

# ***The Dance on the Feet of Chance:***

## **Handling Uncertainty and Managing Risk in the Fuzzy Front-end of Innovation**

**A thesis submitted in fulfilment of the requirements for the award of the degree of**

**Doctor of Philosophy**

from

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by

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## **Abstract**

Corporations have problems dealing with the indeterminate aspects of innovation, particularly in the early ‘fuzzy front-end’ of the process. They have difficulty in reflecting upon and handling uncertainties of innovation; often exhibiting a ‘dynamic conservatism’ or a set of ‘defensive routines’ that inhibit inquiry about such contentious issues. They prefer, and are better equipped to operate within the ‘language of investment’ than the ‘language of invention’. In the language of investment, corporations select an environmental niche, and attempt to program and fabricate its future according to rational, stable assumptions and formulations. This view is closely bound to a utopian image of risk management as a tool able to objectively map, measure, and monitor future uncertainties that govern the behaviour of the chosen niche. By seeking a close and clear fit between risk management solutions (means) and the dominant factors that determine future threats and opportunities to the niche environment (ends), corporations attempt to master risks and colonise the future through an orderly process.

It is the argument of this thesis that this approach is only good when targeting and ‘solving’ well-defined problems of risk management and innovation within an intellectual terrain that has already been intellectually ‘set’. It fails to systematically recognise, reflect upon, and improve the effectiveness of the complex and creative task undertaken in the prior stage of ‘problem setting’ or ‘risk settling’. In contrast to this approach, it is argued that in ill-defined, unique, and uncertain situations, ‘problem setting’ or ‘risk settlement’ are the key primary activities, and ‘problem solving’ or ‘risk management’ only secondary. This study, as its strategic objective, seeks to juxtapose these contrasting views and develop an integrated conceptual framework capable of supporting a reflective practice amongst practitioners grappling with the interplay between ‘risk settlement’ and ‘risk management’ at the ‘fuzzy front-end’ of innovation.

This framework, strongly influenced by Donald Schön's scholarly work, takes the form of a set of concepts designed to synthesise, mobilise, and focus a wide range of academic literature on managing risk and handling uncertainty in product innovation. It informs reflections on professional practice through pragmatist/existential explorations of the role of metaphor in basic thinking processes as well as sociopolitical and psychological insights into the factors influencing how practitioners intuitively transform and translate uncertain, unmanageable realities into packages of manageable problems, *converting* uncertainty into manageable risks and rewards.

In seeking to understand, reflect upon and improve the way in which such a conversion process within the practice of risk settlement works, it is argued that it is useful to view it as having four dimensions: 'undertaking spontaneous and reciprocal reflections', 'coping with anxiety', 'use of metaphors', and 'use of frames and framing'.

The study applies this framework and understanding to an empirical study of risk management and product innovation in the Australian Cooperative Research Centres (CRC) programme. A narrative reconstruction of critical events occurring in a series of R&D projects in the CRCs is used to elucidate, elaborate, and illustrate the conceptual framework that has been developed as both a contribution to risk management thought and, at least in prototype, as a guide for reflective practice. The framework, and its illustration, is designed to support practical reflection on the complexities of 'problem setting', 'risk settlement' and the 'non-rational' character of 'generative metaphors' and the practice of 'invention'.



## **Thesis Certification**

I, Hooman Attar, declare that this thesis, submitted in fulfilment of the requirement for the award of Doctor of Philosophy, in the Graduate School of Management, Macquarie University, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted to any other academic institution for qualifications.

Hooman Attar  
September, 2009

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## **Glossary of abbreviations**

AMMCOE	Australian Metals Manufacturing Centre for Excellence
ANT	Actor-Network Theory
CAD	Computer-Aided Design
CAM	Computer-Aided Manufacturing
CIT	Critical Incident Technique
CRC	Cooperative Research Centre
CSIRO	Australia's Commonwealth Scientific and Industrial Research Organisation
DFM	Design for Manufacturing
FFI	Fuzzy Front-end of Innovation
NPD	New Product Development
OPP	Obligatory Point of Passage
PDMA	Product Development and Management Association
PhD	Doctor of Philosophy
PMBOK	Project Management Body of Knowledge
PMI	Project Management Institute
QFD	Quality Function Deployment
R&D	Research and Development
ROP	Rite of Passage

## **Author's Publications Relating to This Thesis**

### **Refereed Conference Papers:**

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Attar H., Badham R., Couchman P.K., (2008), 'Converting Uncertainty to Risk: A Critical Examination of Organisational Risk Management Practices During Innovation', In Proceedings of the European Group for Organisation Studies, 24<sup>th</sup> EGOS Colloquium, Amsterdam, Netherlands.

Attar H., Badham R., (2009), 'The Mapping is the Territory: Existential Artistry in Converting Uncertainty into Risk in the early Stages of Product Innovation', In Proceedings of the European Group for Organisation Studies, 25<sup>th</sup> EGOS Colloquium, Barcelona, Spain (the paper won the Bob Award for the best presentation).