ICPM INTERNATIONAL CENTRE FOR COMPLEX PROJECT MANAGEMENT

CONNECT

BUILDING CAPABILITY IN COMPLEX ENVIRONMENTS

ISSUE 25: JUNE 2017

'The Edge of Chaos: *How Complex Projects are Inherently Chaotic Systems just Waiting to Unleash'*

'Weak Signals: *What are they? What are the Implications in an Age of Big Data?* **'**

'Systemic Risk: *How connectivity impacts risk management practice'*

'The new Major Projects Knowledge Hub needs to encourage heresy'

CEO MESSAGE

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It is true to say that change is the new norm….. Last edition I welcomed a number of new staff members and this edition we farewell one of those new staff members, Corrine Cole (nee Hopewell). Corrine was only with us a short 4 months but boy did she make an impact. Unfortunately due to unforeseeable family reasons Corinne has made the decision to focus on her family, which means we bid her adieu from our day to day operations and hope she continues to be part of our network in the future.

This edition is by far the biggest We have some wonderful first time contributors, as well as Part Two of the ICCPM Story. Unable to outsource the writing of the second instalment (although we did try!) it has been fascinating researching and reading all of the available material to provide a factual, fair and balanced account from 2007 – 2010. Of particular interest is seeing all of the folks that were interested in establishing a solid foundation from which the organisation could grow and become successful some are still engaged and I thank them for that.

Our Press Club launch of our Contracting for Success in Complex Projects report was a great success and we have received such wonderful feedback from all around the world on the quality of the report both in terms of presentation and content. We have presented on the outcomes a number of times at the Project Governance and Controls Symposium and the

PMI AUS conference, again with terrific feedback. All of you who contributed can be very proud.

I commend to you in this particular edition the opportunity on offer to contribute to the Major Projects Associations Knowledge Hub. This is a new initiative out of the UK from our good friend Jonathan Norman who is an active seeker of knowledge and supporter of collaborative engagement from everyone, everywhere.

As always we value your feedback, let us know if there is something you would like us to cover, and more importantly if there is something you would like to contribute.

Deborah Hein

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The ICCPM Story

PART TWO: 2007 - 2010

The College of Complex Project Managers (CCPM) was established as a legal entity in the Australian Capital Territory in 2007. Discussions and some preliminary activity particularly in the government and academic sectors had been occurring since around 2005. In 2007 the development of the curriculum for the world's first EMBA for Complex Project Management commenced in earnest with the Queensland University of Technology (QUT) and the College working collaboratively.

The College was the precursor to the establishment of ICCPM and its stated purpose and principal activity was:

"The promotion of complex project management as a profession, internationally, through certification of members of the College, the accreditation of post-graduate courses in complex project management, and the development of knowledge in the field of facilitating research activities."

The inaugural board was Simon Henley (Chair), David Dombkins (Deputy Chair), Ali Baghaei, Tom (Charles) Burbage, Jeff Worley, Peter Fielder, Rick Yuse and Stephen Hayes (CEO/Director).

In February 2007 the then Minister Assisting the Minister for Defence, The Hon Bruce Billson, MP released the following to the Media:

The Minister Assisting the Minister for Defence, The Hon Bruce Billson, participated in an historic gathering of the world's leading practitioners in the management of complex projects.

Senior leaders from Defence and industry participated in the inaugural meeting in Canberra of the Fellows and Officers of a new international management institution, the College of Complex Project Managers. The aim of the college is to improve the success rate of complex projects around the world.

Mr Billson said "the establishment of the College reflects the growing concern about the global shortage of trained complex project managers."

"In Australia the Department of Defence is taking a leading role in addressing the demand for complex project managers," Mr Billson said.

"The department is developing a competency standard for complex project managers and is supporting the establishment of the College of Complex Project Managers."

2007

During the first year of operations, the College focussed primarily on establishing appropriate governance including invitations to the membership program; garnering support from international organisations, and working with Dr David Dombkins on the competency standards for Complex Project Managers. Work also continued with academia (QUT) to finalise the Executive Masters in Complex Project Management (EMCPM) for its inaugural launch on the 29th of January 2008 in Canberra.

Staff during 2007 included Stephen Hayes (seconded); Nick Lawton (seconded), Jan Smith (seconded) and Peter Cranage (seconded).

The Hon Bruce Billson speaking at a lunch to launch the Centre in 2007. Dr David Dombkins (on speaker's right and Rear Admiral Simon Henley (on speaker's left)

2008

During 2008, the focus continued on establishing support from international organisations including a number of meetings in London, Sydney, Massachusetts, Washington, St Louis, and Canberra and the commencement of Knowledge Sharing Forums in Washington, Frankfurt, and Singapore. In August of 2008, Dr Dombkins gifted (through deed) the Competency Standards for Complex Project Managers to the Defence Materiel Organisation (who appointed ICCPM as the custodians of the standards).

In November 2008, the company was restructured and legally changed name to the "International Centre for Complex Project Management". This decision of the board was taken to enable the continued growth of the organisation and was deemed essential to

maintain continued corporate support and to ensure the ongoing viability of the organisation. The newly named organisation relaunched at the International Project Management Association (IPMA) International Congress and demonstrated the significant progress made towards being recognised as the global leader in complex project management. The purpose and principal activity for ICCPM was published as:

"The international promotion of complex project management as a profession, support for the development of post-graduate courses in complex project management, establishment of a global network to facilitate the development of knowledge in the field, and facilitating the establishment of research activities".

The board in 2008 included, Simon Henley (Chair), David Dombkins (Deputy Chair), Ali Baghaei, Tom (Charles) Burbage, Jeff Worley, Peter Fielder, Rick Yuse and Stephen Hayes (CEO/Director).

Staff during 2008 included Stephen Hayes (seconded); Nick Lawton (seconded); Jan Smith (seconded); and Ron Davison.

L-R Stephen Hayes (ICCPM), Bob O'Connor (QUT), Peter Little (QUT)

2009

2009 saw the continued growth of collaboration amongst the international community of government, industry and academic organisations interested in complex project management lead by ICCPM. During this period the first International Roundtable Series was conducted by the organisation with the theme 'The Conspiracy of Optimism – Why Mega Projects Fail'.

Following this first successful series an international task force was established to oversight the development of a white paper in complex project management, in collaboration with Global Access Partners. In addition to providing initial policy and strategic implementation advice for governments and global corporations, the white paper established a long-term roadmap for international complex project management research.

The Board was Chris Jenkins (Chair), Simon Henley (Deputy Chair), Tom (Charles) Burbage, Rick Yuse, Mary McKinlay, Harry Bradford, Kim Gillis, Jeff Worley, Ali Baghaei and Stephen Hayes CEO/Director.

Staff in 2009 included Stephen Hayes, Nick Lawton (seconded until July 2009), Christine Levers, Ron Davison, and Jo Spencer. The secondment program with DMO expired 31 July 2009, at that point secondees returned to DMO or transferred to employee status directly with ICCPM.

2010

During 2010 ICCPM established an international task force to oversee the development of a report titled *'Complex Project Management – Global Perspectives and the Strategic Agenda to 2025'*. The report was launched in Australia, the US and the UK during the fourth quarter of 2011. Driven by the need for more effective solutions in an age of pressing global problems and financial austerity, ICCPM and Global Access Partners (GAP) established an International Complex Project Management Task Force of international thought leaders and globally experienced practitioners including key national and international stakeholders from the private sector, governments and academic institutions. Each member of the Task Force was directly involved in the design, development or delivery of complex projects and attended in a personal and professional, rather than representational, capacity to encourage candour, robust debate and innovative thinking. The Task Force aimed to inform global stakeholders in government and industry, leverage knowledge within the CPM community to drive resilient solutions and provide a roadmap for future research based on sound academic and experiential analysis. It emphasised the importance of investment in research and championed better implementation of policy to improve global complex project delivery.

This very significant piece of work is now cited prolifically in a range of academic and professional journals, articles and published works.

ICCPM continued working with QUT in partnership to globalise delivery of the Executive Masters in Complex Project Management and worked to establish a global Associate Partner Network. Executive education products, primarily delivered by QUT, were delivered several times in Australia.

In August 2010 the inaugural ICCPM Research and Innovation Seminar was conducted in conjunction with the SKEMA Business School's 10th Annual Doctoral Seminar in Lille, France.

The Board in 2010 included Chris Jenkins (Chair), Simon Henley (Deputy Chair), Tom (Charles) Burbage, Rick Yuse, Mary McKinlay, Harry Bradford, Kim Gillis,and Stephen Hayes CEO/Director.

Staff in 2010 included Stephen Hayes, Christine Levers, Jo Spencer, Thu Tran and Grant Boore.

The inaugural ICCPM Research Prize was won by a group submission from Manfred Saynisch, Thomas Baumann and Dr. Louis Klein, on the theme "Mastering Complex Projects by radical Rethinking of PM".

During 2007 - 2010 the organisation experienced quite a bit of change as can be expected during a start-up phase. The start-up phase we know encompasses the launching of a venture and the initial penetration into the market. Given the venture was designed and lead by government the market was predetermined for the organisation, this can and has been both a positive and a negative. Positive in respect to the guarantee of participation from Defence and those who work closely with Defence, and negatively in respect to being compartmentalised by other sectors as a predominantly Defence focussed company. The start-up phase is also a period of high creativity and the venture is created where none existed before, it should be the time of innovation and product development with high energy, imaginative marketing and engagement with customers. There is no denying that management during the start-up period focussed predominantly on building brand recognition, attracting support for the venture, and meeting as many potential supporters in as many countries as possible. The generosity of government in providing support for the establishment of the organisation cannot be underestimated nor forgotten. This support provided the human capital necessary through the secondment period 2007 – mid 2009 that enabled the establishment of the necessary business, governance and support frameworks.

CONNECT

BUILDING CAPABILITY IN COMPLEX ENVIRONMENTS

Presents

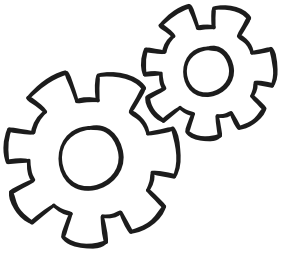
The ten year anniversary since the establishment of ICCPM

In recognition of all that ICCPM has achieved through our ten year history. We invite you to celebrate this milestone with us.

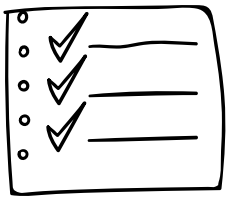
Watch this space for...

- The ICCPM Story: Part Three
- Details on upcoming events
- Anniversary developments

COMPLEXITY DIAGNOSTIC TOOL

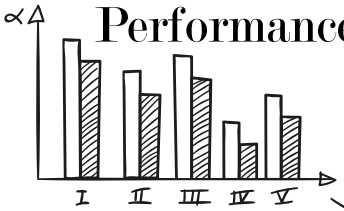


Diagnose Performance



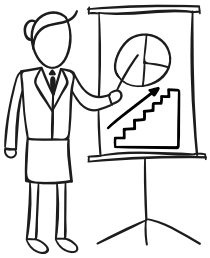
validated by research

Analyse Performance



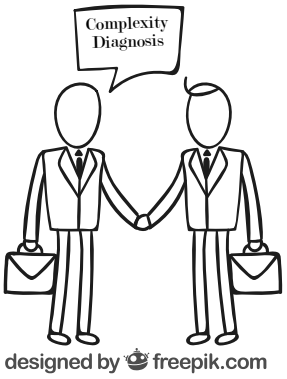
complexity diagnostic tool

Guidance Report



complexity diagnostic report

- Diagnose complexity within projects
- Identify complexity-related risks
- Best practices guidance for management interventions
- Track performance over time
- Multiple stakeholder views
- Executive dashboards for cross-project comparisons
- Based on validated research and aligned to the ICCPM Competency Standard



To register your project for a Complexity Diagnostic you can do so at the ICCPM website www.iccpm.com or contact us on 02 6120 5110 or admin@iccpm.com

2017 Project Management Prize Winner: *Belinda Kelly*

ICCPM is pleased to announce Belinda Kelly as the 2017 winner of the ICCPM PM Prize, which is awarded for academic performance in the Managing Project Complexity subject of the Master of Project Management program at the University of Technology Sydney.

Belinda was presented her prize at the 2017 UTS Design, Architecture and Building Prize Giving by ICCPM Director and Fellow, Dr Phil Crosby.

Deborah Hein, *MD/CEO of ICCPM:*

"ICCPM is pleased to join with the University of Technology Sydney in awarding this prize to Belinda to recognise her academic excellence in the Managing Complexity subject of her Master's Program.

Our purpose in sponsoring this specific prize is to encourage and inspire graduates to join with and become some of the best practitioners in the world so that one day they can manage projects of national significance and potentially become a Fellow of ICCPM. We look forward to working with Belinda and will watch with interest as she develops her project management career."

Belinda Kelly,
UTS PM Prize Winner:

"I would like to thank ICCPM for offering the prize, and for the University of Technology Sydney for having such a fascinating subject as part of the Master of Project Management. It was great to meet Dr Crosby and his partner on the award night, and to learn about the Square Kilometre Array telescope mega-project. ICCPM's support has deepened my interest in complex project management, and this will strongly influence my future career."

The post-graduate project management degrees offered at the University of Technology Sydney (UTS) are internationally recognised and certified degrees providing a pathway into specialised project management roles, or advancement to project and program director positions.

UTS
UNIVERSITY OF TECHNOLOGY SYDNEY

Students have the unique opportunity to develop a specialised skill set by choosing a sub-major in business, construction, engineering, IT, local government management, or health. This approach provides students with the opportunity to combine project management disciplines with sector-focused knowledge.

The course incorporates UTS's block teaching approach, which creates an immersive environment where students work with their peers in a team-based, simulated project environment.

ICCPM Board Updates

Chris Jenkins has resigned from the ICCPM Board after seven years of sustained commitment. Chris was chair of the board for six of these seven years and provided excellent support to the board. His leadership contributed to the current success of the company.

The ICCPM Board of Directors has appointed Mr Ian Mack, Mr Tim Banfield and Dr Phil Crosby to Non-executive Director positions for an initial period. They will hold office until the next Annual General meeting where they will be eligible for re-election.

Ian Mack

Tim Banfield

Phil Crosby

Deborah Hein, ICCPM MD/CEO:

"It is fantastic that these ICCPM Fellows have agreed to join the board.

