integrating a multi-corporate, multi-national industry team into a seamless, high-performance operation. **Achieving consensus that the current culture was probably not capable of dealing with the new levels of complexity that were inherent in the F-35 program was a challenge.** Specific steps to develop a unique F-35 common culture were required and it had to cross corporate, geographic, and national boundaries.” *Tom Burbage.*

A Brief Case Study for Complex Project Leadership

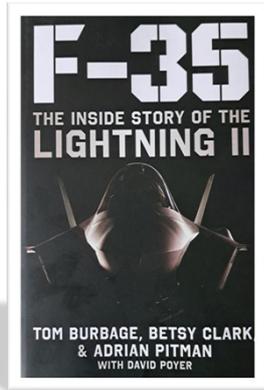


Summary of JSF Challenges:

“Reinforcing the real difference between Leadership and Management was critical to achieving the new F-35 culture. Management is a function of the past and future. If I can analyse past performance data and I correlate that data with other models to generate an action plan to do better in the future, I can manage a program. **Too often, managers are consumed by their data. Leadership on the other hand is a requirement to motivate and inspire people that are under incredible pressure to perform.** The challenge goes through every strata of the program.”

Tom Burbage.

A Brief Case Study for Complex Project Leadership

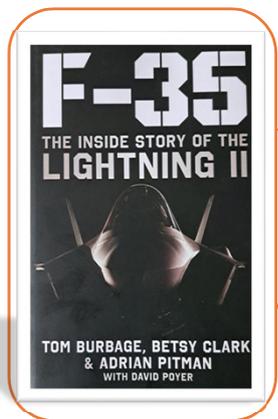


Summary of JSF Challenges:

“Early program relationships between the contractor and government teams were, by necessity, a partnership. Organisational structures were carefully crafted to establish clear counterpart relationships and unambiguous responsibilities. Program objectives, both short-term and long term were mutually constructed and agreed upon. **Once established, the objectives were discussed across the entire Government and Contractor teams and posted in highly visible areas in every participating organisation**”

Tom Burbage.

A Brief Case Study for Complex Project Leadership



Drive Systemic Thinking and Action



Focus Strategically on Delivering Project Outcomes



Engage Collaboratively with Stakeholders



Exercise Contextual Leadership Awareness

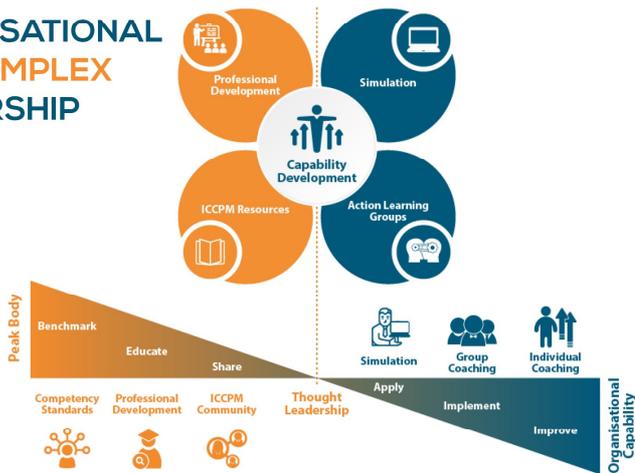


Apply System Governance and Delivery Assurance

Thank you for attending.....

Q&A

BUILDING ORGANISATIONAL CAPABILITY IN COMPLEX PROJECT LEADERSHIP



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