



Changing the game

How Australia can achieve success in the new world of Mega-Projects

Agilience

News release – We have a mega problem that is threatening our economic growth

Headlines

- **Global mega project* spending to hit US \$ 6 – 9 trillion per annum or 8 % of global GDP. The Australian infrastructure pipeline is still > A\$ 300 B for the resources and infrastructure sectors (> 100 mega projects are underway at any time). ¹**
- **The nature of projects is changing from engineering success to delivery sustainable services and economic outcomes. Accordingly Projects are becoming increasingly larger, longer and more complex (compounding at 2.5 % p.a.).**
- **The complication is that these complex projects have low success rates (International estimates are in the order of 1/1000 for economic success with Australia experience less than 50 % based on budget and schedule).**
- **The iron law of mega-projects has become “overtime, over budget and over again”. ²**
- **The value at risk for Australia is in the order of 20 % or > A\$ 60 billion based on conservative estimates of pipeline and success rates. So the imperative to better manage these projects is high.**
- **Traditional models are failing us and we need to understand why and adopt a new approach: “the conventional way of running mega-projects has reached a tension point where tradition is being challenged and reform is emerging” ³**



*Mega projects are defined as projects greater than US 1 billion 1. BCA 2. Bent Flyvbjerg 3. CCPM

The challenge:

“We have a nation shaping pipeline of infrastructure projects and need to create the way to share experiences”

John Fitzgerald Infrastructure Australia

- Despite the recent cutbacks in the Resources sector, we have still have > \$ 300 billion of projects evenly shared across the Resources and Infrastructure sectors in the investment pipeline in Australia over the next decade. ⁴
- Unfortunately there is a very low success rate for complex mega projects both globally (< 15 %) and in Australia (40 – 50 %). If we apply even the most optimistic assessment this would imply an overrun of > 20 % of \$ 300 billion or in the order on \$ 60 billion (which is many roads (\$ 1 – 5 billion, LNG plants (\$ 10 -20 billion), mines (\$ 1billion), schools (\$ 1billion) and hospitals (\$ 1- 2 billion).
- So our challenge is to really understand the evolving nature of these projects in our increasingly sophisticated and socialised economy, and explore why existing approaches are proving insufficient/ inconsistent. From this understanding we can develop the next generation of approaches and supporting environment to maximise our investment returns.

We require a totally new perspective for the next generation of complex mega-projects - Changing the game

Flyvbjerg (2014) defines Mega-projects as “large-scale complex ventures that typically cost \$ 1 billion or more, take many years to develop and build, involve multiple public and private stakeholders, are transformational, and impact millions of people. They are not just magnified versions of smaller projects, they are a completely different breed in terms of their aspiration, lead times, complexity and stakeholder involvement.”⁵

Australian mega projects of the past have been complex engineering achievement such as the Sydney Harbour Tunnel, Victorian Desalination plant, Snowy Hydro scheme.

However, there is an emerging view, that not only is the nature of projects changing, but also the social environment in which these projects occur. Accordingly, they require a totally different perspective, level of stakeholder engagement, cultural environment and project leadership than that practiced at the moment which is based on up-scaled large project management disciplines.

We will explore the nature of this mega-project world, including the challenges, insights and emerging solutions:

- Key research insights
- Taking a different perspective
- Changing the game with new solutions



This research has been commissioned by the Australian Constructors Association to explore the nature of this next generation of complex mega-projects

Critical research question:

“What do we need to do differently to improve our project success rate in this new environment?”

Research/Discovery Approach

We wanted to understand the changed social, political and technological environment for mega projects and based on this consider what new perspectives and approaches are required. We reflected that there were also successful projects in Australia that we could learn from. We purposefully explored the views of a range of new stakeholders that were now intimately involved in this next generation of projects to understand their views of successful outcomes.

Quantitative – Assess the performance gap in Australia through a survey of successful and challenge projects from the perspective of Owners Teams, Delivery Teams, EPCM, and Constructors.

Qualitative – Understand the root causes of success and failure, and identify potential solutions through success case/appreciative enquiry interviews with > 30 stakeholders (Policy makers, Government and Private Sector Owners and Delivery Teams, EPCM, Contractors, Lawyers and Infrastructure Investors.

Action forums – Engage key stakeholders in discussing the research insights and changing the game.



From an international perspective there is a high rate of mega-project failure with less than 1:1000 achieving their promised business cases

Current mega-project performance

Source	Evans & Peck	Flyvberg	IPA	Accenture
# Projects	16	258	➤ 1,000	31
% on budget		10%		17 %
Overrun (% budget)	10-20%	26.7 %	25 %	
Over run Schedule	-10 - +10	90 %	60%	< 20 %
Achieve Business Case		5 %		17 %

Break Fix Model

“generally mega-project planners and managers do not know how to deliver successful mega-projects and therefore they tend to break sooner or later. The fix often takes place at great and unexpected cost to stakeholders. The cure is to get projects right from the outset through proper front end management” ⁶

Faulty decision making

“with the consistent errors and biases of forecasts that form the basis for business cases, cost benefit analysis and social and environmental impact assessments, such analysis will with a high degree of certainty be misleading” ⁷

7. (Flyvbjerg, 2009)

The Australian projects performance gap identified by the research is significant and presents a valuable prize

Australian Mega Projects Survey Results

This study	Total	Successful Projects Average	Challenged Projects Average	Overall Performance Gap (\$ m)	Private sector Gap (\$ m)	Public sector Gap (\$ m)
# Projects	44	23	21		21	23
Budget (\$M)	43,809	1,074	910			
Budget overrun (\$M)	6,021	83	196	3,629		
Budget overrun (%)	13.74 %	8.4 %	27.4%	19 %	19.1 %	20.2 %
Schedule over run (%)		(.3)%	20.3%	20.6%	27.9 %	27.6 %

This is the most comprehensive set of survey data on Australian mega projects completed to date