Ian has been a supporter of and contributor to ICCPM since the beginning. On retiring from his extremely busy role with the Department of National Defence Canada, Ian accepted the role as a Director of ICCPM as a way of providing strategic guidance and contributing to the work of the organisation for which he has great respect.

Tim Banfield has been an active supporter of ICCPM for a long time; he has significant civil service experience to share having served with distinction in various positions in the UK Cabinet Office, Major Projects Authority and other civil service roles.

Dr Phil Crosby brings a wealth of experience from the science and technology sector with his most recent role being as the CSIRO Assistant Director on the Square Kilometre Array, the largest and most capable multinational radio telescope ever constructed.

I look forward to the support, guidance and leadership that the three new Directors will bring to the board."

The ICCPM Board of Directors is made up of a Chair, Deputy Chair, MD/CEO and up to six Non-Executive Directors and is ultimately responsible for the strategic direction of the organisation.

ICCPM Welcomes our New Members
April - June 2017

Laurie Bowman
Australia

Tony Charge
Australia

Chris Hanson
Australia

Belinda Kelly
Australia

Mohammed Mansoor
Australia

Joseph Miller
Australia

Tina Stephenson
Australia

Pieter van der Merwe
Australia

Andrew Waye
Australia

Leigh Wrighton-Jones
Australia

Md Zahangir Alam
Bangladesh

Shah MD Aminul Haq
Bangladesh

Asia Khatoon
Bangladesh

Farida Nasreen
Bangladesh

Mohammad Mashiur Rahman
Bangladesh

Fatima Yasmin
Bangladesh

Stephane Durand
France

Lila Adhikari Ojha
Nepal

Mohan Singh Basnet
Nepal

Umesh Basnet
Nepal

Krishna Chapagain
Nepal

Bhawana Chaulagai
Nepal

Tej Bahadur Chhetri
Nepal

Indra Bahadur Devkota
Nepal

Suprabha Dhungel
Nepal

Lila Kumari k.c
Nepal

Chhaya Lal Moktan
Nepal

Renuka Pandey
Nepal

Yug Raj Pandey
Nepal

Shreelal Poudel
Nepal

Mainali Ram Prasad
Nepal

Asha Kumari Shah
Nepal

Shiva Sharma
Nepal

Deepak Sharma
Nepal

Sushil Kumar Sharma
Nepal

Kiran Thapa
Nepal

Prathma Uprety
Nepal

Noor Rizna Anees
Sri Lanka

Vaidehi Anushyanthan
Sri Lanka

Rathnaseela Endera Arachchige
Sri Lanka

Muthuthanthri Bastiange Uditha Suresh Fernando
Sri Lanka

Ritigahawatta Arachchillage Chanaka Prageeth Gunasekara
Sri Lanka

Liyanage Thakshila Surangani Karunarathne
Sri Lanka

Sarath Kumara Malavisooriya
Sri Lanka

Rosika Nimangani Saman Kumari Mulathe Gedara
Sri Lanka

Kavitha Muthaiah Arunasalam
Sri Lanka

Shashika Priyashana Karunadasa Nawarathna Mudiyanselage
Sri Lanka

Hasini Indika Pallawala
Sri Lanka

Mapitiyage Kuloja Gamindi Peiris
Sri Lanka

Wijai Anuradha Kumarasiri Ranmuthu Hewage
Sri Lanka

Saman Chamindha Senarathne
Sri Lanka

Lumbini Dharshana Senanayake
Sri Lanka

Alankarage Nadeeka Nirmalee Somaratna
Sri Lanka

Ajith Chandra Kumara Thusaya Hewage
Sri Lanka

Chandrika Walihena Gamage
Sri Lanka

Chamila Dinushika Wijeratne
Sri Lanka

Samantha Chandana Bandara Ratukoho Dasanayake Mudiyansela Udagedara
Sri Lanka

Why Become an ICCPM Member?

Membership benefits include:

Visit iccpm.com/register and follow the links to join as either an Individual Member (open to everyone) or a Partner Employee (open to employees of our partners).

If you are a Partner Employee please contact us so we can provide you with your Corporate Code on 02 6120 5110 or admin@iccpm.com

Edge of Chaos (Part I): *How Complex Projects are Inherently Chaotic Systems just Waiting to Unleash*

Warren Black
Complex Projects & Risk Specialist, MechEng, MBA, HDR

Complex projects fail, that's their thing

Large scaled, capital intensive and technically intricate projects (i.e. complex projects) have an extremely poor delivery track record. In fact, a 2014 study by Bent Flyvbjerg of Oxford demonstrated that of 2,062 complex projects completed globally, more than 60% had failed to deliver on their sanctioned cost and schedule objectives. Equally alarming is that this high failure rate had not improved in at least 70 years, across all major project sectors.

Bent Flyvbjerg of Oxford:
60% failure rate of 2062 global complex projects.

Unfortunately what this study confirms is that despite any perceived improvements in project planning, control and risk management practices over the years, the measurable impact on complex project success rates has been negligible. Argue it any way you want, but an industry which boasts an almost 70% failure rate over 70 years, still has room to learn. Now although there are a broad range of views as to why complex project failure rates are so high, one of the growing theoretical arguments is that conventional project planning, control and risk management methods fail to adequately account for the true nature of complexity.

Consider how complex projects are highly integrated and energised entities comprising of an advanced number of stakeholders, tasks, work packages, resources and objectives, all intricately entwined into a colossal spider web of co-dependent relationships which are continually interacting and adjusting in pursuit of a common goal.

In many ways, complex projects are comparable to those highly adaptive and purpose driven complex systems which exist in nature, biology and science such as a colony of bees building a hive, an immune system attacking a virus, a hurricane forming off a coastline or a rain-forest preparing for the coming of winter.

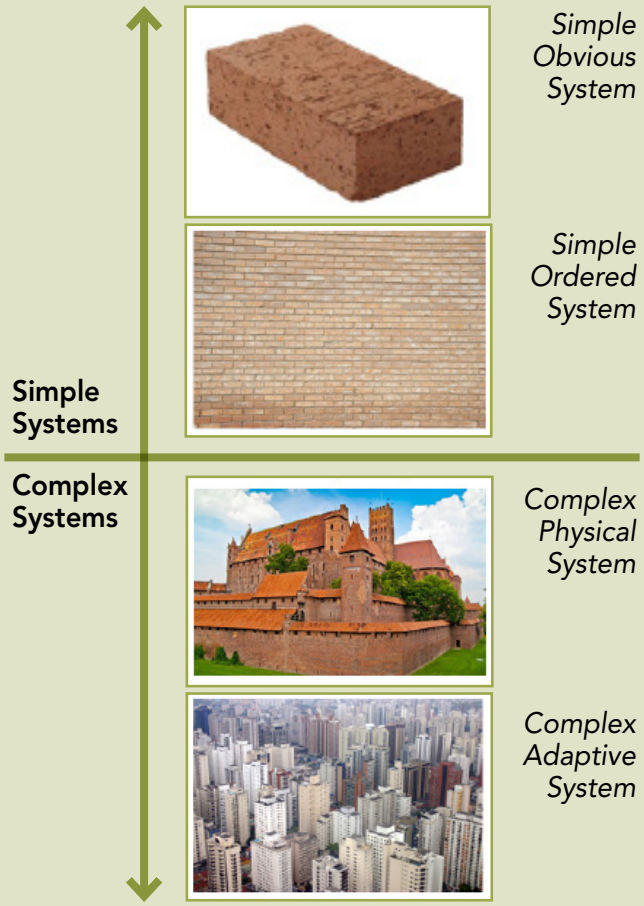
The observation that projects are in fact scientifically valid, complex systems opens up an interesting door for the project management community because if it is indeed true, then it means that the scientifically endorsed rules of Complex Systems Theory apply to project management in much the same manner as any other control system within the broader Complexity Sciences. More specifically, the teachings of Complex Systems Theory potentially offer a next generation solution to controlling the highly dynamic, multi-dimensional and rapidly shifting challenges of modern day complex projects.

Shift Happens! - understanding the true nature of complexity

Fortunately, one doesn't have to look far to find published literature on managing complex projects. Unfortunately, much of this literature is an inaccurate representation of what complexity truly is. In many cases, these literature sources have merely substituted the word "difficult" with the word "complex" and although projects are certainly difficult that single property alone is not sufficient to qualify a project as being scientifically complex.

Scientifically complex systems retain extremely unique characteristics and behavioural phenomena, many of which are not acknowledged by the accepted project management methods. It is thus these complex properties which need to be better understood and more effectively addressed by the practicing project management community. However, in order to truly understand how complexity influences a project we first need to understand how a simple system becomes a complex system.

Consider the following maturity scale;



At the lowest end of the maturity scale we have those systems which are simple & obvious, such as a good old fashioned construction "brick". This system has dimension, volume and weight but little else to distinguish it in terms of complexity. It's a brick, no more, no less. However if we throw a few thousand bricks on top of each other we now get a much more ordered system such as a brick wall. The nature of the individual bricks have not changed but their collective contribution produces a new system with significantly more dimension, resilience and strength than the single brick system.

If we then keep adding a few million more bricks to the system, eventually it will transition into a system which is complex in nature (e.g. a Brick Castle). Now this is where it gets interesting because as a system leaps from simple to complex; new rules come into play. For example, complex systems cannot exist without supporting systems - in the case of the castle it would be the electrical systems, plumbing systems, ventilation systems, gates, doors, windows and so on that make a Castle functional. Thus the leap from a simple system to complex one is an important threshold for achieving management control as new rules and behaviours which did not exist in the simple domain now need to be accounted for.

If we then keep adding a few billion more bricks to the system eventually it moves into an adaptive state of complexity, such as in the case of a Major City.

Such complex adaptive systems (cities, projects, rainforests etc.) are those systems which exist in a state of continual adaption, whereby countless new contributing systems and phenomena emerge and recede almost at will. In the case of a City we now see communities forming along with urbanisation, roads, traffic, trains, law enforcement, political hierarchies and countless other new systems which continually emerge and recede. Each of these supporting systems jointly contribute to the ongoing evolution of the city as it perpetually grows, ages and regenerates.

The Eight Habits of Highly Complex Projects

1. *Emergence*
2. *Butterfly Effect*
3. *Sum of Parts*
4. *Signals*
5. *Strange Attractors*
6. *Fractals*
7. *Non-Linearity*
8. *Edge of Chaos*

Perhaps the most fascinating aspect of the outlined maturity scale is how at the highest levels of complexity, systems appear to "come alive". Such life is achieved by merely increasing the number of contributing components within the system to the point whereby they start to pursue their own destiny through an unlimited number of highly energised relationships which are continually interacting and adapting in real time. This particular phenomena is known as **"Emergence"** and is a fairly common characteristic of a highly complex system.

Emergence is a critical learning for complex project management because the more objectives, tasks, stakeholders and resources one adds to a project system the more additional systems, unplanned behaviours, variable outcomes and new "life" that will emerge from within which will also require management attention. One of the fundamental flaws of conventional project methods is the assumption that resources and effort can be assigned in a proportional manner as the number of tasks increase. As seen by the complex systems maturity scale, the shear momentum and dynamism which emerges at the highest levels of complexity simply does not allow for proportional planning methods to succeed. Additional resources and effort will be required not just to manage the increased number of tasks but also the increased number of potential outcomes, issues and variations of a significantly more complex system. This phenomenon helps explain (in part) why the tail end of a probabilistic cost estimation (P90) can be so long for a complex project; the high uncertainty surrounding potential emergent behaviours at the business end of a cost estimation, often results in an uncomfortably long tail.

The principle of Emergence however is only one example of a complexity phenomena that will almost certainly arise from within a highly complex project system. There are however many other known complex systems phenomena which will also need to be accounted for. Consider the following other well documented complexity phenomena;

The **"Butterfly Effect"**, perhaps one of the best known and it states that even a seemingly insignificant change in one area of a complex system can ripple and compound to create momentous, possibly even uncontrollable, impacts elsewhere within the system. This phenomena helps explain how minor changes to scope, budget, resources or schedule can create program-wide chaos. The fact is, a complex project system, is a highly integrated entity where absolutely everything is connected to each other. Thus by changing one aspect of the project construct you are potentially changing the entire personality of the project.

Similarly, the **"Sum of Parts"** phenomena states that a complex system is a highly integrated entity whose total behavioural outcomes are so much more momentous and impactful than the combined contribution of each individual part. This phenomena helps explain why planning deficiencies and control weaknesses tend to get amplified at the highest levels of complexity. Systematic control defects often remain hidden when applied to a small number of tasks, but become severely exposed when applied to an advanced number of tasks. Sum of parts also helps explain why individual work package time, effort and costs are so hard to reconcile at program level.

Building on the Butterfly Effect and Sum of Parts is the phenomena of **"Signals"** which states that complex systems are highly responsive entities driven by the signals which are generated by the system's internal contributing components continually interacting with and adapting to each other. What this means is complex systems react in real time to the collective feedback that is being generated within the system, regardless of whether the feedback is valid, mature or complete (think BREXIT or Trump 2016). This particular phenomena highlights the importance of maturity, clarity and completeness in all forms of project control, communication and interaction; because positive interactions will generate positive signals which will ripple throughout the system and ultimately yield positive system outcomes - whereas negative interactions will yield negative ripples and ultimately, negative outcomes.

Then there are those phenomena which only serve to demonstrate just how illogical a complex system can be, such as **"Strange Attractors"** which advocates that the primary contributing agents which exist within a complex system, will not necessarily engage with each other through logical means of attraction (eg cause & effect).

Supporting this is the phenomena of **"Fractals"** which states that although numerous repeatable patterns and relationships may exist within a complex system, their behavioural outcomes will rarely be consistent, logical or repeatable. Also the phenomena of **"Non-linearity"** states that a complex system is a highly dynamic, evolutionary and unpredictable entity and thus past performance is not a reliable indicator of future performance. When combined and fully understood, these three phenomena help explain why no two snowflakes are alike and why probabilistic analysis methods such as Monte Carlos, Quantitative Risk Assessments and Data Analytics have had such a poor track record on Major, Mega and Tera projects. Predictive methods

of control are highly contentious in most forms of complexity science and project management can be no different, the shear dynamism and irrationality that exists in highly complex environments does not allow for such forward looking methods to succeed with any degree of repeatable consistency. This is potentially a major paradigm challenge for the complex project community as most large scale engineering projects still continue to invest heavily in probabilistic control and risk methods despite the apparent conflict with Complex Systems Theory.

