



Projects as *Complex Adaptive Systems* - understanding how advanced complexity influences risk and control

Warren Black

Over the past two decades the global project industry has seen significant improvements in defining and standardising project control (and risk management) better practice. Yet despite these improvements, large-complex projects still appear to be failing at the same rate and for all the same reasons. Research published by IPA Global in 2012 identified that 65% of over 300 major infrastructure projects observed globally, had failed to meet their sanctioned objectives (i.e. to come in on time and within budget, whilst delivering the expected benefits) and in 2015, Oxford's Said Business School identified a similar failure rate amongst over 2,000 large-complex projects.

These high failure rates are concerning as they imply that the project control and risk management techniques advocated by such globally accepted methodologies as PMBoK, PRINCE2, P3, ISO 31000, Monte Carlo and the OGC Gateway Review process have for the greater part been ineffective in large-complex project environments *and* that further thinking is required. Now although there are a broad range of theories as to why the traditional project control and risk management practices are failing in projects of advanced complexity, one of the more promising areas of academic research which may offer tangible solutions is that of *complex systems theory*.

The fact is large-scale projects have become so operationally complex that they are starting to reflect the same adaptive-interdependent network behaviours seen in such *complex adaptive systems* as ant colonies, migrating birds, air traffic control networks and even self evolving virus's. In essence, large scale projects are complex systems whose behaviours are highly dynamic, self-correcting, non-linear and extremely unpredictable.

Such dynamic complexity is problematic for the art of project control (and risk management) as many of the traditionally accepted project control methodologies are designed with rational ordered control environments in mind. A "Complex Adaptive System" however denotes a highly dynamic and fluid state of existence whereby the interdependent relationships within the system are often unstable in their existence.

In Warren's presentation he aims to explore the basic of *complex systems theory* and how it all relates to project control and risk management. Specifically Warren will explore the comparable behaviours and characteristics of large-complex projects with that of *Complex Adaptive Systems* in order to discuss how projects might be better controlled and risk managed



Warren Black

Project Engineer, Risk Professional & Complex Risk Theorist

Warren currently consults as an industry specialist on how to embed appropriate governance, risk and assurance practices within complex project delivery environments.

In this regard, Warren is currently engaged in a Higher Degree in Research at the Queensland University of Technology on the topic "*Controlling risks in complex-uncertain project environments*"