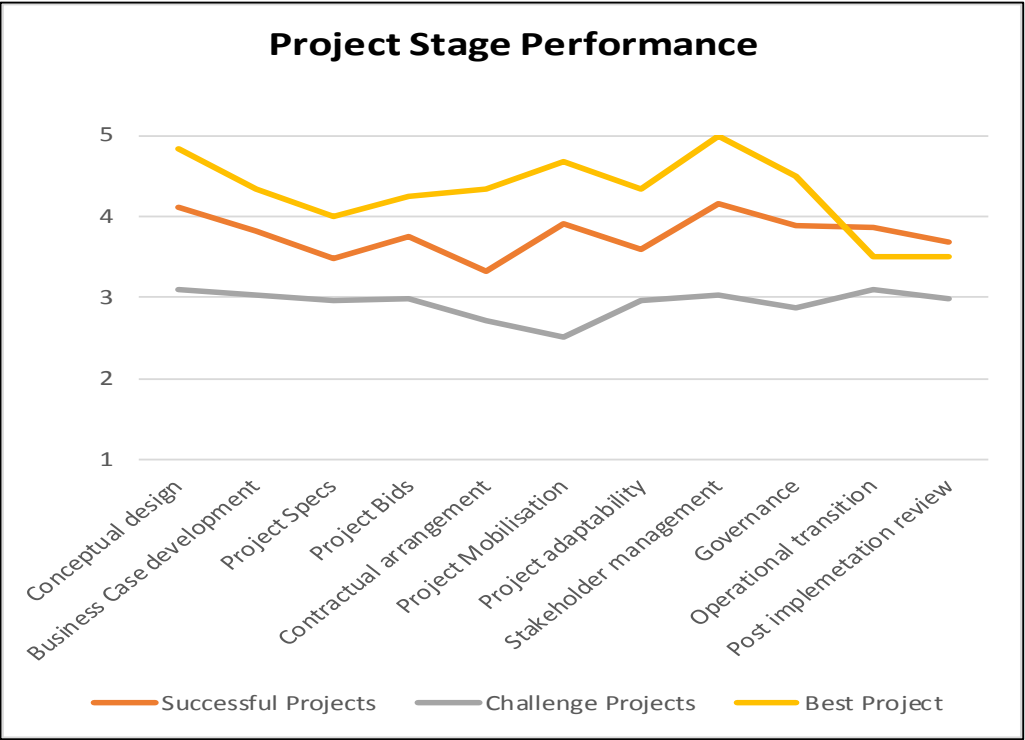
The survey covered 44 mega (> \$ 1 billion) projects worth nearly \$ 44 billion

(BCA estimates of 100 mega projects being active at any time).

- The total budget overrun across the portfolio was \$ 6 billion or 13.7 % with both successful and challenge projects have budget overruns. This is good by International standards.
- Schedule overrun ranged between 0 – 20 % which was fair by international standards.
- However, there was still a significant gap (> 20 %) between successful and challenge projects from both a budget and a schedule perspective.
- There was little difference between private and public sector performance from a budget or schedule point of view.
- Closing the gap from averaged challenged to average successful (19 %) would save over \$ 3.5 billion on this project portfolio. This would be even greater if we could shift to the best practice level of performance..

There was a significant difference in performance at all stages between successful and challenged projects

There were projects that set themselves up for success by the way they approached the early stages. Equally, the challenged projects started badly through time pressure, inadequate stakeholder engagement, loosely specified requirements, aspirational businesses cases and then tended to compensate for this with risk oriented contracts and overly strong project management and governance.



This chart records the average survey results by project stage for successful and challenged Projects in comparison to the best project

Project stage	Successful Projects	Challenged Projects
Concept Design	Wide support/ time staged/ stakeholder engagement	Fast tracked, aspirational, too high level
Business Case Development	Alternate scenarios/ sensitivities/ staged	Reverse engineered/ optimism bias/ no reference benchmarking
Project Specifications	Outcomes focused with flexibility for innovative input	Either light on or too much detail that stifled innovation and added cost
Bidding process	Set the stage for formation of collaboration and problem solving	Excessive focus on competitive tension and risk management
Contracting	Different strategies based on flexibility and alignment	Focussed on task details and risk transfer
Mobilisation of team	Whole of extended team including external stakeholders	Driven by strong project management and schedule
Stakeholder Management	Good upfront and continuous engagement through process	Transactional when needed and too late
Governance	Self managed and accountable team	Strong project management and schedule driven
Operational Transition	Early and continuous engagement of owners teams in process	Lack of engagement and disconnected process with blame
Post review	Genuine opportunity to learn	Fire the Project Manager

The research also identified a number of different risk hot spots for the various project stakeholders on projects that are not necessarily aligned and can cause contention

Stakeholder hot buttons:

Interviews heat map: where challenge projects get it wrong											
Stage	Concept	Business Case	Specification	Bidding	Contracting	Mobilisation	Adaptability	Stakeholder Management	Governance	Operations transition	Post review
Stakeholder											
Owners Team											
Delivery Team											
EPCM Team											
Constructors Team											
Lawyers											
Investment consortia											
Peer Review Team											

- Observations

 - Owners teams** are subject to significant political pressure in both private and public sector. Long term failure is discounted in favour of short term drivers such as press announcement.
 - Delivery team** are often handed a ‘poisoned chalice’ of an undeliverable project and then try too hard to achieve an impossible outcome without having “stop” as an option.
 - EPCM Teams** wanted to ensure there was a great design but potentially over engineered for the economic outcome
 - Consortium teams** are looking primarily for expected financial outcomes. Bids are costly (> \$ 15 million) and cost of losing is high which leads to underbidding and the “winners curse”.
 - Lawyers** are seeking to protect their clients interests (even against the groups). They often shape the culture through the contract model.
 - Delivery teams** focus too much on the technological aspects of complex projects and negate the socio-political aspects in dealing with diverse **unengaged stakeholders**.
 - Peer reviews** are regarded as annoying rather than sources of insight from experienced practitioners.

From the research we recognise that we need to start thinking about mega-projects from a different perspective

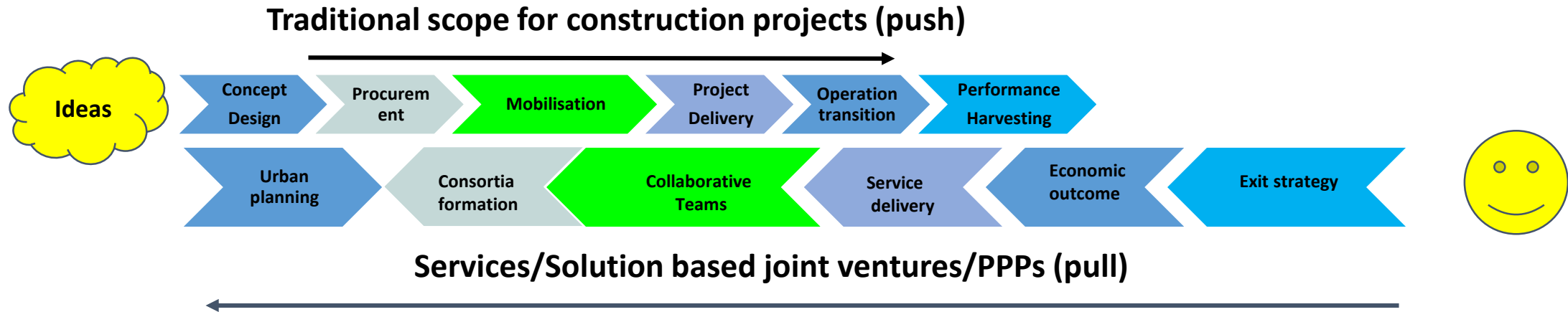


Key insights and implications

1. **The nature of projects is changing** to match the changes in our society. They are becoming increasingly sophisticated and have a far greater number of diverse stakeholders with different requirements that need to be engaged to ensure there is a successful outcome. The failure to recognise this leads to poorly specified designs and continuous scope creep and major overruns in budget and schedule.
2. **Projects have become increasingly complex** and are exposed to many more human variables and environmental and political uncertainties. They are no longer just engineering projects. We need to change our approaches to recognise these factors and be able to more rapidly adapt to emergent knowledge or external changes. Our new business models and governance processes need to be able to flex to allow change while still ensuring transparency, accountability and safety. We need a new form of more inclusive and pervasive agile project leadership.
3. **Changing mindset and models** are required for these new age mega-projects. The engineering mindset is critical but not sufficient. We need not only to broaden the inclusion of the other stakeholders perspectives but also build a new culture of collaboration across corporate and political boundaries.
4. **Next generation distributed and pervasive leadership** is required that enables flexible decision making at the distributed point of need