However perhaps the most ominous of all the known complex systems phenomena is that of the **"Edge of Chaos"**. As demonstrated, complex systems are highly energised entities which are continually shifting and because of this they are also highly volatile entities which at all times are actually no more than a phase transition or two away from descending into pure chaos. Consider how a seemingly peaceful school of fish reacts to the emergence of a shark or how a stock exchange trading floor erupts when receiving a new piece of market news. This is the edge of chaos in action and what it suggests is that even a seemingly stable project is merely a chaotic system in hibernation – just waiting for an excuse to unleash. This particular phenomena is believed by many complexity theorists to be the most important of them all as it helps explain what the purpose of management control within a complex system should be; to prevent the system (aka project) from descending into chaos.

What the Edge of Chaos teaches us is that a complex project is a highly unstable entity which could implode into wild disorder at any stage, and thus needs to be treated as such. That is, project control and risk management within complex projects should not just be about managing tasks and predicting scenarios (aka the traditional method) but it should also be about pro-actively seeking out and addressing those sources of complexity which have the potential to throw the entire system into disarray.

Most practicing project officers will surely agree that the more complex a project is, the harder it is to control and the more risks that will surely emerge. Thus it goes without saying that part of project planning, control and risk management within complex projects should be to address "that which makes the project complex". By addressing any obvious or emergent sources of complexity, project officers are better positioned to reduce the potential for the known complexity phenomena to disrupt the control environment as well as be better positioned to reduce emergent risk.

So what?

Complex projects are highly evolved and systematically advanced. They comprise of an unlimited number of inter-connected contributing parts which continually interact and adapt in pursuit of their primary goal. For this reason complex projects qualify as scientifically valid complex systems and if this is indeed true, then the rules of Complex Systems Theory apply. It is not possible to accept one premise without the other.

Complex systems simply do not play by the same rules as rational-ordered systems. The existence of such known phenomena as Emergence, the Butterfly Effect, the Sum of Parts, Strange Attractors, Non-Linearity, Fractals, Signals and Chaos teach us that complex project systems are highly illogical and disruptive entities which do not conform to the simple state, process driven control methods which are currently accepted and practiced by the project community. With this control gap in mind there are many who argue that the invested project management community needs to start better understanding and accounting for the specific influences of complexity when planning, controlling and risk managing major projects.

The world's projects are not getting any simpler only more and more complex, it is thus questionable whether the project management discipline can progress any further without an adequate working knowledge of the more practical applications of the Science of Complexity. We shall explore some of these more practical applications in the next paper; Edge of Chaos (Part II) - how complex systems theory may provide a new generation solution for complex project risk management.

The New Major Projects Knowledge Hub needs to Encourage Heresy

Jonathan Norman

In terms of major projects we are faced with an increasing scale, complexity and ambition of what we need to do; to reinvent our infrastructure for the digital age; transform our healthcare systems to cope with ageing populations or even square the circle of the increasingly sophisticated weapons systems with what we can afford.

The increasing speed and complexity of this world requires a level and capability to learn faster than we have ever done before. The answer involves some rethinking of how we work and how we perceive our approach to projects. In the past our approach to project management has been based on control; replacing uncertainty, creating repeatable processes and championing efficiency. In the future I suggest, we need to learn some new ways.

Include both … and

Most people now accept that the Iron Triangle of Cost, Schedule and Quality is a process of compromise rather than an absolute. Taking a 'both … and' approach means, to use the cliché, 'plan for the best, prepare for the worst'.

Which at the very least suggests a more sympathetic approach to planning and risk management; one that is far more attuned to the idea of a trade-off where we accept that governance and speed are the two variables. Government programmes, in particular, have struggled to maintain progress or get things done because red tape, reporting and governance procedures have tended to slow decision-making to unworkable levels.

> *"Trying to transfer all the risk atrophies intelligent client capability. You get the supply chain you deserve[1]."*

'Both … and' also implies that organisations need to be able to cope with different styles of project far more efficiently; the imagination to run highly complex, or high risk projects on the one hand and at the same time, the efficiency to run smaller, more process oriented projects on the other; with a portfolio and PMO structure that can accommodate the two extremes.

Accept intangibility and imprecision

Many of the new challenges require solutions that we have yet to imagine. But imagination is where these projects will start because the human mind is actually far better attuned to make sense of big concepts than we give ourselves credit for.

We make sense of new ideas by stitching together elements from our previous experience and allowing our mind to fill in the gaps. Cost engineers and parametricians are very familiar with this technique, building up a cost estimate by combining known data on the cost of previous elements with best guess data to fill in the gaps.

We need to avoid the temptation to move down from the blue skies big picture too soon because the minute we move from problem definition to solutions or from big picture to detail, we find it very hard to move back up again without finding our perspective prejudiced by the constraints imposed on it through the solutions we have identified.

Transformation programmes by their definition depend on the willingness of stakeholders to change their behaviour, sometimes even their culture, to achieve the benefits. We don't fully understand and we certainly can't control the psychology of this change which is of the key deliverable within the programme. Keeping an eye on both the unpredictable and dynamic nature of this change is both precise and imprecise. Precision allows us to identify trends and movements, imprecision allows us to experiment and, at times, trust the stakeholders.

Many of the biggest challenges that we face, such as climate change, will always be giant social experiments until we have either succeeded or failed.

Embrace inefficiency

The trouble with learning is it takes time. You need time to reflect, time to plan and imagine and time to negotiate the cultural, communication and other barriers to understanding that exist within large project teams and between stakeholders; as well as time to assimilate the lessons and adapt your operating procedures. Everyone acknowledges the importance of lessons learned but if you are a contractor competing for work, then justifying this time is a challenge. If you are a client looking to manage your costs effectively, how sympathetically will you view the cost associated with time for learning and reflection; particularly if the benefits of that learning will be enjoyed by the contractor and their next client, rather than you.

Support the human element within projects

> *"Projects are essentially social interventions[2]."*

These heresies of ambiguity, imprecision and inefficiency have a common link: the human and social element. David Hancock captures the implications well when he talks about risk in his book 'Tame, Messy and Wicked Risk Leadership'.

"Projects are essentially social interventions, conceived, designed, led and delivered for society through people. Rather than project risk management continuing to remain inward looking and reliant on engineers and mathematicians to improve its principles and processes. I would like to see it become more outward look – embracing scholars and practitioners from non-scientific disciplines such as sociology, philosophy and behavioural sciences for its future."

The Major Projects Knowledge Hub, developed by the Major Projects Association, combines elements of the old world and the new. It includes a repository of the lessons learned from some of the largest and most complex projects such as Crossrail or the London Olympics 2012. Alongside this is a social platform with knowledge sharing activities to encourage the kind of imaginative collaboration from across all sectors that is needed to allow us to innovate, problem solve and make decisions for the future.

Achieving this new thinking will require some fundamental redesign of how we work together.

We will need to generate a culture and a climate in which organizations, indeed supply chains, are able and willing to share their insight and break down their natural inclination to protect their intellectual property. So I finish with the greatest heresy of all: Knowledge is no longer power. From now on power lies in your organisation's ability to assimilate knowledge from one source and share it with another.

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2. Hancock. D, Tame, Messy and Wicked Risk Leadership, Routledge, Oxford, 2010

Jonathan Norman is Manager of the Major Projects Knowledge Hub an initiative designed to support collaborative working to create, use, share and modify insight and learning around major projects. Conceived and funded by the Major Projects Association, the Hub which is open to all, launched in May 2017.

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Insights360: Using Machine Learning to Better Understand and Manage Team Performance for Complex Project Success.

Michael Devlin
Managing Partner Certus3

Introduction

Despite the continued maturity of project management practices and the recognition that projects are a critical vehicle to keep pace with the rate of change in today's business world, the global rate of challenged or failed projects continues to be unacceptably high. Companies that can find a way to execute projects with superior performance and improved rates of success will have a sustainable competitive advantage.

Certus3's experience in reviewing and recovering large complex projects combined with a decade of research and development has established that:

1. A complex project is a temporary organisation formed by combining many different teams from varying organizational and cultural backgrounds that must come together and rapidly achieve high performance to achieve the project objectives, we refer to this as the project ecosystem.

2. This project ecosystem must operate over an extended period in a continuously changing market and organisational context whilst maintaining the relevance and alignment of their project objectives.

3. Project peak performance requires the recognition that these types of projects are not just technical systems but are also behavioural in nature. They therefore should be viewed and managed as a behavioural system that must adapt its characteristics over time.

4. Project success is dependent on the ability to measure, monitor and manage project ecosystem behaviour. There is a proven correlation between project team behaviour, team performance and probability of project success.

We have used these findings, combined with existing research to develop our Insight360 predictive analytics platform, which uses a Bayesian statistical model to estimate a project's overall Team Performance Score, estimated probability of success range and recommended improvement actions.

The platform uses machine learning to improve its predictive capability as each new additional project analysis dataset is added.

For the first time, project sponsors and business leaders have a quick, low cost, low intrusion, bias-free way of systematically measuring the previously under managed aspect of projects; peoples' behaviour (in a group context) and the impact it has on project team performance.

This paper describes how Certus3's unique project review and recovery experience, combined with existing research led to the development of Insights360. We will first provide an overview of the history and development of Insights360 including the theories that underpin the solution. We will then explain the steps in how it has been developed and tested on projects that involved diverse solution types, varying degrees of business change and represents a total spend of more than a billion dollars (AUD) across a range of ASX200 companies in different industries. Finally, this paper will discuss the role Insights360 can play in improving project execution performance in conjunction with standard project management practices.

History and Development

Insights360 embodies the learnings of over nine years' hands-on project review, recovery and delivery experience conducted through the Australian firm Certus3. Our core business of diagnosing and recovering projects has provided the perfect "petri dish" to conduct our long-term experiment to prove our hypothesised relationship between project ecosystem behaviours, team performance and project success.

The development of this hypothesis was informed by our teams combined 50+ years' experience and insights from peer-reviewed research in the areas of project delivery (project theory), organisational behaviour and change management; two of the most influential supporting theories are addressed below.

Over the course of our experience diagnosing and refining projects, we identified that the root causes of failure were present in each project for an extended period and went undetected by current project management practices, health checks and governance reviews. Project Sponsors and Business Executives were surprised when the root cause issues suddenly surfaced as unrecoverable schedule and cost blowouts.

Research conducted in 2004 by Storm and Janssen was foundational in defining behaviours that are predictive of project success. Storm and Janssen noted that over the years numerous attempts have been made to develop project theory from a formal, descriptive framework into an empirical, predictive model that can be used to systematically increase the performance of projects over time (Storm and Janssen).

Theory 1 - Projects Must Adapt their Characteristics over Time

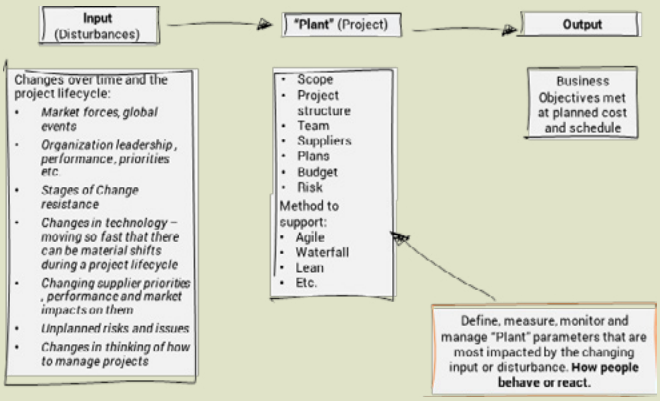

Diagram A: Project as an Adaptive Control System (ACS)

The first theory that influenced Insights360 is that complex projects should be viewed as Adaptive Control System (ACS), which places a deliberate focus on defining, measuring and changing project characteristics in response to a changing environment (Refer Diagram A). Dominant project management approaches and methods, especially in the context of IT and engineering, assume that a project is something that can be "controlled" and operated within an external environment that changes very little. The reality is that the environment external to projects is far from fixed. The organisational context of projects is in a continuous state of flux - the market, business priorities, organisational focus and leadership all change at an increasingly rapid rate.

As shown in Diagram A, a project must accommodate changing inputs (disturbances) and maintain its outputs (schedule, cost and business outcomes) within acceptable tolerances by defining, measuring and managing its characteristics (most importantly its behavioural characteristics).

Take for instance a case where a major technology solution supplier shifts their business focus away from the technology solution you are implementing, due to market influences/pressures. Thus, the supplier's commitment to providing a quality solution is diminished (i.e. their behaviour has materially changed). To manage this change in behaviour the project must adjust (improve) its executive engagement structures and forums to influence the supplier and adjust their behaviour.

Theory 2 - Project Behaviour is a Function of People in a Project Environment (Causal Link)

The second theory, that influenced Insights360 is the causal link between team behaviour, project performance and the project environment. Business leaders know that if you take an individual or group and change factors in their environment like physical location or leadership style as an example, you will see a change in their behaviour and performance (this could be positive or negative behaviour and performance). The phenomenon of group behaviour being a product of different individuals within a given environmental context was first defined by Kurt Lewin in 1937 and is summarised in the theorem:

$$B = f(P, E)$$

Behaviour (B) is a function of a Person or Group of People (P) within a given Environment (E).

Lewin is often recognised as the "founder of social psychology" and was one of the first to study group dynamics and organisational development.

Lewin's theorem provided an explanation for what we were observing and experiencing in large, complex, multi-year projects. When we reviewed a project in distress, we could easily observe dysfunctional behaviour, particularly across various subgroups in the project ecosystem, i.e. project team, business stakeholders, executives and suppliers.

Dysfunctional behaviour can be either overt or hidden, and refers to those behaviours that are not clearly aligned with the central purpose of the project, and not contributing to high performance or success. A variety of project ecosystem environment factors like structure, role clarity, organisational support can contribute to or allow this dysfunctional behaviour. As an example, we observed that an unclear or siloed project structure that allowed subgroups to operate on their own agenda, was a project environment factor that enabled poor group behaviour.

As we commenced the reform process on a project, we found that by making project environment factor adjustments we could observe a visible and positive change in project ecosystem behaviour and project performance. This demonstrated that there was a causal link between project ecosystem environment (E) factors and project ecosystem behaviour (B) and that we could improve behaviour by making environment adjustments using standard project management practices.

This is summarised in Diagram B below.