1. The nature of projects is changing and this requires a different response

The focus of projects is changing from many aspects: the construction of components is shifting to the provision of a sustainable high quality operational services. This involves different stakeholders in the process and requires early involvement of the ultimate operators. There are now global sources of funding for projects and inclusion of international companies in development consortia. This applies especially for infrastructure projects such as airports, ports, hospitals, prisons, toll roads, and light rail but it is also applicable for next generation mining and gas projects with significant local community and regional consumer market involvement. There is a global source of capital and views on risk (project and sovereign) that shape project expectations and have consequences for follow on projects. Environmental expectations and international labour mobility (457/FIFO/DIDO) are also part of the ever changing the dynamic of projects. Because of their nature the size and duration of mega-projects is also increasing with some projects having over 20,000 staff (many from offshore) for durations of more than 5 – 10 years and up to 100 sub-contactors. This implies a shift from the somewhat transactional nature of traditional project teams to the formation of high performing project communities with a shared sense of purpose.



“The structure is only there to keep the rain off the services”

Anthony Manning NSW Health Northern Beaches Health PPP

“We need to run projects backwards with the ultimate owners involved from day 1”

Brett Himbury IMF Investors

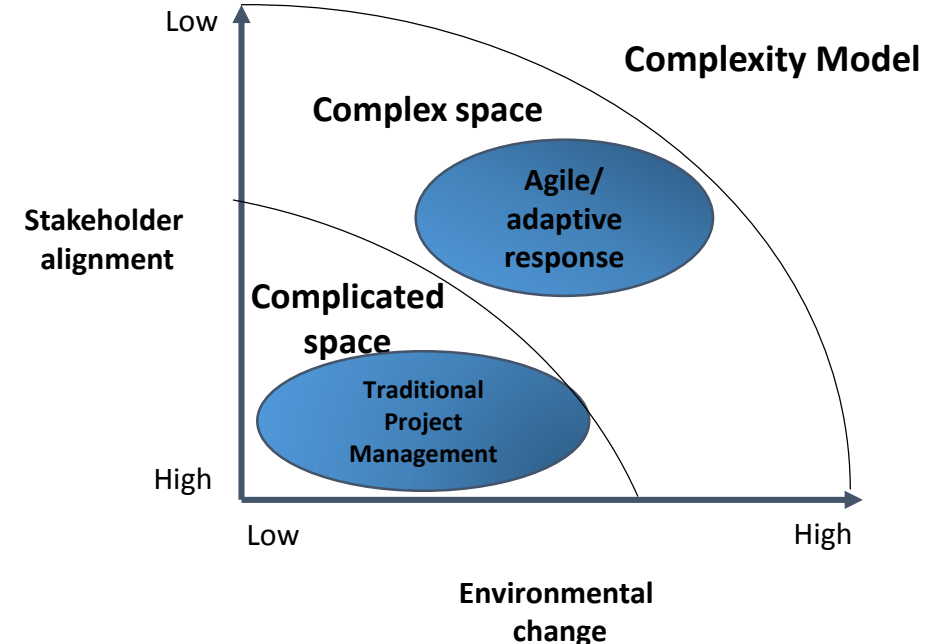
2. Increasing project complexity requires more adaptive processes

There has been limited improvement in the performance of mega-projects over the last few decades and the projects will be increasingly complex and human centric in the future. There is much research occurring on how to improve our performance on mega-projects. This includes better modelling of risk, developing more accurate estimate classes, and improved institutional design for accountability. However, it may be useful to apply a different set of lenses on the whole phenomenon of mega-projects. This entails using some of the thinking from the complexity sciences and organisational behaviour to help us better understand the issues at play in this environment and seek novel solutions.

“Complex projects have been characterised as embodying uncertainty, ambiguity, dynamic interfaces and significant external influences” **IBM**

“Humans are central to the creation of complexity, the people involved, the ways they communicate and the relationships they develop constitute the behaviour and combined culture of the organisation or project” **Complex Project Management Task Force Report.**

“Traditional project management approaches, tools and techniques are inadequate for managing the increasing complexity and ambiguity in our rapidly changing business environment” **CPM Task Force Report**



We have learned that a different set of leadership techniques are required to manage complex systems. They allow us to have a better sense of the environment, shape an identity that can drive self management, rapidly adapt to emergence trends, and constantly seek agile pathways to achieve outcomes.

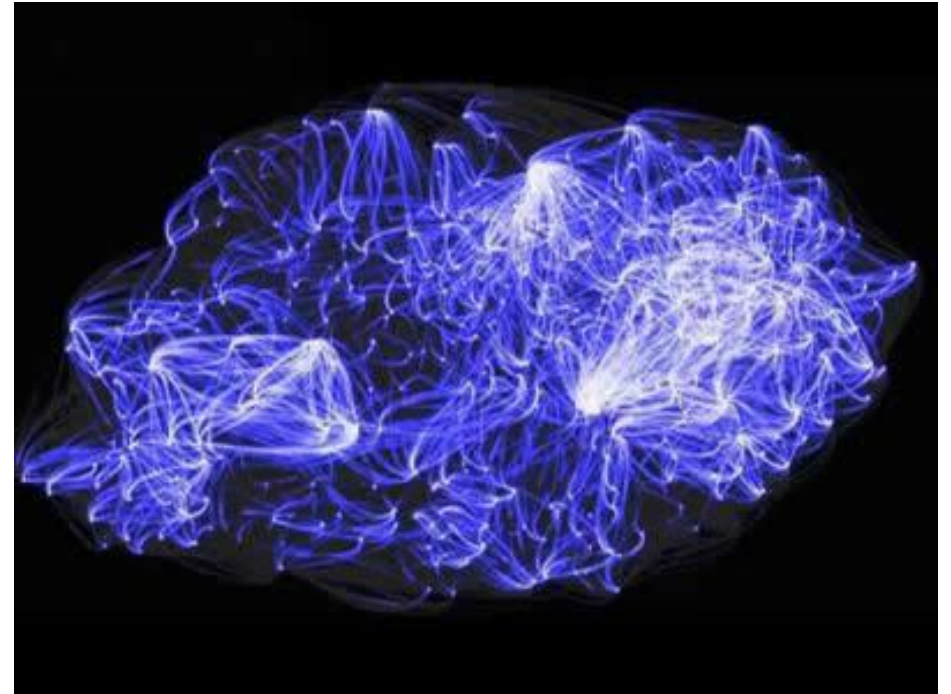
3. We need change mindsets to build a new culture of collaboration across corporate and political boundaries.

We know that for complex eco-systems that we call mega-projects we need a different culture and type of leadership (everywhere) that can rapidly adapt within boundaries to meet emerging challenges.

From organisational behaviour, we have learned that shaping such a performance culture takes time. It requires trust and authenticity, safety to adopt alternate views, emotional engagement with a sense of purpose, coaching not blaming, and a sense of shared accountability.

In this environment, the incremental discretionary effort is high and the ability to collaborate to solve problems or deal with emergence is prevalent. This culture is best when it is supported by an appropriate business model but can also transcend it.

Another key notion here, is that of boundary spanning leadership, as on complex mega-projects we are working across organisations and even layers of Government. We need to manage using influencing techniques as we may not have recourse to direct line authority. Alpha Project Managers often struggle in this space and can create collateral damage in the name of project progress.



These lenses of complexity and behavioural science will be used to frame a set of responses to the challenge of mega-projects.

4. In this new world we need to start to pay attention to and manage a far greater field of variables in addition to traditional project best practices

Traditional Prince II / P3M3 good practice ⁸

Management Control	Lifecycle, stages, gates, tranches, controls, Vision, Blueprint, Outcomes, Business Strategy, Issue management , Configuration management, change control, progress reporting, definition and design,
Benefits Management	Requirements, define, tracking, ownership, plan, transition
Finance Management	Costs, Business Case, approvals, tracking,
Risk Management	Types, breadth, structure, process, rigor, techniques, interventions, opportunities and threats
Organisation Improvement	Functional, change management, business performance management, stakeholder engagement, analysis, Communications, consultation and involvement in requirements, idea and proposition management
Organisation Governance	Leadership, Direction, Alignment, stakeholder representation, senior management active engagement and ownership, balance of authority between functional and PPM Roles, reporting lines, assurance, legislative and policy compliance (FOI, H&S), info management controls
Resources	Capacity, types, procurement, suppliers, skills and experience, control, allocation and deployment

+

Next generation performance measures

	Economic/ Social Impact
Service outcomes	Value in use expected performance metrics (utilisation, quality, availability)
Strategic drivers	Macro economic policy Strategic alignment
Investment returns	Investor consortia/shareholder value creation (Risk weighted ROI) Life of asset costing Cost of funding
Business model performance	Alliance partnership performance Issue resolution/Dispute management Safety
Project eco-system	Stakeholder engagement score (community, press, union)
Project culture	Employee/Team development

These are managed in addition to appropriate use of traditional approaches

5. We also need a new leadership model for complex projects with a different set of Leader capabilities based on the project's complexity

Project type	Traditional (Complicated) Projects	Complex Projects
Characteristic	<ul style="list-style-type: none"> Expert diagnose required Cause and effect discoverable More than one right answer Know unknowns Fact based management 	<ul style="list-style-type: none"> Flux and unpredictability Wicked problems with no right answers Unknown unknowns Many competing ideas Need for creative approaches
Leader's Job	<ul style="list-style-type: none"> Sense, analyse, respond Create panels of experts Listen to conflicting advice 	<ul style="list-style-type: none"> Probe, sense, respond Create environment and experiments to allow emergent patterns Encourage open discussions
Danger signals	<ul style="list-style-type: none"> Experts over confident Reliance on past solutions Viewpoints excluded 	<ul style="list-style-type: none"> Falling back into command and control mode Seeking facts rather than allowing emergence Impatience for problem resolution rather than exploration
Response	<ul style="list-style-type: none"> Encourage external & internal challenge Use experiments and games to explore unfamiliar 	<ul style="list-style-type: none"> Time for creation and reflection Design process that encourages interaction of diverse ideas and emergent solutions

CIFTER Project Management Complexity Factor Table	Complicated	Complex
Stability of project context	2	3
Number of distinct disciplines	2	3
Magnitude of legal, social, environmental implications	2	3
Overall expected financial impact on stakeholders	2	3
Strategic importance to organisation	2	3
Stakeholder cohesion regarding project characteristics	2	3
Number and variety of interface with other organisational entities	2	3

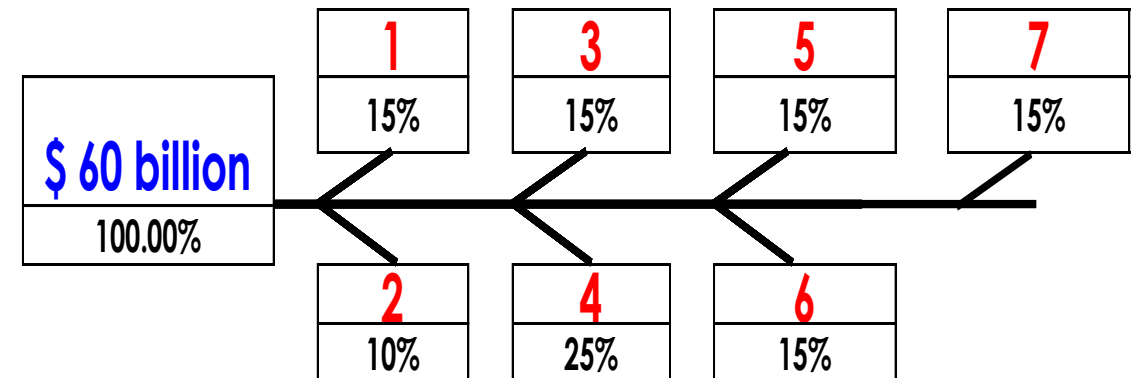
Interview summary: from over 30 critical appreciative enquiry/ success case interviews we identified the following root cause of future success

From the research process, we have focused on what we can do differently from a behavioural perspective to achieve better outcomes for the next generation of mega projects. These are additive to the well known Prince 2 approaches, processes and systems that we use for traditional engineering oriented projects. The degree of impact will depend on the nature and complexity of the variety of new project. The clear areas for improvement identified below come from the domain of leadership, social, behavioural and organisation sciences. We use many of them in steady state organisations but now have the challenge to use them adaptively for complex projects in a dynamic environment. The goal is to select from well known bodies of engineering/financial knowledge while building an adaptive performance focused organisation that spans many diverse stakeholders engaged in an emergent process.