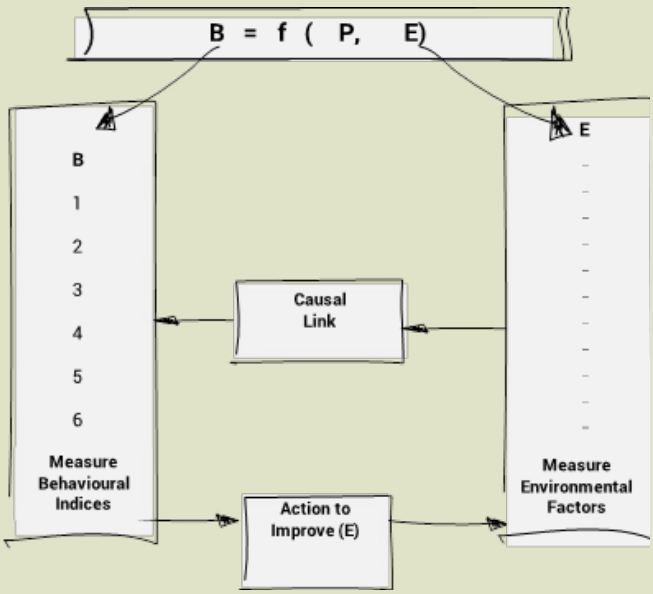

Diagram B: Causal link between project environmental factors (E) and behaviour (B)

Defining and Testing our Algorithm to Prove our Hypothesis

The first four years of research and development for Insights360 focused on defining and testing the core algorithm. Years five to nine have been used to refine the predictive quality of the findings and automate the analytics platform. Following is a summary of the stages we went through:

Stage 1: Define Group Behaviours That Determine High Performance and Success

We adapted the work of Storm and Jasson on the predictive nature of behaviours in projects, and combined this with our observations during our project review and recovery work to define six behavioural indices that represent project ecosystem behaviours critical to team high performance and project success. The six behavioural indices are:

1. **Clarity of Purpose** which means all members of the project ecosystem are aligned to the delivery of a set of common, well-defined business outcomes. All parties are moving in the same direction and are uninfluenced by subgroup agendas.

2. **Balance** which means the project ecosystem is aligned and can achieve a balance between often conflicting performance characteristics of budget, schedule and business solution outcome (quality).

3. **Alliance** which means the degree to which all of those who are expected to contribute directly to the project (a) share a common goal, (b) acknowledge the necessity of the contributions by the others and (c) accept the risks posed by the project.

4. **Drive** which means the degree to which all members of the project ecosystem are aligned to achieve a positive increase in the speed by which the project is progressing. This applies to all essential processes within the project (e.g. mobilisation of resources, definition of key problems and resolution actions). Drive means real progress, not just being busy.

5. **Certainty** which means the degree of capability and alignment of all members of the project ecosystem to effectively manage unplanned adverse events (issues and risks). Unplanned adverse events will always occur in projects. It is the team's readiness, capability and experience in managing these events across three levels of uncertainty (Foreseeable, Unforeseeable and Chaos) (Myer, Loch, Pich 2002) that prevents the events compounding and impacting the project success.

6. **Effectiveness** which means the degree to which all members of the project ecosystem are aligned to implement and support the key operational principles of transparency and simplicity:
   - Simplicity means that the project structure is simple and clear, with roles, responsibilities and reporting lines of each of the project functions and individuals are unambiguously defined.
   - Transparency means that the project plans and status reporting are consistent from the lowest to the highest management levels

Stage 2 - Define the Environmental Factors and a Way to Measure Them

As outlined in Theory 2, while conducting our project review and recovery work we observed project ecosystem environment factors (E) such as structure, role clarity, organisational support or objective clarity, that we could see were contributing to or allowing dysfunctional project behaviours.

We decided that we needed a way to measure envrionmental factors (E) that was quick, not intrusive on project ecosystem members, could be repeated reliably across different projects and could collect information in an accurate, confidential and unbiased way. To achieve this, we designed an online survey that uses twenty-five questions to measure our targeted environmental factors (E) and provide input to our Insigths360 system.

Stage 3 – Define an algorithm that embodies the causal relationship between project environment factors (E), the impact they have on project behaviours (B) and how these behaviours predict team performance and the probability of project success.

Based on our extensive observations and pre-existing research we invented an algorithm that embodies the causal relationship between project environmental factors (E), project ecosystem behaviours (B), Team Performance Score and probability of project success (see Theory 2). We know from our recovery experience that dysfunctional behaviour can be present in a project and go undetected for many months before their impact surfaces in traditional project metrics like schedule, cost, quality, etc. By measuring project ecosystem behaviour regularly, it can provide an accurate measure of team performance and a prediction of the projects probability of success range. This allows improvement actions to be taken on a regular basis to maintain a set of project ecosystem behaviours that support high performance and success..

Stage 4 – Long-Term Testing of our Algorithm

Our involvement in diagnosing and recovering complex projects gave us a unique opportunity to observe the things people do and say (the project ecosystem) and see the impact this had on project performance over an extended period of 12 to 24 months to project completion. This length of engagement gave us sufficient time to repeat the cycle of measurement, observation, action and adjustment many times, resulting in a reliable and accurate model and algorithm, which is illustrated in Diagram C.

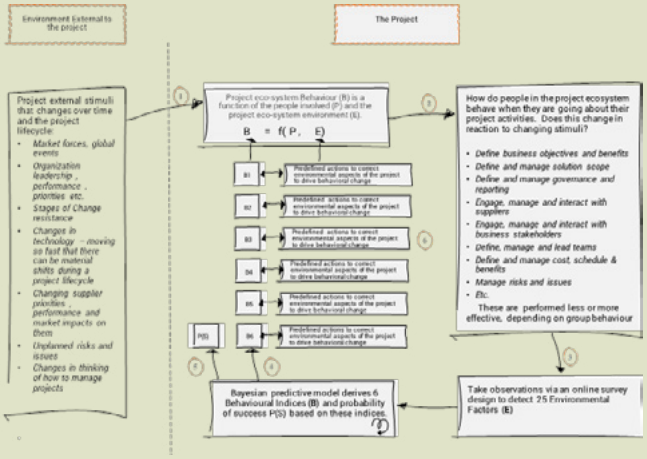

Diagram C: The end-to-end model

1. The project is impacted by external environment changes.

2. This impacts project ecosystem behaviour in a way that is hard to observe, and until now it was not possible to measure and manage.

3. We measure project environmental factors via a specifically designed online survey.

4. The factors are fed to a Bayesian statistical model that derives our six behavioural indices and project success probability.

5. Peak Performance Score and an associated probability of success range

6. Based on the six behavioural indices a pre-defined set of actions can be taken to make project environment factor corrections, which in turn will influence project ecosystem behaviour to improve the project's probability of success.

Stage 5 - Improving the Predictive and Learning Capability of the Platform (Machine Learning)

The final stage of our research and development was to evolve our algorithm so that it could "learn" on its own and become more accurate with every review it executed. Before this our algorithm was deterministic, relying on our expert observation of a given project to progressively "tune" algorithm parameters so that each review it conducted enable us to improve the accuracy of the algorithm.

We found the perfect solution to improve our algorithm in Bayesian Inference or Statistics. We moved our deterministic algorithm to a Bayesian Inference model. A Bayesian Inference model enabled us to replace our activity of "expert observations on each project" and "tuning of the algorithm parameters" by embedding this capability in the Bayesian Inference model. This means that each time the platform runs a review, it can use that new dataset in combination with past data sets to improve the accuracy of the algorithm (this is broadly referred to as Machine Learning). The application of Bayesian Inference in our algorithm is represented as:

Probability of Success = Function (Prior Knowledge, New Evidence)

Where:

- **Prior Knowledge:** is a set of estimated behavioural indices and the corresponding statistical model parameters, based on our experience and data from past projects.
- **New Evidence:** is a set of observed environmental factors collected via the Insights360 survey and a set of calculated behavioural indices for the project being observed.

IBM describes Bayesian Inference, in the context of their Watson Cognitive Computing Platform, as operating like the human brain. As humans, we observe visible phenomena and bodies of evidence; we draw on what we know (past data) to interpret what we see to generate hypothesis about what it means; we evaluate which hypothesis are right or wrong and then we make a decision, choosing the option that seems the best fit and act accordingly.

The other advantage we found with Bayesian Inference is its applicability to smaller datasets combined with expert observation. With the recent rise in popularity of machine learning, there is a misperception in the market that it is only applicable to "big data". Wessel's 2017 Harvard Business Review article rightfully highlights "The relentless push to embrace "big data" can mislead managers into thinking "if it is the right data it must be big" (Wessel).

This bias towards larger datasets has informed prevailing attempts made by global consulting firms to define the factors that predict project success or failure (see for instance: Fauser, Schmidthuysen and Scheffold). This approach is informed by classical statistics or frequentist inference and assumes it is possible to consider an infinite sequence of independent repetitions of the same statistical experiment to infer likelihood (Everitt and Skrondal).

Bayesian Inference is ideally suited to the high-quality dataset we have collected over a nine-year period because it is captured from real projects and combined with tens of thousands of hours of expert observations. This knowledge is now embedded in our Bayesian Inference Model. The automated, self-learning process that drives Insights360 can now update itself based on new datasets received and can learn very quickly and at scale.

Diagram D is a summary screen from the Insights360 platform showing overall Team Performance Score, performace score by sub team and how this performance will impact the probability of project success.

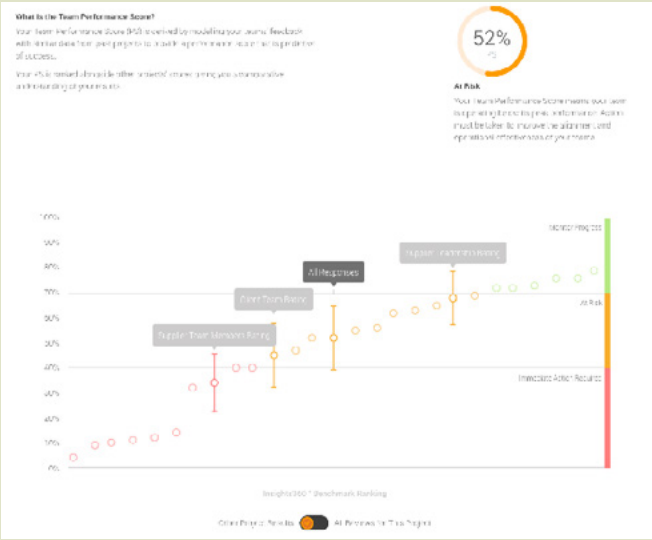

Diagram D: Summary of Insights360 Team Performance, Probability of Success Range and Team Alignment.

Diagram E is a summary screen from the Insights360 platform showing overall team performance and probability of success across a series of reviews during the project lifecycle.

Diagram E: Performance Score and Probability of Success Range over a Project Lifecycle

The Role Insights360 can Play in Improving Complex Project Execution Performance

Not Just Another Project Management System

Insights360 is not a project management system. It has not been designed to replace existing tools or methods, rather it has been developed to work with and complement existing project management practices. Insights360 enables project sponsors, business leaders and forward thinking project managers to measure and monitor how their project ecosystem is behaving and the impact this is having on project performance. They can use this information to coach and lead their teams in the better application of their existing project management toolsets to improve rates of project success.

Why our client's value Insights360

Insights360 provides a quick, low cost, low intrusion, bias-free way to monitor the key dimension to project success, but it also enunciates a new way to think about how to manage transformation projects in a rapidly changing environment.

Conclusion

Our experience over the last nine years in diagnosing, reforming and managing projects has demonstrated that people's behaviour in a project ecosystem is impacted by external environmental factors and that project behaviour is the key determinant of project success. We have defined and proven a predictive algorithm that can measure project ecosystem environment factors, link them to measures of project ecosystem behaviour which can, in turn, provide a predicted Team Performance Score and a probability of project success range.

If behavioural measurements are taken at the right intervals in a project lifecycle, improvement actions can be taken using standard project management practices to ensure higher rates of project success. For the first time, the Insights360 predictive analytics platform provides project sponsors and business leaders with a quick, low cost, low intrusion, bias-free way of systematically measuring the previously under managed aspect of projects; peoples' behaviour and the impact it has on project performance and success.

- **Low impact:** the end to end process needs only 10 minutes from project team members so that they can focus on what they do best.
- **Affordable:** Our clients can run an Insights360 review for one twentieth of the cost of a traditional project health check.
- **Bias-free and Inclusive:** traditional status reporting and "health checks" can be prone to bias. Insights360 is a "closed system" using input captured directly from a broad range of project participants and stakeholders with no opportunity for intervention.
- **Agile assurance via predictive metrics:** Insights360 is designed to support incremental, iterative measurement and improvements throughout the project lifecycle to improve rates of success.
- **People over processes:** the focus is not just on the maturity of your project management processes, but rather how effectively these processes are applied. Our thinking helps clients get the most out of their existing methodologies and works with a range of project management approaches including PMBOK, Prince 2 and Agile.

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Interview with ICCPM's Deputy CEO: *Collin Smith*

ICCPM: You are roughly four months into the job as Deputy CEO for ICCPM; what has been your experience to date and how has it differed from what you thought it might be?

Collin: I have enjoyed learning the business of ICCPM and getting to know the staff and wider stakeholder community although, I have not yet had the opportunity to touch base with all.

As is the case with all new starters, there has been a learning curve. As part of learning about my new job I have undertaken two Certificate IV courses. The first one being a Certificate IV in Training and Assessment which is a necessary part of working for a Registered Training Organisation. I am happy to say that I have successfully completed this course. The second is our very own ICCPM Cert IV in Responding to Organisational Complexity which is still in process. Both these courses have helped me to gain a better understanding of the environment we operate in and the subject matter domain that ICCPM is predicated on.

Although there was some familiarity based on having interacted with a number of the ICCPM stakeholders as part of a previous role at an associated organisation, I have found the ICCPM staff and stakeholders to be friendly, helpful and welcoming. Having had the benefit of being reasonably acquainted with the organisation prior to joining there haven't been any real surprises or things that are significantly different to what I expected. The difference is more around learning to adjust to a new environment and coming to the realisation, through my learning curve at ICCPM, that in many respects I had no idea how to deal with complexity in the projects I have been part of in the past.

Prior to joining ICCPM I worked for a consulting firm and was engaged in an ICT Transformation program at one of the Commonwealth agencies in Canberra. In hindsight, with my new found knowledge, I recognise that all of the program participants including myself (external service providers as well as the client) were ill equipped to deal with the complexity present in the program. I don't even think anyone had a vocabulary that would enable them to recognise and identify the kinds of complexity that we were facing or how to respond to it.