A. Sources of success:

		Weight %
1	Adapting to a new world of complex multi-stakeholder projects	15%
2	Adopting a mindset and business model that allows innovation	10%
3	Managing multi-dimensional complexity	15%
4	Building a whole system performance culture	25%
5	Aligning business models to deliver outcomes	15%
6	Developing distributed leadership and x-boundary Leaders	15%
7	Creating a safe place to learn and share	5%

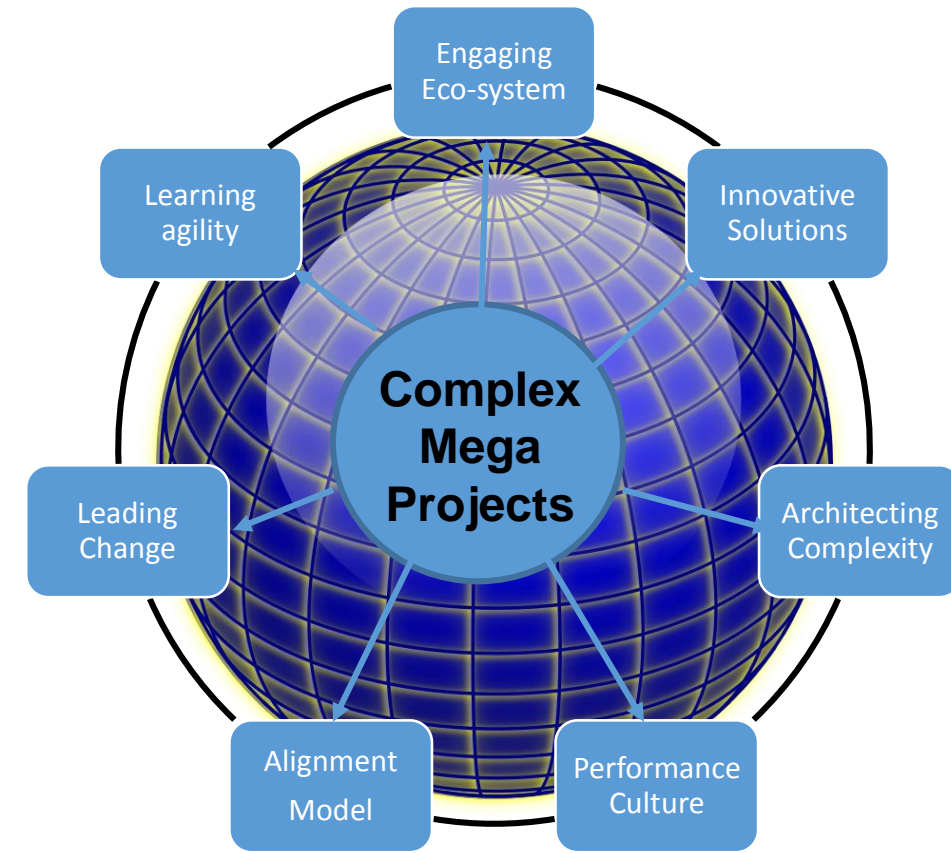
B. Fishbone



Based on these insights we have developed a new behavioural based model for the world of complex mega-projects

Model elements

1. **Engaging the Eco-systems:** Mega projects need to address many diverse stakeholder communities and we need to shift our project focus to people and social needs that pull through supporting processes and technology.
2. **Enabling innovative solutions:** Our engineering and contracting models need to allow for continuous innovation rather than being overly rigidly specified upfront to try to ineffectively reduce risk.
3. **Architecting complex change:** We need to look at how we best break down these complex solutions into viable related component parts. This will be as much about managing human change as structural engineering.
4. **Building a performance culture:** We need to develop a culture of collaboration across all the diverse delivery agents on the mega-projects so they can make continuous optimisation decisions at the point of need rather than relying on centralised control.
5. **Aligning business models:** New projects need contract models that align outcomes across diverse stakeholders, and can flex with the dynamic environment.
6. **Changing leaders:** We need to change the capability and focus of Mega Project Leaders and leadership from task management to achieving political, social and economic outcomes
7. **Learning agility:** We need to embrace learning and rapid adaptation during and between projects so we can develop new processes based on a different form of project outcome



1. Engaging eco-systems

“The psychological commitment to projects happens early, from then on we just backsolve”

“We are trying to produce a recipe that ignores humans”



What needs to change?

- **Stakeholder engagement:** We need to recognise that in the new world of solutions focused projects there are a large and diverse set of stakeholders with different views of success. These views will be political, social and economic. We will need to develop a new market facing and inclusive project eco-system that engages and aligns these stakeholders.
- **Adaptive concept scoping:** Many current projects are aspirational (strategic or social infrastructure) both in the private and public sector. They are hard to specify, large and complex. Because of their nature are exposed to global and local economic, political and social volatility that does not allow for reliable estimates or promised outcomes. We need a new more flexible project business model that can evolve as greater knowledge emerges or flex as the external environment changes.
- **Human engineering:** Our focus is often drawn to the know complicated world of technology and we ignore the complex human social engineering aspects of projects at our peril. We need a shift in focus to include the far broader range of deliverables, and processes that these next projects require. This implies a different governance and leadership model that incorporates these external and internal communities that are part of the project eco-system.

How can we change?

- 1. Engage the far broader set of eco-system stakeholders in an inclusive and sustainable way:** Former BCA Chairman Tony Shepherd spoke of the Community engagement around the Sydney Harbour Tunnel and how they genuinely listened and created an environment of openness and trust that allowed an easier resolution of the inevitable challenges that came later.
- 2. Change the way we manage iconic projects:** From a psychological perspective we need to recognise the importance of iconic projects in both the private and public sector but make this more transparent. If we deny our ambition for these projects we are left trying to reverse engineer viable business cases. This will require a change to our project parameters that allow other factors to be included rather than the subject of unconscious bias or deception.
- 3. Adopting a new more holistic perspective:** Given this far more complex Using some of the approaches from complexity science such as sensing and sense making, we can ensure we can flesh out the concepts sufficiently so we can better understand their cost of construction/service provision. This can use structured creative processes that include multiple key stakeholders such a scenario planning, design thinking and simulations to allow for more robust tested concepts.

2. Enabling innovative solutions



“We sometimes see innovation in a crisis that cannot occur in a structured environment!”

“On many bids we are not allowed the time, space and attitude for innovation to occur”

What needs to change?

- **Trapped in a cycle:** Senior executives feel that they are subject to relentless BAU strategic planning cycles, market reporting cycles, election cycles which drive the pace and timing of new project announcements for publicity purposes rather than allowing space for diverse or disruptive thinking.
- **Trapped in probity:** Many construction companies considered they are asked for orchestrated risk averse answers and are not allowed to challenge or change the questions.
- **Trapped in risk adversity:** In seeking the fantasy of certainty we specify the unspecifiable, wish risks away in rigid processes and registers. Innovation needs an environment of creativity and willingness to fail and learn that is not present in most project environments.

How can we change?

1. **Creative space for innovation:** There is a need for time and rhythm to allow for more mature stakeholder engagement, debate and co-creation of new/alternative solutions. Open innovation platforms or parallel task forces can uncover novel solutions.
2. **Adopt a different procurement model that allows time and parallel processes:** From NASA and many of the other great innovative projects we see an environment of shared vision and value alignment incentivised all parties to consider viable and sustainable operational outcomes rather than just the input costs of components.
3. **Minding risk:** “Creative approaches to risk management recognise the need to develop a shared interest in successful outcomes through identification of resultant mutual opportunity, rather than perceived protection against risk of failure and loss” **CPM Task Force Report.**

3. Architecting complex change

“We create our own complexity by the way we try to manage complexity – endless documents, risk logs, contracts”

“If it is bigger than \$ 2 billion or has more than 3 interfaces it is too complex and will fail”.



What needs to change?

- **Deconstruction of complex projects** into component packages or parts is reductionist and primarily driven by technological drivers. It ignores both the complex intra and inter-world of the project. The packaging can create human interfaces can be a source of greater complexity and misunderstanding and friction with many different contractors.
- **Drive for certainty:** the attempt to elimination change creates rigidity, and endless scope variations. When coupled with a risk averse contracting strategy it creates contention and disputes rather than an aligned problem solving approach to novel issues.
- **Negative feedback loops** end up prioritising reporting and managing variances when we know the original estimates were never accurate in a dynamic multi-stakeholder environment.

How can we change?

1. **The project architecture needs the psychological and sociological knowledge** on how to manage change. The construction engineering is often challenging but the human engineering is far more complex and yet given such little attention by or within the project.
2. **Complex Project Management** we learn to observe and guide rather than constrain the forces. We also build the ability and trust for the people at the primary interfaces to make the myriad of optimising decisions they need to on a daily basis without having to resort to a centralised command and control model.
3. **Learning to tolerate uncertainty and ambiguity** by building a culture of trust and results agility.

4. Building a performance culture

“We need experienced and collaborative people with just enough governance not technocrats and autocrats”

“Governance is more useful at head office than on the site, we need experienced people not paper”

What needs to change?



How can we change?

- **The new model has a far greater reach of people that need to be engaged**, aligned and committed. This cannot be achieved by Gantt charts. There needs to be an environment across the many aspects of the project. One of shared purpose, constructive engagement, collaborative problem solving, trust, accountability and self management.
- **Decisions made at point of impact not at the centre**: As a response to project complexity and consequent anxiety we try to centralise decision making. This ends up as a bureaucratic log jam on complex projects where work often has to continue in spite of the governance.
- **Shared accountability**: Under the current model there is a run for cover, shifting of blame or contracts when things go wrong. This need to change to a sense of mutual achievement and learning how to work better in the future.

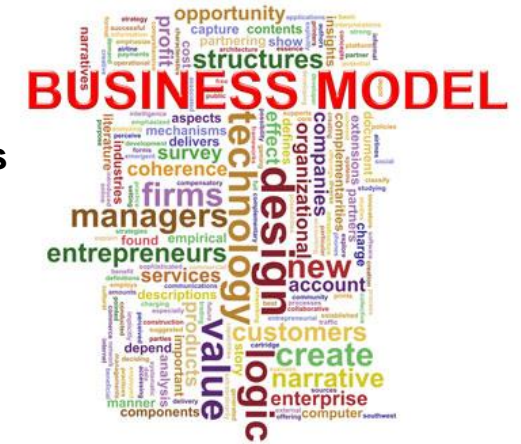
1. **Build a performance culture upfront**: We need to focus much more on the creation of sustainable project environments where we have a clear sense of “why” and aligned teams across boundaries. The formation of the partnership should come from organisations and people who have the ability to both deliver and collaborate to achieve this.
2. **Build trust and transparency in everyday actions**: The challenge is for us move beyond platitudes and to consciously allow a nurturing environment to arise by the way we conduct ourselves in the many transactions and interfaces we have on a daily basis. Culture is emergent not proclaimed. We need to call out non-values aligned behaviours out immediately at any level.
3. **Conflict resolution**: The fear of conflict or avoidance is just as problematic as uncontrolled conflict. Creating a safe place to offer alternative solutions and challenge status quo is healthy. This can be both a value and a process. Dispute Avoidance/Resolution Boards can be useful safety nets but the stakeholders can learn how to have difficult conversations with positive outcomes by using a coaching mindset.

5. Aligning business models

“Hard money contracts can engender adversarial behaviours where ambiguities arise, as parties tend to protect their individual positions, each interpreting the contract in their own favour”

“Alliances change the focus of what adds value and become a catalyst for behavioural change and collaboration”.

“We need to put the Partnership ‘P’ back in PPP!”



What needs to change?

- **Moving beyond the contract:** At present there is a view that the contract form needs to be the mechanism to ensure compliance and order on projects assuming that bad behaviour will occur. We need to see that human collaboration is the key to success and ensure that the form of agreement (alliance, D&C, schedule of rates, lump sum) supports not supplant this.
- **Flexibility:** In complex meg-projects, it is not possible to know all the ‘right stuff’ on day 1 so we need to create a business model that reflects the emergent nature of these projects, aligns the stakeholders around success and allocates a fair share of value and risk.
- **Contracting in a complex world:** There are numerous examples today where the legal document is driving significant contention, claims and disputes, or has been put aside to get on with the project. We do need to develop a more accessible way of creating an agreement around outcomes that guides successful solutions and incentivises performance.

How can we change?

1. **Mutuality of interest** is where the ultimate project results and the relative contribution of all parties (both resources and collaborative behaviours) can be agreed on and then captured in an appropriate form. The process needs to be shaped in the real world of projects using social, emotional and political skills to align the different stakeholders in achieving success.
2. **Joint ventures to create value not limit exposure:** It needs to be able to flex and adapt to external and internal changes as part of the core process not an exception. “
3. **Project issues should be resolved by people** raising them early and seeking to solve them, not by resorting to, at best historical records of an imprecise understanding of scope and costs several years previous. So we may win the skirmish in a contract dispute but then create a lose-lose cultural impact that ultimately undermines the sensitive collaborative culture of the project and its’ achievement of the ultimate economic and social benefits.

6. Changing Leaders

“We need to use large projects as an environment to blood younger people, they bring energy and drive to the project”

“They appointed Alpha Project Managers to difficult contracts to contain the costs, but they ended up destroying the team”

What needs to change?



- **New leadership model:** The shift from managing complicated technological projects to leading complex social solutions needs a different form of leadership that is distributed through the project eco-system not resident in a single person.
- **New Leaders:** The current form of centralised Project Leader who is a single point of responsibility is not viable in a large complex project environment. There are just too many variables and interfaces. Their role needs to change to enabling leadership rather than be the choke point for decisions.
- **Leadership development:** At the moment there is a limited cohort of jumbo project pilots. They tend to learn by surviving the school of hard knocks and often burn out or lose their edge. There is limited development of the next generation on an apprenticeship basis.

How can we change?

- 1. Develop a distributed leadership model:** As the project eco-system is set up it can be designed in such a way that it enables timely leadership decision making close to the operational parts of the project. They can collaborate as a team to design, decide and solve the myriad of daily issues that emerge. They can communicate and share performance outcomes and take joint accountability for success.
- 2. Identify the behavioural capacities required for your next generation leaders:** The Project Leaders of the future will have to have a 360 degree leadership style and become an orchestrator and integrator of distributed leadership. They will need to transcend boundaries (political, national, organisational) and unify disparate stakeholders into an aligned meta-project team.
- 3. Create a pipeline of project leaders:** Develop an action learning model for project managers as part of their everyday activities. They can have defined learning stretch goals, formal peer groups and experienced mentors.

"The perceived complexity of a situation or system is relative to the capacity of the responsible individual or group to comprehend it"

7. Learning agility

“We will make the same mistakes again, just with different people”

“I have been asking for lessons learned for 30 years but never get them”



What needs to change?