This, for me, has made me appreciate the value and indeed the need for what ICCPM aims to do i.e. to build capability among the international project management and enabling functions community to be able to adequately respond to complexity and improve the success rate of complex projects and programs.

Emergence?

Non-Linearity?

Fractals?

Signals?

ICCPM: what do you see as the major opportunities for ICCPM in the future?

Collin: ICCPM is recognised as the global peak body for complexity in projects with a well-established track record over the past ten years. This positions us well for significant growth. Some of the ways in which we could achieve this growth is, for example, through the development of a Diploma as a progression from the existing Cert IV in Responding to Organisational Complexity, the development of a number of practitioner tools such as a cloud based Complexity Diagnostic application, the potential launch of a Complexity Project Manager Certification Scheme, entering new markets - for example we have recently signed an MOU with an education delivery partner in the UK called Kingsfield Academy a part of Kingsfield Consulting.

ICCPM: In your view what are the main challenges facing ICCPM going forward?

Collin: ICCPM has a long standing and proud association with the Australian, UK, USA and Canadian departments of Defence and Defence Industry and particularly Defence and Defence Industry in Australia. This is to be expected given the genesis of the organisation and proximity of the head office in Australia.

While we cherish this relationship with Defence and Defence Industry and have every intention of maintaining and strengthening this relationship we do also need to diversify and increase our reach into a wider range of sectors, stakeholders, clients, corporate partners, and individual members. We have made some progress in this regard in recent times with the addition of a large Telecommunications Organisation as a corporate partner and we have various other partnerships and initiatives that we are pursuing that will help us to break into the Oil and Gas sector and Construction/ Infrastructure sector.

I look forward to growing our impact in these sectors and others both locally and internationally.

ICCPM: What impact do you think ICCPM will have / is having on the global community of project and program stakeholders?

Collin: I recently presented our 2016 Roundtable Series outcomes paper; Contracting for Success in Complex Projects, at the Project Governance and Controls Symposium hosted by the University of New South Wales at its Canberra Campus and was pleasantly surprised to note that almost all of the other speakers (international and local) had some form of reference and acknowledgement of complexity as part of their talks, some to a greater and others to a lesser extent.

This indicates to me that complexity theory and systems thinking are fast becoming mainstream in the thinking around project and program challenges. If you go back ten years or less this would certainly not have been the case.

This is encouraging and I sincerely believe that ICCPM, through its involvement in research, thought leadership, stakeholder engagement and education over the past ten years has played a vital part in the promotion and avocation of complexity theory and systems thinking as a necessary part of the way forward to reducing the failure rate of projects and programs internationally.

So many of the recommendations from our outcomes paper were validated in the content of the other esteemed key note speakers that it is evident that the work ICCPM is doing is extremely valuable, on point and sorely needed in building the global body of knowledge in this space.

However, there is much work still to be done!

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How Can Senior Executives Ensure Project Strategic Objectives Are Realized?

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When senior executives fund projects, they do so in the expectation that they will eventually realize particular target benefits that support the organization's strategic objectives. Project target benefits may include such things as increased market share and reduced operating costs. However, the common approach of relying on a project manager to achieve these target benefits has not worked in practice. For example, the UK government found that *"30–40% of systems to support business change deliver no benefits whatsoever."* Similarly, the Los Angeles Metro and the Sydney Cross City Tunnel are recent examples of projects that failed to realize their target benefits. Thanks to better project management techniques, many projects these days are completed "successfully". Sadly however, they rarely achieve the target benefits set by the "funder" i.e. the senior executive who approves the project's business case and authorizes its associated budget.

Why shouldn't project managers be held accountable for the achievement of target benefits? Well, for a number of reasons. First, project managers usually have an operational mindset that better suits output delivery rather than the realization of benefits. Project managers are experts in delivering project outputs (think of a new business process, or a new information system) according to the well-known iron triangle of scope, cost, and time. Second, the project manager is a transient position—to which the attachment of long-term accountabilities (like benefits) is inappropriate. Third, project managers rarely have exposure to the business case and hence are not well placed to influence project goal setting. Fourth, they are often not identified (let alone appointed) until project approval, and hence unable to contribute to the setting of target benefits during business case development. Finally, the project manager's objectives for completing the project rarely align completely with those of the funding organization.

When funders contract a project manager from outside their own organization, they often also expect them to achieve the target benefits, but this approach inevitably fails. For example, if the government wants to develop a new Online Child Support system to reduce processing time and payment errors to residents eligible for these payments, they may hire a software development company with an established record in delivering quality website systems on time and to budget. But the contract between these entities goes only as far as the delivery of the system; it would normally make no mention of the real reason for the investment in the project – enhancing service efficiency to taxpayers—thus isolating the project manager from the project's underlying rationale.

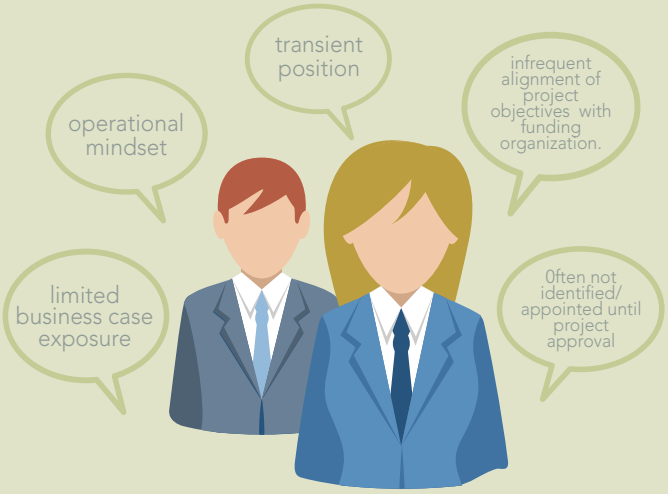

Figure 1: Some reasons why Project Managers should not be accountable to deliver project strategic objectives

Before discussing what should be done to address this situation it is useful to articulate the relationship between a project's outputs (e.g., the online website) and the desired target benefits (e.g., reduced child support payment processing time): To generate the funder's target benefits, not only must the project produce outputs, but those outputs need to be appropriately utilized. Thus, the greater the number of people using the new online child support system, the greater will be the overall efficiency of the payment process. To increase the utilization of the online system, the government could, for example, organize a campaign amongst local communities that encourages the use of the system as well as training sessions on system use. Once most people have moved to using the new online system on

a regular basis, the benefits - improved payment efficiency - may then be secured, and, as a result, can be expected to flow into the future.

But since the work of the software development company concludes when the online system is completed, these "post-delivery" activities must be arranged outside the contract.

If not the project manager (or the software development company), then who should lead the benefit realization process? One option is to have the funder do this – working closely with the project manager. But due to the relentless demands on their time, funders are rarely able to involve themselves as intimately as their projects require. Given these constraints, how then are funders to influence projects so that they obtain the benefits sought from their investments?

New research suggests that when funders appoint a "project owner" – a senior manager from the funding entity who is held responsible for realizing the project's business case – their projects more frequently achieve the benefits sought. The project owner is, in effect, the funder's agent and is thus held accountable for the fulfillment of the business case and the realization of the target benefits. If a project's outputs are to be deployed into routine business operations, the senior functional or divisional executive may be considered to fill this role.

This role of the project owner demands some unique "client-specific" capabilities, different from those of the traditional project manager. Amongst other things, the project owner needs to engage stakeholders in a way that supports achievement of the project's target benefits. To do that he/she must fully and completely understand the goals and strategy of the funding entity in the first place, if not setting these in person.

Later, during project execution, the project owner will also be actively involved (in consultation with the project manager) in the management of problems, impediments, potential delays, external risks, new regulations, and anything else that could prevent the project from achieving the funder's objectives. Since the benefits cannot be realized from projects if the project deliverables are wrong, difficult to use, easily misunderstood, or awkward to change, the project owner needs to work very closely with the project manager to ensure the deliverables are appropriate for end users. Regardless of the project manager's response, this typically means there will be changes in the initial scope of the project—leading inevitably to increases in cost and time (which in turn reduces the value of the project by offsetting its target benefits). This is just one of the many critical tradeoffs that must be carefully weighed by the project owner—in light of reliable information provided by the project manager.

This new role of the project owner is substantial because it is directed at increasing the returns from investments in projects. For decades, by default, we have left it to the project manager to do all that is now being asked of the project owner. Is it any wonder that many of our projects, even when "successful," fail to satisfy the goals and ambitions of their funding entities and are eventually deemed failures? The appointment of an agent of the funder as a new actor in the project process is an acknowledgement that we have overlooked this critical role in the past.

We conclude with some guidelines for senior executives when contemplating a new project. Note the limited involvement of the project funder during the planning and execution phases of the project, while their involvement is mainly required at the front and back ends of a project.

Guideline	Comment
Project Phase: Project funding decision	
Be sure that each project investment decision is based on a business case that identifies the target benefits you want this project to deliver in return for your investment.	Recent research has found that target benefits should be specific, attainable and comprehensive by the inclusion of the project visions of all key stakeholders.
Project Phase: Following project approval	
Appoint a "project owner" from your organization to be accountable for realizing the business case on your behalf (although for selected small projects you can keep this accountability for yourself).	The project owner should be a senior manager from your own organization with a strategic mindset and capabilities to lead projects in complex situations.
Project Phase: After output delivery	
If appropriate, be sure that there is a smooth transition of responsibility from the project owner to the appropriate functional manager.	Initially the utilization of project outputs is facilitated by the project owner, before the line manager takes full responsibility.
Project Phase: After project completion	
Evaluate the performance of the project owner based on their ability to deliver the business case.	More successful project owners are those who maximize target benefits and minimize lifecycle costs.

Systemic Risk: How Connectivity Impacts Risk Management Practice

An Awareness Paper

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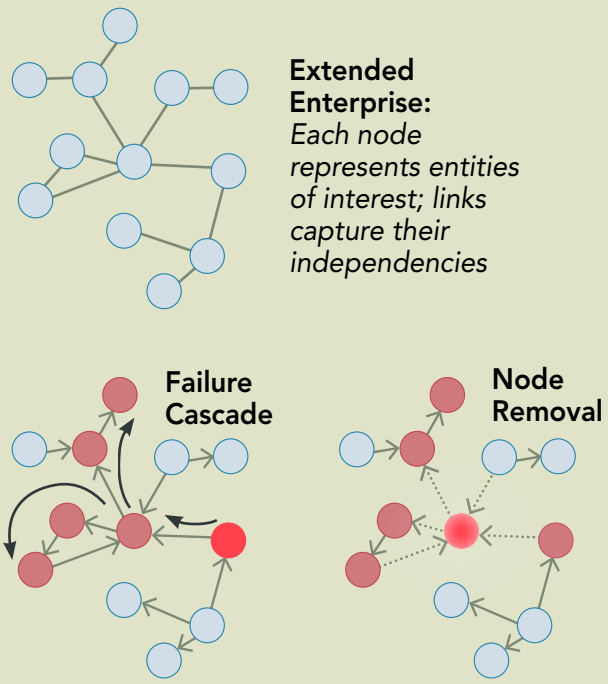
Neil Allan, *RiskIQ*
Neil Cantle, *Milliman*

Abstract

We all know the world is getting more networked and interdependent. We have come to rely on the efficiency of networks for many aspects of our lives, including businesses performance. Yet we have limited understanding of how networks work and behave, particularly in the case of flows, such as electricity, resources, information and money.

Low-frequency, high-impact events are occurring at a much faster rate than anticipated by traditional risk management assessment techniques, disrupting businesses, their performance and long-term viability. Recent examples of such systemic events include 2003 US Power Grid failure (est. cost= 10 billion USD; BP's 2006 Deepwater Horizon oil spill (est. cost = 40 billion USD); 2008 Lehmann Brothers collapse (est. cost = 2.2 billion USD); 2010 Iceland volcano impacting air flights (est. cost= 2.13 billion USD) and 2013 Tesco horsemeat scandal.

The scale and complexity of most business-related networks is daunting for most individuals to comprehend. Yet surprisingly, the building blocks of such networks (nodes and connections) are relatively simple. In other words, complexity arises by the way simple components interact in non-trivial ways. Consequently, managing how a small change in one part of the network, can cause an extreme, disproportionate damage to the function of the whole system is a challenging task – examples range from traffic jams, electricity black-outs to project failures and financial crisis. Similarly, the effects of complexity can be seen in nature, where avalanches, forest fires and epidemics are prime examples of systemic failures, being triggered by relatively minor events. Clearly, to understand these effects, it is necessary to look at the whole system not just the component parts or individual connections that appear to be responsible.



Exposure to systemic risk is dependent on the capacity of a system to sustain a number of dynamical processes. These dynamical processes can be considered as the drivers of systemic risk and come in two distinct flavours: **(a)** individual node removal and **(b)** failure cascades – see lower right and lower left figures respectively.

Systemic risk is the potential of having interdependent failures, which emerge through the interconnectivity within a networked system, whether it is a collection of people, processes or technological artefacts. As such, their potential damage on an organisations performance is immense, potentially threating its survival. Singular systemic events are capable of initiating spectacular cascading failures, often with unpredictable and catastrophic impacts, such as electricity grid black outs or collapse of financial markets. Importantly however, interconnectivity is a necessary but insufficient condition for the emergence and propagation of systemic risks – as with all, the devil is in the detail. To further stress this point, it is not whether a system exhibits a degree of interconnectivity, but rather the specific form that this interconnectivity takes.

Interestingly, networks described by highly ordered, or conversely, random architectures are less likely to be affected by systemic events materialising. Nonetheless, such resilience comes at the cost of reduced efficiency due to the increased levels of redundancy that defines ordered or random networks (Wang and Chen, 2002). To counter this loss in efficiency, the majority of real world networks are (either by design or evolution (Barabási, 2012)) finely tuned between the two extremes, leading to the enhanced sensitivity of real-world networks to systemic threats, These are described by complex networks, where normal distributions go out the window and heavy tails becoming the norm (see Figure 1). Under these conditions, systemic risk is a real threat, where a single tree failing can induce extensive black outs; a lighting strike can change the status quo of an entire market; a factory fire can bring down an automotive manufacturer and the failure of a single financial institution can trigger a financial meltdown.