- **Risk appetite limits learning:** Typically the level of anxiety on complex projects does not allow learning or experimentation to occur. The emphasis is on risk minimisation and therefore tight governance and procedural adherence.
- **Wrong approach:** Research has found that the presence of absence of governance frameworks and methodologies makes very little difference to project outcomes. People tend to rely on their experience and those around them. Yet we spend a great deal of training and control effort on mechanisms that have limited impact. We need to shift approach and learn through experience and reflection.
- **Limited learning appetite:** Project post implementation reviews are seldom conducted or paid attention to. There is limited appetite to explore failure and learn and typically Project Managers end up as the immediate collateral damage.

How can we change?

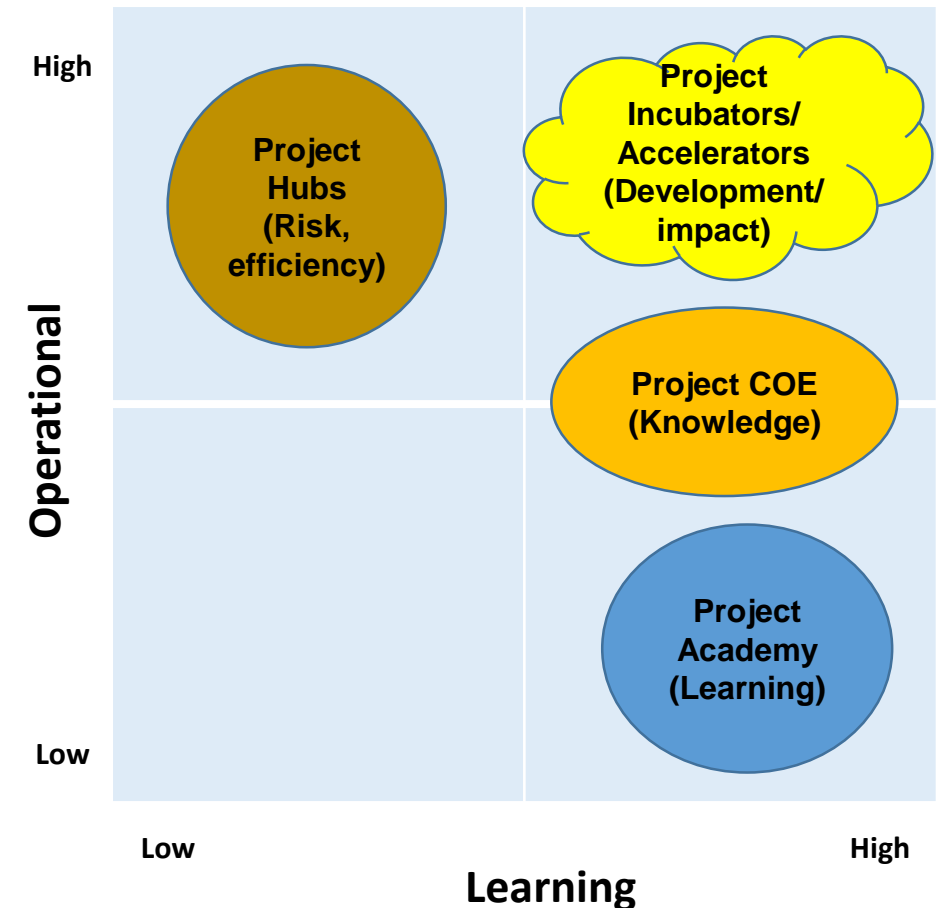
1. **Change the culture:** The project needs to create a way to fail safely. This way we can genuinely explore what happened, what needs to change and not make the same mistake again. NASA created a safe space to be expected to “not know” and therefore be open to learning
2. **Adopt an new embedded learning model:** NASA also recognised the apprenticeship process of learning to deal with complexity and supported this with knowledge management, mentors and simulations to give real life experiences.
3. **Learn across projects:** There are great models of successful transfer of learning across projects through knowledge management that we can leverage. It can be a first port of call for novel project problems to explore other’s experiences and even use new technology platforms for crowd solving and learning.

To achieve different outcomes we need to adopt a different perspective and approach to manage the many dimensions of complex mega-projects

Value	From (Challenged)	To (Successful)	Prize (based on \$ 1 Bn project)	through...
Improved value in use	< 5 % Business case achievement	> 50 %	> \$ 100 m	<ul style="list-style-type: none"> Stakeholder alignment and engagement Adoption of innovative techniques Focus on value harvesting
Improved budget success	Overruns > 30 %	< 5 %	> \$ 250 m	<ul style="list-style-type: none"> Realistic estimates Flexible outcomes based business model Collaborative rapid problem solving
Meeting schedule	Overruns > 30 %	< 5 %	> \$ 100 m	<ul style="list-style-type: none"> Architecting bite sized and parallel chunks Stakeholder alignment and engagement Delivery teams work as one Aligned business models

Changing the way people think, relate and operate is complex but we have some models to draw on

Model	Project HUBS	Centres of Expertise	Project Academy	Project Incubators / Accelerators
Approach	Centralise mega/ major projects	Virtual or physical sharing of knowledge and methods	Specialised learning environments for developing Project Leaders	Built into mega-projects to develop leadership and culture
Benefits	Reduces risks if few very capable mega project managers	Low cost, low touch available 24x7 can be outsourced	Brings like minded cohorts together and is a focussed development activity	Real time learning in the project environment with the real systems and project team
Limitations	Can alienate the owners and other site and eco-system stakeholders. Is also susceptible to economic cycles.	Relies on being kept up to date and relevant. Is optional and does not change behaviours	There is an abstraction from the real project environment that requires deliberate application of learning	Takes some upfront investment of time and a commitment to ongoing development as part of a sustainable practice
Examples	BHPB	Rio Tinto	NASA John Grill Centre Accenture	Telstra VC start ups



2020 News release – We have experience a portfolio of successful projects that have developed the fundamental economic infrastructure for Australia for the next 30 years

Headlines

- ✓ These projects were complex and costly but they were well managed and met all of the performance hurdles in terms of social engagement and impact, economic success for venture partners, as well as sustainability and safety.
- ✓ We had many learning challenges and a number of mistakes along the way, but we learned from them and shared this knowledge with others to ensure we did not make the same mistakes again.
- ✓ We established project communities made up of many diverse stakeholders unified by a shared sense of purpose and fair economic model. The culture was collaborative and 'can do' outcomes focussed, where any issues were dealt with quickly in a generative manner.
- ✓ We now have an amazing generation of Complex Project Leaders who are in demand by the rest of the world, and we are comfortable that our processes will continue to build both the leadership and the Leaders we need for the ever increasing complexity we face in the future.