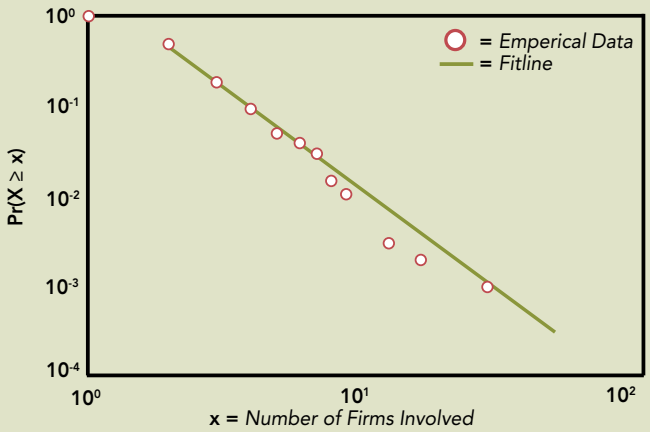


Figure 1: Number of involved firms on single loss events over a period of 6 years. A straight line on a log-log scale highlights the heavy-tail nature of the distribution. This is contrast to what one would normally expect, where on average, a firm's exposure would be limited to very few loss events (Ellinas et al., 2015a).

Since the 2007-2008 financial crisis, Central Banks around the world have been actively involved in understanding the drivers of systemic risks, along with impact to both national and global economic networks in the hope of introducing effective governance and built-in robustness (Haldane and May, 2011). The real challenge to such work comes from understanding the system-level contribution of individual businesses in terms of the probability of triggering systemic risk. The issue for regulators therefore is not whether an individual company is too big to fail, but whether it is too systemic to fail, where its failure can set-off a domino of subsequent failures.

Similarly, large organisations have the same governance dilemmas, where individual, yet tightly-coupled, business units can trigger systemic risk. Modern businesses are increasingly interconnected in sophisticated ways through supply networks, customers, and technologies, to name just a few. Whilst Enterprise Risk Management (ERM) initiatives have been successful in identifying where and when connections arise, an evaluation of the consequent systemic risk is a continuous challenge. A novel way of tackling this challenge requires an appreciation of the emergence of tipping points in the operation of organisations, along with evaluating the effectiveness/efficiency of a wide range of possible mitigation measures (e.g. appropriate culture, containment mechanisms, supplier management etc.).

Despite contextual differences, complex network science provides a framework for understanding such large-scale, systemic events. In doing so, the interdependent nature of risk is highlighted, compared to the traditional view of risk independence. By shifting the focus from assessment of individual risks towards understanding the interdependency of the underlying network, exposure to systemic risk can be assessed and subsequently minimised. Network analysis provides the key in:

- Assessing the robustness and resilience of an organisation to systemic risk, based on the extent, and nature of its underlying network.
- Measuring the susceptibility of an organisation to systemic risk in an auditable, objective and quantitative way.
- Identification of key drivers of systemic risk and mitigation measures that can be applied at a local and/or global level.
- Monitoring organisational changes that may alter the network architecture in such a way as to raise the exposure of the organisation's to systemic risk.

The full Systemic Risk – Awareness Paper is complementary and downloadable at www.riskiq.com.au

It is intended for circulation within your own organisations. It expands on the aforementioned points by providing a non-technical overview, along with examples on how these techniques have been applied in practice. It further strives to ignite a debate around the role of individual organisations in stabilising the environment in which they operate, an appeal to both regulators and individual business.

Weak Signals

What are they? What are the implications in an Age of Big Data

Dr Erin Evans

Weak signals are the early warning of change, or emerging issues that help us to anticipate the future. They often become stronger by combining with other signals. Strong signals in contrast arise in multiple channels, in multiple locations at the same time so that many people are exposed at the same time to make the connection. Weak signals arise from multiple sources so as an observer we need to bring these together in order to understand the pattern that is arising. It is not the source of the signal that it important but rather the process for understanding them. It requires critical mass before it grows in influence. They may be transient in nature or last for longer but offer some lag time before they become prevalent. They exist independent of whether we can see them, so the trick is for us to learn how to see them. The amount of information available is limited, as is the number of cases, so they can be easy to miss.

This is a skill in hearing the signal rather than the noise. Nate Silver (2012) wrote a sizeable book on this topic "The Signal and the Noise: The Art and Science of Prediction". Silver who is an accomplished statistician highlights that the problem is not the lack of data. In fact today there is an almost endless supply of information on any topic or question. Instead, the problem is learning how to interpret the information, paying attention to the right information and recognising the rest as just distraction. In the age of Big Data it is perhaps even more important to recognise the difference between a predictive signal and the distracting noise. Silver sets out many colossal misinterpretations such as the patterns of growing house prices leading to a bubble and a housing crisis. From a complexity lens the challenge that is being faced here is that the situation is being faced purely as an issue that is complicated and can be understood with expertise rather than also having issues of complexity that need to be understood as complex interactions and dynamics. Silver uses the metaphor from Isaiah Berlin's famous essay, "The Hedgehog and the Fox" to explain these contrasting approaches. Hedgehogs believe in big governing ideas from which everything flows; they are specialised, stalwart and order seeking in their approach. Additionally they are confident and ideological. Foxes, on the other hand, believe in being adaptable, self critical and using multiple, multidisciplinary approaches. They are self-critical and cautious, relying on observation. And drum roll…. Foxes make better forecasters.

Despite Silver's mastery with data he highlights the importance of the human factor. Silvers coaches us "we must become more comfortable with probability and uncertainty." Additionally that: "We must think more carefully to the assumptions and beliefs that we bring to a problem."

They are useful when the organisation responds to them with low cost measures, as they are not predictable. Ansoff (1982) states that if organisations simply wait for signals to become clear that they will be onset by surprises and crises. They offer substantial opportunity for the organisation to learn and adapt. Businesses who discover the future before their competitors have a distinct advantage as they have more time to prepare. All members of the organisation are able to read and make sense of weak signals – in fact it is just that variety of views that people from across the organisation bring that can be most important in collating critical insights. The manager who is working with client or partnering organisation notices an uneasy atmosphere for several meetings and then there are some changes announced in the organisation followed by an announcement on the stock market that there is a down turn in profits. Connect the dots. It can be described as: "a funny feeling", "stray pieces of information that call attention to themselves", and "some half conceived pieces of information that hang in the periphery of our comprehension".

Weak signals may appear in various forms - for example as news articles, rumours in the social media, observations of novelty products in exhibitions, or simply a modest sticker of an alternative movement. Weak signals are easily overlooked in the business world, because they represent uncertain knowledge. It is often the case that, in the fear of losing face, people are afraid to even mention weak signals and safer to stay inside the Group Think (Janis, 1982; Park, 1990). In some companies, it is too much to talk

obscure pioneering research about leather jackets grown in tiny bioreactors and easier to talk about the safe and well-worn topics such as climate change and globalisation. The truth is, however, that the big changes are already common knowledge. It is the innovations and events that bring fresh insights and, at best, create a competitive edge. The beginnings of text messaging by Finnish man, Matti Makkonen attracted few people at first, but today everyone knows them. It started as comment by him at a conference made by Makkonen and was only years later incorporated into products by engineers at Nokia. Good sources of weak signals include social media, blogs and research papers. They are often the events that many in the organisation could sense was coming but that not sufficient people with the influence would recognise and act on.

Whilst Big Data provides many opportunities for business it is not a silver bullet and runs a risk of leading managers down the wrong path (Patty, 2017). Thousands of companies are diving into big data to provide more objective, faster and more scientific decision making rather then humans. The applications are vast including the measuring the performance of workers in real time and relying less and less on human intuition to make decisions about who to hire and fire. It is a continuation of scientific rationalism and its allure remains strong in business. . However used uncritically there are issues that it can be inaccurate and far less nuanced (ABC 2017). University of Sydney Professor Uri Gall states that managers were often uncritical in their adoption of algorithms and analytics to measure performance. Little thought is given to how they can curb independent thinking, creativity, freedom and privacy. Anybody with an interest in complexity is aware of the propensity of humans to adapt and play with situations and systems- this leads to gaming the system. When humans design the system to make humans extraneous to the decision making process the risk of a disabled decision and management system is created. Big data needs to be designed as an enabler of human decision-making and management – and a complexity approach of being able to engage with the whole system and paradoxes of it is very helpful here.

Issues such as our own filtering and reframing what we observe to our known understanding of events means that we often misconstrue signals. In this way we bolster what we already know rather than look at what is new and unknown. Group think, whereby we go along to get along is another force that undermines our capacity to learn in organisations and focus on picking up on weak signals.

Ways to overcome these limitations include actively revealing weak signals. These are listed here:

- **Tap local intelligence:** *Linux a software developer use local design to build an ongoing global software project.*
- **Avoid Group Think** (Janis, 1982, Park, 1990). *Tap extended networks of suppliers, customers, partners in the organisational ecosystem for information. Merck & Co. Inc., brought its innovations in biological compounds to market due to a "series of complex, evolving networks of scientific, governmental and medical institutions.*
- **Scan beyond the traditional organisational boundaries:** theses include customer diversity, globalisation and networks.
- **Use the wisdom of the crowds to avoid group think:** *a division of Eli Lilly and Co. asked employees to assess whether drug candidates would be approved by the FDA based on profiles and experimental data, and the internal company market correctly identified the winners from a set of six candidates.*
- **Develop multiple possible scenarios to stop the organisation from falling into a set way of responding.** *Soft Systems approaches engaging with multiple perspectives and Scenario Planning approaches are useful. The aim is planning as well as to challenge people's mental models.*
- **Seek new information to "confront reality."**
- **Encourage constructive dissent:** *Merrill Lynch CEO at the time of the GFC allowed for no dissent. This is a pattern that was also seen earlier at large corporations such as Enron. Lack of dissent can lead to a disastrous path.*
- **Be critical in the application of Big Data:** *what decisions require human insight and how can data enable rather than replace human capability.*
- **Trust seasoned intuition.** *Experts who have mastered their profession in what Malcolm Gladwell terms 10,000 hours have honed their skills and observations to be able to make effective decisions* often

before standard signs are shown (Gladwell, 2008). In a study it was found that experienced nurses picked up the onset of septic shock in premature infants at least a day before the textbook symptoms appeared and a blood test could confirm the presence of the deadly bacterium. These nurses had learned to be sensitive to weak signals even if the cues varied and the symptoms were not strong. It takes many years of experience, with good feedback, to develop reliable intuition.

Scale of Signals:

Sense of turbulence	Weak ↓
Source of challenge is known	Medium ↓
Shape of the challenge is concrete	Medium/Strong ↓
Response strategies developed	Strong
Outcomes of responses is forecastable	

Questions to Consider

Where does your organisation usually respond on the scale of weak signal response?

What measures do you have in place for monitoring weak signals?

What is the role of Big Data in decision-making? Has it taken into account human intuition or weak signals?

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Complexity Certification Stakeholder Workshop

Can project practitioners gain a competitive advantage through certification?

We believe that if you're working on complex projects or delivering programs/projects in a complex environment, you need to have appropriate skills, knowledge, leadership and behaviours. Traditional project management only goes part of the way when managing projects that exhibit unpredictability, volatility and are subject to political influence. We are testing the feasibility of creating a Certification Scheme for Complex Project Managers and invite our Sydney based members to the third in a series of stakeholder workshops:

Date:	Friday 14 July 2017
Time:	10am to 2pm
Venue:	DXC - Level 20, 135 King Street, Sydney 2000 NSW
Catering:	Lunch will be provided

Places are strictly limited and will be allocated on a first to confirm basis.

To confirm your place at the workshop please contact Ian on 0427 150 460 or i.biggs@iccpm.com

Find out more, take the survey, read the position paper

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ICCPM Solutions Pty Ltd is a boutique service provider established to provide advisory services and support to the most complex projects and programs that exist today and will exist tomorrow.

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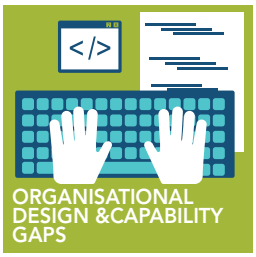

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to discuss your needs and we can work out a plan to support your delivery.

The Outcomes Paper from the 2016 International Roundtable Series: *'Contracting for Success in Complex Projects'*

In a world where success is increasingly measured by outcomes, the field of contract and commercial management takes on a new importance particularly when outcomes, in the main, are delivered by projects operating in an environment of ever increasing complexity.

Commercial innovation has become the key enabler of progress, delivering new capabilities and enabling the success of technical invention. Contract management has become a critical competency, establishing a shared understanding of roles, responsibilities and governance standards that enable the management of complexity.

The baseline for this report assumes that organisations are currently executing the fundamentals of both project and program management to an appropriate standard. Anecdotal evidence suggests that this is not the case. A recent post on the Project Management International LinkedIn Group entitled "Why some organisations do not follow proper PM Practices?" offers some interesting insights into why organisations fail to implement or apply good practice PM and ask some valid questions of practitioners. Unfortunately limited research exists to unpack this particular systemic problem. ICCPMs position on this has been very clear in that we have always offered the following: *"Appropriate well executed project/program management practice is adequate yet not sufficient to manage projects/programs in complex environments".* We would now take this a step further and state that *"The fundamentals of project and program management must be well executed as a minimum, to enable the application of systems and complexity based approaches to manage projects and programs in complex environments".*

Traditionally, the connection between contract management and project management has been limited and often administrative in nature.

Similarly, many project managers have come from technical backgrounds, with little exposure to commercial disciplines.

Today, those gaps must be closed and it was in recognition of this need that IACCM and ICCPM came together to develop a series of joint workshops that led to this paper.

Our goal was to develop a shared understanding of the interdependencies between project management and contract and commercial management. It was also to propose a series of practical steps that can be taken to improve performance on major projects and reduce the unacceptable levels of failure that are seen today.

The recommendations contained in this paper are by intention broad in nature out of necessity to address issues at the institutional, organisational and individual level concurrently. The participants involved in the roundtables were by design representative of all layers in the value chain including executive leaders, policy makers, practitioners, consultants, educators, and subject matter experts some with education and experience in complexity and some without. This paper is a representation of the collective output from all contributors.

When it comes to establishing understanding, we can hail this paper as evidence of success. Whether the recommended actions are adopted and success rates are increased, only time can tell.

If you would like to purchase a hard copy of the report, contact **ICCPM** on **admin@iccpm.com** or **02 6120 5110.** If you would like to read the full report, **click here**.

'Patterns of Strategy'
by Patrick Hoverstadt and Lucy Loh

Review by Dr Erin Evans

A sign of mastery is the ability to convey the complex in simple and wise terms. Patrick Hoverstadt and Lucy Loh have succeeded in delivering the simplicity on the other side of complexity in their latest book Patterns of Strategy (1st edition).