Appendices

- Acknowledgements
- Quotable quotes
- References

The interview/discovery process was conducted through 30 interviews with different stakeholders to get their perspectives of success and failure

- Political leadership
 - Former Premier of New South Wales
- Infrastructure Agencies:
 - Infrastructure Australia
 - NSW Treasury
 - Infrastructure NSW
 - Infrastructure Partnerships Australia
- Professional Peak bodies:
 - Australian Construction Association
 - Project Management Institute
 - Australian Institute of Project Managers)
- Business Leadership
 - Former Chair of Business Council of Australia
 - Chair of Australian Construction Association
- Owners team Mega Project Managers
 - Resources
 - Transport
 - Health
- Construction companies
- Engineering Design organisations
- Lawyers (3)
- Infrastructure Investors (3)

Quotes –

Engaging eco-systems

- “We have a nation shaping pipeline of infrastructure projects and need to create the way to share experiences”
- “We had the important conversations with the Minister early and off the radar”
- “Politics did not want the problem solved
- “Iconic projects have different motivators”
- “The psychological commitment to projects happens early, from then on we just backsolve”
- “Governments unrealistic politically driven due dates drive unrealistic schedules and then they impose huge penalties to try and enforce performance”
- “The intrinsic complexity of projects, in part is driven by political, social, technological and environmental issues, as well as including end user expectations which may change dramatically over the project lifecycles.”

Innovative solutions

- “The Government procurement process and probity constrains the ability to be innovative, collaborative and agile. It is over specified.”
- “We knew it was the wrong concept early on but just did not stop”
- “Government need to think through the packages more carefully. There is no need for everyone to bid on everything”
- “Project Management has an opportunity to regain the central place it should never have lost in the management of strategic initiatives, innovation, and change, but this will require adding more flexible methods to the available toolkit.”
- “In the professional bibles of today; the phased stage gate approach has been internalised so thoroughly by the profession that any mention of parallel trials is met by incredulous reactions.”

Quotes –

Architecting complex change

- “We need to understand exit points for Infrastructure investors when we structure the deal”
- “The investor requirements can shape the business model which in turn influences all the consortia partners”
- “We don’t trust Greenfields projects because their revenue models are unreliable. We rather look at undervalued (captive markets with mature counter parties) brownfield opportunities”
- “Large projects are seldom delivered by the ‘Company’ that wins it”
- “I can see a project that is doomed to go off the rails on day 1”
- “If you don’t apply a contract then you effectively establish different business conditions that can then become an implied contract”
- “There is often a vast gap between the bid team and the delivery team”

Building a performance culture

- “We are trying to produce a recipe that ignores humans”
- “For large PPP bids the risk of not winning is greater than the risk of not delivering”
- “It’s about the person (70 %) not the job”
- “We need experienced and collaborative people with just enough governance not technocrats and autocrats”
- “We sometimes see innovation in a crisis that cannot occur in a structured environment!”
- “Governance is more useful at head office than on the site, we need experienced people not paper”
- “60 % of the project is about pre-emptive factors the other 40 % is about the right culture and relationships”
- “Psychology is prime and will override any business model”
- “Australia has an adversarial approach to contracting and project management”

Quotes –

Aligning the Business Model

- “Lead contractors spread S1i*t downhill!”
- “Engineers fear financial models!”
- “We changed the number until we got over the line without reducing the scope”
- “We need symmetry of commercial capabilities for alliances to work properly”
- “Alliances change the focus of what adds value and become a catalyst for behavioural change and collaboration”
- “Foreign entrants have different risk assumptions”
- “We create our own complexity by the way we try to manage complexity – endless documents, risk logs, contracts”
- “Our response to risk was more governance which just added complexity and cost. We should rather have used mentoring”.
- “Put the contract in language the people can understand”
- “Investment Banks a more focused on getting the transaction over the line than the operational viability”

Changing Leadership

- “I see a lot of whipping from a distance but with no blood on the knife” JB
- “IRP reviews are useless because corporate choose not to see”
- “We did not create a safe learning environment – we wanted someone to blame”
- “Don’t shoot the project manager”
- “Governance is more useful at head office than on the site, we need experienced people not paper”
- “Large projects are seldom delivered by the ‘Company’ that wins it”
- “We suffered a dictatorship by an incompetent owners team filled with technocrats as a result of previous bad experiences”

Quotes –

Learning agility

- “I have been asking for lessons learned for 30 years but never get them”
- “We will make the same mistakes again just with different people”.
- “We need to define turning points and options a key stage gates otherwise we get stuck with inertia”
- “The Board should have asked the right questions
- “We need to use large projects as an environment to blood younger people, they bring energy and drive to the project”
SK
- “IRP reviews are useless because corporate choose not to see”
- “The project should have failed at an early gate!”
- “We did not create a safe learning environment – we wanted someone to blame”

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Malcolm is an Executive Change Coach. He has been involved in applied research for the last 5 years in the areas of human behaviours in a business context, accelerated development of leaders and boundary spanning leadership. He is currently part of the coaching team at the John Grill Centre for Project Leadership and Adjunct Faculty at AGSM.

As an Asia Pacific Industry Managing Partner in major international consulting firms (Booz & Co and Accenture) and Director of Business Schools (AGSM and MBS) he has executive teams plan and transform their organisations.

He has worked both in the private and public sectors extensively with large scale Resources and Oil industry multinationals as well as with the Federal and State Governments.

Malcolm has focused on adult learning/capability models and successfully used action learning techniques to build cross business unit/agency collaboration in both large organisations and Government. He conducts applied research in the application of complexity and behavioural sciences to organisations and mega-projects.

Malcolm has post graduate degrees in Business, Science, and Psychotherapy.

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James is an internationally accredited strategy & execution, portfolio project, programme, PMO, benefits and project management consultant. James is an approved trainer with extensive proven history of uplifting the capability of over 1000 executives, programme, project, PMO, benefit and change managers.

He has supported executives and teams to better understand their roles and responsibilities, increasing speed of delivery within the project / programme / portfolio environment.

Clients leverage James' deep experience as a Programme Director, PMO Manager, Organisational Change Manager and Portfolio Advisor to optimise organisational project delivery. He has delivered many of his clients' most challenging programmes while coaching clients to ensure ongoing delivery capability uplift.

For the last four years James has led the MBA course in Strategy Implementation, Queensland University of Technology for full and part time Executive Masters students. He is a sought after speaker at conferences and workshops.

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Craig focuses on Executive Development, Digital Marketing Strategy and Operational Excellence.

He has been a long standing Program Director and Faculty member on AGSM's MBA, MBT and Executive Education Programs. He has consulted to major telecommunications, consumer products and resources companies. In addition he lead a boutique management consulting firm for over 6 years and accumulated over 15 years experience as a director on boards.

Craig's career includes more than 25 years experience at senior levels in the corporate and public sectors in both Australia and the United Kingdom including senior sales, marketing and executive roles in major Australian and international companies.

Craig brings a breadth of functional expertise coupled with genuine adult learning experience to help organisations change. He understands how to engage the participants of change in the process.

He has an undergraduate degree and postgraduate degrees in economics, industrial relations, marketing and an MBA. He is a Fellow of the Australian Institute of Company Directors and a Senior Fellow of Finsia as well as being a Certified Practising Marketer.