Hoverstadt and Loh amass over 50 years of experience in organisations and their practical observation as well as deep knowledge of strategy and systems theories is highly evident. For the systems and complexity versed reader, Patterns of Strategy comes with an "Ah- finally!" response.

Hoverstadt has previously published The Fractal Organisation on the Viable Systems Model. The skill in applying the benefits of systems thinking in an accessible and effective manner is again the hallmark of this new publication. Much of the systems thinking and complexity literature is dense making it difficult for the practitioner to access. This edition by Hoverstadt and Loh combines the best of systems thinking and applied organisational approaches.

Patterns of Strategy engages with the organisation as a complex adaptive system in their presentation of strategy. This has a number of significant consequences to the development and implementation of strategy. Although classics of strategy have called on the practitioner to be aware of the environment this has been a static analysis.

By contrast, *Patterns of Strategy* actively engages with the dynamics, seeing the organisation as part of an ecosystem. They show how strategic fit drives strategic direction. Relationships are fundamental in this view, as well as their changing nature due to the context that they are in.

For example in the energy sector in a gas organisation your direct competitors will at times be engaged with as competitors, however if you are facing challenges from the renewable energy or atomic energy subsectors then they will be your allies. The systems approach of engaging with the recursive nature of relationships as well as multiple perspectives serves to provide a much more nuanced as well as realistic and powerful view of the situation and how to navigate in it.

The systems approach of engaging with the recursive nature of relationships as well as multiple perspectives serves to provide a much more nuanced as well as realistic and powerful view of the situation and how to navigate in it.

Hoverstad and Loh's book helps the senior manager, consultant or educator to enable their organisation in focus to navigate through the complexity they face. There are a series of 80 different patterns presented that are grouped and given metaphoric names that are humorous and memorable such as Jeeves, Guerilla, Parasite and Frigate Bird. Each pattern details the conditions needed to use it and the efforts needed for changing a pattern. There is a section on implementation to ensure that this book delivers what the practitioner really needs – the ability to make change in their organisation.

As an educator and advisor I will be using this book in two modes – to deliver a fresh and enriched way of approaching organisational strategy to my students and as the basis of the consulting practice with clients. In the project management discipline, the need to deliver strategic outcomes and align with organisational complexity has been discussed since the turn of the century with the works of Shenhar (2005) amongst others. This is an excellent guide to systemic strategic thinking and practice that will enable greater success in project and organisational strategy delivery.

Hoverstadt and Loh's **'Patterns of Strategy'** *can be purchased as a hard copy or e-book on Amazon*

ICCPM
R&D Updates & Activities
Dr Erin Evans

The Roundtable event and White Paper, 'Contracting for Success in Complex Projects', have been met with a great deal of praise and high levels of engagement in Australia and Canada.

We recognise that the insights of leading practitioners about the issues that they face and the improvements that they want to see combined with the input and view of researchers in the field, delivers an effective means of participatory design. Additionally, the Roundtable series enables and highlights areas for action research.

We encourage our partners and members to work with us and IACCM to promote the research that will enable the desired improvements to contracting practice.

Research

We have been having discussions to promote a CRC-P (Cooperative Research Centre Project) grant to support short industry led collaboration to develop products and services to solve industry problems and deliver tangible outcomes. The area of contracting research would deliver substantial improvement to competitiveness and solve an industry problem. We have been engaging in discussions with National Energy Resources Australia (NERA) on th eprospect of working with senior leaders in the resources sector on this issue.

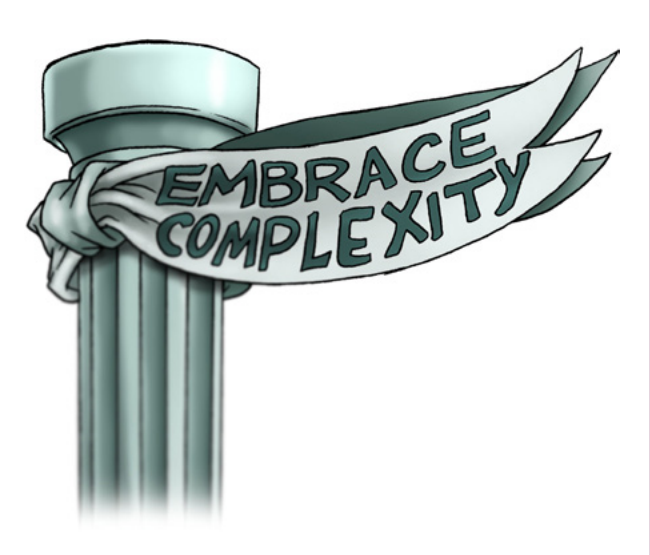
We are of course always interested in engaging with our partners and members on these research areas and invite you to make contact to discuss interests.

Diploma Development

In the Development area, the focus is on the development of our Diploma program that will continue from our successful Certificate IV in Responding to Organisational Complexity. This year we will make a formal application to the accreditation body ASQA. In the coming weeks we will be developing and sending out a survey requesting feedback from members and partners on the content and delivery mode issues of the Diploma program.

The Diploma program will offer an opportunity to deepen and broaden the areas of learning and development. As previously, the Competency Standards for Complex Project Managers form a reference for the areas of focus. The areas may include Contracts and Negotiations, Change Management, Strategy, Communications, Stakeholder Management, Conflict Management and Culture in complex environments.

We look forward to an active engagement in this process to design and develop a program that meets the needs of our members and partners.



First Telfer Complex Project Leadership Seminar: *"Advances in Complex Project Management"*

Professor Stephane Tywoniak
Academic Director,
Master of Business Complex Project Leadership,
Telfer School of Management,
University of Ottawa

On May 1st 2017, the Telfer School hosted its first ever public seminar on Complex Project Leadership.

Four distinguished keynote speakers presented case studies of their experiences in leading the delivery of complex initiatives:

Ms Michelle Leafloor - Director of Health Information Systems and Clinical Solutions Delivery at The Ottawa Hospital (TOH)

Michelle presented how TOH approached the challenges associated with the delivery of a new integrated IT system for its six sites, during a change of IT strategy

Dr Marc Fortin - Assistant Deputy Minister, Science and Technology, Department of National Defence (DND) and CEO of Defence Research and Development Canada

Marc explained the DND strategy for innovation and research, and how using innovative approaches - including crowdsourcing, competitions and partnerships - was changing how his organization delivered R&D projects.

Mr Craig Hebert - General Manager, Historic Waste Program Management Office, Canadian Nuclear Laboratories)

Craig reflected on the challenges of delivering the Port Hope (ON) Area Initiative, Canada's largest environmental remediation project which involves the removal of 1.7m cubic meters of historic low-level radioactive waste, whilst minimising the disruption to the local town, the communities, and economic activity.

Mr Kevin Radford -Assistant Deputy Minister, Real Property, Public Services and Procurement Canada

Kevin shared his insights from the restructure of the Canadian Federal Science Infrastructure Strategy, which involved consolidating 1465 facilities from 99 departments and agencies across the country.

Key lessons learned from the presentations were synthesized by the Master of Business Complex Project Leadership (MBCPL) participants at the end of a very informative day:

- The need to build adaptability and flexibility into the planning and delivery of complex projects in order to respond to emergent challenges;
- The importance of stakeholder engagement and communications throughout the project lifecycle;
- The value of investing into a complex project's early front end in order to develop a clear value proposition and high impact outcomes;
- The requirement to continually challenge traditional approaches to project delivery in order to take advantage of new, emerging, practices.

The Telfer School received very positive feedback from the attendees and speakers about the seminar. We hope that this event will become the premier public forum to discuss complex projects in Canada. The May 2018 Seminar will be organized by the MBCPL participants.

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A Look into ICCPM's 2017 Knowledge Sharing Forum

On the 18th of May ICCPM conducted a one-day Knowledge Sharing forum event in Canberra. This was in conjunction with a visit by the QUT International Projects Unit – Australia Awards contingent from Sri Lanka.

The event's theme was 'Complexity: Facing Challenges and Delivering Successful Outcomes'.

The Forum was designed for both individuals with curiosity in complexity and those experienced in complexity management to engage with ICCPM's latest complexity research and development

The outcomes paper from the 2016 Roundtable series on Contracting for Success in Complex Projects was presented along with the release and test-drive of the new online project complexity diagnostic tool, designed for project managers to gain real time insights to manage their projects more effectively.

Attendees also had the pleasure of hearing from an array of senior practitioners and thought leaders on their experiences and strategies for managing complex projects, policy development and negotiations.

ICCPM would like to thank Dr Phil Crosby, Dr Peter Beven, Bruce Armstrong, Leo Cusack, Ross Smith, Steve Hein, OAM, Ian Biggs, FAIPM, CPPE, Collin Smith and the ICCPM Team for putting together a successful event at short notice.

We are hoping to run similar events in locations outside of Canberra. If you missed out on this one keep an eye on our events page.

Attendee Feedback: *Laurie Bowman, Synchrony:*

It was great to attend the ICCPM Knowledge Sharing Forum in Canberra last Thursday. The highlight being the interactive & thought provoking leadership panel discussion with Margaret Staib, Jude Burger, Alison Denny-Collins and Gretel Purser.

Key focus areas raised included:

- The importance of focusing on the objectives from change initiatives as opposed to the project products;
- The benefits of having organisational change managers placed above projects in the hierarchy in order to order to coordinate and prioritise the change initiatives within the projects;
- The importance of being sensitive to change fatigue within the organisation;
- The benefits of adopting a risk based approach towards achieving objectives that encourages innovation; and
- The need to get the right people (such as psychologists, organisation behaviour experts and mentors) integrally involved in order to establish the right culture and process.

Interestingly the entire discussion revolved around managing people. With the human behavioural aspects apparently being so important it makes one wonder why higher status isn't given to Human Resource Professionals and organisational behaviour experts. We have C-Level executives for all sorts of things but why not for organisational behaviour?

Why become a Registered Training Organisation in Australia?

Collin Smith, ICCPM

In 2014 ICCPM took a decision to become a Registered Training Organisation (RTO) in Australia. This process was lengthy and involved a great deal of work. However, it was necessary to ensure that ICCPM remains committed to a very important component of its mandate i.e. to educate the stakeholder community on how to identify and respond to organisational complexity, in particular complexity in projects and programs. ICCPM's education offering makes an invaluable contribution to improving the success rate and return on investment of projects and programs.

The importance of this initiative was not only in the alignment with our objectives as the international peak body for project complexity. It also means that by complying with the Australian Skills Qualifications Authority (ASQA) requirements to become an RTO, our stakeholders can rest assured that we have the requisite quality assurance systems and processes in place to be able to design, develop, deliver and maintain a high quality education product.

While the registration of ICCPM as an RTO was a necessary enabling factor, the journey does not end there. Typically, RTOs will have a range of courses in their scope, which they are approved to deliver. These courses are usually available from the existing list of registered training packages with relevant units of competency pre-defined and are freely available on the national register of training packages in the Vocational Education and Training (VET) sector. However, in our case, no prior units of competency existed for responding to organisational complexity, which just highlights the need (gap) in the market for ICCPM.

ICCPM therefore undertook a process of defining relevant units of competency for responding to organisational complexity at an appropriate Australian Qualification Framework (AQF) Level of Certificate IV and is the exclusive owner of these units of competency. This means that for five years (and possibly longer) no other RTO has access to these units of competency.

The next step was to build the course content to achieve our ASQA accredited units of competency as the training outcome. These units of competency align with the Competency Standards for Complex Project Managers (CPM). ICCPM is the custodian of the only set of CPM Competency Standards in the world: https://iccpm.com/content/cpm-competency-standards

The commercial outcome of all of this is the ICCPM Certificate IV in Responding to Organisational Complexity education product that is the first and only nationally accredited qualification in complexity available in the Vocational Education and Training Sector in Australia.

The exposure we have had through engaging with stakeholders on the design, development and delivery of the Certificate IV in Responding to Organisational Complexity has also generated interest in other non-accredited training offerings. These include carve outs from the Cert IV that are offered as short courses / workshops either "as-is" or as customised offerings.

Examples of this include delivering the 3-day Respond to Complexity in Project Environments unit as a standalone corporate course, or as a condensed half-day executive overview for senior executives who need to get themselves across the core complexity concepts that their staff are learning about in detail. Based on a request, we have also recently developed a 2-day Project / Program Team Building and Leadership workshop, which is modelled on the Lead through Complexity unit in the Cert IV, which is proving to be popular.

Furthermore, we have begun to explore augmenting our accredited and non-accredited courses with mentoring and coaching services to help embed the practice application of learning in the workplace.

The next chapter in our accreditation journey in Australia is to develop and accredit a diploma level qualification as a progression from the certificate IV qualification.

The leadership of ICCPM believes that our commitment to quality education is evidenced through the rigorous process and creative design undertaken in these initiatives and looks forward to many more participants on our courses in the future.

ICCPM Training Calendar:

Dates	Details	Location
26-26 July	Lead Through Complexity	Canberra
11-12 July **12-13 September**	Risk and Decision Making in Complex Environments Lead Through Complexity	Melbourne
22-23 August	Lead Through Complexity	Sydney
1-3 August **25-26 October** **6-7 February 2018**	Complexity in Project Management Risk and Decision Making in Complex Environments Lead Through Complexity	Brisbane
Dates to be advised	Certificate IV in Responding to Organisational Complexity	Perth
Dates to be Advised	Certificate IV in Responding to Organisational Complexity	Canberra

To find out more visit the **ICCPM website** *and complete the enrolment form or contact us on* **02 6120 5112**

EDUCATION & EVENTS

2017 Event Calendar

Dates	Title	Organisation	Location
14 July	Certification Workshop	ICCPM	*Sydney, Australia*
15-20 July	27th Annual INCOSE International Symposium 2017	INCOSE	*Adelaide, Australia*
31 July - 1 August	IACCM Australasia Conference	IACCM	*Melbourne, Australia*
20 - 22 September	Building the Future, Project Management Conference 2017	PMINZ	*Christchurch, New Zealand*
10 - 11 October	Defence, Industry, National Security Forum 2017	NZDIA	*Wellington, New Zealand*
11 - 13 October	IACCM Americas Conference	IACCM	*Toronto, Canada*
22 - 24 October	AIPM National Conference	AIPM	*Melbourne, Australia*

ICCPM Member Profiles

Nicolas Tallat

Nicolas started his career at the Swiss Defence Procurement Agency (Armasuisse) in 2000 as Project Manager. He has managed various complex armament projects and programs in particularly flight simulators for the Swiss Air Force.

Between 2009 and 2012 Nicolas was assigned as National Armaments Director Representative at NATO and Swiss Liaison Officer to European Defence Agency in Brussels.

Since September 2012 he is Head of Multilateral Relations at the Headquarter armasuisse in Bern and responsible for the multilateral relations between Switzerland and NATO respectively European Union/European Defence Agency.

Nicolas has a Commercial Pilot Licence and graduated with a Bachelor of Business Administration (BBA). He holds a Master's degree in Project Management, Klagenfurt University, Austria and is fluent in Frent, German and English.

In 2006 Nicolas participed in the 28th European Session for Armament Officials (SERA) at the Institute for Higher National Defence Studies (France/Paris) and since June 2016 Swiss Councilor and Member of the SERA Council of Studies. He is also Certified Senior Project Manager / Certified Senior Agile Project Manager and a lecturer for Project Management at School of Management Fribourg, Switzerland.

Not only armament project and programs themselves are becoming more and more complex. The external framework conditions (i.e. political and legal) for future multilateral cooperations have increased massively in complexity. For Switzerland as non-NATO and not-EDA Member States, this additional complexity is not to be underestimated.

ICCPM contributes various tools, articles, courses and events to the subject of complexity. Through this contributions ICCPM helps me to get complex projects and programs back on track and to manage successfully the projects.

Chris Hanson

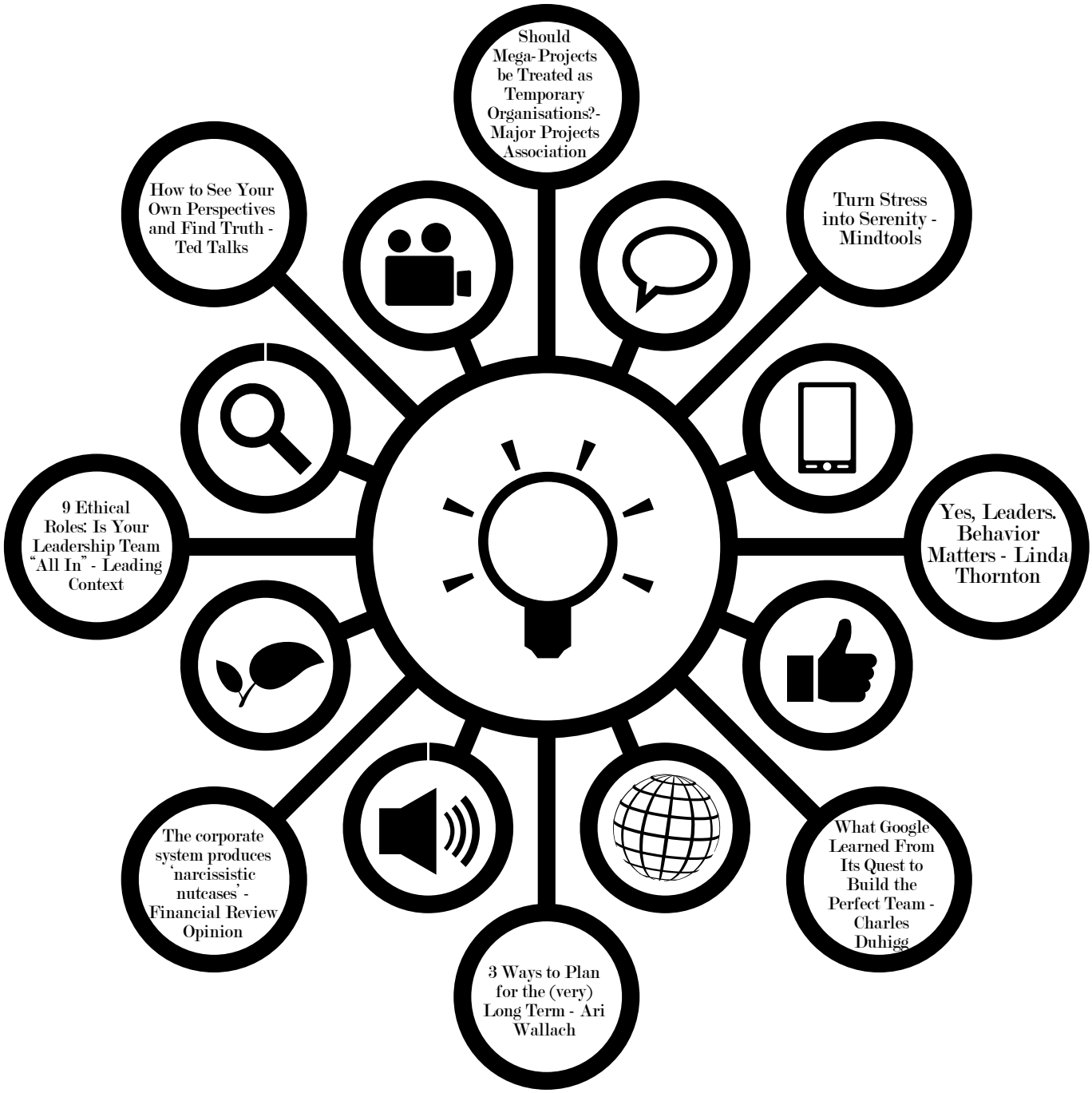
Chris has over 40 years industrial experience, the last 20 project managing a wide variety of projects for both government and private industry, primarily the Defence, infrastructure and petrochemical industries on both the east and west coasts of Australia. These included Chevron's Gorgon project on Barrow Island off the northwest coast of Western Australia and a number of projects for Dept of Defence on the east coast including the design and installation of a dedicated effluent treatment plant for the Dept of Defence's Garden Island Graving Dock in Sydney which was the first of its kind in Australia.

He began his career in the water industry with an engineering company specialising in the tertiary treatment and processing of industrial wastes before moving to the chemicals and plastics industries with ICI Australia (now Orica) at their Botany manufacturing site, initially as a technician working on the first gas phase polymerisation plant for polypropylene plastic in Australia then as a process chemist providing specialist support to the other eleven businesses on the site which were integrated to produce a range of industrial products for downstream manufacturers.

His most recent assignment was with Sydney Trains as PM and delivery manager for a complex business transformation and capital works program valued at over $400M which was one of Sydney Trains top 15 projects.

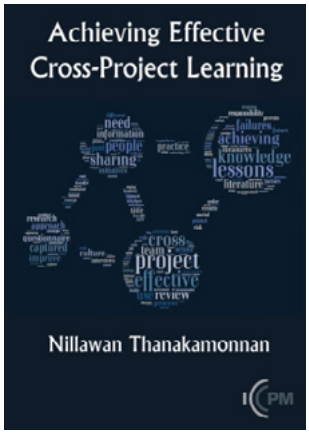
Chris is an AIPM certified project manager, and a WHS systems auditor, holds a Master of Engineering Science and a BSc in Process Engineering and is currently completing a Cert IV in Responding to Organisational Complexity with ICCPM.

FOOD FOR THOUGHT



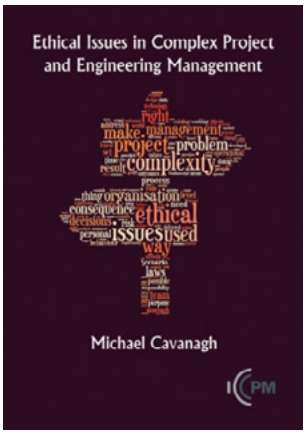
ICCPM e-BOOK SERIES

ICCPM's eBook series is centered around tools and methodologies to help manage complex projects. These eBooks are written by leaders in their field. This series is available to purchase through all Amazon domains.



Achieving Effective Cross Project Learning *by Nillawan Thanakamonnan*

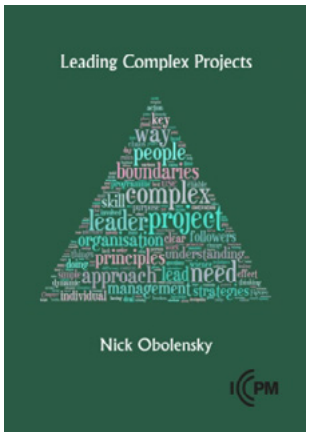
Cross project learning is a capability that many organisations have heavily invested in but have not been able to achieve effectively. This research based introductory ebook seeks to address the question: "How can past project lessons be effectively used for future projects?"



Ethical Issues in Complex Project and Engineering Management *by Michael Cavanagh*

A discussion of ethics in complex project and engineering management, covering ethical tensions, process and product ethics and a discussion on thinking ethically.

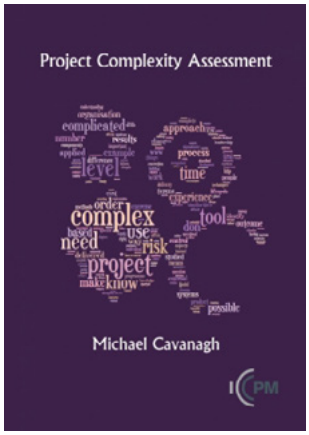
Ethical dilemma scenarios are also provided for consideration.



Leading Complex Projects *by Nick Obolensky*

"How do I lead a complex project when the traditional tools are not sufficient?"

This book will answer the question by examining the changing context of project and programme leadership and how to complement traditional leadership techniques with new ones. It covers principles needed to deal with complexity and ways of developing these principles. There are strategies for the project manager to understand the context of the complex project environment and the nature of those they are leading or influencing. There are also questionnaires for project managers to gauge their own capability and adaptability and a powerful team exercise.

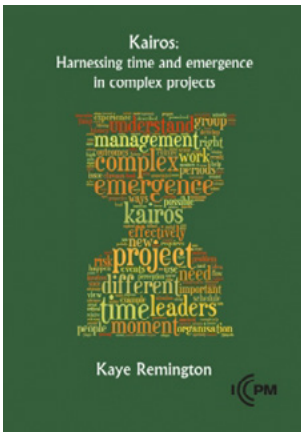


Project Complexity Assessment *by Michael Cavanagh*

Complex projects must be managed using complex project management methods.

The misunderstanding of the difference between complicated and complex projects is a major cause of difficulty and failure. Complicated projects are linear, you know what you have to do, there may be a manual and various steps to completion have been captured. Complex projects are anything but linear. You don't know what you have to do and are surrounded by unpredictability, uncertainty and tigers jumping out at you from behind trees.

That's what this book is about: finding out and assessing the complexity of a project before it starts.

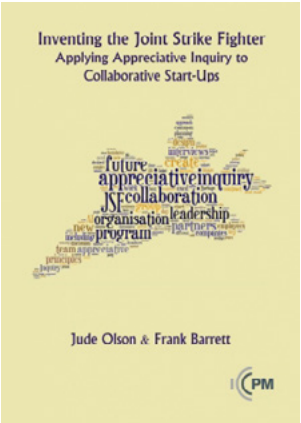


Kairos: Harnessing time and emergence in complex projects by Kaye Remington

Einstein asserted that time isn't constant, but depends on the speed you're travelling

The Ancient Greeks, and Project Managers who deal with uncertainty and complexity on a daily basis, have known this for ages. The ticking of a clock – what we term 'Chronos' time - is constant; but 'Kairos' time expands and contracts according to the task-at-hand, and needs to be grasped as it flies by. If we get the timing right, we can take advantage of the emergent opportunities – get the timing wrong, and monsters will jump out from behind trees and eat us up.

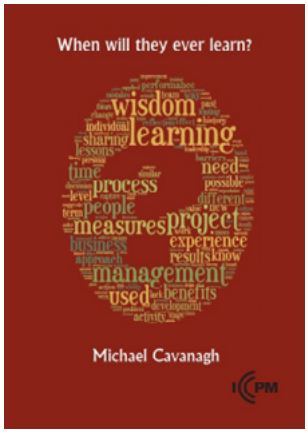
Kaye Remington is an internationally-acknowledged expert in the field of complexity, and in this eBook, she describes how to grab Kairos by its forelock and exploit it to the best advantage.



Inventing the Joint Strike Fighter *by Jude Olson & Frank Barrett*

"How is it possible to achieve collaboration between a diversity of interests, when parties represent different organisations and there has been little or no common history of collaboration?"

This eBook is a case study in which a group of leaders set out to give birth to a new start-up organisation, using Appreciative Inquiry (AI) techniques. It studies the challenges faced by Lockheed Martin and the unique Joint Strike Fighter (JSF) project.

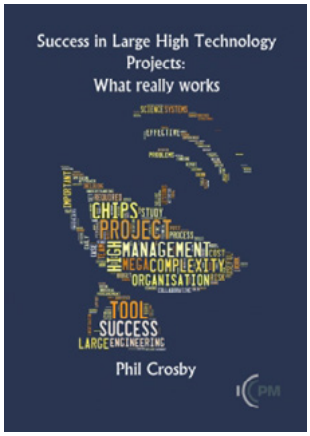


When will they ever learn? *by Michael Cavanagh*

B.B. King, the great blues guitarist, sings 'Fooled me once, shame on you; fooled me twice, shame on me'. Pity we pay no attention; we make the same mistakes over and over again in Project Management. We believe that even though past projects have regularly failed to deliver on schedule, to cost and to scope, this time everything will be perfect and go exactly as planned, thanks to a combination of the tooth fairy and the alignment of Jupiter and Mars.

It won't. Failure is a learning opportunity – so is success. But only if we are prepared to use the experience to reflect on what really happened, work out why, turn that understanding in to a general rule that could apply in different situations, test our theory, and modify our behaviour accordingly.

This EBook will tell you how.



Success in Large High Technology Projects: What really works? by Dr Phil Crosby

Complex and demanding mega-projects are characterised (or in some cases plagued) by new and risky engineering technologies, daunting infrastructure, and staggering budgets.

Do concept reviews, funding approval, or early stage planning take advantage of success indicators based on learning from relevant past experience? Does such knowledge actually exist? And is there any evidence that early stage project development is more effective when armed with such information? This book answers these questions and more! It also provides a checklist to make sure your next project, high technology or otherwise is a success.

For more information or to submit a proposal, contact us admin@iccpm.com +61 2 6120 5110

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How to join ICCPM

Visit iccpm.com/register and follow the links to join as either an Individual Member (open to everyone) or a Partner Employee (open to employees of our partners).

If you are a Partner Employee please contact us so we can provide you with your Corporate Code.

We will be profiling members of the ICCPM network in each issue of the CONNECT magazine; if you would like to appear or suggest someone for a profile in a future edition please get in touch.

In the September edition of *CONNECT*...

- ICCPM Story Part III
- Book Reviews
- Thought Leadership articles
- **10th Anniversary Updates**

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